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# THE GARDENS' BULLETIN

**SINGAPORE**

**Vol. XXIII**

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## CONTENTS

<table>
<thead>
<tr>
<th>Article</th>
<th>Authors</th>
<th>Title</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burkhill, H. M.</td>
<td>James Sinclair</td>
<td>James Sinclair, 1913–1968. An obituary and an appreciation</td>
<td>i</td>
</tr>
<tr>
<td>Sinclair, J.</td>
<td></td>
<td>Florae Malesianae Precursores—XLII. The Genus Myristica in Malesia and outside Malesia</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Index</td>
<td>537</td>
</tr>
</tbody>
</table>

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SINGAPORE

Volume XXIII

1968

A periodical reflecting the interests and activities of the Botanic Gardens, Singapore

EDITOR:

Director, Botanic Gardens, Singapore
James Sinclair at his desk in the Singapore Herbarium.

Plate I.

This photograph was taken in 1959 in the old Singapore Herbarium building.
James Sinclair, 1913-1968
An obituary and an appreciation

by

H. M. BURKILL.*

Director, Botanic Gardens, Singapore

James Sinclair was born on 29th November, 1913 at The Bu of Hoy in the Orkney Islands. Winter storms caused delay in reporting his birth to the registration authorities at Kirkwall on Mainland (the principal island of the group), and by some confusion his birth was officially dated 6th December, 1913 at which it remained throughout his life.

Sinclair’s father was a tenant-farmer of The Bu, an arable farm of some 100 acres, which by British standards was a large property for an arable farm, and by Orkney standards immense. Bu is an old Norse word derived, perhaps, from boer, a farm settlement. To have acquired such a name, the property must have had a long history of considerable economic importance to the community, and its master was, and is, a man of influence and leadership on the Island of Hoy.

Sinclair first attended the parish school of Hoy where one teacher taught a handful of children aged 5 to 14 years. He did well at his lessons and in August 1926 he went to the Orkney County Council Secondary School at Stromness on Mainland where he stayed till 1932. He was an apt pupil and gained the school-leaving certificate of the Scottish Education Department in 1931. He stayed on at school for an extra year to take, and pass, examinations in higher mathematics, French and science (physics, chemistry and biology). These qualifications gained him entry to Edinburgh University.

Colonel Henry Halcro Johnston, C.B., C.B.E., D.Sc., M.D., C.M., D.L., of the Island of Orphir in the Orkneys, was a close friend of Sinclair’s parents. In his youth he had acquired an interest in the Orkney flora and began to assemble a herbarium. A career as a doctor in the Royal Army Medical Corps of the British Army prevented a regular study, but after retirement from active service he picked up again the threads of this interest. Because of his friendship with Sinclair’s parents, he naturally made the acquaintance of their son. From an early age Sinclair had shown an interest in natural history. From the age of 5 years, it is said he was collecting plants to learn their names and uses, and when Johnston came into his life at about the age of 10 years he was ripe for Johnston’s enthusiasm. The latter’s main collecting years

* The writer acknowledges with thanks helpful information from the following persons: Miss E. R. Bullard, J. Shearer Esq., Sir George Taylor, Dr. H. R. Fletcher, Professor J. R. Matthews, Professor Dr. C. G. G. J. van Steenis, Dr. R. van der Wijik, Dr. E. Post and E. C. Wallace Esq. The text is however solely on the author’s responsibility.
in Orkney were in fact 1923-36 which exactly cover Sinclair's most receptive and formative student years. It was this association which kindled the spark within. Though botany was not a subject on the curriculum for the school-leaving certificate, Sinclair, undoubtedly with Johnston's encouragement, made it an out-of-school hours study-cum-hobby. He would get hold of botany text books and absorb all that he could from them. And in the field he began to accompany Johnston on his collecting forays which took them to most of the Orkney islands. While Johnston himself was collecting for his own herbarium, and it will be referred to again later in this narrative, he encouraged Sinclair to start in September 1924 a herbarium of his own. Such was the enthusiasm that Sinclair applied to this that, on the authority of Johnston in a testimonial for Sinclair dated September 1937, by that date he had collected specimens of 522 species and 89 varieties of Orkney flowering plants and ferns, establishing many new vice-county records and some new to science. The known flora of the Orkneys is said (Sinclair msc.) to contain some 653 species of flowering plants, gymnosperms, ferns and fern allies, so it was no mean achievement that in little over a decade and before reaching the age of 24 years he had actually collected representatives of four-fifths of these sections of the flora.

Sinclair entered the University of Edinburgh in 1932, taking the full B.Sc. course in which he graduated with honours, Class II. in botany in 1936 under the Professorship of Sir William Wright Smith. Zoology, chemistry and bacteriology were subsidiary subjects. His grasp of botany was such that the department employed him during his last three undergraduate years as a demonstrator to junior students. During his third year at the University, in July 1935, he was a member of an expedition organised by the Biological Society of the University to the Island of Barra in the Outer Hebrides. His contribution to this expedition was to study and collect marine algae. He visited Barra again in 1936, and the results of these trips were published in 1936 and 1938.

Though Sinclair was obviously cut out for a career in botany, could there but be a living to be made out of it, he had decided by the end of his time at the university to become a teacher. Britain, and the world generally, was just emerging from the effects of the world slump and the extensive employment of biologists in government and industry was scarcely the accepted practice it is today, and university employment was very limited. Though his decision appears to have been quite at variance from his interest and training, it must be presumed that he accepted the prospect of a career in teaching as a second best choice which would at least allow him a fair opportunity to indulge in botany as a recreational pass-time. After all, would he not, one may deduce his reasoning, be following the precept of Magnus Spence, one of the fathers of Orcadian botany, who was a village dominie? His university education finished therefore, he spent the year 1936-37 at the Teachers Training College, Moray House, Edinburgh, to acquire
the qualifications of Chapters III and V of the Scottish Teachers Training Certificate by which he became a certified teacher for primary schools.

He found employment with the County Council of Orkney Education Committee, teaching first at Kirkwall. There is some indication that he was not altogether happy at Kirkwall, but when he went in 1939 to teach at the village school on the Island of Stronsay, he found contentment, preferring the small island school to the larger town school. The island children liked him, and certainly there was reciprocation. There was something about him that inclined him towards children. Though he remained a bachelor all his life, in his Singapore days, at least, he was always in touch with young people. He used to conduct examinations for Boy Scouts badges in forestry, and an impromptu caller at his house in the Singapore Botanic Gardens would certainly meet two or three youngsters in his sitting room, his gardener's children, or his house-servant's, while it was a common sight to see his car out on some errand in town full of small faces.

He taught at the village school on Stronsay for about two years. During this time he made a study of the marine algae of the island. In 1946 on demobilisation after World War II service he revisited Stronsay in August and September and made further collections. These records he published in 1949. G. W. Trail in his work "The Marine Algae of the Orkney Islands" (Trans. Bot. Soc. Edin. 14, 1890) lists about 300 species. Sinclair in his paper "The Marine Algae of Stronsay" was to increase the known marine algal flora of the Orkneys by 50 new records.

At this time too he was making other phycological finds. In October 1938 and May 1939 he made on Mainland, Orkney, the first collection in the United Kingdom (it had been recorded from the Atlantic coast of Eire once before) of the arctic fucoid, Fucus distichus Linn., subsp. anceps (Harv. et Ward.) Powell (vide Powell: J. mar. bio. Assn. U.K., 36 (1957) 407-32 and 663-93). In the other extreme he made a discovery of Bostrychia scorpioides (Gmel.) Mont. in August 1936 at the Bridge at Loch Stenness on South Mainland in salt-marsh. This is the most northerly record for this generally tropical-subtropical genus.

He was called up for World War II service on 29th April, 1941 and served in the Radar Unit of the Royal Air Force as a Radar Operator. He was demobilised on 30th November, 1945 with the non-commissioned rank of Leading Aircraftsmen. His initial service training was done at the R.A.F. Signals Wing at Caithness and Sutherland in Scotland. In his spare time he botanised making some interesting records about Durness, and some new vice-county records for mosses which were published in the British Bryological Society's Reports. Early in 1942 he was posted to India and the rest of his war service was completed there (some in parts now East Pakistan). This took him to many places in that sub-continent, and he collected in the Himalayas, at Quetta. Bombay, Trichinopoly, Travancore, Chittagong and at Cox's Bazar. For one brought up on a sub-arctic moorland heath vegetation, it must have been a
tremendous experience to have physical contact with such a range of conditions: from the montane sub-snowline to the near-equatorial shore; from the desert to the tropical rain-forest of the Earth's rainiest place. This undoubtedly opened his eyes to the immensity of tropical botany. He collected assiduously when duties permitted, and he left a reputation that lingered in the R.A.F. Units in which he served long after he had left them. His principal collecting was done at Cox's Bazar where he stayed two years. This permitted him time enough to make a detained study of the vegetation for 5-6 miles radius from the town. He paid a subsequent visit there in 1949. His paper 'The Flora of Cox's Bazar, East Pakistan' (Bull. Bot. Soc. Bengal, 9, 1955) lists 746 species and varieties of flowering plants, ferns and bryophytes, and one new species, Nothopegia acuminata J. Sinclair (Anacardiaceae).

After demobilisation, he was appointed on 8th February, 1946 to the post of Government Botanist, an unestablished post on the staff of the Royal Botanic Garden, Edinburgh, under his old professor, Sir William Wright Smith. He was put in charge of the Herbarium. Although on his call-up in 1941 he had written to the Orkney Education Committee signifying an interest in returning to teach at the school on the Island of Stronsay, there can be no doubt that this appointment was a step in the direction he had always hoped for. He was by interest, training and experience first and foremost a botanist, and it put an employment as a professional botanist right into his hands.

His mentor, guide and friend, Johnston had died in 1939. Johnston's unique herbarium of some 4,000 numbers had been deposited at the Stromness Museum together with his field books of which there were separate ones for each of the Orkney islands. Sinclair soon found on his return home after the war that the collection was suffering from neglect, and when he was appointed to the staff of the Royal Botanic Garden he was able to arrange for its transfer to the Edinburgh Herbarium where it remains housed. Unfortunately Johnston's field books were not also moved, and access to them by some present workers on the Orkney flora has not been easy. Sinclair's action is in conformity with views he often expressed on the undesirability of important collections being sidetracked to inaccessible places, and that they should be in working herbaria. His own collection he has willed to the Edinburgh Herbarium and he encouraged others working on the Orkney flora to do likewise where their collections would be properly curated and always easily available for research workers.

On holiday in 1947 he visited Portugal and collected there, but the writer has no record of what places were visited, nor what was collected, nor of any resulting publication.

During the two years he was in Edinburgh he served the Botanical Society of Edinburgh as Honorary Assistant Secretary.

He resigned from his appointment in Edinburgh on 24th February, 1948 to accept the post of Curator of the Herbarium, Botanic Gardens, Singapore. One can see that his experience in India whetted his appetite and this was the opportunity not to be
missed. His Singapore service dates from 25th March, 1948 and he held the same substantive post till his retirement on 18th July, 1963, though the post was retitled Keeper of the Herbarium on 1st January, 1955 and Botanist (Keeper of the Herbarium) on 1st January, 1960. His retirement at the age of 49 years was premature, brought about by Government’s policy of filling public service posts with locally-domiciled persons. It was in fact simply a technicality for there was no one to replace him, and so instead of being on the permanent establishment he was re-engaged on contract, and he remained on contract till 18th July, 1965. Even then his official connection was not severed for he remained in Botanic Gardens quarters with the full facilities of the Department available to him as a voluntary and honorary research worker till the end of April 1967.

When he arrived in Singapore, the Botanic Gardens research programme was to prepare a revised Flora of Malaya. He was given the task of revising the Malayan Annonaceae. He has said rather wistfully on occasions that he was given no choice. What he would have chosen to do had he been given an open option is not known, but that he made a success of his task and became deeply interested in it, there is no doubt. Later he was to write that the annonaceous genus Oxymitra was his favourite genus. This was to reveal an emotional stubbornness for he was to retain this name in his monograph on Malayan Annonaceae (1956) in spite of an untenable conflict with the Rules of Nomenclature. The name Oxymitra was validly published as a Lichen genus by Bischoff in 1829. Oxymitra Hk.f. et Th. (1855) was therefore invalid, and a proposal at the Botanical Congress of 1954 to conserve it was rejected. In order to give the annonaceous genus a name van Steenis published the name Friesodielsia in 1949, thus commemorating two great botanists who had contributed much to the study of the Annonaceae. In his monograph Sinclair curtly rejected the situation: he dubbed the new name fanciful and would have nothing to do with it. Later, on due reflection, he accepted the rigid application of the Rules, though he was never able to say that Friesodielsia was his favourite genus. The aura was lost.

His work on the Malayan Annonaceae necessarily brought him material for examination from neighbouring countries. Thus concurrently he was able to publish papers on Annonaceae from India, Burma, Thailand, Borneo and Papua.

Then followed a monographic revision of the Malayan Myristicaceae published in 1958, but at about this time the emphasis of the Singapore Herbarium’s taxonomic work shifted on sound technical grounds from a local Malayan compartmentalism to a phytogeographic basis working in closer collaboration with the Flora Malesiana Foundation of the ’s Rijksherbarium, Leiden. This change is reflected in his programme of research and in his field expeditions, and there followed a series of three major publications: Flora Malesianae Precursorae, XX — The Genus Gymnacranthera (Myristicaceae) in Malaysia (1958); Flora Malesianae Precursorae, XXXI — The Genus Knema (Myristicaceae) in Malaysia and
Outside Malaysia (1961); and *Florae Malesianae Precursores*, XLII — The Genus Myristica (Myristicaceae) in Malesia and Outside Malesia, which is published posthumously here as the substance of this volume of *Gardens' Bulletin, Singapore*, 23 (1968).*

In his Malayan plant collecting he visited all the states of Malaya except Kedah and Perlis. His major expeditions were: 1949 to Sarawak (while on loan to the Sarawak Government to put in order the Sarawak Museum Herbarium after seven years of neglect arising through World War II); 1950 and 1951 to Penang; 1953, 1954 and 1955 to Trengganu; 1956 to North Borneo; 1958 to Luzon, Philippine Islands; 1959 to West Java and 1960 to Sarawak and Brunei. It was to his very great regret that in 1961-62 he could not accept the Royal Society's generous offer of financial assistance to visit New Guinea to see East Malesian Myristicaceae in the field owing to Indonesian hostility towards Dutch New Guinea, as it was then, and when this was resolved, "Confrontation" extended the impasse.

Early in his time in Singapore he attempted to revive the Corps of Collecting Monkeys of which E. J. H. Corner, then Assistant Director, and now Professor of Tropical Botany at Cambridge University, was the founder. Che Ngadiman bin Haji Ismail (see *Gard. Bull. Sing.* 17 (2) 337, 1959), who had assisted Corner from 1937 to 1941, was sent to Kelantan in 1949 to obtain a young berok monkey (*Macacus nemestrina*). Sinclair and Ngadiman tried to train it, but the animal was sickly, and their efforts were not rewarded. With staff shortages in the Gardens and restrictions in plant collecting in Malaya because of the "emergency", the attempt was not repeated.

Though his main interest developed into the woody families, Annonaceae and Myristicaceae, he had a very wide general interest and knowledge of the whole flora including the bryophytes, marine algae and marine phanerogams. Amongst his manuscript papers are such headings as "Plants to look for at ............." He felt himself to be the watch-dog for plants threatened with extinction under "development", and his views were often irascibly expressed, occasionally finding their way into print, for example, p. 242 in this volume regarding *M. succedanea*. He collected, of course, regularly and frequently in all parts of Singapore. The general conception of Singapore as being an island is a half-truth. The state is composed of many islands of which Singapore is the principal one and gives its name to the whole. Sinclair made a special interest of the islands to the southwest, a group known as the Southern Islands. Making friends with the Malay villagers he often spent week-ends there, and his collecting revealed interesting similarities of the islands' vegetation to that of the East Coast of Malaya.

* Malaysia and Malesia used above are synonymous, *sensu* van Steenis; *Gard. Bull. S.S.* 9 (1937) 187-9 and *Mal. Nat. J.* 18 (1964) 211-2. With the creation of a political state, the Federation of Malaysia, in 1963 the use Malaysia in a phytogeographic sense is no longer practical and is superseded by Malesia.
Plate II.

Facsimile of J. Sinclair's handwriting.

Upper: Sheet 1 of the manuscript of the monograph on Myristica published in this number of the Gardens' Bulletin.

Lower: Handwriting at actual size.
Burkill — Biographic Notes

While to list his collecting forays within Singapore would serve little purpose, those outside Singapore are given in the appendix. Much of south Johore is reachable by day trips, and though these were numerous, and often in terms of material brought back to the Singapore Herbarium apparently nearly profitless, it would be a misjudgement of the man to write them off as frivolous. For it was on these trips, having located certain trees, he would return and return again to study their phenology and to collect material in bud, flower and fruit. Many of these trips were to the property known as ‘The Dusun’, and its vicinity, of J. A. Le Doux at Kota Tinggi, a naturalist and friend of the Singapore Botanic Gardens, for very many years (see Gardens’ Bulletin, Singapore 18 (3) 328, 1961). It was this persistence that made his collections with detailed field notes immensely valuable, and a model that many botanists, foresters and over-hasty collectors should try to copy.

He published on new additions to the flora of Singapore, and he was particularly pleased with his discovery of the first Malay Peninsula records of the marine phanerogams, Cymodocea isoetifolia Aschers., C. rotundata (Ehrb. & Hempr.) Aschers. & Schweinf. and C. serrulata (R. Br.) Aschers. & Magnus, the first Singapore record for Thalassia hemprichii (Ehrb.) Aschers., and a second Singapore record for Halophila spinulosa (R. Br.) Aschers. This marine fossicking of course included collecting of algae which continued to the date of his heart attack, and his material was regularly distributed. Plate III, taken during a visit with the writer to Raffles Light in 1963, shows him in cryptic pose.

It would be opportune to round off comment here on his interest in cryptogams. Mention has already been made to his work on the algae of Barra and Stronsay, and on collection of mosses. His first, third and fifth published papers were on algae. He was a member of the British Bryological Society from 1940 and of the British Phycological Society from soon after its formation in 1952. His early moss collections are recorded in the Transactions of the former society. During his time in Singapore he collected mosses on all his expeditions and distributed them to bryologists. When he climbed Kinabalu on 13th June, 1957 he brought a piece of granite at the writer’s request from the summit, and on it was a moss, the highest-grown plant between the Himalayas and the mountains of New Guinea! Dr. R. van der Wijk has determined it as Andreaea rupestric Hedw. var. rubicunda (Bartr.) Wijk. In correspondence before his return home in 1967 he began planning the things he wanted to do in Orkney, and one of them was a moss-collecting outing. During his terminal illness over the winter months of 1967-68, he grew mosses in his bedroom at The Bu. ‘There was so little green outside that I took in pieces of moss to look at ……..’, he wrote on 23rd January, 1968. There is no doubt that in the glades of the annonaceeous forest to which he was first directed in Singapore, and of the myristicaceous forest that this led him on to, the cryptogams continually caught his eye. It is a guess, and the writer’s opinion, that if he had in 1948 been left to choose
what specialist study to make, it might well have been on these lower plants. Certainly he looked on his moss collection as a source of occupation when, in retirement, old age precluded more active out-door botanising.

He was a man of boundless energy and persistence of purpose, but he always seemed to be working under pressure. His knowledge of the Malayan flora and his expertise on the Annonaceae and Myristicaceae meant that he had a large correspondence, and in particular he gave much assistance to the Forest Departments of Malaya and the Bornean territories in determining collections. At the end of 1956 when Government's malayanisation terms to him gave him a retention prospect of six years he felt as though the Sword of Damocles was hanging over his head and that he would never have time enough to finish the work on which he was engaged. Though in the end he remained in Singapore till the end of April 1967, the psychological trauma never left him, and he worked with redoubled energy without sparing himself.

When travelling to Great Britain for home leave or when returning to Singapore he invariably made use of the opportunity to visit and work at herbaria on the way. Thus he was enabled to visit the herbaria at Leiden, Florence, Munich, Geneva, Brussels, Utrecht, Paris, Peradeniya, Calcutta, Tokyo, Manila, Kepong and Bogor, several of them more than once. And when in Great Britain he seldom allowed himself the holiday for which he had been sent there. Instead, with a copious list of queries that had accumulated during his work in Singapore, he spent long periods working at Kew, the British Museum, Edinburgh and Cambridge. The expenses of these visits were almost entirely borne by himself.

Hindsight is easy, but one can see now that, being considerably overweight, he over-taxied his physical strength. On 18th October, 1964 he suffered a coronary thrombosis, and was in hospital for two months and was off work for about four months. Recovery was slow, but he was lucky in avoiding disablement and was able to get back into his stride again though the tempo was slower and the going harder. This frustration added to his fears of not being able to complete his work on hand and he confided to his friends his feeling of working against time and of impending death.

By the time that he finally left for Britain on 1st May, 1967, his monograph on Myristica was in typescript. Indeed, some of it was already in first proof, but he intended to make some improvements after reference to material at Kew. He had also manuscript of species descriptions of Horsfieldia, the fourth and final genus of the Myristicaceae, and as soon as he had completed Myristica, he intended to work on Horsfieldia and to return to Singapore, where he had rented a house and installed his servant and personal possessions in anticipation, to complete it. For the future, he spoke of settling in Singapore and taking up a revision of the Malesian Annonaceae for Flora Malesiana. He had already been assured of working facilities in the Singapore Herbarium.
On arrival in Britain, he went direct to The Bu, where his sister and brother-in-law were working the old family farm. He felt the change in climate and the cold intensely and he became numb mentally and physically, and he wrote admitting an inability to get going on anything. In August 1967 an abdominal operation was necessary and advanced inoperable cancer was found. Further debility set in, and on 24th January, 1968 he returned to the Balfour Hospital, Kirkwall, “For a general check-up” he wrote, not knowing that his condition was beyond recovery. He died there on 15th February, 1968 to be buried on his native Hoy two days later.

Of the value of his contribution to Malesian botany there can be no doubt. It is necessary to refer to the other side of the coin, his contribution to Orkney botany. The comprehensiveness of his personal herbarium in Orkney plants in 1937 has already been recorded. In the next four years till 1941 when he was mobilised for war service it was added to, and after Johnston’s death in 1939, he was generally deemed to be the authority on the local flora. Though from early 1941 he was only to live in the Orkneys for short visits, he still retained this reputation. All things of Orkney natural history interested him and he maintained a fat book of clippings from The Orcadian, the local newspaper, recording national history of the islands. He kept up a regular correspondence with anyone engaged on study the local flora, and although he was not taking part in the Botanical Society of the British Isles mapping scheme, he willingly lent his help to Miss E. R. Bullard who was Recorder for Orkney. On 14th December, 1960 he wrote to her: “I wish you every success with your distribution maps and your intended publication. I shall not be publishing anything on the Orkney flora for a long time as I am very hard pressed for time at the moment . . .”. However when the call came he responded at once.

The Orkney Book, a biographic account of the geophysical, biological and anthropological and social history of the Islands had long been a standard book, but published in 1909, it was out of date in many respects. Mr. John Shearer, lately Director of Education, Orkney, undertook in 1964 to edit a new version, “The New Orkney Book”. The contributors were to be Orcadians. Sinclair was considered an obvious choice and was invited to prepare an account of the-local flora, which he did at once. Though he had been given a length, he made his work a labour of love and it was ten times too long! With considerable cutting he tried to reduce the length, yet at the same time not to offend his sense of adequacy by cutting out essentials. It was still over the admissible length, and the editor eventually had the unenviable task of editing it to fit his space. The New Orkney Book (1966), Chapter 17, Our Orkney Flora, pp. 121-8, was the result. The original text is to find a home in the Kirkwall Public Library.
Before concluding it is necessary to say a little about the numbering of his herbarium. He numbered in the field, and so far as is known he used before coming to Singapore only his own series. When he came to Singapore the Singapore Field Numbers Series (SFN) was in use for official collecting and he had to use it. Blocks of numbers issued to him were used serially in the normal way. Whenever he collected a sufficient quantity of duplicates, one would be put aside for incorporation in his own herbarium and there it would receive a number in his own series. It would thus acquire two numbers, though the Sinclair number would not automatically follow in a parallel seriality with the original S.F. Number. In some of his papers and correspondence certain specimens are cited by both numbers. The SFN series was discontinued from 1st January, 1959, but for some years it had been in declining use. From 10th October 1956, commencing with no. 8877, Sinclair collected solely on his own series. The last number in his collection register is 10,922 dated 25th February, 1967.

It emerges from a consideration of his life and work that no matter what his current occupation he was a dedicated botanist, and always at pains to achieve accuracy — first as a tyro, schoolboy and undergraduate, secondly as a knowledgeable amateur, school teacher and soldier, and lastly as a professional whether on duty or on leave. These seem to have been stages of achievement which finally brought basic interest and occupation into unity. How much was by design, how much was the turn of fate, one cannot say. In general he was a man who displayed no great ambition. He asked for nothing more than to be allowed to get on with whatever absorbed his attention at the time. He had an anathema for exercising authority and a suspicion of it when at the receiving end. Any form of bureaucracy he shunned whenever he could. Thus he appeared reserved and diffident, but when botany was involved he was not stand-offish and often he was outspoken. Miss Bullard in her association with him over the recording of the Orkney flora says “He was always very helpful although he could be a bit severe at times!” Withal, on acquaintance he was good company and showed a nice sense of humour.

To the roll of Orkney botanists: Robert Heddle (1827-1860), Magnus Spence (1853-1919), George W. Traill (1836-1897), and Henry Halcro Johnston (1856-1939), and to the roll of Malayan botanists: George King (1840-1909), J. S. Gamble (1847-1925), Henry Nicholas Ridley (1855-1956) and Isaac Henry Burkill (1870-1965) must now be added the name of James Sinclair (1913-1968).
Burkill — Biographic Notes

I. Publications


II. Sinclairian Taxa

ACANTHACEAE

ANACARDIACEAE

ANNONACEAE


ovata (Scheff.) J. Sinclair, comb. nov. l.c., 15 (1956): 5.
 (= Orophea ovata Scheffer.)

stenogyna (Diels) J. Sinclair, comb. nov. l.c.: 5.
 (= Orophea stenogyna Diels.)

 (= Eburopetalum borneense Becc.)

 (= Uvaria dulcis Dunal.)


Cananga odorata (Lamk.) Hk. f. et Th. var. fruticosa (Craib) J. Sinclair comb. nov. in Sarawak Mus. J., 5 (1951): 599.
 (= Canangium fruticosum Craib.)

 (= Drepananthus apoensis Elmer.)

 (= Uvaria argentea Bl.)

 (= Drepananthus carinatus Ridley.)

olivaceus (King) J. Sinclair, comb. nov. l.c.: 242-3.
 (= Xylopia olivacea King.)

pahangensis (Hend.) J. Sinclair, comb. nov. l.c.: 240-1.
 (= Drepananthus pahangensis Hend.)

philippinensis (Merr.) J. Sinclair, comb. nov. l.c.: 239.
 (= Drepananthus philippinensis Merr.)

pruniferus (Maingay ex Hk. f. et Th.) J. Sinclair, comb. nov. l.c.: 239-40.
 (= Drepananthus pruniferus Maingay ex Hk. f. et Th.)

ridleyi (King) J. Sinclair, comb. nov. l.c.: 237-9.
 (= Xylopia ridleyi King.)

scortechinii (King) J. Sinclair, comb. nov. l.c.: 244-6.
 (= Xylopia scortechinii King.)

(= Uvaria argentea Bl.)


(= Mitrephora excelsa Hk. f. et Th.)

micranthum (A.D.C.) J. Sinclair, comb. nov. l.c.: 225-6.

(= Guatteria micrantha A.D.C.)


siamensis (Craib) J. Sinclair, comb. nov. l.c.: 273.

(= Monocarpia siamensis Craib.)


(= Polyalthia pulchra King.)

var. angustifolium (King) J. Sinclair, comb. nov. l.c.: 334.

(= Polyalthia pulchra King. var. angustifolia King.)


(= Polyalthia macrantha King.)

membranifolium J. Sinclair, sp. nov. l.c.: 191-2.

merguiensis (Chatterjee) J. Sinclair, comb. nov. l.c., 14 (1953): 45.

(= Uvaria merguiensis Chatterjee.)


(= Melodorum latifolium Hk. f. var. ovoideum King.)


holttumii J. Sinclair, sp. nov. l.c.: 429.

macrophyllus (Bl.) Hk. f. et Th. var. siamensis J. Sinclair, var. nov. l.c., 15 (1956): 16-17.


umbrosus J. Sinclair, sp. nov. l.c.: 445-6.


(= Polyalthia eriantha Ridley.)


(= Fissistigma maclurei Merr.)


(= Unona pannosa Dalz.)


(= Cyathocalyx subsessilis Ast.)


(= Polyalthia aberrans Maingay.)

blandfordianum (C.E.C. Fischer) J. Sinclair, comb. nov. l.c.: 46.

(= Sphaerocoryne blandfordiana C.E.C. Fischer.)
(= Saccopetalum arboreum Elmer.)
koolsii (Kostermans) J. Sinclair, comb. nov. l.c.: 378.
(= Saccopetalum koolsii Kostermans.)
longiflora (Hk. f. et Th.) J. Sinclair, comb. nov. l.c.: 378.
(= Saccopetalum longiflorum Hk. f. et Th.)
tomentosa (Roxb.) J. Sinclair, comb. nov. l.c.: 378.
(= Uvaria tomentosa Roxb.)
uguiculata (C.E.C. Fischer) J. Sinclair, comb. nov. l.c.: 378.
(= Saccopetalum uguiculatum C.E.C. Fischer.)
vidalii J. Sinclair, nom. nov. l.c.: 378.
(= Saccopetalum longipes Vidal.)
(= Melodorum beccarii Diels.)
(= Cyathocalyx marginalis Scheff.)
(= Cananga monosperma Hk. f. et Th.)
(= Melodorum ovalifolium Ridley.)
argentea J. Sinclair, sp. nov. l.c.: 461-3.
kingii J. Sinclair, sp. nov. l.c.: 453-4.
(= Uvaria ophthalmicus Roxb.)
cauliflora Hk. f. et Th. var. beccarii (King) J. Sinclair, stat. nov. l.c.: 294-5.
(= Polyalthia beccarii King.)
var. desmantha (Hk. f. et Th.) J. Sinclair, stat. nov. l.c.: 295-6.
(= Unona desmantha Hk. f. et Th.)
var. wrayii (Hemsl.) J. Sinclair, stat. nov. l.c.: 296-7.
(= Unona wrayii Hemsl.)
(= Xylopia congesta Ridley.)
(= Ellipeia glabra Hk. f. et Th.)
hirtifolia J. Sinclair, nom. nov. l.c.: 300.
(= Polyalthia hirta Ridley.)
lateritia J. Sinclair, sp. nov. l.c.: 290-1.
motleyana (Hk. f.) Airy Shaw var. oblonga (King) J. Sinclair, stat. nov. l.c.: 304.


(= Orophea beccarii Scheffer.)


(= Orophea costata Scheffer.)


(= Goniothalamus dielsianus Lauterb.)


(= Orophea dolichonema Diels.)

filipes (Lauterb. ex K. Schum.) J. Sinclair, comb. nov. l.c.: 7.

(= Orophea filipes Lauterb. et K. Schum.)


(= Stelechocarpus grandifolia Warb.)

lignocarpa J. Sinclair, sp. nov. l.c.: 7–9.


var. sessilicarpa J. Sinclair, var. nov. l.c.: 411–2.


(= Goniothalamus mollis Warb.)

monticola J. Sinclair, sp. nov. l.c., 14 (1955): 408.

multirovulata (Fischer) J. Sinclair, comb. nov. l.c., 14 (1953): 43, 47.

(= Mitrephora multirovulata Fischer.)


pulchella (Diels) J. Sinclair, comb. nov. l.c.: 10.

(= Orophea pulchella Diels.)

rhytidophylla (Diels) J. Sinclair, comb. nov. l.c.: 10.

(= Orophea rhytidophylla Diels.)

sessilifolia J. Sinclair, sp. nov. l.c.: 10, 12–13.

setosa (King) J. Sinclair, comb. nov. l.c., 14 (1953): 43.

(= Orophea setosa King.)

var. major J. Sinclair, var. nov. l.c., 14 (1955): 406.


(= Orophea silvestris Diels.)


(= Melodorum prismaticum, Hk. f. et Th.)


(= Sageraea cauliflora Scheff.)
Garden's Bulletin, Singapore — XXIII (1968)


(= Popowia dubia Kurz.)


(= Ellipeia nervosa Hk. f. et Th.)

pumila (King) J. Sinclair, comb. nov. l.c.: 48.

(= Ellipeia pumila King.)


(= Popowia flava Teys. et Binn.)

Uvaria hahnii Finet et Gagnep. J. Sinclair, comb. nov. I.e.: 44.

(= Unona hahnii Finet et Gagnep.)


caudata Hk. f. et Th. var. vetriculata J. Sinclair, var nov. l.c.: 608-9.


(= Habzelia oxyantha Hk. f. et Th.)

sub-dehiscens (King) J. Sinclair, comb. nov. l.c.: 345-6.

(= Alphonsea sub-dehiscens King.)

LABIATAE


MYRISTICACEAE


(= Myristica bancana Miq.)

bancana (Miq.) J. Sinclair, var. borneensis (Warb.) J. Sinclair, comb. nov. l.c.: 439.

(= Gymnacranthera murtonii (Hk. f.) Warb. var. borneensis Warb.)

eugeniifolia (A.DC.) J. Sinclair, comb. nov. l.c.: 444-7.

(= Myristica eugeniifolia A.DC.)

var. griffithii (Warb.) J. Sinclair, comb. nov. l.c.: 447-50.

(= Gymnacranthera farquhariana Wall. var. griffithii (Hk. f.) Warb.)

forbesii (King) Warb. var. crassinervis (Warb.) J. Sinclair, stat. nov. l.c., 17 (1958): 102-4.

(= Gymnacranthera crassinervis Warb.)

paniculata (A.DC.) Warb. var. zippeliana (Miq.) J. Sinclair, stat. nov. l.c.: 108-12.

(= Myristica zippeliana Miq.)


(= Myristica canarioides King.)

var. rufirachis J. Sinclair, var. nov. l.c.: 393.

penangiana J. Sinclair, sp. nov. l.c.: 408-10.

polyspherula (Hk. f. emend. King) J. Sinclair, comb. nov. l.c.: 422-5.

(= Myristica polyspherula Hk. f.)

punctatifolia J. Sinclair, sp. nov. l.c.: 413-6.

subalpina J. Sinclair, sp. nov. l.c.: 410-1.

subglobosa (Miq.) Warb. var. brachiata (King) J. Sinclair, stat. nov. l.c.: 430-2.

(= Myristica brachiata King.)

cinerea (Poir.) Warb. var alpina J. Sinclair, var. nov. l.c.: 287-8.

var. andamanica (Warb.) J. Sinclair, comb. nov. l.c.: 174–81.
(= Knema glauca Bl. var. andamanica Warb.)

var. cordata (J. Sinclair) J. Sinclair, comb. nov. l.c.: 181–2.
(= Knema glaucescens Jack var. cordata J. Sinclair.)

var. patentinervia (J. Sinclair) J. Sinclair, comb. nov. l.c.: 182-4.
(= Knema glaucescens Jack var. patentinervia J. Sinclair.)

f. longipedicellata J. Sinclair, f. nov. l.c.: 182-4.

var. rubens (J. Sinclair) J. Sinclair, stat. nov. l.c.: 185.
(= Knema glaucescens Jack f. rubens J. Sinclair.)

var. sumatrana (Miq.) J. Sinclair, comb. nov. l.c.: 185–93.
(= Myristica sumatrana Bl.)


var. arenosa J. Sinclair, var. nov. l.c.: 198, 200.

var. linguiformis J. Sinclair, var. nov. l.c.: 197, 200–1.

var. paludosa J. Sinclair, var. nov. l.c.: 197, 201–2.

erratica (Hk. f. et Th.) J. Sinclair, comb. nov. l.c.: 205–9.
(= Myristica erratica Hk. f. et Th.)

galeata J. Sinclair, sp. nov. l.c.: 211–4.


var. glaucescens, f. rubens J. Sinclair, f. nov. l.c.: 306–8.


kinabaluensis J. Sinclair, sp. nov. l.c., 18 (1961): 229–32.

kunstleri (King) Warb. var. surigaoensis J. Sinclair, var. nov. l.c.: 238–9.

latericia Elmer var. albifolia J. Sinclair, var. nov. l.c.: 243.

var. lunduensis J. Sinclair, var. nov. l.c.: 244.

meridionalis J. Sinclair, sp. nov. l.c.: 13 (1951): 297–9.


percoriacea J. Sinclair, sp. nov. l.c.: 268–71.


rigidifolia J. Sinclair, sp. nov. l.c.: 284–6.

scortechinii (King) J. Sinclair, comb. nov. l.c.: 288–91
(= Myristica scortechinii King.)

stenophylla (Warb.) J. Sinclair, comb. nov. l.c.: 300–2.
(= Gymnacranthera stenophylla Warb.)


woodii J. Sinclair, sp. nov. l.c.: 283–6.

- ser. Fuscae J. Sinclair ser. nov. l.c.: 244.
- ser. Tenuiveniae J. Sinclair ser. nov. l.c.: 315.


- ser. Uncinatae J. Sinclair ser. nov. l.c.: 145.

Myristica carrii J. Sinclair sp. nov. l.c.: 160.

cyelanica A.DC. var. cagayanensis (Merr.) J. Sinclair stat. nov. l.c.: 442. (= M. cagayanensis Merr.)

chrysophylla J. Sinclair sp. nov. l.c.: 254.

var. entrecasteauxensis J. Sinclair, var. nov. l.c.: 257.

cornutiflora J. Sinclair, sp. nov. l.c.: 348.

cylinrocarpa J. Sinclair, sp. nov. l.c.: 337.

eilliptica Hk. f. et Th. var. celebica (Miq.) J. Sinclair, stat. nov., l.c., 16 (1958): 356.

(= Myristica celebica Miq.)

var. simiarum (A.DC.) J. Sinclair, stat. nov. l.c.: 356.

(= Myristica simiarum A.DC.)


fatua Houtt. var. affinis (Warb.) J. Sinclair, stat. nov., l.c.: 275.

(= M. affinis Warb.)

var. inutilis (Richard ex A. Gray) J. Sinclair, stat. nov. l.c.: 278.

(= M. inutilis Richard ex Gray)

var. magnifica (Beddome) J. Sinclair, stat. nov. l.c.: 282.

(= M. magnifica Beddome)

var. morindifiolia (Bl.) J. Sinclair, stat. nov. l.c.: 286.

(= M. morindifiolia Bl.)

var. morobensis J. Sinclair, var nov. l.c.: 289.

var. morotaiensis J. Sinclair, var. nov. l.c.: 292.

var. platyphylla (A. C. Smith) J. Sinclair, stat. nov. l.c.: 300.

(= M. platyphylla A. C. Smith)

var. quercicarpa J. Sinclair, var. nov. l.c.: 302.

var. sangowensis J. Sinclair, var. nov. l.c.: 304.

var. sphanogheana (Miq.) J. Sinclair, stat. nov. l.c.: 304.

(= M. sphanogheana Miq.)

var. wenzelii (Merr.) J. Sinclair, stat. nov. l.c.: 309.

(= M. wenzelii Merr.)

firmipes J. Sinclair, sp. nov. l.c.: 355.

flosculosa J. Sinclair, sp. nov. l.c.: 359.

gracilipes J. Sinclair, sp. nov. l.c.: 334.

hooglandii J. Sinclair, sp. nov. l.c.: 156.

hypargyraea A. Gray var. gillespieana (A. C. Smith) J. Sinclair stat. nov. l.c.: 418.

(= M. gillespieana A. C. Smith)
var. guillauminiana (A. C. Smith) J. Sinclair, stat. nov. l.c.: 420,
(= M. guillauminiana A. C. Smith)
var. insularis (Kanehira) J. Sinclair, stat. nov. in l.c.: 422.
(= M. insularis Kanehira)
impressinervia J. Sinclair, sp. nov. l.c.: 232.
inopinata J. Sinclair, sp. nov. l.c.: 199.
lancifolia Poiret var. bifurcata J. Sinclair, var. nov. l.c.: 460.
var. clemensis (A. C. Smith) J. Sinclair, stat nov. l.c.: 463.
(= M. clemensii A. C. Smith)
var. montana (Roxb.) J. Sinclair, stat. nov. l.c.: 467.
(= M. montana Roxb.)
papyracea J. Sinclair, sp. nov. l.c.: 133.
pedicellata J. Sinclair, sp. nov. l.c.: 324.
rosselesis J. Sinclair, sp. nov. l.c.: 205.
smythiesii J. Sinclair, sp. nov. l.c.: 316.
tenuivenia J. Sinclair, sp. nov. l.c.: 327.
umbrosa J. Sinclair, sp. nov. l.c.: 147.
uncinata J. Sinclair, sp. nov. l.c.: 150.
undulatifolia J. Sinclair, sp. nov. l.c.: 400.
womersleyi J. Sinclair, sp. nov. l.c.: 249.

MYRSINACEAE
(= Ardisia ferruginea Mez.)

SAPOTACEAE
215-6.
(= Payena grandiflora Ridl.)
(= Payena selangorica)

VERBENACEAE
Petraeovitex wolfei J. Sinclair, sp. nov. in Gard. Bull. Sing., 15 (1956): 18,
20-21.
III. A summary of all Sinclair's collecting in Asia, Singapore excepted, while on the staff of the Botanic Gardens, Singapore.

(Numbers of collections are quoted after each locality).

1949

22 February - 10 March  

7 - 18 April  
East Pakistan: Cox's Bazar — 74.

22 July  
Johore: Mersing — 8.

9 - 19 September  
Perak: Maxwell's Hill — 234.

1950

27 - 29 August  
Johore: 9 m.s. Kota Tinggi-Mersing Road — 5, G. Lambak — 11, Kluang F.R. — 6, Ma'okil F.R. — 12.

9 - 21 November  

23 December  
Johore: 7 m.s. Johore Bahru-Scudai Road — 2.

1951

7 October - 4 November  

1953

26 March  

15 April  

14 May  

17 June  

21 June  
Johore: 71-83 m.s. Johore Bahru-Scudai Road — 6.

4 - 18 July  

TOTAL 186 nos.

3 - 16 November  
1954

7 March
Johore: Mt. Austin Estate — 4.

8 April

16 April

16 May

21 May
Johore: 23¹⁄₄ m.c. Kota Tinggi-Mersing Road — 9.

18 June
Johore: Kota Tinggi — 7, Sg. Tiram — 5.

11 July
Johore: Sg. Tiram — 14.

1 August
Johore: 14½–19½ m.s. Kota Tinggi-Mersing Road — 21.

5 September
Johore: Sg. Tiram, Nam Heng — 7.

6 November –
Johore: Sg. Tiram — 6.

21 November
Johore: Kota Tinggi — 6.

1955

25 February
Johore: Sg. Tiram — 6.

1 – 6 April
TOTAL — 54 nos.

17 April
Johore: P. Pisang — 8, P. Sauh — 5.

6 May
Johore: Kota Tinggi — 6.

31 May
Johore: Kota Tinggi — 3.

30 – 31 July
Johore: Sg. Tebrau — 3.

5 – 25 September
TOTAL — 226 nos.

1956

19 – 21 October
Pahang: Bentong-Kuantan — 9; Fraser’s Hill — 9.

1957

24 February
Johore: Johore Bahru — 1.

20 – 21 April
TOTAL — 14 nos.

1 June – 6 July
TOTAL — 416 nos.

25 July
Johore: P. Merambang — 3.

4 – 5 December
Johore: Mersing — 6.
1958
5 April
Johore: Sg. Sedili Besar — 1.
13 – 16 May
TOTAL — 63 nos.
25 May – 5 July
Philippine Islands: Antipolo — 13, Mt. Makiling — 63, Los Banos — 5, Bicol Nat. Park — 26,
Camarines — 11, Lake Bulusan — 69, Patag — 4, Agargay Lake — 18, Mt. Bulusan — 23,
Bulusan seashore — 18, Baguio-Santo Tomas — 140.
TOTAL — 390 nos.
7 October – 5 November
Selangor: Ulu Gombak — 2, Klang Gates — 4,
Ginting Simpah — 7; Perak: Ipoh — 29, Che-
mor — 11, Dindings — 6, K. Kangsar — 2,
1959
14 January
Johore: Kota Tinggi-Mersing Road — 12.
21 February –
Java: P. Handeuleum Sisi — 2, P. Peutjang —
3 March
25, Tjiujong Kulon — 5, Ujong Kulon — 5,
Bogor — 27, G. Salak — 10, Tjibodas — 22.
TOTAL — 96 nos.
5 April
Ceylon: Nuwara Eliya — 37.
20 December
1960
13 January
Johore: Kota Tinggi-Mersing Road — 5.
26 January
Johore: Kota Tinggi-Mersing Road — 5.
4 March
Johore: Nawai — K. Sedili Road — 10.
31 July –
Sarawak: Semengoh F.R. — 58, Sg. Sobat Tapang.
7 September
Serian — 31, G. Gaharu — 40, Bako — 30,
Matang — 23, G. Gading, Lundu — 36, G.
Meroyon, Sampadi F.R. — 17, Batang Kayan
Sampadi F.R. — 2, Miri — 2; Brunei: Anduki
F.R. — 34, Sg. Lumut — 10, Badas Swamp
28, Bt. Puan, Sg. Belait — 14, Bt. Labi F.R.
—21, Bt. Puan — 11, K. Belait — 6, Bt.
Tepaling — 1, Berakas F.R. — 9, Muara — 1.
TOTAL — 374 nos.
30 September
Johore: Mawai-K. Sedili Road — 9.
1961
24 January
Johore: Mawai-K. Sedili Road — 7.
8 February
Johore: Mawai-K. Sedili Road — 7.
2 March
25 March
29 March
2 April
Johore: Sg. Tuenseh, Jason's Bay — 2.
21 April
Johore: Sg. Dodol, 14 m.s. Kota Tinggi-Mersing
Road — 6.
30 April
Johore: Lombong, Kota Tinggi — 1.
19 May
Johore: 15½ m.s. Kota Tinggi-Mersing Road — 4.
4 June  Johore: Serkat — 1.
23 June  Johore: 184-204 m.s. Kota Tinggi-Mersing Road — 10.
28 November  Johore: 204 m.s. Kota Tinggi-Mersing Road — 7.
5 November  Johore: Mawai-Kuala Sedili Road — 1, Jason’s Bay — 2.
28 November  Johore: Mawai-Kuala Sedili Road — 5.
8 December  Johore: 21 m.s. Kota Tinggi-Mersing Road — 2.

1962
17 May  Johore: 83 m.s. Mawai-K. Sedili Road — 4, Jason’s Bay — 2.
10 June  Johore: Kg. Sg. Sedili Besar — 4.
17 June  Johore: Kg. Senibong, Plentong — 3.
21 June  Johore: Kg. Sg. Sedili Besar — 7.
28 October  Johore: Sg. Semolok, Mawai — 1.
TOTAL — 15 nos.

1963
6 October*  Johore: Sg. Semagot, 30 m.s. Kota Tinggi-Mersing Road — 7.

1965
10 January  Johore: 2 m.s. Jalan Scudai, Johore Baharu — 1.
30 May  Johore: Kg. Kelantan, Kota Tinggi — 7.
13 June  Johore: Sg. Tebrau — 6.
20 June  Johore: Sg. Semandani, Sg. Diman, Jason’s Bay — 8.
4 July  Johore: 5 m.s. Jalan Scudai, Johore Bahru — 2.
19 September  Johore: G. Pulai — 3.
14 November  Johore: Sg. Mupoh, Sg. Tementang, Sg. Dohol, Sg. Merah, 102-14 m.s. Kota Tinggi-Mersing Road — 8.
21 November  Johore: 2 m.s. Jalan Scudai, Johore Baharu — 1.

1966
6 February  Johore: Jason’s Bay — 8.
6 March  Johore: Gelang Patah — 2, Kangkar Pendas — 2.
10 April  Johore: 2 m.s. Jalan Scudai, Johore Baharu — 1.
2 May  Johore: Sg. Mupoh, Sg. Pak Kenet, Sg. Merah, 10½-14 m.s. Kota Tinggi-Mersing Road — 10, Kg. Kelantan, Kota Tinggi — 2.
30 June  Johore: Kg. Lukut, Kota Tinggi — 2.

EDITOR'S NOTE.

At the time of James Sinclair's final departure from Singapore on 1st May, 1967, all the typescript of this monograph lay with the Printer. About three-quarters had been set and was in various stages of fairing under the author's correction. This and the balance of later set and unread galley was sent to him at his home in Orkney. Although typesetting had been put in train, it was known that the author intended to check certain of his statements against facilities at Kew which were not available at Singapore, with the possibility of having to make some changes in proof. Illness overtook him and he never did any more to his text. The monograph is published, except for general editorial attention, in precisely the form in which he left it. Whatever amendments he had expected to make have unfortunately had to be ignored.

The Editor acknowledges the generous understanding of Mrs. Edith Spence, the author's sister, for sending all the manuscripts and proofs to Dr. R. E. Holttum at Kew; the very great help of Dr. Holttum in sorting out and putting together all the printer's proofs in proper sequence and in reading them against earlier proofs or the manuscript, a task of no little magnitude; and the help of Sir George Taylor, Director, and Mr. J. P. M. Brennan, Deputy Director and Keeper of the Herbarium, Royal Botanic Gardens, Kew, for forwarding all this material to Singapore.

H. M. BURKILL,
Botanic Gardens, Singapore.

17th August, 1968.
The Genus Myristica in *Malesia and outside Malesia

by

JAMES SINCLAIR

I. INTRODUCTORY PART

Explanation and Scope of this paper

This paper is complementary to one which appeared in the Gardens' Bulletin, Singapore 16 (1958) 205 namely "A Revision of the Malayan Myristicaceae" and if used in conjunction with it, will form a more complete account of all known species of Myristica in Malesia as well as outside Malesia. It follows two other papers on the family Myristicaceae, "The Genus Gymnanthera in *Malaysia", Gard. Bull. Sing. 17, 1 (1958) 96 and "The Genus Knema in Malaysia and outside Malaysia" Gard. Bull. Sing. 18, 3 (1961) 102. These two papers are also entitled "Florae Malesianae Precursoria"—XX and XXXI respectively. Unlike Knema which has its second centre of distribution with 20 species in the Malay Peninsula out of a total of 37, Myristica is poorly represented in the Peninsula with only 10 out of a total of 72 species. This being so, it will be realized that the short section dealing with the Malayan species in the first paper cannot purport to give a very comprehensive account or understanding of the genus as a whole or the relation of one species to another. The present study of Myristica, extended particularly to New Guinea, that great centre of origin and distribution of numerous species, and onward to the eastern and outer limits of the genus in the Solomons, Fiji, Tonga and Samoa, cannot but reveal many new and unexpected features not to be found in previous literature. More important, the general principles and common patterns of morphological variation which serve as a basis for the classification and division of the genus into sections and series will also be clearer. The relationship of species to species and series to series, if at first a tangle, will in the end, happily become apparent.

*Foot-note:—Malaysia has now come to mean the territories of Malaya, Sarawak and Sabah (British North Borneo).
The species here are arranged in the order in which they occur in their respective series and not alphabetically as was the case in *Knema*. It is hoped that departure from the alphabetical order will not cause undue inconvenience. Had I been using the system solely for myself, I should have continued with the alphabetical arrangement to save time when searching for any particular species. I found it extremely difficult and puzzling at first in assigning the species to their respective series. Diagnostic characters are extremely uniform in *Myristica* with a lot of overlapping in closely related species. Even when well on in the revision my conception of the relations of species to series was vague, uncertain and often wrong. Eventually the keys did much to finalize the affinities. Perhaps if all the closely related taxa with their illustrations are brought together in the text, then the student will see their relations more clearly and quickly and get accustomed to this arrangement. If I have wrongly placed a certain species, it would be easier to detect the error when arranged in this manner. The flowering and fruiting stages of several species are still unknown and with the best judgment, it is not impossible to be misled when assigning such species to the correct series. (See under heading *Work for the Future*.)

For various reasons and much to my regret the study of embryology and germination in the genus is beyond the scope of the present taxonomic revision. It is a time-consuming study which requires large numbers of fresh, viable seeds often from forests afar. Furthermore, seeds in *Myristica* may become mature in the absence of an embryo. Even when present it is very difficult to extract the minute fragile germling from the hard, surrounding, stony mass of endosperm intact. One cannot hash and smash valuable type specimens which may only have a single fruit. It would have been most desirable to know if section I and section II differ from each other embryologically and if so what general principles can be applied. Pollen morphology also had to be left out, but only a detailed study would prove whether it is of use in distinguishing taxa lower than genera.

In conclusion to these preliminary remarks, it is opportune at this stage to introduce and stress one important aspect on which the classification of *Myristica* in this paper is based. This is the division of the genus into two main sections based on the structure of the inflorescence. There are two main types of inflorescence, the woody, scar-covered, *Knema*-like, persistent axis which continues to elongate and to produce flowers from time to time (= section II) and the slender, fragile, non-scar-covered, more or less branched axis which does not persist and bears flowers only once (= section I). These two types will be discussed in detail later.
Alphabetical Revised list of species and varieties of Myristica

1. M. agusanensis Elmer
2. andamanica Hk.f.
3. archboldiana A. C. Smith
4. argentea Warb.
5. beccarii Warb.
6. brassii A. C. Smith
7. buchneriana Warb.
8. carrii J. Sinclair, sp. nov.
9. castaneifolia A. Gray
10. ceylanica A.DC.
   var. ceylanica
   var. cagayanensis (Merr.) J. Sinclair, stat. nov.
11. chartacea Gillespie
12. chrysophylla J. Sinclair, sp. nov.
   var. chrysophylla
   var. entrecasteauxensis J. Sinclair, var. nov.
13. cinnamomea King
14. concinna J. Sinclair, sp. nov.
15. cornutiflora J. Sinclair, sp. nov.
16. crassa King
17. crassipes Warb.
18. cucullata Markgraf
19. cylindrocarpa J. Sinclair, sp. nov.
20. dactyloides Gaertner
21. elliptica Wall. ex Hk.f.et Th.
   var. elliptica
   var. celebica (Miq.) J. Sinclair
   var. simiarum (A.DC.) J. Sinclair
22. ensifolia J. Sinclair, sp. nov.
23. fatua Houtt.
   var. fatua
   var. affinis (Warb.) J. Sinclair, stat. nov.
   var. inutilis (Richard ex A. Gray) J. Sinclair,
   stat. nov.
   var. magnifica (Beddome) J. Sinclair, stat. nov.
   var. morindiifolia (Bl.) J. Sinclair, stat. nov.
   var. morobensis J. Sinclair, var. nov.
   var. morotaeniensis J. Sinclair.
   var. nov.
   var. papuana MgF
   var. platyphylla (A.C. Smith) J. Sinclair, stat. nov.
24. firmipes J. Sinclair, sp. nov.
25. flosculosa J. Sinclair, sp. nov.
26. fragrans Houtt.
27. fusca MgF
28. garciniifolia Warb.
29. gigantea King
30. globosa Warb.
31. gracilipes J. Sinclair, sp. nov.
32. guadalcanalensis J. Sinclair, *sp. nov.
33. guatteriifolia A.DC.
34. hollrungii Warb.
35. hooglandii J. Sinclair, sp. nov.
36. hypargryraea A. Gray
   var. hypargryraea
   var. gillespieana (A.C. Smith) J. Sinclair,
   stat. nov.
   var. guillauminiana (A. C. Smith) J. Sinclair,
   stat. nov.
   var. insularis (Kanehira) J. Sinclair stat. nov.
37. impressinervia J. Sinclair.
   sp. nov.
38. iners Bl.
39. inopinata J. Sinclair, sp. nov.
40. insipida R.Br.
41. kajewskii A. C. Smith
42. koordersii Warb.
43. lancifolia Poiret
   var. lancifolia
   var. bifurcata J. Sinclair,
   var. nov.
   var. clemensis (A. C. Smith) J. Sinclair,
   stat. nov.
   var. montana (Roxb.) J. Sinclair. stat. nov.
44. lepidota Bl.
45. longipes Warb.
46. lowiana King
47. maingayi Hk.f.
48. malabarica Lamk
49. malaccensis Hk.f.

*Foot-note:—Material received since this paper went to the press shows that M. guadalcanalensis is only M. insipida. I have therefore deleted the Latin description so that this superfluous name will not be valid.
Gardens' Bulletin, Singapore — XXI (1968)

50. markgraviana A. C. Smith
51. maxima Warb.
52. neglecta Warb.
53. papyracea J. Sinclair, sp. nov.
54. pedicellata J. Sinclair, sp. nov.
55. petiolata A. C. Smith
56. philippensis Lamk
57. roselensis J. Sinclair, sp. nov.
58. schleinitzii Engler
59. smythiesii J. Sinclair, sp. nov.
60. sphaerosperma A. C. Smith
61. subalulata Miq.
62. succedanea Reinwardt ex Bl.
63. sulcata Warb.
64. teijssmannii Miq.
65. tenuivenia J. Sinclair, sp. nov.
66. tubiflora Bl.
67. umbellata Elmer
68. umbrosa J. Sinclair, sp. nov.
69. uncinata J. Sinclair, sp. nov.
70. undulatifolia J. Sinclair, sp. nov.
71. villosa Warb.
72. womersleyi J. Sinclair, sp. nov.

Total number of species and varieties

To-date there are 72 species and 23 varieties of Myristica in this paper.

Alphabetical Revised list of Myristica species in section I

1. M. agusanensis Elmer
2. argentea Warb.
3. carrii J. Sinclair, sp. nov.
4. cinnamomea King
5. elliptica Wall. ex Hk.f. et Th. var. elliptica
   var. celebica (Miq.) J. Sinclair
   var. simiarum (A.DC.) J. Sinclair
6. fragrans Houtt.
7. garciiniifolia Warb.
8. gigantea King
9. guatterifolia A.DC.
10. hooglandii J. Sinclair, sp. nov.
11. impressinervia J. Sinclair, sp. nov.
12. iners Bl.
13. inopinata J. Sinclair, sp. nov.
14. lowiana King
15. maingayi Hk. f.
16. malabarica Lamk
17. malaccensis Hk.f.
18. markgraviana A. C. Smith
19. maxima Warb.
20. neglecta Warb.
21. papyracea J. Sinclair, sp. nov.
22. philippensis Lamk
23. roselensis J. Sinclair, sp. nov.
24. schleinitzii Engler
25. succedanea Reinwardt ex Bl.
26. umbellata Elmer
27. umbrosa J. Sinclair, sp. nov.
28. uncinata J. Sinclair, sp. nov.

Alphabetical Revised list of Myristica species in section II

1. M. andamanica Hk.f.
2. archboldiana A. C. Smith
3. beccarii Warb.
4. brassii A. C. Smith
5. buchneriana Warb.
6. castaneifolia A. Gray
7. ceylanica A.DC. var. ceylanica
   var. cagayanensis (Merr.) J. Sinclair, stat. nov.
8. chartacea Gillespie
9. chrysophylla J. Sinclair, sp. nov.
   var. chrysophylla
   var. entrecasteauxensis J. Sinclair, var. nov.
10. concinna J. Sinclair, sp. nov.
11. cornutiflora J. Sinclair, sp. nov.
12. crassa King
13. crassipes Warb.
14. cucullata Mgf
15. cylindrocarpa J. Sinclair, sp. nov.
16. daetlyoides Gaertner
Sinclair — Myristica

17. ensifolia J. Sinclair, sp. nov.
18. fatua Houtt.
   var. fatua
   var. affinis (Warb.)
      J. Sinclair, stat. nov.
   var. inutilis (Rich. ex A. Gray) J. Sinclair, stat. nov.
   var. magnifica (Beddome)
      J. Sinclair, stat. nov.
   var. morindifolia (Bl.)
      J. Sinclair, stat. nov.
   var. morobensis J. Sinclair, var. nov.
   var. morotaiensis J. Sinclair, var. nov.
   var. papuana Mgff
   var. platyphylla (A. C. Smith)
      J. Sinclair, stat. nov.
   var. quercicarpa J. Sinclair, var. nov.
   var. sangowoensis J. Sinclair, var. nov.
   var. spanogheana (Miq.)
      J. Sinclair, stat. nov.
   var. subcordata (Bl.) Miq.
   var. wenzelii (Merr.)
      J. Sinclair, stat. nov.
19. firmipes J. Sinclair, sp. nov.
20. flosculosa J. Sinclair, sp. nov.
21. fusca Mgff
22. globosa Warb.
23. gracilipes J. Sinclair, sp. nov.
24. guadalcanalensis J. Sinclair, sp. nov.
25. hollrungii Warb.
26. hypargyrea A. Gray
   var. hypargyrea
   var. gillespieana (A. C. Smith) J. Sinclair, stat. nov.
   var. guillauminiana (A. C. Smith) J. Sinclair, stat. nov.
   var. insularis (Kanehira)
      J. Sinclair, stat. nov.
27. insipida R. Br.
28. kajewskii A. C. Smith
29. koordersii Warb.
30. lancifolia Poiret
   var. lancifolia
   var. bifurcata J. Sinclair, var. nov.
   var. clemensii (A.C. Smith)
      J. Sinclair, stat. nov.
   var. montana (Roxb.)
      J. Sinclair, stat. nov.
31. lepidota Bl.
32. longipes Warb.
33. pedicellata J. Sinclair, sp. nov.
34. petiolata A. C. Smith
35. smythiesii J. Sinclair, sp. nov.
36. sphaerosperma A. C. Smith
37. subalulata Miq.
38. sulcata Warb.
39. teijmannii Miq.
40. tenuivenia J. Sinclair, sp. nov.
41. tubiflora Bl.
42. undulatifolia J. Sinclair, sp. nov.
43. villosa Warb.
44. womersleyi J. Sinclair, sp. nov.

New Section

The new section Myristica section Fatua is described.

New Series

The following five new series are described: — Uncinatae, Hoogelandiae, Cinnamomeae, Fuscae and Tenuiveniae.

New Species

The following 21 new species, eight in section I and 13 in section II are described in this paper: —


New Varieties

The following six, all in section II, are new varieties: —
M. chrysophylla var. entrecasteaxensis; M. fatua var. morobensis, var. morotaiensis, var. quercicarpa and var. sangowoensis; M. lancefolia var. bifurcata.

New Status

The following 13, all in section II, receive new status. They are all former species reduced to varieties: — M. ceylanica var. cagayanensis (Merrill); M. fatua var. affinis (Warb.); M. fatua var. inutilis (Richard ex A. Gray); M. fatua var. magnifica (Beddome); M. fatua var. morindifolia (BL.); M. fatua var. platyphylla (A. C. Smith); M. fatua var. spanogheana (Miq.); M. fatua var. wenzelii (Merr.); M. hypargyrea var. gillespieana (A. C. Smith); M. hypargyrea var. guillauminiana (A. C. Smith); M. hypargyrea var. insularis (Kanehira); M. lancefolia var. clemensii (A. C. Smith); M. lancefolia var. montana (Roxb.).

New Synonyms


Vernacular Names

The common vernacular names used in Sumatra, Malaya, Java and Borneo such as chendarah, chendaharan, dara-dara, darahan, penara, pendarah, pendarahan and penarahan for Myristica, are equally applicable to the other genera of the Myristicaceae and it is not necessary to repeat them under each species. They all refer to the “blood” or blood-red sap which the tree contains. The number of vernacular names for Myristica in New Guinea is overwhelming but not surprising for that island with its numerous dialects is almost a modern Babel.
Comparison of the present Revision with that of Warburg's

From the revised list of species it will be seen that there are now some *72 species and 23 varieties in the genus. Of these, 28 species and two varieties belong to section I and 44 species and 21 varieties to section II. There are *22 new species and six new varieties and of these the new species represent some *30.6 per cent of the total number of species. It is expected that some more new species will still turn up in New Guinea. There are 19 series, nine in section I and ten in section II. Warburg's list of series and species is appended here for comparison while my own follows later. He has some 82 species, 55 of which he was able to place in 21 series. Merrill, Warburg and A. C. Smith have in turn added a few more species but some of these had to be reduced. At the end of the Systematic Part will be found a section dealing with the obscure and excluded species followed by a list of names in *Myristica* which have been transferred to the African and American genera. Thus all the names and synonyms in *Index Kewensis* have been accounted for.

### Myristica series and species according to Warburg

*Note*:—To make the comparison between Warburg’s and the author's classification clearer, the revised names of species are added when they differ from that of Warburg.

<table>
<thead>
<tr>
<th>Series</th>
<th>Species</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Maxima</td>
<td>1 M. maxima, 2 M. philippensis</td>
</tr>
<tr>
<td>2 Schleinitzii</td>
<td>3 M. schleinitzii</td>
</tr>
<tr>
<td>3 Celebica</td>
<td>4 [M. celebica] = M. elliptica var. celebica, 5' [M. simiarum] = M. elliptica var. simiarum</td>
</tr>
<tr>
<td>4 Maingayi</td>
<td>6 M. maingayi, 7 M. gigantea</td>
</tr>
<tr>
<td>5 Malabarica</td>
<td>8 [M. borneensis] = M. malaccensis, 9 M. malabarica, 10 [M. fallax] = M. iners, 11 M. malaccensis, 12 M. andamanica</td>
</tr>
<tr>
<td>6 Littoralis</td>
<td>13 M. guatteriifolia, 14 [M. cookii], 15 [M. riedelii], 16 [M. littoralis] these three are all M. guatteriifolia</td>
</tr>
<tr>
<td>8 Lepidota</td>
<td>22 M. lepidota</td>
</tr>
<tr>
<td>9 Tubiflora</td>
<td>23 M. tubiflora</td>
</tr>
<tr>
<td>10 Elliptica</td>
<td>24 M. elliptica</td>
</tr>
</tbody>
</table>

*Foot-note*:—Excluding *M. guadalcanalensis* the figures are now 71 and 21 and 29.58 per cent.
He lists the following species after the key. He could not place them in any series for the male flowers were then unknown:

- 56 M. amplifolia,
- 57 bancana,
- 58 beccarii,
- 59 lancifolia,
- 60 sericea,
- 61 iners,
- 62 garciniifolia,
- 63 vordermanii,
- 64 salomonensis,
- 65 anceps,
- 66 sumbavana,
- 67 wallacea,
- 68 spanogheana,
- 69 albertisis,
- 70 finschii,
- 71 longipes,
- 72 resinosa,
- 73 impressa,
- 74 sulcata,
- 75 chalmersii,
- 76 globosa,
- 77 baeuerlenii.

All names in italics are now synonyms or varieties with a new status. Names in roman are good species.

In an “Anhang” he places 78 neglecta. The following consisted of loose fruit only: — 79 pseudo-argentea, 80 *avisparadisiacae, 81 macrocarya and at the end of the monograph, page 619, was added 82 koordersii.

*Note:*—According to Article 21, recommendation 21B of the Rules of Botanical Nomenclature the name of a series should be a plural adjective. Since Myristica is feminine the adjective should end in ae. Thus series Maxima should be series Maximae. I have accordingly altered Warburg’s terminations in my own list to a plural ending.

*Foot-note:*—Warburg’s original name is M. avis paradisiacae.
List of Myristica species according to their positions in the series and text in this paper

section I MYRISTICA

1. series Maximae
   1. M. maxima Warb.
   2. M. papyracea J. Sinclair
   3. M. philippensis A. DC.

2. series Uncinatae
   4. M. umbrosa J. Sinclair
   5. M. uncinata J. Sinclair

3. series Hooglandiae
   7. M. hooglandii J. Sinclair
   8. M. carrii J. Sinclair

4. series Maingayae
   9. M. umbrosa J. Sinclair
   10. M. lowiana King
   11. M. maingayi Hk. f.

5. series Malabaricae
   12. M. malabarica Lamk
   13. M. umbellata Elmer
   15. M. malaccensis Hk. f.

6. series Ellipticae
   16. M. elliptica Wall. ex Hk. f. et Th.

    var. elliptica
   var. similium (A. DC.) J. Sinclair
   var. celebica (Miq.) J. Sinclair
   17. M. garciniifolia Warb.
   18. M. inopinata J. Sinclair
   19. M. schleinitzii Engler
   20. M. rosselensis J. Sinclair

7. series Cinnamomeae
   21. M. cinnamomea King

8. series Littorales
   22. M. guatterifolia A. DC.
   23. M. agusanensis Elmer
   24. M. markgraviana A. C. Smith

9. series Fragrantes
   26. M. impressinervia J. Sinclair
   27. M. argentea Warb.
   28. M. succedanea Reinwardt ex Bl.

section II FATUA

10. series Fuscae
    29. M. brassii A. C. Smith
    30. M. sphaerosperma A. C. Smith
    31. M. womersleyi J. Sinclair
    32. M. fuscus Mg
    33. M. chrysophylla J. Sinclair
        var. chrysophylla
        var. entrecasteauxensis J. Sinclair

    var. morobensis J. Sinclair
    var. morotaensis J. Sinclair
    var. papua Mg
    var. platyphylla (A.C. Smith) J. Sinclair
    var. quercicarpa J. Sinclair
    var. sangwoensis J. Sinclair
    var. spanogheana Miq.) J. Sinclair
    var. subcordata (Bl.) Miq.
    var. wenzeli (Merr.) J. Sinclair
    var. affinis (Warb.) J. Sinclair
    var. inutilis (Rich. ex A. Gray) J. Sinclair
    var. magnifica (Beddome) J. Sinclair
    var. morindifolia (Bl.) J. Sinclair

11. series Fatuae
    34. M. koordersii Warb.
    35. M. lepidota Bl.
    36. M. fatua Houtt.
        var. fatua
        var. affinis (Warb.) J. Sinclair
        var. inutilis (Rich. ex A. Gray) J. Sinclair
        var. magnifica (Beddome) J. Sinclair
        var. morindifolia (Bl.) J. Sinclair
    var. wenzeli (Merr.) J. Sinclair
    var. morobensis J. Sinclair
    var. morotaensis J. Sinclair
    var. papua Mg
    var. platyphylla (A.C. Smith) J. Sinclair
    var. quercicarpa J. Sinclair
    var. sangwoensis J. Sinclair
    var. spanogheana Miq.) J. Sinclair
    var. subcordata (Bl.) Miq.

12. series Tenuiveniace
    38. M. smithiesii J. Sinclair
    40. M. buchneriana Warb.
    41. M. pedicellata J. Sinclair
    42. M. tenuivenia J. Sinclair
    43. M. archboldiana A. C. Smith
Geographical Distribution of the species

The species composition of each geographical area of distribution, Malesian and Extra-Malesian is now given. Endemics are in bold type.

MALESIAN SPECIES

SUMATRA:

M. cinnamomea; M. crassa; M. elliptica; M. gigantea; M. guatterifolia; M. iners; M. lowiana; M. maingayi probably; M. maxima. Total 9 species. Endemic none.

MALAY PENINSULA:

M. cinnamomea; M. crassa; M. elliptica; M. gigantea; M. guatterifolia; M. iners; M. lowiana; M. maingayi; M. malaccensis; M. maxima. Total 10 species. Endemic none. [M. fragrans, sparingly but widely cultivated, is not native, so it is not counted].

JAVA:

M. guatterifolia; M. iners; M. teijsmannii.

Total 3 species. Endemic 1 species.

LESSER SUNDA ISLANDS:

M. fatua var. spanoghena; M. insipida; M. lancifolia var. montana. Total 3 species including 2 vars. Endemic 1 variety.
Borneo: M. beccarii; M. cinnamomea; M. elliptica var. elliptica and var. celebica; M. gigantea; M. guatterifolia; M. iners; M. lowiana; M. malaccensis; M. maxima; M. papyracea; M. smithioides; M. villosa. Total 12 species + 1 var. Endemic 4 species.

Philippines: M. agusanensis; M. ceylanica var. ceylanica and var. cagayanensis; M. cinnamomea; M. elliptica var. similatum; M. fatua var. fatua and var. wenzelii; M. guatterifolia; M. philippensis; M. umbellata. Total 8 species + 2 vars and including 1 var. Endemic 3 species + one endemic variety. M. elliptica var. similatum is here reckoned as a species including a variety.

Celebes: M. elliptica var. celebica; M. fatua var. affinis; M. impressinervia; M. koordersii; M. lancifolia var. fatua and var. wenzelii; M. guatterifolia; M. philippensis; M. umbelata. Total 8 species + 2 vars and including 2 vars. Endemic 2 species + 2 vars.

Moluccas: M. elliptica var. celebica; M. fatua var. fatua, var. morotaiensis and var. sangowensis; M. fragrans; M. globosa; M. koordersii; M. lancifolia var. bifurcata and var. montana; M. subalulata; M. succedanea. Total 8 species + 3 vars and including 2 vars. Endemic 2 species + 2 vars.

New Guinea: a. section I — M. argentea; M. carrii; M. garciiniifolia; M. hooglandii; M. inopinata; M. markgraviana; M. neglecta; M. rosseleensis; M. schleinitzii; M. umbrosa; M. uncinata. [Total 11 species]

b. section II — M. archboldiana; M. brasii; M. bucheriana; M. chrysophylla var. chrysophylla and var. entrecasteauxensis; M. concinna; M. cornutiflora; M. crassipes; M. cuculata; M. cylindrocarpa; M. ensifolia; M. fatua var. morindiiifolia; M. morobensis, var. papuana, var. quercicarpa and var. subcordata; M. firmipes; M. flosculosa; M. fusc; M. globosa; M. gracilipes; M. hollrungi; M. insipida; M. lancifolia var. lancifolia; var. bifurcata and var. clementisii; M. lepidota; M. longipes; M. pedicellata; M. sphaerosperma; M. subalulata; M. sulcata; M. tenuivenia; M. tubiflora; M. undulatifolia; M. womersleyi. [Total 29 species + 7 vars and including 1 var.] Grand Total for the two sections, 40 species + 7 vars and including 1 var. Endemic 34 species + 6 vars.

Extra-Malesian Species

India: M. dactyloides; M. fatua var. magnifica; M. malabarica. Total 3 species including 1 var. Endemic 1 species + 1 var.

Ceylon: M. ceylanica var. ceylanica; M. dactyloides. Total 2 species. Endemic none.

Andamans and Nicobars: M. andamanica. Total 1 species. Endemic 1.
<table>
<thead>
<tr>
<th>Region</th>
<th>Species Information</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BURMA:</strong></td>
<td><em>M. guatterifolia</em>. Total 1 species. Endemic none.</td>
</tr>
<tr>
<td><strong>INDO-CHINA:</strong></td>
<td><em>M. guatterifolia; M. iners</em>. Total 2 species. Endemic none.</td>
</tr>
<tr>
<td><strong>SIAM:</strong></td>
<td><em>M. crassa; M. elliptica var. elliptica; M. iners</em>. Total 3 species. Endemic none.</td>
</tr>
<tr>
<td><strong>FORMOSA:</strong></td>
<td><em>M. ceylanica var. cagayanensis; M. elliptica var. simiarum</em>. Total 2 species including 2 vars. Endemic none.</td>
</tr>
<tr>
<td><strong>AUSTRALIA:</strong></td>
<td><em>M. insipida</em>. Total 1 species. Endemic none.</td>
</tr>
<tr>
<td><strong>SOLOMONS:</strong></td>
<td><em>M. platyphylla; M. globosa; M. insipida; M. kajewskii; M. petiolata; M. schleinitzii</em>. Total 6 species + 1 var. and including 1 var. Endemic 2 species + 1 var.</td>
</tr>
<tr>
<td><strong>THE BANKS GROUP:</strong></td>
<td>*M. hypargyraea var. <em>guillauminiana</em>. Total 1 endemic variety.</td>
</tr>
<tr>
<td><strong>NEW HEBRIDES:</strong></td>
<td><em>M. fatua var. papuana</em>. Total 1 variety. Endemic none.</td>
</tr>
<tr>
<td><strong>FIJI:</strong></td>
<td><em>M. castancifolia; M. chartacea; M. hypargyraea var. gillespieana</em>. Total 3 species including 1 var. Endemic 2 species.</td>
</tr>
<tr>
<td><strong>TONGA:</strong></td>
<td><em>M. hypargyraea var. gillespieana</em>. Total 1 species including 1 var. Endemic none.</td>
</tr>
<tr>
<td><strong>SAMOA:</strong></td>
<td><em>M. fatua var. inutilis; M. hypargyraea var. hypargyraea</em>. Total 2 species including 1 var. Endemic 1 species and 1 var. This might also be expressed as 2 endemic vars as in Map 2.</td>
</tr>
<tr>
<td><strong>CAROLINES</strong></td>
<td><em>(Palau Islands)</em>: <em>M. hypargyraea var. insularis</em>. Total 1 species including 1 var. Endemic 1 var.</td>
</tr>
</tbody>
</table>

From a study of the above enumeration, showing the number of species in each region, and from a comparison with the corresponding one for *Knema* in *Gard. Bull. Sing.* 18 (1961) 106, it will be seen that the distribution of *Myristica* differs from that of *Knema* in a number of ways. The main centre of distribution and origin of *Myristica* is in New Guinea and from there it appears to have spread both eastwards and westwards, while *Knema* is essentially a western Malesian genus with its main centre of origin in Borneo and a lesser one in the Malay Peninsula. It only just reached western New Guinea with a single species, while *Myristica* attained its greatest development in New Guinea with some 40 species and eight varieties out of which no less than 34 species and six varieties are endemic in that island. From the Solomons the genus extends eastwards in gradually diminishing numbers of species to the New Hebrides, Fiji, Tonga and Samoa with a northward extension of one species to the Carolines and a southerly spur to north and north-east Australia with one species. In comparison *Knema* terminates, as stated, in New Guinea without any further eastward migration and it is absent from Australia. The advance of

*Foot-note:*—See Addenda. This var. has now turned up in the Santa Cruz Group.
Myristica into western Malesia was easier than the eastward route, being facilitated by the greater continuity of the land-mass over which it had to pass. It even reached Ceylon where Knema is absent but is fewer in species than Knema, especially in Borneo and the Malay Peninsula. It surpassed Knema in the number of species in peninsular India but fell behind in Siam, Indo-China and Burma. It is absent in the Eastern Himalayan region, China and Hainan. Myristica as a genus is remarkable for the uniformity of characters in all its species but it did not pass from New Guinea to western Malesia entirely unaltered. It must be apparent by now that the greater number of species in New Guinea belongs to section II with a short, woody, scar-covered, persistent, Knema-type of inflorescence, while those in western Malaysia show a much greater development of the branched panicle and belong mostly to section I. It may be that the wetter and more uniform climate of western Malesia has encouraged the development of the slender branched inflorescence axis. Another point that may be noticed from the distribution list is the high percentage of endemics in Myristica for the whole area of distribution, some 75 per cent as against 46 per cent in Knema. Apart from one species, M. fatua, there is not very much polymorphism.

Notes on Distribution in some of the more important areas

a. Malay Peninsula
A few new first records have been added since the revision in Gard. Bull. Sing. 16 (1958). Myristica iners turned up in two more provinces, namely Kelantan and Negri Sembilan with M. cinnamomea and elliptica var. elliptica new to Kelantan and maxima new to Trengganu.

b. Borneo
Myristica elliptica var. celebica occurs in the jutting peninsula of North-East Borneo nearest to Celebes. M. lowiana and maxima were recently collected in British North Borneo for the first time. The record of endemic species in Borneo is low in comparison with that of Knema.

c. Philippines
There is nothing new from the Philippines since Merrill's time.

d. New Guinea
Definition:—The term New Guinea as used in this paper means the whole island as well as its various off-shore archipelagos and is the same as van Steenis's Division IX with its 29 smaller units as used in Flora Malesiana. His divisions of New Guinea are excellent phytogeographical ones and should be retained even if they are to be changed politically. It should be mentioned, however, that all the main administrative areas in Australian Papua and T.N.G. are now called Districts. Those of Papua have recently been changed from Division to District to bring them into line with the same terminology which has long been in use in T.N.G. Thus we have Central District (formerly Central Division) in Papua corresponding to Morobe District in T.N.G.

Remarkable progress in building up of collections from New Guinea has taken place in the last few years since 1956. Many of Warburg's rare species known only from a single gathering and destroyed during the war at Berlin as well as several new species have now been obtained. The high standard and the fine quality of the specimens with excellent and most informative field notes are to the credit of a small group of energetic and exceptionally skilful and discriminating collectors who seem to know just what is wanted. I am extremely grateful to them and for the
service they have rendered to increase our knowledge of the family, especially with new information about field characters, habitat and distribution. Among the names deserving special mention are those of Womersley, Hoogland, Brass, Koster, Kalkman and van Royen. Womersley and his staff from the Forest Department of Lae have done valuable work in many areas, particularly in the Eastern Highlands and also in New Britain. Hoogland has many fine collections from the Northern District of Papua. Brass recently visited the D'entrecasteaux Islands, a hitherto botanically unexplored region, and obtained several novelties not only in Myristiceae but in other families as well. Outstanding is the large number of tree ferns recently described by Holtum from the Brass collection made in that area. Van Royen rediscovered M. neglecta, one of Warburg's doubtful species, and obtained first class material of the also doubtful M. lancefolia from Pulau Waigeo, and from his collection it can now be proved that P. Waigeo is the type locality and not P. Bouton (see under notes for that species). The very active Dutch botanists of the Forest Department at Hollandia, alas, have gone, with a short and fruitful era closing behind them. They got fine collections of M. garecinifolia, another species imperfectly known up till recently. It is a pity that more seeds and living collections of the species in danger of extinction could not be brought to permanent sites in botanic gardens in the tropics, for New Guinea, a living plant museum, is doomed and could soon be denuded of its wonderful forests. It would be best for science and taxonomic botany if both New Guinea and Borneo could be evacuated of their entire population and turned into a vast nature reserve under the control of a responsible international body. God protect forests that remain in what is known as the "under-developed" or developing countries." The future population of the world may one day have to live on the sea as there will be no standing room on land. Income tax reliefs and other remunerations will, no doubt, one day be given to people to encourage them to produce fewer offspring and rigorous family planning campaigns made compulsory for those who are too fertile. There are too few systematic botanists to be able to revise all the families before the forests are felled. They are usually poorly paid and few are able to visit the forests of remote countries to see and obtain living material for their studies. Many difficult problems could easily be solved by a check-up on living material in situ. There are fewer botanists still who have any influence over stubborn politicians or on the unsympathetic masses of laymen and labourers. The herbarium botanist is often too complacent or too busy with routine work to think of conservation in foreign lands. He fears the opposition he will meet if he tries to interfere. A determined and militant group of botanists, not afraid to use some force, and backed by a private army, if that were possible, might accomplish something before it is too late.

The distribution of Myristica species in the separate 29 divisions of New Guinea was in Warburg's day very imperfectly known. It is still far from complete and changing from time to time. We cannot, with any certainty state that this particular species is confined to Dutch New Guinea or that that one occurs only in the south-east end of the island. I shall however, list here the species that are, to-date, confined to Dutch New Guinea and those that belong to the Australian part.

(1) Species of the three divisions of Dutch New Guinea.

(2) Species of Australian territory, i.e. Papua and T.N.G., the Mandated Territory (former Kaiser-Wilhelmsland)
(3) Species common to the whole island


Summarizing the results of the above data for New Guinea, the position as it stands to-date is as follows:—

1. Out of a total of 40 species and 8 varieties in New Guinea 5 species are confined to the western or Dutch part, 19 are from the eastern or Australian part (2 territories. Papua and the Mandated Territory of New Guinea) while 16 are common to both (1) and (2). The sum of these three numbers for categories (1), (2) and (3) will total 40 if the count is made at the species level. Thus in (2) species Nos. 8 and 13 have varieties so the total number is reckoned as 19 and not 21. *M. fatua* and *lancifolia* being common to both the Dutch and Australian parts as species but not at the varietal level.

2. As already mentioned 34 species and 6 varieties are endemic in New Guinea.

3. Of those not endemic, 6 species including 2 varieties also occur in some of the neighbouring territories, e.g. *M. fatua* var. *papuana* is also in the Solomons and the New Hebrides; *M. globosa* in the Moluccas and the Solomons; *M. insipida*, Lesser Sunda Islands and North and North-East Australia; *M. lancifolia* var. *bifurcata*, the Moluccas and doubtfully Celebes; *M. schleinitzii*, the Solomons and *M. subalulata*, the Moluccas (Kai islands only). It will be noticed that none of them occurs in Western Malesia.

4. Of the 40 species and 8 varieties in New Guinea, nearly one half, 18 species and 4 varieties are new to science. More new ones are expected to turn up.

e. Ceylon

The rather rare Ceylon species, *M. ceylanica*, is not different from the common Philippine species, *M. cumingii*. At least, I cannot separate them so the older name *M. ceylanica* has to be used. This discovery once more brings out the need to study the extra-Malesian species in a complete revision. The somewhat unusual geographical distribution, missing the Malay Peninsula and Borneo, does not come as a shock. A similar case occurs in the Annonaceae where *Anacaxagorea luzonica* of the Philippines also misses the Malay Peninsula but occurs in Ceylon where it used to be known as *A. ceylanica*. Climatic similarities no doubt play a role in the distribution of these species. In Ceylon *M. ceylanica* is found in drier situations than those in which the closely related species, *M. dactyloides*, grows. I was first acquainted with this type of ecological habitat at Mount Makiling in Luzon where I saw *Anacaxagorea luzonica* growing with *M. elliptica* var. *simiarum* in dense shade in the rocky dried-up bed of a stream on the lower mountain slopes. *M. ceylanica* has also been collected here at Mount Makiling but I did not see it.

f. Siam and Indo-China

There is a paucity of species here. They are found only in the south in both these areas and represent a Malayan element.

g. Australia

The widely distributed, coastal sand dune species, *M. insipida*, has spread to northern and north-eastern Australia from New Guinea and Timor Laut. It has been known from Australia for a long time.

h. Samoa

This is the most easterly station known for *Myristica*, distance and water now acting as barriers to any further eastward extension.
General Characters and their Usefulness in Classification

Method of presentation and objects in view

The general characters of Myristica have already been dealt with to a certain extent in the paper "A Revision of the Malayan Myristicaceae" in Gard. Bull. Sing. 16 (1958) but since the number of species described there is not great, a more complete account is now offered. There are masses of dry facts and details but how can they be presented so as not to discourage the student? It is obvious that a selection of the most useful must be made and arranged in some order before we can name the species. The best order will be one which corresponds closely with the sub-divisions of the genus into sections, series, species, etc. It is not for the pattern to be broken up but for it to be integrated into a whole so that we can see how the major groups are related and what general principles can be laid down. Such an arrangement will then form the basis for the key. The keys bring certain contrasting characters together which may be useful in the identification of two species but they are not elastic and cannot always be adjusted to bring in some other desired character simultaneously and conveniently. An attempt has been made here to supplement the keys by a slightly different arrangement of the useful general characters of each plant organ. Thus, if a species has leaves with a cordate base, then the other species that have such bases are also mentioned. Cordate bases are not common so the number of species that have them will not be too numerous to remember. As the species that have them belong to widely separated series, it would not be possible to bring them together in the same place in a type of key which brings certain series together. The most useful characters for identifying species are pointed out under the various organs in turn and those which are less valuable may be omitted. Lists of species which have unusual or peculiar characters are given if such characters are an aid to identification. The student is advised to read through the introduction before attempting to use the keys.

Habitat

The majority are inhabitants of lowland, tropical, evergreen rain forest. There are several mountain species, however, especially in New Guinea, most of these belonging to series Fuscae and Tubiflorae and ranging from 1,200–1,500 m above sea-level. A few of the mountain species are below the 1,000 m line but M. cucullata, longipes, sphaerosperma and subalulata are exceptional in reaching 2,000 m or slightly above. Mountain species outside New Guinea are M. ceylanica and dactyloides in Ceylon and koordersii in Celebes. The first, however, does not go above 830 m in its upper limits. M. buchneriana is a New Guinea species with a preference for ridge tops from 300–1,300 m. A list of mountain species is appended with their altitude ranges. Seashore species are few and prefer a sandy or rocky substratum. M. guatterifolia, garciniiifolia, insipida and schleinitzii occur on coastal dunes while
the first is also found on rocky sea-cliffs, particularly on those of small uninhabited islands. *M. hollrungii* grows on muddy river banks near the sea or in the upper brackish regions of the mangrove subject to inundation. *M. elliptica* var. *celebica* and *M. impressinervia* are recorded from limestone. Quite a few of the lowland species grow in fresh water swamp or peat swamp forest. Many of these species have stilt-roots, but often the same species tends to lose them if it grows in dry situations. The presence of these roots is therefore not very reliable as a systematic character, but it may be helpful at times. I am inclined to believe that most species would acquire them if induced to grow in swamp forest.

**List of mountain species**

- *M. brassii* 1,700 m
- *M. buchneriana* 300-1,300 m
- *M. ceylanica* 830 m
- *M. crassipes* 700-1,385 m
- *M. cucullata* 560-2,030 m
- *M. dactyloides* 300-1,500 m
- *M. flosculosa* low-1,538 m
- *M. globosa* sea-level-1,230 m
- *M. koordersii* 200-1,100 m
- *M. longipes* 460-2,000 m
- *M. markgraviana* 184-923 m
- *M. sphaerosperma* 1,150-2,100 m
- *M. subalulata* (mountain forms) 2,215 m
- *M. teijsmannii* 100-1,000 m
- *M. tubiflora* sea-level-1,538 m
- *M. uncinata* 1,385 m
- *M. womersleyi* 2,000 m

**Species for which stilt-roots have been recorded**

- *M. andamanica*
- *M. argentea*
- *M. beccarii*
- *M. crassa*
- *M. dactyloides*
- *M. elliptica* var. *elliptica*
- *M. fatua* var. *fatua*
- *M. fatua* var. *magnifica* (it also has knee-roots)
- *M. fatua* var. *morindii-folia*
- *M. fatua* var. *papuauna*
- *M. fatua* var. *platyphylla*
- *M. firmipes*
- *M. garciniifolia*
- *M. hollrungii*
- *M. iners* (very rarely)
- *M. kajewskii*
- *M. koordersii*
- *M. lancifolia* var. *elemensii*
- *M. lowiana*
- *M. malabarica*
- *M. papyracea* (sometimes)
- *M. schleinitzii*
- *M. smithiesii*
- *M. succedanea* (always?)
- *M. teijsmannii*
- *M. umbrosa*
- *M. villosa*

**Frequency and Rarity of Species**

John Wyatt-Smith, formerly of the Forest Research Institute, Kepong, Selangor, Malaya, in *unpublished* data on silviculture, informed me that when making surveys of lowland dipterocarp forest in Malaya, he found that the percentage of *Myristicaceae* species to the acre was about three per cent. The percentage in Sarawak must be slightly higher as I have noticed myself that in the areas I visited, the *Myristicaceae* are more numerous per acre than in Malaya. The number of different species in Sarawak we already know from these "Precursors" to be greater than in Malaya. A recent practice in silviculture in Malaya, in order to preserve the economic dipterocarp species, has been to poison

*Foot-note:*—Now published as Malayan Forest Records No. 23 (1963)— Manual of Malayan Silviculture for Inland Forests, parts 1-3 by J. Wyatt-Smith.
or ring-bark the smaller, uneconomic trees of other species in certain dipterocarp forests. This will give young dipterocarp seedlings a chance to grow while the old trees are removed thus producing a more open type of forest. Surely three per cent Myristicaceae is not a large number and cannot be in the way in such operations as they are monopodial trees with mast-like trunks and their branches do not spread. I appeal to foresters to leave them alone as they are rare and their seedlings cannot regenerate outside the shade of the primary forest. I have had no success using ordinary, simple methods in trying to grow them from cuttings. That the shade of the forest is necessary in the propagation of early stages of many trees, is clearly demonstrated by the following example. I had a good germination of Parishia pauciiflora in a flower pot up to the cotyledon stage. The pot was in full sun and it was then noticed that the first seedling leaves appeared at the end of a rather long epicotyl but never unfolded. They soon began to wither as well as part of the epicotyl. The pot was at once removed to cool shade and there was an immediate revival. The undamaged parts came to life, the young leaves unfolded and soon the second pair of foliage leaves appeared. The seedlings were saved just in time and made good recovery. If left alone in the forest some species of Myristica do eventually reach 100 ft or over, (see below) and at that size would have some economic value.

In New Guinea, in particular, there are several species which are very rare or have been collected once only. Other species, collected once only in an area, are actually common there, as mentioned on the label, e.g. M. cornutiflora and fatua var. sangowoensis. A list of the rarest species is now given for interest. This may be useful in identification or in using the key as the following will show. It has often happened in the past, in the case of two closely allied species, that the amateur botanist, always keen to find rare or new records, has a tendency to believe or hope that he has collected the rarer species of the two. I am referring to all families, not to Myristicaceae in particular. Erroneous records in the British Isles have, in the past, often resulted from this trait, coupled with inexperience of the numerous amateurs. If in Myristica, the species keys out to be one of the following rare ones, it would be best to check the identification carefully. The number after the species in the appended list indicates the number of times it has been collected.

List of rare species in Myristica

<table>
<thead>
<tr>
<th>Species</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>M. archboldiana</td>
<td>1</td>
</tr>
<tr>
<td>M. brassii</td>
<td>1</td>
</tr>
<tr>
<td>M. concinna</td>
<td>3</td>
</tr>
<tr>
<td>M. cylindrocarpa</td>
<td>2</td>
</tr>
<tr>
<td>M. ensifolia</td>
<td>1</td>
</tr>
<tr>
<td>M. fatua var. morobensis</td>
<td>1</td>
</tr>
<tr>
<td>M. fatua var. quercicarpa</td>
<td>1</td>
</tr>
<tr>
<td>M. fatua var. sangowoensis</td>
<td>1</td>
</tr>
<tr>
<td>M. firmipes</td>
<td>1</td>
</tr>
<tr>
<td>M. gracilipes</td>
<td>2</td>
</tr>
<tr>
<td>M. hypargyraea var. guillauminiana</td>
<td>1</td>
</tr>
<tr>
<td>M. inopinata</td>
<td>2</td>
</tr>
<tr>
<td>M. impressinervia</td>
<td>1</td>
</tr>
<tr>
<td>M. neglecta</td>
<td>4</td>
</tr>
<tr>
<td>M. pedicellata</td>
<td>1</td>
</tr>
<tr>
<td>M. petiolata</td>
<td>1</td>
</tr>
<tr>
<td>M. tenuivenia</td>
<td>2</td>
</tr>
<tr>
<td>M. uncinata</td>
<td>2</td>
</tr>
<tr>
<td>M. undulatifolia</td>
<td>4</td>
</tr>
<tr>
<td>M. womersleyi</td>
<td>1</td>
</tr>
</tbody>
</table>
In New Guinea the commonest species are: — *M. fatua* var. *papuana*, *M. globosa*, *M. hollrungii*, *M. subalulata* and to a less extent *M. tubiflora*. Outside New Guinea the most frequent are: — *M. elliptica* var. *elliptica*, *M. fatua* var. *fatua*, *M. fragrans*, *M. guatterifolia* and *M. iners*.

Mountain species tend to be rarer than lowland ones. Species from isolated areas and islands are often endemic, e.g. *M. hypargyraea* var. *guillauminiana*. Species with numerous flowers and fruits are often common, also the smaller trees with small fruits. The small fruits are more easily distributed by birds and other animals. Polymorphic species and especially those with several varieties spread far and wide as also do the coastal dune and seashore species. Those growing along river banks like *hollrungii* are probably distributed by water. Its seeds are small and light.

**Size**

They do not reach the first storey like the dipterocarps but a few are canopy trees of the second order. The majority reach 30 ft or 10–12 m. The smallest recorded is *M. ensifolia* 1.5 m high and the tallest, *M. sulcata*, 12–43 m. *M. gigantea* comes next, 30–40 m high, while there are several over 30 m. Incidentally some of the tall ones have very small flowers, e.g. *M. globosa*, *lepidota* and *malabarica*. Mountain species naturally tend to be smaller than those at a lower elevation. Keys do not usually give the height of the tree but it is often recorded by foresters on the herbarium label. A list of the smallest and tallest might be useful in supplementing the key. The lowest figure where there are two given will also show approximately how high the tree is when it first begins to reproduce as my records are based mostly on fertile specimens.

**Height of the smallest species**

<table>
<thead>
<tr>
<th>Species</th>
<th>Height (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M. brassii</td>
<td>6</td>
</tr>
<tr>
<td>M. carrii</td>
<td>3-7</td>
</tr>
<tr>
<td>M. cylindrocarpa</td>
<td>6</td>
</tr>
<tr>
<td>M. ensifolia</td>
<td>1.5</td>
</tr>
<tr>
<td>M. gracilipes</td>
<td>6</td>
</tr>
<tr>
<td>M. impressinervia</td>
<td>6</td>
</tr>
<tr>
<td>M. cornutiflora</td>
<td>5-12</td>
</tr>
<tr>
<td>M. subalulata</td>
<td>3-10</td>
</tr>
</tbody>
</table>

**Height of the largest species**

<table>
<thead>
<tr>
<th>Species</th>
<th>Height (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>M. archboldiana</td>
<td>30</td>
</tr>
<tr>
<td>M. dactyloides</td>
<td>27</td>
</tr>
<tr>
<td><em>M. fatua</em> var. magnifica</td>
<td>30+</td>
</tr>
<tr>
<td><em>M. fatua</em> var. papuana</td>
<td>9-30</td>
</tr>
<tr>
<td><em>M. fatua</em> var. quercicarpa</td>
<td>37</td>
</tr>
<tr>
<td>M. fusca</td>
<td>20-30</td>
</tr>
<tr>
<td>M. gigantea</td>
<td>30-40</td>
</tr>
<tr>
<td>M. globosa</td>
<td>8-35</td>
</tr>
<tr>
<td><em>M. hollrungii</em></td>
<td>6-36</td>
</tr>
<tr>
<td>M. iners</td>
<td>10-36</td>
</tr>
<tr>
<td>M. lepidota</td>
<td>22-35</td>
</tr>
<tr>
<td>M. maingayi</td>
<td>36</td>
</tr>
<tr>
<td>M. malabarica</td>
<td>25-30</td>
</tr>
<tr>
<td>M. maxima</td>
<td>15-30m</td>
</tr>
<tr>
<td>M. papyracea</td>
<td>22-37</td>
</tr>
<tr>
<td>M. pedicellata</td>
<td>30</td>
</tr>
<tr>
<td>M. sulcata</td>
<td>12-43</td>
</tr>
<tr>
<td>M. uncinata</td>
<td>30</td>
</tr>
</tbody>
</table>
Bark

The bark is either blackish or blackish grey to some shade of brown in colour. The blackish type varies from longitudinally striate to deeply longitudinally fissured. It is rather thin, hard but brittle and may flake or not in old trees. Species having this type of bark are *M. gigantea*, *maingayi*, *lowiana*, *iners* and *malabarica*. These mentioned cannot be distinguished from each other by the bark. The brownish shades of bark are more variable as to striations and flaking. The striations are generally not so deep or they may be absent. The flaking may be in very small rectangular pieces, often following a longitudinal pattern or it may be irregular in large, thin papery portions such as in *villosa* and *papyracea*. There is a lot of detail in bark manifestations so it is better to refer to the individual species in the Systematic Part for the variations. The appearance of the bark in many trees still remains unknown as collectors have stated nothing about it for these species on the labels. It may be pointed out here that the two rather similar species *M. iners* and *malaccensis* can easily be distinguished by the bark. I saw them both growing in the Semengoh Forest Reserve (Arboretum) near Kuching in Sarawak and I found the Dyak tree climbers were well acquainted with their differences.

Twigs

Some unrelated species have certain peculiarities in their twigs but neither these peculiarities nor such species will come together for contrast in the keys which are here based on related species and the series to which they belong. A large number of species have very similar twigs, too uniform to be of much use in identification. *M. subalulata*, the only species to have myrmecophil, can at once be eliminated from the rest by the ant swellings on its twigs. These may not, however, be present on every twig seen on a herbarium sheet. A few species have two lines stretching from petiole base to petiole base. These may be faint or distinct, usually faint or absent in the older, terete portions of the twig.

*List of species with two lines on the twigs*

<table>
<thead>
<tr>
<th>Species</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>M. crassipes</em></td>
<td></td>
</tr>
<tr>
<td><em>M. cylindrocarpa</em>—2-angled at the apex only</td>
<td></td>
</tr>
<tr>
<td><em>M. ensifolia</em>—2-angled at the apex only</td>
<td></td>
</tr>
<tr>
<td><em>M. fatua var. fatua</em>—lines rather faint, not always present</td>
<td></td>
</tr>
<tr>
<td><em>M. fatua var. inutilis</em>—very faint or 2-angled at the apex only</td>
<td></td>
</tr>
<tr>
<td><em>M. fatua var. morotaiensis</em>—very distinct</td>
<td></td>
</tr>
<tr>
<td><em>M. fatua var. papuaiana</em></td>
<td></td>
</tr>
<tr>
<td><em>M. flosculosa</em></td>
<td></td>
</tr>
<tr>
<td><em>M. hollrungii</em></td>
<td></td>
</tr>
<tr>
<td><em>M. sulcata</em>—distinct</td>
<td></td>
</tr>
<tr>
<td><em>M. subalulata</em>—very distinct, sometimes slightly winged</td>
<td></td>
</tr>
</tbody>
</table>

A few species have an abundance of lenticels on the twigs.
List of species with lenticels

M. argentea—numerous, giving the twigs a rough appearance
M. castaneifolia—a few
M. crassipes—a few
M. cucullata—a few
M. fatua var. fatua—numerous
M. fatua var. inutilis—numerous
M. fatua var. morindifolia
M. fatua var. morotaiensis
M. fatua var. papuana

M. fatua var. sangowoensis
M. hollrungii—a few
M. hypargyraea var. hypargyraea—numerous
M. hypargyraea var. insularis—a few
M. pedicellata
M. undulatifolia—a few
M. womersleyi

The species with very thick twigs, 5 mm and over, the semipachycaul species as they might be called, are readily separated from many which have slender twigs, 1-2 mm thick. The remainder and majority are in a class having the twigs 3-5 mm thick. These measurements are taken in the apical regions of the twigs and tend to vary. Often tall trees have slender twigs such as M. gigantea, iners and lepidota.

Thick twigs

M. carri—5-7 mm thick
M. castaneifolia—5-7 mm and 1 cm lower down
M. chrysophylla—4-6 mm
M. crassa—6-7 mm, more lower down
H. fatua var. wenzelii—6 mm, 8 mm—1 cm lower down

M. kajewskii—3-8 mm
M. lowiana—5-8 mm
M. maxima—5-8 mm
M. neglecta—7 mm
M. papyracea—5-8 mm
M. umbrosa—5 mm
M. villosa—1 cm

Slender twigs

M. concinna—1-2 mm
M. cylindrocarpa—2-3 mm
M. ensifolia—2 mm
M. firmipes—1-2 mm
M. fragrans—1-2 mm
M. gigantea—1-2 mm
M. globosa—1-2 mm
M. impressinervia—2 mm
M. iners—2-3 mm
M. lanceifolia var. montana—2 mm
M. lepidota—1-2 mm
M. longipes—2 mm
M. malabarica—2-3 mm
M. tubiflora—1-3 mm, sometimes filiform, 0.4 mm only on very young twigs
M. umbellata—1 mm

Most species have glabrous twigs or these may be puberulous or slightly pubescent on the innovations just below the terminal bud. In contrast, the villose twigs of M. villosa may be easily recognized by the 1-2 mm long hairs on the innovations and by the glabrous, blackish, cracking bark lower down. Series Maingayae, series Fuscae, M. inopinata and some of the varieties of M. fatua have densely tomentose innovations.

Leaves

Leaves are always present and form the main part of a herbarium specimen on a sheet. They have a lot of easily observable characters such as shape, thickness, length and breadth, nature of indumentum, colour on drying, shape of base and apex, length of petiole in proportion to lamina, its thickness, number of veins and whether
parallel or curved, distinct or faint, presence or absence of secondary veins and reticulations. To see these characters, we do not need to dissect or boil up the leaves as in the case of flowers. They should be brought into the key; some botanists say we should start with them. Foresters prefer them and often ignore the reproductive characters. They are of great use but do not supercede floral or fruiting characters for the major divisions of a genus such as sections or series. Leaf characters should be used with caution as many of them are variable and tend to overlap with certain species. As *Myristica* is a uniform genus there tends to be a lot of overlapping characters, not only in leaves but in those of other organs as well. Thus the oblong shape of leaves may overlap or pass over gradually into the oblong-elliptic, or the elliptic into the elliptic-lanceolate or the oblanceolate into the obovate in the same species or in two closely related species. The characters of species at one end of a series may overlap with those at the adjacent end of the next closely related series. This is only natural and will show how one series arose from the next or how one species is related to the next. This may not please the tidy-minded who would prefer every species and every series to be divided off sharply from the preceding but much more is explained by continuity than by a break in morphological pattern. Let us now consider the various useful characters of the leaves in turn.

**Texture of the leaves**

None are membranous or delicate and few are thinly chartaceous. Several are coriaceous and several are chartaceous; in fact most vary between chartaceous and thinly coriaceous with a lot of overlapping. Very few are rigidly coriaceous as the conditions of the primary lowland rain forest are uniform. The leaves of mountain species will tend to be more coriaceous. Those of the following species are brittle and tend to break in herbaria: — *M. elliptica, neglecta* and *teijsmannii*. Generally, the texture is not of very much use as a distinguishing character in a key.

<table>
<thead>
<tr>
<th>Rigidly coriaceous leaves</th>
<th>Other coriaceous leaves</th>
</tr>
</thead>
<tbody>
<tr>
<td>M. crassa</td>
<td>M. brassi</td>
</tr>
<tr>
<td>M. cucullata</td>
<td>M. maingayi</td>
</tr>
<tr>
<td>M. fatua var. sangowoensis</td>
<td>M. malaccensis</td>
</tr>
<tr>
<td>M. lowiana</td>
<td>M. maxima</td>
</tr>
<tr>
<td>M. succedanea</td>
<td>M. sphaerosperma</td>
</tr>
<tr>
<td>M. umbrosa</td>
<td>M. subalulata, mountain forms</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Thingly chartaceous leaves</th>
</tr>
</thead>
<tbody>
<tr>
<td>M. lancifolia var. lancifolia</td>
</tr>
</tbody>
</table>

**Shape of the leaves**

Leaf shape alone is of low diagnostic value. The usual ones are oblong, elliptic and lanceolate and in that order of frequency. A diverse intergradation or combination of these three shapes, one
with the other or less often with the ovate or obovate series is the rule. Some species do have oblong or elliptic leaves but such combinations as oblong-elliptic or oblong-lanceolate, etc. are much more common. Especially protean is *M. insipida* which may have several shapes on the same tree. An unusual shape which is sometimes exemplified by one or two leaves on a twig of some *Myristica* species but which does not predominate and is of no systematic value is the panduriform. It may be seen sometimes in the following along with their normal leaf shapes:— *M. cornutiflora, longipes, malaccensis, maxima, subalulata, sulcata* and *tenuivenia* and may turn up in others. In *M. insipida* there are sometimes a few falcate leaves among the normal symmetrically elliptic ones. The only other useful peculiarities which might help to single out species are the long, narrow-elliptic leaves of *M. ensifolia* and the slightly undulate leaf margins of *M. undulatifolia*. The leaves in most species have an acute apex, though acuminate, bluntly acute or less often obtuse ones also occur. The base is acute or rounded or both in some species. Species with large leaves often have a tendency to vary from rounded to sub-cordate or cordate. Such are *M. castaneifolia*, *chrysophylla*, *fatua* vars *morindiifolia* and *subcordata*, *fuscana*, *hollrungii*, *hypargyraea* vars *gillespieana* and *insularis*, *papyracea*, *philippensis* and *subalulata*, though *archboldiana*, *beccarii*, *garciniifolia* and *schleinitzii*, species with medium-sized leaves, have rounded or subcordate bases also.

**Size of the leaves**

(a) *Lamina*

The largest ones are rarely seen in herbaria, the apical ones are often taken to fit the size of the paper. Some use can be made of size-class in a key. It is obvious that usefulness will be maximum only when the smallest can be contrasted with the largest in the key. For length, three size-classes might be suggested here, but their overlapping ranges need not be absolute. The following might be taken, 1-12-(15) cm small; 15-30 cm medium and 30-50 cm large. Species with the longest leaves are *M. castaneifolia*, *fatua* vars *affinis* and *morindiifolia*, *philippensis* and *umbrosa*. The tabulated enumeratio will give details:—

<table>
<thead>
<tr>
<th>Species</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>philippensis</td>
<td>18-45-50 cm</td>
</tr>
<tr>
<td>hollrungii</td>
<td>20-35 cm</td>
</tr>
<tr>
<td>fatua var. magnifica</td>
<td>20-37 cm</td>
</tr>
<tr>
<td>carrii</td>
<td>20-38 cm</td>
</tr>
<tr>
<td>subalulata, fatua var. wenzelii and hypargyraea var. gillespieana all</td>
<td>20-40 cm</td>
</tr>
<tr>
<td>hooglalndii</td>
<td>22-42 cm</td>
</tr>
<tr>
<td>papyracea</td>
<td>23-40 cm</td>
</tr>
<tr>
<td>villosa</td>
<td>24-36 cm</td>
</tr>
<tr>
<td>fatua var. morindiifolia</td>
<td>24-46 cm</td>
</tr>
<tr>
<td>maxima</td>
<td>25-40 cm  (see note after maxima on special leaf-measuring exercise)</td>
</tr>
<tr>
<td>fatua var. affinis</td>
<td>27-40-(48) cm</td>
</tr>
<tr>
<td>fatua var. fatua</td>
<td>30-35 cm</td>
</tr>
<tr>
<td>castaneifolia</td>
<td>30-60 cm  (herbarium sheets, apical leaves 15-24 cm)</td>
</tr>
<tr>
<td>neglecta</td>
<td>32-40 cm</td>
</tr>
<tr>
<td>umbrosa</td>
<td>37-47 cm</td>
</tr>
</tbody>
</table>
Species with the smallest leaves are shown in a list with their length-measurements. Their breadth is given in brackets.

<table>
<thead>
<tr>
<th>Species</th>
<th>Length (cm)</th>
<th>Breadth (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>firmipes</td>
<td>4-8</td>
<td>(1.5-2.5)</td>
</tr>
<tr>
<td>concinna</td>
<td>5-11</td>
<td>(1-3)</td>
</tr>
<tr>
<td>tubiflora</td>
<td>6-15</td>
<td>(2-6)</td>
</tr>
<tr>
<td>gigantea</td>
<td>7-10</td>
<td>(2-3.5)</td>
</tr>
<tr>
<td>lancifolia var. lancifolia</td>
<td>8-16</td>
<td>(2-6)</td>
</tr>
<tr>
<td>globoa</td>
<td>8-17</td>
<td>(3-5.5)</td>
</tr>
<tr>
<td>lepidota</td>
<td>9-14</td>
<td>(3.5-4.5)</td>
</tr>
</tbody>
</table>

Species with the smallest leaves tend to have the narrowest ones also. *M. ensifolia* is a species with medium size-class leaves, 17-22 cm long but the breadth is only 2-3 cm. Among the broadest leaves in the genus are those of *M. fatua* var. *morindiifolia* 9-19 cm; *papyracea* 10-18 cm and *maxima* 10-16 cm. Other broad ones are as follows:

<table>
<thead>
<tr>
<th>Species</th>
<th>Length (cm)</th>
<th>Breadth (cm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>hollrungii</td>
<td>5-13</td>
<td></td>
</tr>
<tr>
<td>carrui</td>
<td>7-13</td>
<td></td>
</tr>
<tr>
<td>hypargyracea var. gillespieana</td>
<td>7-14</td>
<td></td>
</tr>
<tr>
<td>subalulata &amp; fatua var. fatua</td>
<td>7-15</td>
<td></td>
</tr>
<tr>
<td>umbrosa</td>
<td>8.5-15</td>
<td></td>
</tr>
<tr>
<td>brassii</td>
<td>10-12</td>
<td></td>
</tr>
<tr>
<td>hypargyracea var. insularis</td>
<td>10-15</td>
<td></td>
</tr>
<tr>
<td>fatua var. affinis</td>
<td>10-16</td>
<td></td>
</tr>
</tbody>
</table>

(b) Petioles

The average length for petioles is 1.5-2.5 cm and the average thickness 3mm. Advantage may be taken of lengths 4 cm or over and 1 cm or under to single out certain species. With regard to thickness 5-6 mm may be considered stout and 1-1.5 mm slender. The outsizes will scarcely be noticed if the lamina is in good proportion to petiole measurement. An example of disproportion is seen in *M. archboldiana* where the blade is 13-15 cm long and the petiole 2.5-4 cm long. The species with the longest petioles are: — *M. petiolata* 2.5-6 cm; *papyracea* 3-5.5 cm; *castaneifolia* 3-5.5 cm; *kajewskii* 2-5 cm, while those with the shortest are *beccarii* 6 mm — 1 cm; *malabarica* 5 mm — 1.5 cm; *cylindrocarpa* and *fatuia* var. *subcordata* 7 mm — 1 cm; *ensifolia* and *lancifolia* var. *montana* 8 mm — 1 cm; *globosa* and *tubiflora* 8 mm — 1.5 cm. Those with the stoutest petioles, 5-6 mm thick, are *M. fatua* var. *magnifica*, *maxima*, *neglecta*, *villosa* and *womersleyi*, while *concinna* 1 mm, *lepidota* 1-2 mm, *impressinervia* 1-1.5 mm and *firmipes* 1.5 mm are those with the thinnest.

Colour on drying

The colour on drying should not be neglected as a diagnostic character, for the leaves of many species dry their own particular shade with a constancy that is remarkable. Yet we cannot always rely on colour as polymorphic species like *iners* and *globosa* show some variation. Faulty methods of drying may upset the final appearance of the dry product, but on the whole, the specimens
being tough and bulky, do allow a movement of air into the press so that they seldom go black. There are species with leaves which dry a pale straw colour or a pale greenish brown on the upper surface like *M. elliptica, schleinitzii* and *garciniifolia*, all in series *Ellipticae* and others which, like *umbrosa*, take on a rich nut-brown shade. The blackish brown or dark greyish brown leaves of *sulcata* will often distinguish it from the lighter colour in *subalulata* when sterile as also will the more vivid green of *malaccensis* from the draber tints of *iners* or the dark brown of *lowiana* from the lighter greenish brown of *maingayi*. Coriaceous leaves usually dry darker than chartaceous ones. Some leaves retain their gloss and some lose it; others again are glossy only when dry. Those of *M. hooglandii* are extremely glossy and waxy above when dry. The glaucous colour of the undersurface of fresh leaves usually changes to a pale grey or whitish grey, that is in species which are not covered beneath by tomentum. The nerves beneath are often darker, being reddish brown in *fragrans*. In *tubiflora* which has rather similar leaves, they remain the same colour as the surrounding matrix. In *koordersii* the nerves beneath are chocolate brown.

*Tomentum of the leaves*

At every possible opportunity use has been made of hairs and scales in the keys for separating not only species but certain series as well. These scales and hairs occur on the lower surface of the leaf. Many species have scales but only a few have both scales and hairs. The hairs can be easily and readily seen both in the field and in the herbarium. There are two kinds of scales, only one kind being made use of here to separate species and series. It will be noticed that many species have a whitish, silvery or greyish homogeneity on the lower surface of the leaf. This phenomenon is often seen in young leaves, disappearing in older ones. It may, however, persist. Thus nearly all the species in series *Tubiflorae* have it at least when young except *longipes* where it is more often absent. It is well marked in series *Fragrantes* especially in *argentea* and *succedanea* but not always in *fragrans*. Series *Uncinatae* and *Maximae* show it, but it may be absent sometimes from *M. maxima* and *philippensis*. Under the low power of the microscope this whitish bloom appears to consist in many cases of minute scales, very close together and deeply and firmly embedded in the surrounding tissue of the leaf. In some cases it is probably only an incrustation or a colouration due to wax or pigment. This type of scale I have not normally used for separating taxa in the keys and have counted all such species possessing it as species with glabrous leaves or “without scales”. The kind of scales used here
in classification is the larger, lax, powdery ones which are visible with a hand-lens or the naked eye and which can be easily rubbed off as a furfuraceous dust and which also disappears with age. They are usually cinnamon brown in colour, making the leaves conspicuous at a distance but may vary from yellow to pale yellow or whitish. They are found in the following:

section I
series Cinnamonomeae — M. cinnamomea
series Littorales — M. agusanensis; M. guatteriifolia; M. markgraviana

section II
series Tenuiveniae — M. archboldiana; M. beccarii; M. buchneriana; M. pedicellata; M. smythiesii; M. tenuivenia
series Fatuae — M. fatua and its vars.: M. Koordersii, M. lepidota, M. villosa
series Fuscae — M. brassi; M. chrysophylla; M. fusca; M. sphaerosperma; M. womersleyi

Hairs as well as scales occur in some of the species in this list. The hairs are stellate or dendroid, usually branched, rarely simple, being derived from scales by the elongation of the axis. They may be 1–3 mm long in chrysophylla var. chrysophylla and in villosa. Hairs also occur on the young leaves of M. inopinata in series Ellipticæ but they soon disappear. The following have hairs as well as scales:

M. guatteriifolia—hairs few and sparse
M. markgraviana
M. buchneriana—hairs mostly in young leaves
M. chrysophylla var. chrysophylla
M. fusca
M. sphaerosperma
M. womersleyi
M. fatua var. morindiifolia
var. quereicarpa
var. subcordata
M. villosa

Venation

One of the most readily observable leaf characters is the number of pairs of primary nerves and this has been used throughout to separate two contrasted species in the ultimate dichotomies of the key when there is no overlapping of such numbers. Species with the highest number of nerves have the largest leaves and conversely the small-leaved species have the fewest number of nerves. The following are among those with the greatest number of pairs of veins:—M. fatua var. morindiifolia 35, fatua var. wenzelii 25–32, neglecta 30, philippensis 18–30 and villosa 20–32 pairs while M. elliptica var. simiarum 8–11, fragrans 8–11, firmipes 8–14, malabarica 9 and lepidota 10–12 pairs are those with the fewest.

The primary nerves are usually faint and sunk in depressions on the upper surface of the leaf and raised and prominent on the lower. In a small number of species they may be very faint, fine and slender, often with parts of them vanishing or invisible especially
at the leaf-margins or they may be very prominent and thicker than normal. The following have very faint nerves: — M. archboldiana, concinna, cucullata, garcinifolia, koordersii, lancifolia and its vars, neglecta, pedicellata, rosselensis, smythiesii, tenuivenia, and umbellata. Their opposites, those with the stoutest nerves, are: — M. chrysophylla, crassa, fatuva var. morindiifolia, fusca, lowiana, maxima, philippensis, subalulata, villosa and womersleyi. Primary nerves are usually reasonably well-spaced from each other, but in the following species they are closely crowded together, yet still equidistant: — M. fatuva var. morotaiensis, subcordata and wenzelii, M. fusca, lepidota, pedicellata, petiolata, tenuivenia and tubiflora. They arise from the midrib obliquely at an angle of 45–60° but in some cases the angle of origin may be 70–90° as is seen in M. crassipes, fatuva var. morobensis, flosculosa, globosa malabarica, malaccensis, sphaerosperma and sulcata and in these examples the veins are deeply curved. In a few instances, only the veins at the base of the leaf arise at a wide angle, the upper ones are oblique, namely: — M. buchneriana, chrysophylla var. chrysophylla and fatuva var. subcordata. While in some species the nerves are oblique and nearly parallel, more than half of them have nerves which curve gradually towards the margins with deep arches. A few species have both straight and slightly crooked veins in the same leaf. Some use has been made in the keys, especially in section 2, of straight and arcuate nerves to distinguish certain series. Thus in section 2, the following series have curved nerves: — Cimiciferae, Fuscae (very strongly curved), Laurifoliae, Subalulatae and Tubiflorae while the following have more or less straight ones: — Castaneifoliae, Heterophyllae and Tenuiveniae. Series Teijsmanniae has both kinds but series Fatuae is unreliable and better left out of the scheme since most of the varieties of fatuva are straight, others curved and others again both straight and curved. In section I less use has been made of these two kinds of nerves for certain species are unreliable; yet generally series Maximae, Hooglandiae and Littorales (one species markgraviana slightly curved) have straight ones, series Fragrantes and Uncinatae have them curved while the remainder are rather mixed or not sharply defined.

Interarching of the veins at the margins is the usual feature. It may be distinct or indistinct, even in the same species and should never be taken as a decisive character in trying to distinguish between two closely allied species. I do not understand why so many beginners fail to understand this nor why they seem to think that faintness or distinctness of veins in this family should be stressed for creating two species when there is only one. To illustrate this I may mention such species like M. chartacea, iners, lancifolia and longipes where the prominence of the veins varies with the texture of the leaf. The following species tend to have prominent intra-marginal anastomosis of the veins: — M. markgraviana, sphaerosperma, subalulata, sulcata, undulatijolia and womersleyi while fatuva var. morindiifolia and fusca may have the loops of interarching double. In the next group of species, the
veins tend to vanish at the margins with broken or no loops: — *M. concinna*, *lancifolia*, *schleinitzii*, *succeedanea*, *umbellata* and others.

In many cases a short secondary nerve is present between two primary nerves and the occurrence of such nerves is used as a subsidiary character in separating series *Hooglandiae* which has them from *Uncinatae* which does not have them or series *Castaneifoliae* and *Laurifoliae* (present in both) from series *Heterophyllae* and *Teijsmanniace* (absent in both). They are numerous in *M. lancifolia* var. *montana* and *M. chartacea* of series *Castaneifoliae* and are also found in series *Tenuiveniae*. Secondary nerves are, however, present in many species, sometimes even only one or two such nerves and it would probably be hard to find a sheet where one leaf at least does not show a secondary nerve.

Reticulations may or may not be present but they are never dense as in the dried leaves of *Knema*. Their presence is often unpredictable with variation even in the same species. They are usually absent or obscure in coriaceous leaves but visible in thin leaves, even in the same species, e.g. *M. lancifolia*. They are generally faint or absent on the upper surface of leaves and more distinct on the lower if present at all there, but many species, anyway, do not have them on the lower. Sometimes, however, they may occur only on the upper. They are more distinct in series *Fuscae* than in any other series, being present on both surfaces of the leaf and giving it a very distinct sub-bullate appearance, especially in *M. chrysophylla* var. *chrysophylla* and in *M. womersleyi*. They are mostly scalariform but may be lax and reticulate in *dactyloides*, *gracilipes* and *malaccensis* on the lower surface and in *cylindrocarpa*, *inopinata* and *malabarica* on the upper surface. In *M. villosa* both scalariform and reticulate ones occur on the upper surface but are invisible on the lower surface owing to the tomentum. Their presence and absence, therefore, may be useful in distinguishing *malaccensis* from *iners*, *dactyloides* from *ceylanica* and *cylindrocarpa* and *gracilipes* from the other members of series *Tubiflorae*.

**The Inflorescence**

The two types of inflorescence on which the genus has been divided into two sections have been mentioned at the beginning of this revision. Species with the first type are mainly of western Malesian origin while those of the second predominate in eastern Malesia, especially in New Guinea. The most important fact about these types is that the first is of short duration, producing flowers during one season or flowering period and then perishing while the second is persistent, producing flowers from time to time, the main axis elongating slightly with each fresh crop.

Going on to details, the first consists in the male, of a panicle with opposite, less often alternate branches developing in acropetal succession and bearing stalked flowers in racemose, umbellate or sub-umbellate fashion at the ends of the branches, the primary branches sometimes branching again in a similar way.
The lowermost pair of primary branches is usually at right angles to the main axis. The main axis of the inflorescence is slender and never woody. It it terete or often flattened and always smooth at the base. There is also dichotomous branching (vide infra). The female inflorescence is shorter than the male with fewer branches, but often simple, in which case it resembles the second type, though it will usually still be recognized by its smooth base. It is therefore not so useful for section determination if too young or too short. Among the species with the longest male inflorescences of the first type are:

- M. maxima 10-18 cm
- M. maingayi 10-16 cm
- M. malaccensis 7-10 cm
- M. philippensis 6-10 cm
- M. guatteriifolia 2-10 cm

among those with the shortest male inflorescences are:

- M. hooglandii 1-2 cm
- M. guatteriifolia 2-10 cm

M. umbellata has an unbranched male inflorescence, but it is likely that branching will also occur since this observation was based on the only one gathering ever known of male flowers. An unbranched axis is sometimes seen in M. argentea, fragrans and elliptica var. simiarum.

In the second type of inflorescence the axis is a short, thick, scar-covered, woody tubercle as in Knema. It is mostly simple but may be bifurcate, trifurcate or in M. hollrungii 1–5–furcate. There is also dichotomous branching (vide infra). The flowers are stalked, rarely sessile, and borne in umbels or racemose umbels at the apex of the axis, also in acropetal succession. The scars are the marks left by the fallen pedicels and bracts. The main axis is, on the average, only 5 mm—1 cm long with the shortest 1–5 mm long and the longest 3–7 cm, though very few species reach the latter dimensions. The average thickness is greater than that of section I species, being 5 mm with 1 mm as the minimum and 1 cm as the maximum. Species with the longest axes are M. castaneifolia 1.5–7 cm, M. ceylanica var. ceylanica 5 mm–2 cm, M. hypargyraea 1–4 cm and M. dactyloides 1–1.5 cm while those with the shortest are M. tubiflora 1 mm—1.5 cm, M. concinna and lepidota 2–3 mm and M. globosa and tenuivenia 2–5 mm long. The female inflorescence is similar but often shorter than in the male.

In series Ellipticae and Fragrantes in section I and in series Tubiflorae in section II the inflorescence may be dichotomous as well as unbranched even in the same species. Here dichotomy results mostly from the suppression of the terminal part of the main inflorescence axis and is not always complete as intermediate and transitional stages are often seen between the panicle and the dichasium, especially in series Ellipticae. Dichotomous inflorescences in section I are usually distinguished from their counterpart in section II by their smooth basal portions. They are
also fragile and caducous, being really only a modification of the first type while those of section II (series Tubiflorae) usually have a woody persistent basal part like those of the second type. The rank of series is, therefore, probably high enough for these groups of species which show dichotomy as this dichotomy is not complete but can be traced back to a dual origin in both section I and II.

Pedicel scars may be seen in *M. argentea* (series Fragrantes) and also sometimes in all members of series Ellipticae except *M. inopinata*. The presence of these scars should not mislead the student into thinking that he is dealing with a section II type of inflorescence for the main portion of the axis below the scar-bearing part is thin, smooth and not woody.

Now if this were the complete picture of the two types of inflorescence, identification would be simple but several complications arise in the second type which may be misleading to the inexperienced. In certain section II species the axis may at times have a very short, smooth part at its extreme base which might cause the student to believe he is dealing with a section I plant. However, from the fact that this smooth initial part is not a constant feature but rather an abnormality in a particular species, and that it is stout and woody with the scar-bearing, peduncular part situated above it or at its apex, the inflorescence still belongs to the second type. In extreme cases the smooth basal part reaches a maximum of 2–3.5 cm long as in *M. hypargyraea*, resembling a transition to the first type of inflorescence. The stalk of the inflorescence has to emerge a little distance before flowers can be produced. It may be that the reproductive phase has received a check at this stage through some unfavourable climatic conditions and its growth is arrested. If the transition mentioned above is a true one, then it is a good thing since it could demonstrate how the panicular type gave rise to the more frequent *Knema*-like type. If there were no connection between them, then *Myristica* might have to be divided into two genera or at least into two subgenera. It may be that the damper, more uniform climate of western Malesia has favoured the panicular type and the drier, more seasonal one of eastern Malesia has encouraged the second type and that the significance of diversity in the inflorescence is less phyletic than supposed. I believe that this diversity is mostly phyletic and that climate plays only a minor part, see page 42. In a uniform genus like *Myristica* with few evolutionary trends and living in uniform conditions in sheltered forests, one cannot expect sharp distinctions between series and series or even between every species. The continuity and uniformity in a slow but progressive evolution is more natural and satisfactory than having gaps and sharp distinctions which cannot be explained. If left alone some of the more variable species might produce new ones but alas the day is almost here when there will be gaps as forests in the tropics are being slashed at daily by destructive humanity in satanic fury, now with bulldozer and to-morrow probably with even more devilish instruments.
Here are some species in section II which may have a smooth basal part to the inflorescence:—M. fusca, ceylanica, andamanica, crassa, teijsmannii, hypargyraea, lancifolia var. bifurcata with some species in series Tubiflorae such as cylindrocarpa, gracilipes, longipes and tubiflora. The student may tend to confuse series Tubiflorae with series Fragrantes for young inflorescences of the former do not always show the dichotomy and may at times be simple as in M. tubiflora itself. Again both young and mature inflorescences of the latter e.g. M. fragrans may also be simple as has already been pointed out. A further complication may be seen in M. longipes (series Tubiflorae) where the basal part of the inflorescence may be smooth and even thin and fragile as well, but the youngest stages will often show that the smooth part is lacking and that we are dealing with the second type of inflorescence. The dichotomy here is different from the irregular bifurcations seen in species like hollurungii, ceylanica and dactyloides where the branches do not diverge, but are usually closely adpressed to each other or bunched together. The last, at times, has a very knarled, hand-like inflorescence and hence the name “dactyloides”.

Both types of inflorescence always arise in the axil of a leaf or of a fallen leaf. In M. philippensis several inflorescences are produced on the short twigs of the present year’s growth each in the axil of a fallen bract. These twigs will lengthen as they grow older. Even the youngest inflorescence at the top is lateral and not terminal as is sometimes stated. The actual terminal bud will be seen at the very top while the leaves are as yet concealed inside the bud. It seems that the dry seasonal climate of the Philippines retards leaf formation until the flowers are over. In M. maxima and papyracea a few leaves will by this time have opened above the flowers but not with philippensis if it has been growing in its native islands. However, (see note under this species and the sheets Didrichsen 2129 and 2154) when grown in the moist climate of Bengal, the leaves appear before or at the same time as the flowers. The position with regard to the other two species might be reversed if they were grown in the Philippines where probably the climate might delay the appearance of the leaves till the flowers are over.

The average number of male flowers on the ultimate flower-bearing parts of an inflorescence is from 3–6 but certain series have fewer or more. Those with only a few flowers at a time, 1–3, are series Tubiflorae with M. longipes and tubiflora and series Fragrantes with M. fragrans. Dense clusters of flowers, 6-10 or more, are found in series Citmicerferge, Subalulatae, Laurifoliae, Teijsmanniae, some members of Tenuiveniae, and some of the Ellipticae such as M. elliptica var. similum, some varieties of M. fatua such as var. magnifica with 8–20 and var. inutilis and in M. lancifolia var. montana. The number of female flowers in a cluster in most species is generally only 1–3.
Bracts

Bracts are early caducous and are seldom seen on herbarium specimens. Bracts up to 2 cm long, the largest in the genus occur in *M. philippensis*. Bracteoles will be discussed under the next heading ‘Flowers’.

Flowers

A certain amount of information about the general characters of flowers, their size, shape, tomentum, etc. has already been given in “A Revision of the Malayan Myristicaceae” in *Gard. Bull. Sing. 16* (1958) 225. Before proceeding further, it may be pointed out now that female flowers are less useful than male for specific determinations so no great use has been made of them in the present account. They tend to be rather uniform, their shape conforming to that of the ovary which they accommodate and shelter.

Size

The longest flowers in the genus are the female of *M. uncinata*, 2 cm long; the male has not yet been seen. The following male flowers are the next longest and their breadth is given after their length: —

- *M. fusca* 1.5-1.7 cm x 5 mm
- *M. hooglandii* 1.3-1.6 cm x 8 mm—1 cm
- *M. neglecta* 1.3-1.5 cm x 6-8 mm

A few others reach 1 cm in length, the female usually 1 mm shorter and more swollen. Some female flowers, however, are the same length and a very few are longer. The following male flowers are the smallest in the genus: —

- *M. concinna* 2-3 mm x 2 mm
- *M. agusanensis* 2-4 mm in diam.
- *M. malabarica* 3-4 mm in diam.
- *M. impressinervia* 3-4 mm x 4 mm
- *M. lepidota* 3.5 mm x 2-2.5 mm
- *M. chartacea* 5 mm x 3-4 mm

Shape

The shape of the male perianth is at times useful in specific determination especially the shape in bud. It is globose or sub-globose in series *Maximae*, series *Littorales* and in *M. fragrans*, *impressinervia* and *crassa* with a tendency to be ovoid-globose in *iners*, *malabarica* and *malaccensis*. Such overlapping of shapes is common. It is ovoid in *M. ceylanica*, *dactyloides*, *castaneifolia* (later ellipsoid), *chartacea*, *hollrungii*, *hypargyrae*, *smythiesii* and *teijsmannii*; ellipsoid or ovoid-ellipsoid in series *Hooglandiae*, series *Fuscae* and *M. argentea*; oblong or oblong combined with some other shape in series *Maingayae*, *M. succedanea*, *umbellata*, *schleinizii*, *koordersii*, *insipida* and *andamanica* (oblong to sub-globose in the latter). There is an elongate group which, in series *Tubiflorae*, is perfectly tubular, and is used as a diagnostic character; elongate but not quite so tubular in series *Ellipticae* and cylindric or sub-cylindric in *concinna*, *subalulata* and *sulcata*. The obovate or clavate shape is rare but may be seen in *buchneriana*, *dactyloides* and *fatua var. inutilis*. A few species
have the perianth 3-angled at the apex in bud, often a useful character for distinguishing *M. cinnamomea* and also most members of series *Ellipticae*. This angulation is very distinct in *M. garcinifolia* but less so in *M. elliptica*. It is visible in *M. inopinata* when the dense tomentum covering the flower-buds has been removed. It has also been observed in *M. malaccensis* and might help in distinguishing that species from *iners*.

The shapes of female flowers are mostly ovoid, globose or subglobose and when their lobes begin to reflex, the perianth then becomes urceolate or campanulate but always conforming to the shape of the ovary. In the species where the male flower is more elongate, the female perianth is more or less elongate too, with the flowers flask-shaped to narrow-conical.

The three lobes of the perianth may be acute or obtuse at the apex. The male perianth is usually split down at its apex for $\frac{1}{4}$ of its length by the lobes but in species with an elongate or tubular perianth the splitting may be only $\frac{1}{5}$ or $\frac{1}{4}$ such as: — *M. subalulata* $^{\frac{1}{5}}$, *fusca* $^{\frac{1}{5}}$, *argentea*, *cornutiflora* and *neglecta* $\frac{1}{3}$, *brassii* and *crassipes* $\frac{1}{5} - \frac{1}{4}$ and *longipes* and *tubiflora* $\frac{1}{5}$. In several species with less elongate flowers, the split may be $\frac{1}{3}$; rarely does it reach $\frac{3}{4}$ as in *hypargyracea* and *villosa* except in female flowers of various species. Female flowers are usually more deeply split than the male, $\frac{1}{5} - \frac{3}{4}$, the splitting helping to expose the ovaries for fertilization. Here also their lobes tend to be more reflexed, also helping to display the ovary; they are erect, oblique or less often reflexed in the male.

**Tomentum of flowers**

Several species may be identifiable by the tomentum of their flowers. The following are all densely tomentose, the remainder being tomentulose, pubescent or glabrous: — Series *Maingayae*, series *Littorales*, *M. inopinata*, all species in series *Fuscae* except *M. brassii*, series *Tenuiveniae*, *M. jatua* and some of its vars, *M. lepidota*, *villosa*, *sulcata*, *undulatifolia*, *insipida*, *dactyloides*, *tejissmannii* (slightly), *hypargyracea*, *castaneifolia* and *lancifolia* var. *bijurcata*. The tomentum of *M. dactyloides* will distinguish it from the closely allied, only slightly tomentulose *ceylanica*. In a few of the above species the tomentum may be described as lanose, sub-lanose and villose. These are *M. markgraviana* (sublanose), *M. chrysophylla* var. *chrysophylla* (pale lanose), *M. fusca* (lanose-tomentose) and *M. villosa* (villose).

**Androecium**

The androecium is not nearly so useful as that of *Knema* for distinguishing species especially because the anther number is not variable and because the anthers are difficult to count. It has therefore not been used very much here in classification but some important facts have been observed about it. In section I the column is rather massive and cylindrical with little or no development of the sterile apiculus. The stalk is as thick as the fertile part and also not very well-developed. There are exceptions in series *Fragrantes* where there is a more pronounced sterile
apiculus and in series *Hooglandii* where the stalk is much thinner than the column. In section 2, on the other hand, there is more differentiation into these three parts. The apiculus is often present, though it may be absent also. The stalk is not so broad as the fertile part. It is difficult to know how dependable the androecium really is in classification as exceptions sometimes occur. Even in the same species there may be variation. When describing the androecium I have usually examined 3–4 flowers but in some sheets where flowers are not plentiful one cannot boil up so many.

There is a good development of the apiculus in *argentea, buchneriana, cucullata, flosculosa, lepidota, sulcata, teijsmannii* and *undulatifolia* and maximum development in *subalulata*. It is poorly developed in *concina, globosa, fatua* var. *inutilis, hypargyracea* and *longipes* while *concinna, insipida* and *longipes* may or may not have an apiculus. Unfortunately male flowers have not been seen in *umbrosa* and *uncinata* where I have very much wanted to know the real relation of their series *Uncinatae* to *Hooglandiae* and *Maximae*. Again the column of *M. neglecta* is not like that of the rest of the species in series *Hooglandiae* and perhaps I have wrongly placed it in that series. I have tried to fit it into other series such as *Tenuiveniae* but more important characters keep it out of the latter. Perhaps it should be placed in a series by itself. More material is required.

The fertile portion is nearly always longer than the stalk, sometimes three to four times as in some of the section I species, usually twice as long and often one and a half times as long. Only in *fatua* var. *papuana, papyracea, rossezensis* and *tubiflora* is it nearly equal or just slightly longer, one and a quarter times. The stalk may be completely covered with hairs or glabrous or with hairs at the base only. A count shows that about 47 per cent of the species have tomentum on the stalk, 34 per cent are glabrous and 19 per cent have basal hairs only. I can see no connection between this variable feature and the classification into sections and series. Even it is not constant in the various varieties of *M. fatua*.

The basic anther count is 10 but we get small variations such as 6–10 or 10–12. The numbers given for *M. maxima* and *lowiana* in *Gard. Bull. Sing*. 16 (1958) 341 and 347 should be corrected to half the numbers given respectively, i.e. they should now be 6–10 and 7. As pointed out the anthers are difficult to count and of no value for distinguishing species.

**Ovary**

The ovary is the most uniform organ in the flower and therefore is of little or no value in classification. It is covered with some tomentum in every case, and most often the tomentum is dense. The shape, as mentioned before, is rather similar to that of the female perianth, the ovoid and sub-globose being the commonest. The more elongate perianths have a conical or narrow-conical ovary. The style is very short or mostly absent, the ovary tapering into the two stigmatic lobes. These are glabrous and at first closely
pressed together. At maturity the lobes diverge like the letter V and are acute at the apex or in some cases such as *M. ceylanica, fatua* var. *papuanus, globosa, hollrungii, inopinata, koordersii, rosselensis* and *teijsmannii* are obtuse, the whole structure then resembling that of a duck’s gaping bill.

**Pedicels**

Pedicel length in male flowers is frequently used in the keys as a subsidiary character when two species with different lengths are directly contrasted or when there is a shortage of comparative characters. In most species the male pedicels reach 5 mm in length. The following have the longest male pedicels: —

- *M. maxima* 1-1.5 cm
- *M. hooglandii* 1.3-1.5 cm
- *M. neglecta* 1-1.4 cm

The following have the shortest male pedicels: —

- *M. maingayi* 3 mm
- *M. gigantea* 1-2 mm
- *M. agusanensis* 2-3 mm
- *M. elliptica* var. *simiarum* 2-3 mm
- *M. rosselensis* 4-5 mm
- *M. lepidota* 2-3 mm
- *M. villosa* 4 mm
- *M. concinna* 0.5-2 mm

It will be noticed that those with the longest pedicels are often section I and those with the shortest section II species. The following has sessile male flowers: *M. chrysophylla*. Female flowers usually have shorter pedicels than the male, being sessile in several including *chrysophylla, tenuivenia, villosa, and fatua* var. *magnifica* (sessile or 2.5 mm long in the last). They are longer in *flosculosa, lancifolia* vars *bifurcata* and *elemensii* and in *longipes* and *tubiflora*. Several species have not yet been seen in female flower, those of *gracilipes* being 2.7–3.5 cm long in fruit. In a few others they may be the same length as the male or a little longer as in *buchneriana, markgraviana, sphaerosperma* and *succedanea*. Thickness is not often recorded, the pedicels being merely described as slender or stout. Male pedicels are usually slender, about 1 mm thick but under 1 mm in the following: —series *Malabaricae, M. argentea* and *M. cornutiflora* and in the remainder where direct measurements are given: —*M. tubiflora* 0.2–0.3 mm, *fatua* var. *inutilis* 0.5 mm, *longipes* 0.5–0.7 mm and *chartacea* 0.75 mm. Very few reach 2 mm such as *M. buchneriana, fusca* and *inopinata*. Female pedicels are in nearly all cases stouter than in the male, reaching 2–3 mm, but are the same in *fusca, 2 mm thick*. Those of *markgraviana* have a thickened collar 4–5 mm thick just below the flower.
Bracteoles

Although there is much uniformity in bracteoles and their general features they exhibit a number of useful minor peculiarities. Normally the bracteole is situated at the base of the perianth where the latter joins the pedicel, but in series Tubiflorae it very soon comes to be 1–5 mm below the base of the perianth. This is the most useful of all bracteole characters and serves to identify this series. The following species also have the bracteole 1-3 mm below the flower: — M. neglecta, brassii and sphaerosperma. At first the bracteole is the same size as the flower-bud. It is convex on the outer surface and concave on the inner, thus being the right shape for protecting the flower-bud. When the flower elongates it soon surpasses the bracteole in size so that the latter is then from $\frac{1}{2}$ to $\frac{1}{2}$ the size of the mature flower. It is usually semi-circular in outline, being mostly broader than long and more often obtuse or rounded at the apex than acute. Having fulfilled its function, it is no longer needed and falls early, and in some species very early. Rarely does it persist in fruit. Here are some general features of bracteoles as well as special details. The average length of the bracteole is 2 mm. In small flowers it is 1 mm long. It is only 0.5 mm long in M. lancifolia var. clemensii. The largest bracteoles are to be found in M. teijsmanni 6–7 mm long, philippensis 4–6 mm, lowiana and villosa 5 mm. The broadest are in kajewskii, teijsmannii and villosa where they are 7 mm broad. Shapes other than the usual semi-circular are orbicular, suborbicular and ovate. In M. philippensis the bracteoles may be 1–3–lobed and in M. fatua var. fatua they are ciliate on the back or abaxial surface. Species which have tubular or elongate flowers such as those in series Ellipticae, Fragrantes and Fuscae have small bracteoles as the flowers themselves are narrow. Otherwise large flowers have large bracteoles and small ones reduced bracteoles. Bracteoles are very early deciduous in the following: — M. umbellata, series Fragrantes, some members of series Ellipticae, M. buchneriana, M. koordersii and M. lancifolia var. clemensii. They persist for some time in M. fatua, kajewskii, hypargyraeae, teijsmannii, castaneifolia and chartacea. Species which have tomentose flowers also have the bracteoles tomentose on the outside but not on the inside where they are always glabrous. The following have the margins of the bracteoles ciliate: — M. iners, malaccensis, lancifolia and castaneifolia. The basal remains of the fallen bracteoles in M. hooglandii and neglecta are thickened and recurved.

Fruit

The fruit is of great value in the identification of species and it is safe to say that out of the several features provided by it such as size, shape, nature of tomentum, thickness of pericarp, description of the stalk, aril and seed, there is usually at least one of the above which will readily identify most species, provided that the fruit is not too old or too young. This is fortunate for very often foresters and others tend to collect more fruiting specimens than
Sinclair — Myristica

flowering. In Myristica the unilocular fruit splits along a longitudinal circumferential suture into two valves and contains a single ovule.

Size

The largest fruits are from 7–10 cm long with one record of 12 cm. They are not numerous and are to be found mainly in some section I species. The majority of fruits are 4–7 cm in length while the smallest, of more frequent occurrence than the largest, measure 1.3–3 cm long and belong mostly to section II. The following are examples of the longest, their breadth being listed second: —

<table>
<thead>
<tr>
<th>Section I</th>
<th>Section II</th>
</tr>
</thead>
<tbody>
<tr>
<td>M. maxima 7-9x3.5-5 cm</td>
<td>M. archboldiana 7x4 cm (still immature)</td>
</tr>
<tr>
<td>M. philippensis 5-8x3-4.5 cm and once recorded as 12 cm long</td>
<td>M. fatua var. magnifica 7-10.5x5 cm</td>
</tr>
<tr>
<td>M. papyracea 8-9x4.5 cm</td>
<td>M. kajewskii 7-8.5x5.5-7.5 cm</td>
</tr>
<tr>
<td>M. umbrosa 6.5-9x4.5 cm</td>
<td>M. womersleyi 6-9 cm in diam.</td>
</tr>
<tr>
<td>M. maingayi 10.5x6-6.5 cm</td>
<td>M. sphaerosperma 6 cm in diam. but probably reaching the same dimensions as in womersleyi</td>
</tr>
</tbody>
</table>

The following is the list with the smallest fruits: —

<table>
<thead>
<tr>
<th>Section I</th>
<th>Section II</th>
</tr>
</thead>
<tbody>
<tr>
<td>M. elliptica var. similum 1.5-2 cm</td>
<td>M. globosa 1.5-2.5 cm in diam.</td>
</tr>
<tr>
<td>M. schleinitzii 2-3.5x1.5 cm in diam.</td>
<td>M. concinna 1.8-2x1-1.2 cm</td>
</tr>
<tr>
<td>M. rosellei unknown, but probably the same size or smaller than those of schleinitzii</td>
<td>M. insipida 2.5-3.5x1.5-1.8 cm</td>
</tr>
<tr>
<td>M. chrysophylla 2-3 cm in diam.</td>
<td>M. cylindrocarpa 2.5-2.8x8 mm — 1 cm</td>
</tr>
<tr>
<td>M. pedicellata 2x1.5 cm</td>
<td>M. gracilipes 2.5-3x1.5 cm</td>
</tr>
<tr>
<td>M. beccarii 2.5-3x1.5-2 cm</td>
<td>M. lancifolia var. lancifolia 1.6-1.8 x1.4-1.5 cm</td>
</tr>
<tr>
<td>M. smythiesii 2.5-3x1.8-2 cm</td>
<td>M. subalulata 1.6-2.8x1.3-2 cm</td>
</tr>
<tr>
<td>M. fatua var. quercicarpa 1.3-1.5x 1.8-2 cm</td>
<td>M. lancifolia var. montana 2-3x1-1.4 cm</td>
</tr>
</tbody>
</table>

Shape

The fruits of a large number of species are either oblong or globose, a lesser number ovoid or ellipsoid while only a minority are obovoid. More common, however, are combinations of these shapes such as ovoid-globose, ovoid-oblong, oblong-ellipsoid, while some variable species may have more than one shape. Actually
sub-globose is more usual than absolutely globose or perfectly spherical. Several of the species in series Tubiflorae have elongate, spindle-shaped fruits, acute at both ends, especially at the apex such as *M. longipes* and *tubiflora*. *M. carrii* also has rather narrowly ellipsoid fruits. Among the obovoid ones are *M. archboldiana* and *lepidota* with *buchneriana* ellipsoid or obovoid, *fatua* var. *papuana* oblong or obovoid and *fimnipes* obovoid-ellipsoid to ellipsoid. Those of *fragrans*, though variable, are usually pyriform and drooping. The following have the apex rather oblique and sometimes slightly uncinate: — *M. castaneifolia*, *chartacea*, *fusca*, *petiolata*, *uncinata*, *villosa*, *fatua* var. *subcordata* and *elliptica* and its vars. *Myristica fatua* var. *quercicarpa* has the most unusual fruits of all. They are disc-shaped with a central mucro and resemble those of an oak. The following have a mucro without the apex being uncinate or oblique: — *M. hypargyrea*, *lancifolia* var. *lancifolia* (slightly prominent) *pedicellata*, *subalulata* (best developed in this one) and *undulatifolia*. A few others have a mucro in young fruits, but this does not persist for long.

**Tomentum**

First of all those with a densely tomentose pericarp are easy to identify and are in the minority so they may be eliminated by the following list. In it the nature of the tomentum as well as the length of the hairs is indicated: —

- *M. philippensis* tomentose, 1 mm
- *M. umbrosa* tomentose, 1 mm
- *M. uncinata* tomentose, 1 mm
- *M. lowiana* woolly, 1-2 mm
- *M. malabarica* tomentose, 1 mm
- *M. guatterifolia* tomentose, 1 mm
- *M. markgraviana* furfuraceous-tomentose, 1 mm
- *M. inopinata* densely villose, 2-3 mm
- *M. chrysophylla* lanose or sub-lanose, 3-5 mm

Four of the above species may be distinguished readily by their dark chocolate tomentum, namely *castaneifolia*, *petiolata*, *uncinata* and *womersleyi*. The colour is pale brownish yellow in *villosa*, a golden yellow in *chrysophylla* var. *chrysophylla*, a dark rusty brown in *fusca* and usually a medium rusty brown in the remainder.

Of the species not mentioned above, less than half have a glabrous pericarp or end up with one. The remainder, more than half of all the species in the genus are pubescent or tomentulose. By tomentulose as used in this account, is meant densely covered with extremely short hairs which look more like stippling than hairs. Some species such as *concina*, *hollrungii*, *iners*, *insipida* and *maingayi* are at first invested with a furfuraceous scurf and later become glabrous, while in *fatua* vars *fatua*, *morindiiifolia* and *papuana* the scurf persists. The colour of the pubescent, tomentulose
and furfuraceous fruits referred to in this paragraph is usually a medium rusty brown, but those of the following tend to be pale in colour:—M. concinna, cylindrocarpa, garciniifolia, gracilipes, insipida and fatua var. inutilis. M. sulcata may have them medium as well as pale brown.

**Thickness and Texture of the Pericarp**

The pericarp is considerably thicker and softer in unripe fruits than in mature ones. As the fruit ripens, the seed increases in size and the pericarp gradually shrinks and hardens. Thus measurements from herbarium specimens for thickness may not always be reliable if the fruit is not quite ripe. In the present account measurements are taken mostly from dried ripe fruits. We cannot go far wrong with the thinnest which are:—M. concinna 0.5–1 mm; cylindrocarpa 1 mm; lancifolia var. bifurcata 1 mm; lancifolia var. montana 0.25–0.5 mm; pedicellata 1 mm and schleinitzii 0.5 mm. With the thickest, one can never be quite certain that the measurements are final. The following are among the thickest:—M. archboldiana 8 mm—1.2 cm; crassa 1 cm (will probably become less); crassipes 5–8 mm; cucullata 5–7 mm; elliptica 1 cm; fragrans 5 mm–1 cm; iners 5 mm–1.3 cm; kajewskii 5–8 mm–(1 cm); lowiana 8 mm–1 cm; māingayi 2–2.5 cm (will probably become less); succedanea 1 cm; teijsmannii 5 mm; undulatifolia 5 mm and womersleyi 5 mm.

The remainder, the great majority of the species, have a pericarp of 2–3 mm thick at maturity. The pericarp may be hard and woody as in M. archboldiana, castaneifolia, cinnamomea, crassipes, cucullata, hypargyraea, kajewskii, lepidota, petiolata, sphaerosperma, undulatifolia and womersleyi. Sometimes it may be brittle, tending to break in herbaria, such as in M. chrysophylla, concinna, malaccensis, fatua var. fatua, and fatua var. papuana. A thin pericarp is not necessarily fragile. In fact the majority of thin ones is quite hard. The unripe fruits of M. fatua var. magnifica, M. malabarica and fragrans have a rather succulent and fleshy pericarp, that of the latter may be eaten [Sinclair in Gard. Bull. Sing. 16 (1958) 239]. The pericarp of M. fusca, maxima and uncinata tends to become wrinkled on drying, sometimes or slightly in flosculosa, kajewskii and philippensis, while that of papyracea becomes very dark and remains smooth and glossy. M. crassipes and hypargyraea have a warted pericarp rather like that of the rugose fruits in certain Annonaceae such as Mitrephora and Fissistigma.

**Stalk**

The section I species which have the longest inflorescence axis (the peduncle) will naturally tend to have the longest fruiting peduncles. Sometimes, however, there is no great elongation in the stalk in section I species for it must be remembered that it is the male inflorescence and not or less often the female which is elongate and panicular. The pedicels, especially in female flowers, are never long anyway so they will not add greatly to the overall length of the stalk. Stalk measurement in this account is usually that of peduncle and pedicel combined because in the fruiting stage it is rather late to tell where the one ends and the other begins.
However, in species which show dichotomy and have 2–4 fruits in a dichasium, the forks of the dichasium will mark the delimitations of the peduncle and pedicel. If one of the arms of the fork is suppressed or absent, a bracteole scar may still be visible indicating the above delimitations.

The longest stalks, peduncle + pedicel are to be found in *M. maxima* where they reach 9 cm. Then come those of *papyracea*, *philippensis*, *iners* and *malabarica*, 3–4 cm long. In section II *M. longipes* and *tubiflora* have stalks 3–3.3 cm long. Those with sessile or nearly sessile fruits, the stalk 5 mm long or less, are *M. beccarii*, *castaneifolia*, *chartacea*, *chrysophylla*, *lepidota*, *villosa* and *fatua* vars *morobensis*, *subcordata* and *wenzeli*. It is on account of the broad, rounded base and thick pedicels that some fruits may appear sessile when their fruit-stalk is actually 5 mm long. Smaller fruits with 3–5 mm long stalks, e.g. *M. lancifolia*, are not in appearance sessile since their pedicels are slender, well-proportioned to the length of the pericarp and not hidden by its base. The prolongation of the base of the pericarp into a pseudo-stalk is seen in *M. flosculosa*, *gracilipes*, *longipes*, *tubiflora* and in most members of series *Ellipticae*.

The thickness of the stalk seems rather a trifling iota, averaging 4 mm and having few extreme values, only some three species reaching 1 cm. It should not be ignored, however, for occasionally it may help in identification. The following have the thinnest stalks, series *Tubiflorae* featuring prominently:

- *M. elliptica* var. *siimiarum* 2 mm  
  *M. ensifolia* 1.5-2 mm
- *M. schleinitzii* 2-3 mm  
  *M. gracilipes* 1-1.5 mm
- *M. concinna* 1-2 mm  
  *M. longipes* 2 mm
- *M. pedicellata* 2 mm  
  *M. tubiflora* 2 mm
- *M. cylindrocarpa* 2 mm

The following have the thickest stalks:

- *M. elliptica* var. *celebica* 7 mm  
  *M. firmipes* 7 mm
- *M. sphaerosperma* 5-7 mm  
  *M. kajewskii* 1 cm
- *M. fatua* var. *wenzeli* 5-7 mm  
  *M. hypargyraea* var. *gillespieana* 8 mm—1 cm
- *M. undulatifolia* 7 mm  
  *M. castaneifolia* 7 mm

In a few cases, e.g. *M. garciniifolia*, *longipes* and *tubiflora*, the stalk thickens at its apex, forming a small clavate receptacle to receive the fruit.

**Aril**

The aril is so very uniform that it is practically of no value in species determination. In *Myristica* it is split down to the base or nearly to the base by its numerous segments. The latter narrow and converge towards the apex of the seed. The colour varies through different shades of red to orange but collectors are seldom precise about the exact tint, very often never mentioning it at all. The immature aril is white.
Seed

The seed also is of little value in species determination, only species with large seeds may be worth contrasting with the smallest. The size and shape of seeds will of course depend on a large extent on that of their fruits. If data were available, the colour of fresh seeds might be compared with that of dried ones. When stripped of their arils all seeds are so uniform except for size. It is on account of this uniformity that neither Markgraf nor I myself am able to identify three of Warburg's species described from seeds or seeds without arils. These three species, *M. avisparadisiacae*, *M. macrocarya* and *M. pseudo-argentea* have been relegated by us to *Species obscura*. In *Myristica* the dried seeds are marked by a pattern of vertical ridges and furrows, the latter in life being occupied by the segments of the aril.

The Sections in *Myristica* and their Significance and Origin

The genus *Myristica* exhibits few evolutionary trends except for the two types of inflorescence already mentioned, that is the herbaceous, branched, deciduous type of section I *Myristica* and the contracted, woody, persistent type of section II *Fatua*. In fact there is a close and remarkable uniformity in the species and their characters. The lack of diversity is, however, compensated for by the large number of species which exists. The uniform and sheltered habitat in the primary forest will, to a certain extent, be a moderating factor, limiting the trends of diversity. We have seen how the female flowers and especially the ovary are so constant as to be of little use in classification. Similarly the aril and the seed are of little value in species determination except where, by a difference in size, two species can be contrasted in a key. Advances to syncarpy are scarcely possible to a single-seeded, unicarpellate fruit. If left alone some of the more polymorphic species would no doubt, over the ages, still produce some new species, but it looks as if they were now doomed in the rush to bulldoze all forests in the tropics. It is a pity that some more species besides *M. fragrans* had not been of economic use since cultivation would have produced some variation and preservation. Man will not help for he is not interested, but think what he could do if willing with all his modern scientific means. It would be wonderful if only artificial swamp forests could be created to save and care for species which will one day vanish from this earth. Yet this is no dream, for an artificial swamp forest does exist. It is *Cypress Gardens* in Florida — See Reader's Digest (March 1964) 107.

There are more species with the woody, persistent, section II type of inflorescence, more than I first realized when the revision of only the Malayan species was completed. Also there are more with this type of inflorescence in New Guinea than elsewhere. All the Malayan species except one have, as has been emphasized before, the herbaceous, paniculate type of inflorescence which is characteristic of Western Malesia. We must not forget, however, that the two types exist together throughout the area except in Australia and some of the Pacific Islands where the section II type alone occurs.
Let us call the section I *Myristica* type of inflorescence M and the section II *Fatua* type F for convenience. It might be suggested that climate would have some effect on the development of the two kinds of inflorescence, the damp or wet uniform climate producing the panicular or M type and the drier, seasonal and more variable one encouraging the short, woody, scar-covered, persistent F type. But if this were the case nearly all the trees in other families belonging to the same geological period and growing in the same habitat as *Myristica* would also be expected to respond similarly to the effects of climate. This would mean that trees in a damp evergreen forest would have an elongate inflorescence and those in dry forests, subjected to dry climate, would have a short, condensed type of axis. This is certainly very far from what we actually find. Climate might have had some slight effect on certain species, but it was not the initiating factor and never alone produced the M and F types of inflorescence. These can only have arisen due to some genetic mechanism already present in the primitive ancestors of *Myristica*.

It was mentioned in *Gard. Bull. Sing.* 16 (1958) 246 and in Lawrence, *Taxonomy of Vascular Plants* (1951) 59 that, as an inflorescence, the branched panicle might be considered the most primitive. If we accept this and apply it to the M species of *Myristica*, we can also add the more clumsy form of staminal column with little or no development of stalk and apiculus, the large leaves and the large fruit to support a statement that these M species are more primitive than the F ones. These primitive characters are not tremendously important ones so the F species, after all, are not very much advanced over the M group. The word primitive does not necessarily mean that the M species arose before those of section F or that the panicular inflorescence came before the other type although there is a strong degree of implication.

The question of the origin of the inflorescence is a difficult one. Which type actually came into being first? I am afraid we shall never know the exact answer. No theory that I can think of is immune from attack or contradiction of some kind. It has already been mentioned on page 30 that the stalk of the inflorescence has to emerge a little distance before flowers can be produced. In some very young inflorescences of section *Fatua*, even where there is as yet only one flower, the pedicel appears to be almost sessile, arising from the wood of the twig. However, if examined by a hand-lens an actual inflorescence will be seen, represented by a minute swelling or protuberance between the pedicel and the twig. This tumescence consists of at least more than one layer of cells high. In Cryptogams the inflorescence or fructification, even if buried in the tissue of the fertile branch, usually has a stalk consisting of a few cells. Only in the lowest Cryptogams is the stalk reduced to one cell or entirely absent. In the archetypes of *Myristica* there must always have been a stalk, however short. This does not bring us any nearer to the answer for the stalk primordium in the archetype could at once proceed to develop and produce either an elongate inflorescence or a woody *Knema*-like one. Since section
M is supposed to be the most primitive with the most primitive inflorescence, it seems only reasonable to suppose that the panicular type came first and this is the view that I am obliged to accept and the rest of what happened will be based on this assumption although the reverse way could also be possible. However, for a fuller explanation and discussion of the archetypes see ahead under the origin of Knema and migration.

How is it that the M species, though more primitive than the F have not been the most successful in attaining a species majority? It could be that the M species were at one time numerous but many of them have died out. Myristica is supposed to have arisen in the Jurassic or early Cretaceous, Gard. Bull. Sing. 16 (1958) 240. The climate of that period and more so that of the early Cretaceous was supposed to be mild and tropical with abundant rainfall while great rivers, deltas and swamps were being formed. What ideal conditions for the start and success of Myristica! The family is a relict one today and not able to survive in conditions outside the primitive forest. Certainly many species of both sections must have died out, especially those of the M section. Most of the M species are tall trees with large fruits and take a long time to develop and reproduce. The species of the other section, most of them smaller trees with smaller fruits, come into maturity quicker and the fruits are more easily spread by birds. Hence they are more numerous and more successful even today. The destruction by man did not come into the Mesozoic picture, nor would early man who lived in the forest and depended on its canopy for concealment and hunting, have cleared away any great part of his protective environment.

The question of the migration of Myristica is another difficult one and can only give rise to endless argument and wild surmise. If there had only been one centre of origin, say Borneo, then explanations would have been a lot simpler. The problem is further complicated by other centres and other factors. The centres are Borneo, New Guinea and the Malay Peninsula though the latter might be combined as Borneo-Malaya. The existence of the two kinds of species, one with the herbaceous, panicular inflorescence and the other with the persistent have also to be taken into consideration in a discussion on migration. The origin of Knema, too, should not be left out, since it has a woody, scar-covered inflorescence similar to that of the F species of Myristica. In fact it is possible that the F species might have produced Knema, which is more advanced since its anthers are free, only their filaments being fused into a column.

We have the facts of the present to formulate a theory and to explain the position as we see it today but not the facts of the past to corroborate our statements. If the F type of Myristica did produce Knema, we should have expected Knema to be more abundant in New Guinea since the F species are more abundant there. But the fact is that only one species of Knema has been found there, the majority being in Borneo and a lesser number in Malaya. If Knema had any connection at all with the second
section of *Myristica*, it looks as if it arose from that section in Borneo and not in New Guinea. The ancient land-mass of Asia, including Borneo is probably older than that of New Guinea, though the separation of New Guinea took place very early, earlier than that of Borneo from the main mass when Sundaland disappeared. The single species of *Knema* might have reached New Guinea from the Moluccas (where it is also present) before these two land-masses were isolated from each other. All *Knema* species could not get to New Guinea but this one made it. It is not impossible that one or even a few should have reached New Guinea after the separation but the chances of this are very remote. We might have expected *Knema*, a western genus, to have the elongate type of inflorescence since most of the *Myristica* species in Borneo have that type. We have already seen that climate could not be responsible for initially determining what type of axis *Knema* was to have. If *Knema* really originated from the F species of Borneo then the latter must have been much more numerous than they are now. Today there are only three such species in Borneo and can only three be sufficient? Actually it seems better to suppose that *Knema* arose neither from the F type of *Myristica* nor from the M but from the archetype and common ancestor of *Myristica*. This was probably a tree with pole-like trunk, stilt-roots, whorled branches, long drooping leaves, thick twigs and a stout, terminal bud, a pachycaul not very unlike our present-day *M. maxima* or *Knema hookeriana* but with this essential difference. The inflorescence axis was shorter and mostly simple but not persistent, there being no scars. In fact it was much less differentiated than any of the present-day types. This inflorescence primordium could, we assume, develop with ease into any type, once it was first determined which genus was to be produced. Thus the two types of *Myristica* came into being, *Horsfieldia* and *Gymnacranthera* were also produced by the inflorescence axis elongating, and *Knema* by the inflorescence becoming woody. Many other factors including genetical and inherited characters would also determine the genus but once the genus was established, the pattern had been set for the numerous species to evolve.

It seems therefore that the archetypes of *Myristica* were present in Borneo and Malaya and that they, not the M and F species, migrated eastwards to New Guinea and on to the Solomons, Fiji, Tonga and Samoa. There was also the southward migration from New Guinea to North Australia, a northward extension to the Carolines and the westward movement from Malaya to India and Ceylon. In Borneo and Malaya these archetypes produced the M species of *Myristica* with a lesser number of the F ones while in New Guinea the F ones were produced with a numerical superiority over the first kind. It is doubtful, however, if the picture was as simple as this. It is probable that, for longer or shorter distances over some parts of the course, the M and F species themselves moved, but the main mass-migrations were completed by the archetypes.
The Series in Myristica and their Significance

When attempting to place species into some systematic order it became apparent that certain species fell into small natural groupings with a varying number of species in each group. Three is a common number forming such triads as *M. maxima*, *papyracea* and *philippensis* or *M. gigantea*, *lowiana* and *maingayi*. Such species are close to each other and may sometimes be mistaken for one another if sterile. They are less likely to be confused with species outside their own groupings. These natural groups I have called the series. This taxon is not a major division so therefore it cannot be expected that the differences between one series and the next will be very great or numerous. My series, therefore, are rather similar to those of Warburg, but he has put some species into the wrong ones probably because of insufficient material at hand. Some of the species in my classification may also be in the wrong series for the same reason. I have not attempted to divide the series into subspecies for with too many sub-divisions relations become obscure and not easy to see. It is necessary for the pattern not to be broken up but to be integrated into a visual whole so that one can see how each series is related to the rest, which series stands at the beginning of the system, which are to be in the middle, and which is at the end. Why divide a series into subspecies when there is some doubt whether that series itself is correctly constituted? One can go too far in the opposite direction also, and lose sight of the natural grouping by uniting two closely allied series. For example there might be a temptation to unite series *Maingayae* with *Malabaricae* or series *Uncinatae* with *Maximae*. The male flowers of *Uncinatae* are unknown so it is better at present to keep the last two separate. It must be remembered that we cannot force species unnaturally into series or artificial groupings for the genus is a uniform one and it is only natural that one series should grade slightly into the next. There will be, in such a system, species that have the majority of their characters agreeing best with those of their own series but not all of them. These other characters may be far more suggestive of those of an allied series. In other words one series, through certain of its species, grades into the next. There are many examples of this sort of thing in the series of section II, especially the last four. Characters may remain distinct but measurements often overlap.

Apart from the inflorescence characters, the following are the most important ones separating the series: — the presence or absence of both scales and hairs on the undersurface of the leaves (perhaps I have placed too much weight on this character), the shape of the flowers, the position of their bracteole, whether the perianth is 3-angled or not at the apex in bud and how far it is split down by the perianth lobes, whether the primary veins of the leaf are straight or curved, and the presence or absence of secondary veins and reticulations. Miscellaneous characters such as measurements and shapes of organs and the nature of their tomentum if any come last.
Let us examine section II *Fatua* and see how its series are related to each other. It would appear that series *Fatua* is the basic one from which most of the others in this section have arisen. *M. fatua* itself is a species of some 14 varieties, being more polymorphic than all the others and occupying the complete geographical range of the genus from India to Samoa. Its centre of origin is really in two regions, each with an equal number of varieties, (1) the Moluccas-Celebes region and (2) New Guinea. To series *Fatua* also belong *M. koordersii*, *lepidota* and *villosa* and the series is characterized by the presence of scales or hairs or both on the undersurface of the leaves. A close off-shoot is series *Tenuiveniae*, differing in the finer, oblique veins, the hairs generally absent and the scales less dense. Its species might have been included in series *Fatua*, but that would only give the latter an unnatural clumsiness whereby it would no longer be on the same comparative level with the other well-balanced series of section II. Series *Fuscae*, another off-shoot of series *Fatua* is also rather close to *Fatua*, differing in having larger flowers with the perianth not split so far down, and the leaves sub-bullate with more reticulations and generally longer hairs. Here end the series which have a dense covering of scales and hairs on the leaves though there may be, in the remaining series, traces of minute whitish scales or dye-like colourations which cannot be removed by rubbing. For all practical purposes the latter may be disregarded and leaves having such colourations will, in this publication, be counted as glabrous.

The first of the glabrous-leaved series, the *Tubiflorae*, is a distinct one, often with dichotomous branching of the inflorescence and usually an elongate, ellipsoid, less often oblong fruit. It stands apart from the remainder in having the bracteole some distance below the mature flower. Unfortunately a number of species have not been seen in flower, but they seem to fit into this series quite well on the basis of the fruit. There is a parallel case in section I where series *Fragrantes* also shows dichotomous branching of the inflorescence, mostly by suppression of the terminal part of the main axis. There is a temptation to derive series *Tubiflorae* from *Fragrantes* if one believes that section I is more primitive than section II and the other way round if one does not. There is also dichotomy in series *Ellipticae* where the inflorescence axis divides into two equal branches, but the panicle is present too. *M. elliptica* may have both types of inflorescence.

Among the other glabrous series, *Subalulatae* has connections with *Tubiflorae* on account of the elongate or tubular shape of the flowers in both. The latter series may have arisen from the *Subalulatae*, certain species in both showing connections with each other. Thus *M. cucullata* and *flosculosa* in *Tubiflorae* show similarities with *M. undulatifolia* in *Subalulatae*. For details see notes under these species in the Systematic Part. *M. crassipes*, another member of the *Tubiflorae*, shows a relationship with series *Fatuae* because of the similar fruit, the thick fruit-stalk, the presence of two lines on the twigs and some yellowish scales or colouration on the lower surface of the leaves. The scales in *crassipes*, however,
are not lax or powdery and cannot be easily rubbed off. There is a similarity between series Fusca and the Tubiflorae through M. brassii which also has its bracteole some distance below the flower (?always for only one flowering collection is known) as in the Tubiflorae. Further resemblances are seen in its elongate perianth, not split down very far by the lobes, and in the absence of hairs and scales on the undersurface of its leaves. There are very minute silvery scales but these are very closely embedded in the leaf-tissue. It may be that I have wrongly placed M. brassii in series Fusca instead of series Tubiflorae, but there is no trace of a dichotomous inflorescence in this species unless the material of it represents the inflorescence in a very young stage and it may elongate and become dichotomous later. More collections are really required to settle the relationship.

The series Cimicijerae is a small one, being the nearest off-shoot of the Subalulatae, especially M. globosa, itself a sort of miniature M. subalulata with rather similar leaves, flowers and fruit but all on a smaller scale and differing in the absence or poor development of the apiculus which in the Subalulatae is very prominent.

Series Heterophyllae shows affinities with Subalulatae through M. hollrungii (for details see notes at the end of series Heterophyllae) and also with the Castaneifoliae, cf. the long petioles of both series as seen in such species as M. kajewski with those of M. petiolata and castaneifolia. Similarities will also be found in the flowers of the members of both these series. Series Heterophyllae is, however, probably closest to series Teijsmanniae, the leaves and flowers all of a similar shape, but reduced in size and darker in colour in the latter.

Series Teijsmanniae, in turn, is close to the Laurifoliae differing from them in minor characters such as stouter twigs, larger leaves with straighter veins, larger flowers and the fruit more globose and not oblong. Series Castaneifoliae, besides being nearest to series Heterophyllae, is also near to series Laurifoliae, differing from it in having fainter, more oblique nerves, an absence of reticulations, the petiole long in proportion to the lamina, the flowers larger or less often the same size and the fruit more ellipsoid and not oblong. For details, again see the notes at the end of each relevant series.

Thus all the series with glabrous leaves in section II and especially the last four, namely Heterophyllae, Teijsmanniae, Laurifoliae and Castaneifoliae are very similar to each other, differing only in minor characters. There are plenty of examples of connecting species to show the intimate inter-relationships of these series. Grouping in relation to a certain set of similar characters will produce one alliance while a different grouping is possible through other combinations. The set-up of relationships in section II may be compared to those of an isolated island population of the human species where there are only a few families but these have intermarried in the past. There will be many resemblances between family and family, some more obvious than others. There will also be plenty of examples where the children of one family will
share certain characters of inheritance with their cousins and second cousins in another family.

**Conclusion**

After reviewing both sections we note that certain series in the first are related to others in the first. There are more series in the second but these are related among themselves. Only in certain cases is there an alliance between series in both. The chief example is where series *Fragrantes* in the first is related to series *Tubiflorae* in the second section through the dichotomy of the inflorescence. In this section the series with glabrous leaves are closely allied to each other. Such relations that exist between series justify a division of the genus into two sections even if inflorescence characters are not taken into consideration.

**Summary**

1. There are two types of inflorescence in *Myristica*, the genus being divided into two sections chiefly on this account.
2. Climate had little effect on the origin of these two types of inflorescence.
3. The first type, the caducous, herbaceous panicle probably came before the second, the persistent, woody, scar-covered *Knema*-like type.
4. The second did not arise from the first directly but apparently through an archetype.
5. Archetypes and their particular kind of inflorescence are discussed.
6. The origin of *Knema* is considered along with that of the two sections of *Myristica* since it has a similar inflorescence to that of *Myristica* section II.
7. The migration of *Myristica* and *Knema* is outlined.
8. The archetypes of *Myristica* probably migrated in the first instance though *Myristica* itself may have done so later but only over parts of the course.
9. The series of both sections and their inter-relations are summarized.
10. Both series and species are linked in a reticulate relationship.
11. The assignment of species to series is in certain cases still somewhat tentative.

**Work for the Future**

It will be seen from the descriptions in the 'Systematic Part' and from the accompanying table that male flowers, female flowers and fruit are still lacking for certain species. Fortunately very few fruits are missing but the same cannot be said about male flowers which have still to be recorded and described for a number of species. When all is known about them, it may well happen that certain species have been placed in the wrong series. It does not matter about the female flowers for they are less important in the determination of series. The table should be a reminder of what is still required for future collecting and investigation. The positive sign in the table signifies that the item is present and the zero that it is still unknown.

In the introduction it was stated that embryology and pollen morphology have been left out. It would be interesting to know if a study of the latter would be of use in distinguishing sections and series or any of the closely related species from each other. R. P. Wodehouse, Brittonia 2, 5 (1937) 397 found that the mono-sulcate pollen grains of the *Myristicaceae* distinguished the American genera, but that the variations among the different species were often relatively slight.
**Table for Future Collecting**

The sign 0 indicates that the parts mentioned in these columns have not yet been seen and the + sign that they have.

<table>
<thead>
<tr>
<th>Species</th>
<th>Male flowers</th>
<th>Female flowers</th>
<th>Fruit</th>
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<td>0</td>
<td>+</td>
</tr>
<tr>
<td>archboldiana</td>
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<td>0</td>
<td>+</td>
</tr>
<tr>
<td>beccarii</td>
<td>+ immature</td>
<td>0</td>
<td>+</td>
</tr>
<tr>
<td>brassii</td>
<td>+</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>carrii</td>
<td>+</td>
<td>0</td>
<td>+</td>
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<td>concinna</td>
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<td>+</td>
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<tr>
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<tr>
<td>womersleyi</td>
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**Acknowledgements**

Besides the institutions mentioned in *Gard. Bull. Sing.* 16 (1958) 247 which were previously acknowledged for assistance given, I have now to thank the directors and curators of the following who have since sent their material on loan: —Hamburg Botanic Garden, Zurich Botanic Garden and Museum, and the Museum of National History at Budapest. I am grateful to the Curator of the Bernice P. Bishop Museum, Honolulu, for sending material of *Myristica hypargyraea* var. *insulares* and to the Conservator of the Herbarium of the University of Tübingen for a photograph of the type of Gaertner's *M. dactyloides*. I am also grateful to many individuals for miscellaneous assistance and to others for checking and sending extracts from literature not available in Singapore. I should like especially to thank C.E.B. Bonner, A. A. Bullock, H. M. Burkill, Chew Wee Lek, M. Flach, C. X. Furtado, R. E. Holttum, R. D. Hoogland, L. A. Lauener, F. Markgraf, W. Meijer, P. van Royen, H. K. Airy Shaw, F. A. Staffleu, W. T. Stearn, T. C. Whitmore, J. S. Womersley and last but not least C. G. G. J. van Steenis for his reviving drops of *l'eau de la vie* which have prevented me from falling by the wayside and pulled me out of this almost unending forest of *Myristica*. 
II SYSTEMATIC PART

KEYS

<table>
<thead>
<tr>
<th>Large size-class leaves</th>
<th>...</th>
<th>30–50 cm in length</th>
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<tr>
<td>Medium size-class leaves</td>
<td>...</td>
<td>15–30 cm in length</td>
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<tr>
<td>Small size-class leaves</td>
<td>...</td>
<td>1–15 cm in length</td>
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<tr>
<td>Oblique nerves as used here</td>
<td>...</td>
<td>at angle of 45° to midrib</td>
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Notes on the Keys

Foremost is the systematic key which is really a series of keys dividing the family into sections, series, species and where necessary varieties. This is followed by a continuous key for fruiting and sterile material, and finally there are two regional keys, one for Borneo and the other for New Guinea. A regional key for the Malay Peninsula will be found in *Gard. Bull. Sing.* 16 (1958) 336. It is recommended that one should read the sections on Leaves and Fruit in the Introductory Part before attempting to use the key for fruiting and sterile material. It would be better still if one can find time to read the other introductory sections which deal with twigs, inflorescence and flowers.

When naming *Myristica* the student will see specimens with male flowers, female flowers, fruit and sterile material. It is not easy to construct a key for four such kinds of material without making it long. It will be seen here that some of the keys are unfortunately long but is it not better to shun brevity than to fail in tracking down a species? Why, for example, are there as many as 10–15 separate diagnostic characters devoted to some species in the keys. To answer this and similar questions, take a common, widely distributed and well known species like *M. subalulata*. Where can one meet with a species as easy as this to identify if good material is at hand? A portion of a twig showing the swollen deformations caused by ants would be sufficient. But I once saw a miserable sterile fragment of this species which consisted of the apical part of a twig with very much smaller leaves than usual, their bases acute and not rounded or sub-cordate, no ant swellings on the twigs and no lines or wings running from petiole base to petiole base. How often do we see as many as ten to fifteen positive diagnostic characters present at any one time in a herbarium specimen of a single dioecious *Myristica*.

There are groups of species with large size-class leaves which look rather alike when sterile, e.g. *M. umbrosa* and *uncinata*, others with equally similar, small size-class leaves reminding one of *M. fragrans* and finally the remainder, an even more bewildering assortment in the medium size-class range. Flowers are so often immature in herbaria that in many cases we cannot be sure of their real size. They may or may not have a sterile apiculus to their staminal columns. The absence of an apiculus, particularly in young material, could be misleading and one might develop later. Our knowledge of male flowers of certain New Guinea species is still incomplete so the keys for these species have been based mostly on fruiting material and leave much to be desired, e.g. certain species in
series *Uncinatae, Tenuiveniae* and *Tubiflorae*. Fruits alter so much on drying that we are still not sure of their real shape in a few species. Most *Myristica* species are so reticulately and closely related that they differ from each other not by one or two striking or outstanding characters but rather by a number of minor ones. Thus the length of the key increases. It must be remembered that there is a large number of species, too, so the key in any case cannot be short.

It is an advantage to have as many diagnostic characters and as much information as possible at our disposal, anything at all which can be of use when running down the species, for there are so many stages in the keys where the student can go astray or come to a jarring halt. He probably goes astray because his specimen lacks something or fails to show clearly a certain critical character that will take him from one stage of the key over intervening ones to the correct and final goal. Imagine the consequences and futility if there is only one such critical character listed by the author at such 'crossing over' stages of the key and the specimen does not show it.

The colour of the leaves and sometimes that of their nerves on drying may be useful when there are few other available distinguishing characters. I have been tempted to use colour often but it will not always lead to the haven of hope and must be treated with some caution. It is not always possible to express information about colour in very short phrases without adding considerably to the length of the key.

Sometimes certain characters appear to be useful and one is tempted to draw attention to them. It is doubtful whether such characters are always constant for a particular species if insufficient material of that species was available for study. In such cases the word 'always' followed by a query and enclosed in brackets will be seen at certain places in the keys.

I am always changing measurements and shall probably continue to do so. My faith in them is not shaken. In many cases they are only meant to supplement statements like "leaves larger or smaller than...............etc."

Sometimes the yellow or brownish scales on the undersurface of the leaves become very thin in quantity, e.g. as in series *Tenuiveniae* and in such cases can scarcely be described as lax or powdery as they are stated to be in the key. Unfortunately such scales may become white and also very thin in quantity as in *M. fatua* var. *inutilis*. I hope this does not lead to confusion with the species which are classed as having glabrous leaves with or without white colourations of wax or very minute microscopic scales which cannot be rubbed off easily. Usually *M. fatua* var. *inutilis* and other such species will have traces of yellow scales present as well as the white ones.
The Systematic Key

It will be seen that besides the master key to the series in section *Myristica* there is a similar but abridged or skeleton key also to the series in section *Myristica*. This skeleton key will give a more concise idea of the basic construction of the master key and what major divisions separate one series from another. The major divisions and the essential characters in the master key have been somewhat obscured by some minor yet necessary trimmings. A similar skeleton key for the series in section *Fatua* has not been considered necessary since the series in this section, especially the last four are more equally related to each other and are better indentified by a number of minor characters than by one major character or sub-division.

I have tried to make a continuous systematic key from the existing one by joining up the various series according to their position and sequence in the two master keys. The resulting key is longer and more cumbersome so I have abandoned the idea.

The systematic key is based mainly on male inflorescences which give the clue to the sections. The female inflorescence will help in section determination to a less extent. If both are absent the student may be forced to turn to the long key for fruiting and sterile material.

Key to Fruiting and Sterile Material

A twig and its leaves are the integral parts of a herbarium specimen and leaves are ever present on the living trees. Here the emphasis is on leaves for there could be no satisfactory key for fruits alone in a genus as large as *Myristica*. Yet it is desirable to have fruits to supplement leaf characters. If in this key I have used fruiting characters alone to distinguish certain species, then I try to come back and cover them by some other combination using vegetative characters. Similarly if scales are sometimes absent in species where they normally occur or if the veins on the lower surface of the leaves are sometimes raised when we expect them to be flush with the lower surface, then that species is repeated in some other part of the key to give the student a second chance. Thus certain species occur several times in this key which covers more variations and exceptions than the systematic one.

In a uniform genus like *Myristica* where many species are often equally inter-related, it is not easy, with the omission of floral characters, to find major divisions based on leaf characters which will divide the key into a small number of convenient equal parts. If these parts are not equal they tend to become numerous, adding
to the length of the key especially its final stages. In this key a considerable number of species can be eliminated at the beginning in one move by segregating those with the yellowish scales on the under-surface of their leaves from the rest which are glabrous or may at times have some whitish colouration on the leaves. This glabrous group is still very large but it can be reduced a little by removing from it small groups of species which have some outstanding peculiarities such as two lines present on the twigs from petiolo base to petiolo base, leaves cordate at the base or lamina very narrow in proportion to length. After that there is not much choice but to resort to such procedures as getting rid of species with small size-class leaves and dividing the remainder into lots with large and medium size-class leaves. Each of these resulting categories is then subdivided as to whether their nerves are faint or prominent on the lower surface of the leaves. A large group, thus pushed towards the end is one with medium size-class leaves having prominent nerves. This one is finally sub-divided according to whether the leaves are oblong or not. Since fruit may not always be present, the major divisions have to be made on leaf characters. This may not be a disadvantage after all for one cannot always be sure of the correct shape of herbarium fruits. They shrink on drying and young immature ones which are ellipsoid often become globose when ripe.

Although the major divisions of this key are very different from those of the systematic one yet the species that come together in both in their ultimate dichotomies are often identical. It will be obvious, however, that there will be some direct confrontations which have little in common. By way of compensation certain other species with close similarities now come together in new and desirable combinations not possible in the first key.

The Regional Keys

The two regional keys are probably of more practical value than the others. It is hoped that they lead to the short cuts in a less dense jungle of species. The student who takes the wrong turning here will not be so hopelessly lost that he cannot retrace his steps or find a new way out. Species with yellow scales on the under-surface of the leaves are as in the key for fruiting and sterile material separated at the beginning. Some of the series with their respective species follow in the same sequence as in the systematic key but I have tried to vary the pattern somewhat so as to give a slightly different arrangement.
KEY TO THE SECTIONS OF MYRISTICA

1. Inflorescence axis not persistent, producing flowers once only. Male inflorescence usually a panicle, less often a dichotomous cyme and rarely a peduncle with 2-3 flowers or a single flower; main axis smooth at the base, often flattened, slender, herbaceous; total length of the inflorescence 5 mm—18 cm long. Female inflorescence shorter with fewer branches or unbranched. Staminal column rarely with a sterile apicus except in series Fragantes and in M. neglecta, the stalk about as thick as the fertile part. Leaves generally without lax, powdery, yellow or brownish scales and hairs on the lower surface (some four exceptions) but a whitish or greyish colouration of very minute scales or matter which cannot be rubbed off easily sometimes present. Fruit generally larger than in section Fattua, several with dimensions of 7-10 cm long occur

(1) section Myristica

1. Inflorescence axis persistent, producing flowers from season to season. Male inflorescence a short, thick, star-covered, woody tubercle as in Knema, less often a dichotomous cyme; main axis rarely with a smooth basal portion free of scars; total length of the inflorescence 1 mm—3 cm long, rarely 7 cm. Female inflorescence similar to the male, as long or shorter. Staminal column nearly always with a sterile apicus (absence due to immaturity?), the stalk usually thinner than the fertile part. Leaves with or without scales and hairs. Fruit generally smaller, average 4-5 cm long, a few reaching 7-10 cm long and the smallest 1.8-2 cm long

(2) section Fattua

MASTER KEY TO THE SERIES IN SECTION MYRISTICA

1. Male inflorescence paniculate, (exception, some members of series Ellipticae cymose) a slender main axis with 1-3 or rarely more pairs of opposite branches (some of them at times alternate) arising in acropetal succession from base to apex of the main axis, the branches bearing the flowers at their extremities in umbels, sub-umbels or fascicles, the lowermost pair of branches sometimes again dividing similarly into opposite pairs of branchlets. Female inflorescence similar but often reduced in size and number of branches and flowers. Staminal column not usually produced into a sterile apicus, the stalk mostly (not always) as broad as the fertile part. Lower surface of the leaves various shades of brown when dry, sometimes whitish or greyish especially in the large-leaved species of series Hooglandiae, Uncinatae and less often in Maximae, the lower veins and midrib the same colour or darker, the lamina generally oblong in large-leaved species and elliptic in the smaller, and the base and apex varying. Fruit diverse, large, medium or less often small size-class, tomentose to glabrous

2. Indumentum not generally present on lower surface of leaf (except lax scales in series Cinammomeae); nerves oblique or curving

3. Leaves large size-class; length 18-50 cm, average 34 cm; breadth 5.5-18 cm, average 12 cm; nerves 16-30 pairs, average 23 pairs, very distinct; lamina coriaceous or stoutly coriaceous with rounded, sub-cordate, cordate, less often acute base, lower surface usually greyish, whitish, occasionally yellowish. Twigs thick, 5 mm or more at the apex with a large thick terminal bud

4. Male panicles 6-18 cm long (slightly smaller, 2-5 cm long in M. papyracea) much branched. Male flowers numerous, 5-8 mm long, globose or ovoid-globose (medium size). Reticulations of leaf scalariform, often visible on the lower surface when dry. Fruit oblong and rounded at the apex

(1) series Maximae

4. Male panicles shorter, 2-4 cm long with fewer, less regular branches, the female about the same length or slightly smaller (not seen in series Uncinatae). Male flowers fewer and much larger, among the largest in the genus, 1-1.6 cm long and 5 mm—1 cm broad, the male not seen in series Uncinatae (female 2 cm long in M. uncinata), ellipsoid or ovoid-ellipsoid in bud with an acute or obtuse apex. Reticulations of leaf not generally visible. Fruit oblong, sub-globose or narrowly oblong, rounded or narrowed at the apex
5. Primary nerves of leaf prominent on both surfaces, secondary nerves absent, base mostly rounded. Flowers densely adpressed-tomentose with 2 mm long hairs (not seen in *M. umbrosa*). Stalk of staminal column not seen, probably as broad as fertile part. Fruit sub-globose when mature, often ellipsoid when young or that shape as a result of drying or squashing in herbaria, tomentose or densely tomentulose

(2) series Uncinatae

5. Primary nerves of leaf more slender, usually not very distinct above, faint on the lower surface, secondary nerves present, also faint, base mostly acute. Flowers tomentulose or thinly so, the hairs less than 1 mm long. Stalk of staminal column narrower than fertile part. Fruit oblong to narrowly oblong, minutely and thinly tomentulose, tending to become glabrous

(3) series Hooglandiæ

3. Leaves medium to less often small size-class; length 5–30 cm, average 17.5 cm; breadth 1.8–12 cm, average 6.5 cm; nerves 8–22 pairs, average 15 pairs; lamina mostly chartaceous, sometimes coriaceous with acute, less often rounded base, lower surface yellowish brown or various shades of brown, not or less often whitish or glaucous (glaucous sometimes in fresh leaves, whitish sometimes in *M. malaccensis* and *M. elliptica* when dry). Twigs more slender at the apex, 2–3 mm thick, the terminal bud also slender

6. Flowers not 3-angled at the apex in bud (slightly angled in *M. malaccensis*, always?), ovoid, oblong-ovoid or subglobose. Bracteoles if persisting about half to nearly as long as the adult flowers. Scars of pedicels not distinct and not raised on the secondary branches of the inflorescence. Leaves mostly acute at the base. Twigs generally a dark grey colour, reddish brown in the younger parts. Bark blackish and deeply longitudinally furrowed

7. Inflorescence axis, flowers, terminal bud and innovations rusty-tomentose or woolly-tomentose. Flowers more or less coriaceous, mostly oblong. Inflorescence axis (except in *M. gigantea* 3–4 mm thick, bracteole (male) 2–5 mm long, not ciliate at the margins, tending to persist for sometime. Staminal column acute at the apex. Leaves usually coriaceous

(4) series Maingayae

7. Inflorescence axis, flowers, terminal bud and innovations glabrous or puberulous, less often pubescent except when young (e.g. in the young inflorescences of some specimens of *M. iners* from E. Borneo) the indument becoming less with age, greyish or yellowish, never rusty or dark reddish brown. Flowers with a thin perianth, mostly globose, sub-globose or ovoid. Inflorescence axis more slender, 1–2 mm thick; bracteole (male) 1–2 mm long, ciliate at the margins in two species, sometimes early caducous. Staminal column rounded at the apex. Leaves usually chartaceous (coriaceous) in *M. malaccensis* 

(5) series Malabaricae

6. Flowers often 3-angled at the apex, ellipsoid or nearly tubular. Bracteoles if persisting smaller, \( \frac{1}{4} - \frac{1}{2} \) the length of the adult flower. Scars of pedicels often distinct on the older secondary branches of the inflorescence. Leaves acute or rounded, emarginate or sub-corate at the base. Twigs often pale straw-coloured or reddish brown. Bark reddish brown, not generally deeply furrowed

8. Scales if at all present on lower surface of leaf then never lax or powdery but very closely applied and cannot be rubbed off easily, whitish in colour. Inflorescence sometimes cymose and dichotomous. The 3 angles at the apex of the perianth distinct or sometimes faint or absent (e.g. *M. schleinitzii* and *rosseleinsensis*). Twigs often pale straw-coloured or reddish brown, the striations not very deep. Leaves rounded or acute, sometimes sub-corate at the base, nerves prominent or faint, secondary nerves present or not, reticulations present or not. Fruit ellipsoid or oblong, 2–6–(8) cm long; pericarp less than 1 cm thick, the tissue compact in cross-section when dry. Bark reddish brown or dark brown 

(6) series Ellipticae
8. Lax powdery cinnamon scales present on lower surface of leaf; not closely applied but easily rubbed off, hairs never present. Inflorescence always paniculate. The 3 angles present at the apex of the perianth distinct. Twigs dark brown with deep striations. Leaves scute at the base, nerves rather faint, secondary nerves present, reticulations absent. Fruit ellipsoid, 6–9 cm long, pericarp up to 1.5 cm thick, the tissue woody and porous or granular in cross-section when dry. Bark blackish brown (7) series Cinnamomae

2. Indument of hairs or lax cinnamon brown or yellowish powdery scales present on the undersurface of the leaf; nerves oblique

9. Indument consisting of both hairs and cinnamon brown or yellowish scales (hairs absent or very rare in M. agusamensis). Secondary veins almost absent in the leaves, primary veins prominent beneath. Male inflorescence 2–8 cm long. Male flowers in bud subglobose but not 3-angled at the apex. Stalk of staminal column shorter than the fertile part. Fruit oblong or ovoid-globose, rounded at the apex, densely tomentose or tomentulose; pericarp hard but scarcely woody. Bark reddish brown (8) series Litorales

9. Indument of lax cinnamon scales only, hairs absent. Secondary veins present in the leaves, primary veins faint beneath. Male inflorescence 5 mm–1 cm long. Male flowers in bud cylindrical or narrowly oblong, more elongate, 3-angled at the apex. Stalk of staminal column as long as fertile part, often swollen. Fruit ellipsoid, sometimes rather oblique towards the apex, tomentulose; pericarp very hard and woody. Bark, blackish brown (7) series Cinnamomae

1. Male inflorescence not paniculate, a slender main axis dividing in a dichotomous pattern, once forked, less often twice, or in one case a monochasium with the flowers on the upper or one side of the secondary axis only; sometimes the main axis simple with 2–3 flowers or even reduced to a single flower especially in the female. Staminal column produced into a sterile apiculus, the stalk narrower and slightly shorter than the fertile part. Lower surface of the leaves often whitish or greyish with reddish brown nerves and midrib, the lamina elliptic, medium to small size-class, base acute and apex apiculate or acuminate. Fruit large, 6–9 cm long, glabrous or becoming glabrous, never tomentose (9) series Fragrances

**Skeleton key to the series in section Myristica**

1. Inflorescence a panicle with pairs of opposite branches, the younger in succession towards the top of the main axis, the largest and lowermost sometimes with pairs of opposite branches of a second order

2. Indument not generally present on lower surface of leaf (except lax scales in series Cinnamomae)

3. Leaves large size-class with 16–30 pairs of veins

4. Panicles large size-class, much branched. Flowers medium size-class (1) series Maximae

4. Panicles small size-class, branches few, shorter and more condensed. Flowers largest in the genus

5. Secondary veins absent; primary prominent. Perianth tomentose. Fruit sub-globose or ellipsoid, tomentose (2) series Uncinatae

5. Secondary veins present; primary much more slender. Perianth tomentulose. Fruit narrow, oblong, tomentulose (3) series Hooglandiae

3. Leaves medium or (small size-class) with 8–22 pairs of veins

6. Perianth not 3-angled at apex in bud

7. Inflorescence axis and flowers rusty-tomentose (4) series Maingayae

7. Inflorescence axis glabrous, puberulous or (pubescent when young only) (5) series Malabaricae

*Note:*—Refer to previous key for measurements.
6. Perianth 3-angled at apex in bud

8. Scales if at all present whitish and very closely adpressed to lower surface of leaf, never lax and powdery. Leaves with secondary veins or without, base acute or rounded

(6) series Ellipticeae

8. Scales lax and powdery, cinnamon brown. Leaves with secondary veins, base acute

(7) series Cinnamomeae

2. Indumentum present on lower surface of leaf

9. Indumentum consisting of both hairs and lax, cinnamon brown or yellowish scales on undersurface of same leaf

(8) series Littorales

9. Indumentum consisting of lax cinnamon scales only

(7) series Cinnamomeae

1. Inflorescence a dichasium once or twice forked, sometimes (in series Fragrantes) reduced to a main unbranched axis with 1–3 flowers

10. Male flowers ellipsoid and not 3-angled at the apex in bud; bracteole very early deciduous. Staminal column with an obtuse apiculus, the stalk slightly narrower than the fertile part. Fruit generally larger. Nerves of leaves tending to curve widely

(9) series Fragrantes

10. Male flowers tubular, sometimes ellipsoid, 3-angled or faintly so at the apex in bud; bracteole tending to persist, rarely early deciduous. Staminal column without an apiculus, the stalk mostly the same thickness as the fertile part. Fruit smaller. Nerves of leaves (not always reliable) more oblique, tending to curve less

(6) series Ellipticeae

1. Key to the species in series Maximae

1. Leaves nearly sub-bullate above when fresh, usually drying a blackish or dark brown above and glaucous, cinereous or brownish beneath. Male panicles 10–18 cm long, puberulous to almost glabrous, laxly branched with slender, 1–1.5 cm long and 0.8 mm thick pedicels. Bracteoles small, shorter than the flowers, 2 mm long. Bracts of the inflorescence inconspicuous, about 2 mm long, early caducous. Male perianth, 4–6 mm long and 4 mm broad in bud and up to 8 mm long at anthesis, greyish, sub-tomentulose outside, becoming glabrous, female 8–9 mm long. Fruit dark rusty sub-tomentulose, much wrinkled when dry becoming glabrous

(1) M. maxima

1. Leaves not sub-bullate above when fresh, usually drying a paler or medium brown, sometimes a greenish or yellowish brown above and various shades beneath. Male panicles shorter, 2–10 cm long, tomentulose, less laxly branched with stouter branches and slightly thicker, 4 mm—1 cm long and 1.5–2.5 mm thick pedicels. Bracteoles much larger, 4–6 mm long, as large as the (young) flowers (old flowers will exceed bracteoles which are late in falling). Bracts of the inflorescence conspicuous or not, longer. Male perianth slightly larger, 5–8 mm long and 5–6 mm broad in bud, the tomentum denser, female 9 mm long. Fruit rusty-tomentulose, tomentose or glabrous

2. Leaves usually drying yellowish green and glossy above, yellowish or brownish yellow beneath, often broadly obovate but sometimes broadly oblong, the base rounded or cordate. Male flowers rather few on a short, flat, firm, 2–5 cm long inflorescence; male perianth 6–7 mm long and 5 mm broad, dark brown-tomentulose, very coriaceous, thick and tough; pedicels 4–8 mm, average 5 mm long and 1.5 mm thick, thickening up to 2.5 mm at their apices; bracts of the inflorescence not conspicuous; stalk of staminal column glabrous. Fruit glabrous or soon glabrous, blackish and smooth when dry

(2) M. papyracea
2. Leaves usually drying medium or light brown above, greyish or whitish beneath, rarely brown, more variable in shape but not so broad, generally oblong, less often obovate, the base acute, rounded or in very large leaves (those 30–50 cm long) sub-cordate. Male flowers more numerous on a less rigid, 6–10 cm long, more branched inflorescence; male perianth 5–8 mm long and 5–6 mm broad, lighter brown with laxer, longer tomentum, (the female tomentose not tomentulose), not coriaceous, brittle when dry; pedicels 7 mm—1 cm long and 1–1.5 mm thick; bracts of the inflorescence very conspicuous before falling, the largest up to 2 cm long; stalk of staminal column pubescent. Fruit rusty-tomentulose to tomentose, varying a good deal in the amount of tomentum and the time it persists; usually very dense when young, dense or even glabrous when old

(3) *M. philippensis*

2. Key to the species in series Uncinatae

1. Leaves rigidly coriaceous, oblong-elliptic, less often oblong, 37–47 cm long and 8.5–15 cm broad, drying a rich reddish or medium brown and often glossy above, whitish beneath, glabrous on the lower midrib. Terminal bud straight and acute at the apex, minutely puberulous. Flowers not seen but probably large as in the next species. Fruit 6.5–9 cm long and 4.5–5 cm broad, densely and shortly medium brown-tomentulose. Stilt-roots sometimes present

(4) *M. umbrosa*

1. Leaves thinly coriaceous, oblong, 18–30 cm long and 5.5–10.5 cm broad, drying a paler or dull greyish brown above and cinereous beneath, the lower midrib in young leaves covered with adpressed, dark brown hairs, soon glabrous. Terminal bud uncinate (always?) with 1 mm long, dark brown, adpressed hairs. Male flowers not seen. Female ellipsoid, large, 2 cm long, densely tomentose with 2 mm long, dark brown, adpressed hairs, the lobes narrow, much reflexed or uncinate. Fruit 4–6 cm in diam., nearly sub-globose, tomentose with dark brown, chocolate-coloured tomentum. Stilt-roots not reported

(5) *M. uncinata*

3. Key to the species in series Hooglandiae

1. Leaves coriaceous, brittle on drying, oblong, often with nearly parallel sides, the base rounded or sub-cordate, the midrib very stout and raised on both surfaces, the petiole also stout, 4 cm long and 5 mm thick; nerves 30 pairs, fine and indistinct as are the numerous, shorter secondary nerves, the line of interarching at the margins indistinct. Male inflorescence rather short, 1.5–2 cm long but immature and may lengthen: flowers in a condensed raceme or pseudo-corymb at its apex. Stalk of staminal column pubescent and nearly as broad as the fertile part, the sterile apiculus acute and 1.5 mm long

(6) *M. neglecta*

1. Leaves chartaceous or thinly coriaceous, not brittle on drying, oblong, oblong-elliptic or occasionally narrow-elliptic, the base acute; the midrib raised on both surfaces but less prominent, the petiole not so stout, 1.5–3 cm long and 3 mm thick; nerves 16–22 pairs, fine with fewer secondary nerves than the above, the line interarching fine but clearly visible. Male inflorescence 1–2 cm long, laxer, the axis more slender and flattened and with fewer, 1–4 flowers. Stalk of staminal column glabrous, slender, much narrower than the fertile part, the sterile apiculus truncate, very short or absent

2. Tree 12–20 m high. Leaves slightly chartaceous, medium brown and very glossy and waxy above when dry as if varnished. Bracts of the inflorescence axis not distichous. Male flowers large, 1.3–1.6 cm long and 8 mm—1 cm broad, oblong to almost sub-globose in bud, obtuse at the apex; female 8 mm in diam., ovoid-globose. Male pedicels 1.3–1.5 cm long. Fruit oblong, 6–7 cm long and 3–3.5 cm broad, but young ones sub-globose; stalk 1 cm long

(7) *M. hooglandii*

2. Tree 3–7 m high. Leaves chartaceous, greyish brown and dull above when dry. Bracts of the inflorescence distichous. Male flowers smaller, 1 cm long and 5 mm broad, ellipsoid in bud, acute at the apex; female unknown. Male pedicels 8 mm—1 cm long. Fruit narrowly oblong or ellipsoid, 4–5 cm long and 1.5 cm broad; stalk 1–1.5 cm long

(8) *M. carrii*
4. Key to the species in series Maingayae

1. Young twigs slender, 2–3 mm thick in the apical parts. Terminal bud slender, 1–3 mm thick. Leaves narrow, spatulate, occasionally lanceolate, 7–10 cm long and 2–4 cm broad, the apex obtuse, rarely acute; nerves 12–18 pairs; petiole slender, 1–2 mm thick. Inflorescence axis rather slender, 1–2 mm thick, the male 2–3 cm long. Male flowers 3–5 mm long; pedicels 1–2 mm long, very slender, 0.5 mm thick; bracteole 1 mm long. Fruit ovoid, tomentulose, 5.5 cm long and 4 cm broad

(9) M. gigantea

1. Young twigs stouter, 4–6 mm thick in the apical parts. Terminal bud stouter, 3–5 mm thick. Leaves larger and wider, not spatulate, 12–30 cm long and 4.5–9 cm broad, the apex acute; nerves 17–20 pairs, also stouter; petiole stouter, 3–4 mm thick. Inflorescence axis 3–4 mm thick, the male 4–16 cm long. Male flowers 5–6 mm long; the tomentum slightly longer and more shaggy; pedicels 3–5 mm long, 1–1.5 mm thick. Fruit more oblong, woolly-tomentose or the indumentum very short and scurfy, soon glabrous, 6–10.5 cm long and 4–6.5 cm broad

2. Leaves rigidly coriaceous, drying blackish brown and extremely glossy above, rusty-brown beneath, mostly lanceolate, the sides nearly parallel for most of their length, 19–30 cm long, the midrib stout, 3 mm thick and striate when dry; petiole 3–5 cm long and 3–5 mm thick. Indumentum on the innovations of the twigs extending down a considerable distance, sometimes up to 12 cm at each flush of new leaves, not so pronounced at other times. Male flowers 4–5 mm long and 2–2.5 mm broad. Fruit densely woolly-tomentose, ellipsoid or oblong, sometimes ovoid, 6–8 cm long and 4 cm broad. Tree of peat-swamp forest with stilt-roots

(10) M. lowiana

2. Leaves coriaceous, drying olive green above and dull or less glossy, yellowish or glaucous brown beneath, elliptic-oblong or narrowly elliptic, sometimes broadest above the middle, the sides less parallel, slightly smaller, 12–28 cm, average 18 cm long, midrib about 1 mm narrower, less deeply striate when dry; petiole 2–2.5 cm long and a trifle more slender, 2–4 mm thick. Indumentum on the innovations of the twigs not usually extending down more than 3 cm, again conspicuous only with the seasonal flush of new leaves. Male flowers 5–6 mm long and 3.5–4 mm broad. Fruit with reddish-brown, furfuraceous scurf, soon becoming glabrous, oblong or oblong-ovoid and more rounded at the apex, larger, up to 10.5 cm long and 6–6.5 cm broad. Tree of drier situations in lowland primary forest without stilt-roots

(11) M. maingayi

5. Key to the species in series Malabaricae

1. Leaves chartaceous, 8–19 cm, average 12 cm long and 2.5–6 cm, average 3.5 cm broad; nerves rather few and slender, 9–15 pairs

2. Fruit densely rusty-tomentose up to 10 cm long and 4–6 cm broad. Male inflorescence 4–6 cm long, branched. Male flowers small, 3–4 mm in diam., globose to sub-globose in bud, later more ovoid, minutely greyish brown pubescent; pedicels 5–8 mm long; bracteoles usually present. Stalk of staminal column densely tomentose. Leaves elliptic or elliptic-lanceolate with about 9 pairs of nerves. Swamp forest species with stilt-roots

(12) M. malabarica

2. Fruit glabrous, (some minute rusty scurf present when young) 5 cm long and 3–3.5 cm broad. Male inflorescence a 1–2 cm long unbranched (always?), slender peduncle with the flowers in a perfect umbel at its apex. Male flowers larger, 6–7.5 mm long and 3–4 mm broad, ovoid-oblong in bud, glabrous, pedicels 7 mm—1 mm long; bracteoles very early caducous. Stalk of staminal column glabrous. Leaves mostly narrowly elliptic with 9–15 pairs of slightly fainter (always?) nerves. No stilt-roots reported

(13) M. umbellata
1. Leaves chartaceous or coriaceous, larger and more variable in shape, 12-25-(33) cm long and 3-10 cm broad; nerves 12-20 pairs, generally more prominent but some faint ones at times in M. iners

3. Bark greyish black, flaking and deeply longitudinally fissured. Twigs slender, 1-3 mm thick and reddish or blackish brown in the apical parts, greyish and striate in the older. Leaves chartaceous, less often coriaceous, variable in shape, mostly lanceolate, less often oblanceolate to oblong or obovate, 12-20 cm long and 3-6 cm broad (broad forms 7.5-10 cm broad), base acute, rarely rounded, the lamina usually drying a pale brown on both surfaces, the margins not revolute; nerves 12-15 pairs, slender, distinct or at times very faint beneath, oblique; reticulations faint or indistinct. Male inflorescence 2-8 cm long, depending on age. Male flowers ovoid in bud, not 3-ridged at the apex, 7-8 mm long and 5-6 mm broad. Fruit oblong to oblong-ovoid, 5-8.5 cm long and 4-4.5 cm broad, the pericarp 5 mm—1.3 cm thick, depending on the progressive ripening of the fruit, hard. Stilt-roots reported, certainly not always, mostly absent (14) M. iners*

3. Bark blackish or dark brown, flaking but not longitudinally fissured. Twigs 3-5 mm thick and rather pale and smooth in the apical parts, darker and striate in the older. Leaves coriaceous, oblong with nearly parallel sides, 15-25-(35) cm long and 4-11 cm, average 7 cm broad, base rounded, the lamina usually drying greenish above and glaucous beneath, the margins revolute; nerves 15-20 pairs, thicker and stouter, arising from the midrib at a wide angle; reticulations often forming a lax network beneath. Male inflorescence 7-10 cm long, Male flowers sub-globose in bud, 3-ridged at the apex (always? This requires more investigation), smaller, 5 mm long and 3 mm broad. Fruit oblong, 5-7 cm long and 3 cm broad, the pericarp thinner and more brittle when dry. Stilt-roots not reported. Not so common as iners (15) M. malaccensis

6. Key to the species in series Ellipticae

1. Leaves brittle (often breaking in herbaria) glaucous beneath when fresh, usually drying pale yellowish brown beneath but sometimes retaining the whitish or glaucous colour, especially in var. celebica (the whiteness just a colouration or seemingly due to foreign organic or inorganic matter, lime or salt incrustations or to very minute adpressed scales, not the normal, lax powdery ones of species like fatua and its allies), the colour sometimes blackish above when dry in thin-leaved specimens of var. similium (see key to vars), the nerves distinct especially beneath, secondary nerves not present, base nearly alway acute, if at all rounded then finally acute at its junction with the petiole. Male flowers nearly tubular in bud, (4)-8-9 mm long and 2 mm broad, slightly 3-angled in bud at the apex, nearly glabrous, (densely adpressed-tomentose in the vars, see key). Fruit entirely glabrous, often gibbous at the base and oblique at the apex, large in var. elliptica. 7-8 cm long and 3.5-4 cm broad, smaller in the other vars. The var. elliptica a swamp forest species with stilt-roots (16) M. elliptica and its vars

1. Leaves not or less brittle (not normally breaking in herbaria) usually drying a pale brown, sometimes a dark brown beneath, but not glaucous, nerves distinct or not beneath, secondary nerves usually present, base mostly rounded and often subcordate or emarginate, less often acute (acute in rosselensis). Male flowers oblong or elliptoid, variable in size, 5 mm—1 cm long and 2-4.5 mm broad, the angles at the apex more distinct except in 19 and 20, glabrous or tomentose. Fruit glabrous to tomentose, not gibbous at the base nor oblique at the apex (except sometimes slightly so in garcinitifolia), generally smaller in size. Sea-shore species with stilt-roots or inland species without them

2. Flowers especially the male prominently 3-angled at the apex in bud, the latter not deflated on drying, male perianth 8 mm—1 cm long and and 3-4.5 mm broad; main axis of the inflorescence generally stout, 3-4 mm thick. Fruit 3-6 cm long and 2.5-3 cm broad. Twigs 4-5 mm thick in the apical parts

*Note:*—There is a possibility that hybrids between M. iners and malaccensis may occur. Atypical specimens somewhat intermediate between the two have been found.
3. Leaves both young and old entirely glabrous, many of them panduriform or broadest above the middle, emarginate or subcordate at the base; nerves fine and faint, 17–22 pairs with numerous shorter secondary ones. Apical parts of the twigs and the flattened inflorescence axis glabrous. Perianth slightly tomentose at first, later nearly glabrous, the male ellipsoid and acute at the apex in bud, 8 mm long and 3–4 mm broad; pedicels 5–8 mm — (1 cm) long and 1 mm thick; bracteole 2 mm long; staminal column without an apiculus. Female inflorescence 3 cm long, slightly branched with 2–3 flowers. Fruit oblong, pale brown-tomentose at first, soon glabrous, 5–6 cm long and 3 cm broad, the base usually narrowed into a short pseudo-stalk; peduncle 1–1.5 cm long and pedicel about the same length, thickening into a tiny cup-shaped receptacle where it joins the fruit. A species of the coastal dunes

(17) *M. garciniifolia*

3. Leaves covered with some floccose tomentum when young, very early glabrous, not panduriform, only the older ones emarginate at the base; nerves slightly more distinct, 13–18 pairs with much fewer secondary ones. Apical parts of the twigs and the terete inflorescence axis densely tomentose. Perianth densely yellowish brown-tomentose, the male oblong and obtuse at the apex in bud, 8 mm — 1 cm long and 4–4.5 mm broad; pedicels 4–6 mm long and 2 mm thick; bracteole 4–5 mm long; staminal column with a sterile apiculus. Female inflorescence shorter, 4–5 mm long, unbranched with 1–3 flowers only. Fruit (not quite mature), ovoid or almost conical, yellowish brown and densely villose, 3 cm long and 2.5 cm broad, the base broad and horizontally flattened, not narrowed into a pseudo-stalk; peduncle very short, 5 mm long and pedicels 5 mm long, not thickening into a cup-shaped receptacle. An inland species

(18) *M. inopinata*

2. Flowers not 3-angular or only faintly so in bud, the latter often becoming deflated on drying, male perianth 5–6 mm long and 2–3 mm broad; main axis of inflorescence 1–3 mm thick. Fruit smaller, oblong and rounded at both ends, glabrous or nearly so, 2–3.5 cm long and 1.5 cm broad. Twigs more slender, 2–3 mm thick in the apical parts

4. Leaves thinly coriaceous, oblong to ovate with a rounded, subcordate or cordate base, generally drying a pale yellowish brown above, sometimes with an olive green tinge, 8–21 cm long and 5–8.5–(12) cm broad; nerves 10–15 pairs, raised or not but fairly distinct beneath. Male and female inflorescences with several flowers, 3 or more. Female inflorescence branched, Stalk or staminal column pubescent. Fruit rusty-tomentulose becoming glabrous, 2–3.5 cm long and 1.5 cm broad, 2–4 in a cluster, pseudo-stalk 3–4 mm long. A sea-coast species, stilt-roots reported

(19) *M. schleinitzii*

4. Leaves chartaceous, lanceolate or narrowly elliptic with an acute or slightly rounded base, drying a dark or blackish green above, 6–16 cm long, average 12 cm long, narrower, 1.8–4 cm broad, average 3 cm broad; nerves 16–20 pairs, very fine on both surfaces, not raised beneath, at times indistinct. Male and female inflorescences with about 3 flowers at the ends of the branches. Female inflorescence mostly unbranched. Stalk of staminal column glabrous. Fruit not seen. An inland species, stilt-roots not reported

(20) *M. rosseleensis*
Key to the varieties of Myristica elliptica

1. Male flowers 8–9 mm long, glabrous to slightly adpressed-puberulous outside; pedicels 5 mm long also glabrous or puberulous. Flowers very few, 1–3 on a 2–2.5 cm long, only slightly branched inflorescence. Fruit large, 7–8 cm long and 3.5–4 cm broad, oblong-ellipsoid, often gibbous and narrowed to an oblique apex; stalk 2–3.5 cm long. Leaves 12–18 cm long and 4–8 cm broad (28 cm long and 12 cm broad in saplings); nerves 12–17 pairs. Trees of the fresh water swamp forest, 8–33 m high with stilt-roots

M. elliptica var. elliptica

1. Male flowers smaller, 4–6 mm long, rusty-tomentose to densely adpressed-pilose outside; pedicels 2–3 mm long, densely rusty-tomentose. Flowers more numerous on a 2.5–5 cm long, more branched inflorescence. Fruit smaller than the above, more sub-globose, less or not gibbous with a shorter, less distinctly oblique apex. Leaves about the same size or slightly smaller; nerves 8–11 pairs. (Size of leaves variable in all three and not a very reliable diagnostic character)

2. Fruit 3.5–4 cm long and 2.5–3 cm broad, oblong, pseudo-stalk present, about 5 mm long; stalk 1.3–1.5 cm long and 4–7 mm thick. Male inflorescence 2.5–4 cm long, male flowers more numerous than in var. elliptica; about 5 in the cluster. Leaves drying pale yellowish brown above as in the typical and sometimes whitish beneath. Trees of limestone, coral-limestone or sandy substrata, 20–26 m high without stilt-roots, nearest to var. elliptica in the fruit and to var. simiarum in the flowers

M. elliptica var. celebica

2. Fruit smallest of the three vars, 1.5–2 cm in diam., globose to sub-globose, pseudo-stalk absent or only 2–3 mm long; stalk more slender, 1 cm long and 2–3 mm thick. Male inflorescence 3–5 cm long, pedicel scars sometimes more numerous at the apices of the branches; male flowers numerous, 6–12 in the cluster. Leaves drying the same colour above and sometimes blackish (probably due to too much heat) in thin-leaved specimens, not whitish beneath. Smaller trees in the rocky beds and on banks of streams on hill-sides, 5–15 m high without stilt-roots

M. elliptica var. simiarum

7. Key to the species in series Cinnamomeae

Note: As there is only one species in this series refer to Master Key to the series in section Myristica where M. cinnamomea appears twice. As sterile specimens of M. cinnamomea might be confused with M. beccarii and smythiesii or these two confused with each other a key is now given, based entirely on vegetative characters, to separate these. See also the key to the Bornean species where these three occur together in 4 (1) and 4 (2).

1. Leaves elliptic or narrowly elliptic, acute at the base; nerves 14–20 pairs, very faint beneath; petiole slender, 1.2–2.2 cm long and 2–3 mm thick. Stilt-roots not reported. Twigs slender, 2–3 mm thick in the apical parts, not flaking in the older parts (21) M. cinnamomea

1. Leaves elliptic or not, rounded at the base (those at the extreme apex may be acute); nerves generally fewer, faint of not beneath; petiole shorter, 6 mm—1.3 cm long. Stilt-roots present. Twigs slender or stouter, the bark tending to crack in the older parts

2. Twigs 4–5 mm thick, rusty-tomentose and striate on the innovations. Leaves coriaceous, lanceolate or oblong-lanceolate, base rounded and often emarginate or sub-cordate; nerves 11–18 pairs, sunk but visible above, fairly prominent beneath; length 9–22 cm; breadth 5–9 cm; petiole 6 mm—1 cm long and 3–4.5 mm thick (39) M. beccarii

2. Twigs 2–3 mm thick, rusty-tomentulose on the innovations. Leaves less coriaceous, narrowly elliptic or elliptic, base rounded but not emarginate or sub-cordate; nerves 12–14 pairs, very fine and faint on both surfaces, sometimes scarcely visible; length 8–16 cm; breadth 2.5–6 cm; petiole 8 mm—1.3 cm long and 2.5–3 mm thick

(38) M. smythiesii
8. Key to the species in series Littorales

1. Leaves coriaceous or chartaceous, elliptic-lanceolate, lanceolate or elliptic, less often elliptic-oblong, often acuminate at the apex, 11–30 cm long and 3–12 cm broad, the line of interarching of the 15–20 pairs of veins on the lower surface not distinct; lower surface densely to thinly covered with minute, powdery, rusty brown, yellowish or whitish yellow scales. Twigs reddish brown or dark brown in the older parts. Male panicle 2–8 cm long, much branched with numerous flowers, the branches not loosely articulated. Male flowers small, 2–7 mm long and 2–5 mm broad; pedicels 2–5 mm long; female flowers 3–7 mm long; female pedicels 2–4 mm long. Fruit oblong or ellipsoid, densely rusty-tomentose or minutely tomentulose, 3–5 cm long and 2–4 cm broad

2. Leaves coriaceous, less often chartaceous, elliptic-lanceolate, less often elliptic, 15–30 cm long and (3)–5–12 cm, average 8 cm broad, drying a medium or a rich brown above, indumentum dense or not beneath, hairs sometimes present, petioles with hairs, later becoming glabrous; reticulations visible only when indumentum is not dense. Male inflorescence 2–8 cm long. Male flowers 4–7 mm long; pedicels 5 mm long; bracteole 3 mm long. Fruit oblong, densely dark brown or rusty-tomentose, 5 cm long and 3–4 cm broad; stalk 1.5–1.8 cm long

(22) M. guatterifolia

2. Leaves chartaceous, lanceolate, 11–15–(20) cm long and 2–6 cm, average 3 cm broad, drying a pale greenish brown above, indumentum very thin, hairs absent, petioles glabrous; reticulations often visible beneath. Male inflorescence 2–5 cm long, average 3 cm. Male flowers 2–4 mm long; pedicels 2–3 mm long; bracteole 1.5–2 mm long. Fruit oblong or ellipsoid, rusty-tomentulose, tending to become glabrous, 3–3.5 cm long and 2–2.3 cm broad; stalk 5 mm long

(23) M. agusanensis

1. Leaves mostly chartaceous, sometimes thinly coriaceous, broadly elliptic to elliptic-lanceolate, acute or blunt, not acuminate at the apex, 16–23 cm long, average 19 cm and 6–10 cm broad, average 8 cm, the line of interarching of the 12–15 pairs of veins rather distinct; lower surface especially along the midrib covered with minute hairs as well as brownish or whitish yellow scales. Twigs various shades of grey in the older parts. Male panicle 3–6 cm long, branched but few-flowered, the branches often loosely articulated and tending to break up into segments on drying. Male flowers 7 mm—1 cm long and 5–7 mm broad; pedicels 7 mm—1 cm long; female 7 mm x 7 mm; female pedicels 7 mm—1 cm long. Fruit ovoid-globose, 3–3.5 cm in diam., minutely medium brown furfuraceous-tomentose

(24) M. markgraviana

9. Key to the species in series Fragrantes

1. Leaves chartaceous, small size-class, 6–13 cm long and 3.5–6.5 cm broad with 8–11 pairs of nerves. Twigs slender, 1–2 mm thick in the apical parts, glabrous. Male flowers 3–7 mm long. Stilt-roots not observed

2. Leaves acute or shortly and sharply apiculate at the apex, the lamina whitish or not beneath when dry; nerves impressed or not above, often drying with a reddish tinge beneath. Inflorescence axis glabrous, 1–3 cm long, average 2 cm long. Male flowers waxy and glabrous outside, 6–7 mm long and 2.5–3.5 mm broad (slightly larger when fresh or in the female), sub-globose to ellipsoid in bud, urceolate at anthesis, especially the female; pedicels 1–1.5 cm long, glabrous. Stalk of staminal column glabrous. Fruit glabrous (except for some loose rusty scurf when young), broadly pyriform or sub-globose, drooping, very aromatic, 6–9 cm long and nearly as broad

(25) M. fragrans
2. Leaves acute or bluntly acute (always?) at the apex, the lamina a more ashy white beneath when dry; nerves strongly impressed above, drying a brownish colour beneath. Inflorescence axis striose-tomentose, 1.5-5 cm long. Male flowers striose-pubescent or tomentose, not waxy, smaller, 3-4 mm long and 4 mm broad, globose in bud, broadly campanulate at anthesis, facing inwards towards the centre of the axis or towards the opposing twin inflorescence branch; pedicels 5 mm long, striose. Stalk of staminal column tomentose. Female flowers and fruits not seen

(26) M. impressinervia

1. Leaves chartaceous or coriaceous, larger, 10-25 cm long and 4-11 cm broad with 9-18 pairs of nerves. Twigs slightly stouter, 2-3 mm thick in the apical parts, slender in argentea but much stouter in succedanea especially in the older parts, glabrous or rusty-tomentose. Male flowers larger, 7 mm — 1.1 cm long. Stilt-roots sometimes present

3. Twigs slender, 2 mm thick in the apical parts, glabrous, very rough with raised lenticels (the roughness a good diagnostic character), the bark tending to crack. Leaves chartaceous, silvery white beneath except for the brownish midrib and nerves, elliptic-lanceolate; nerves 9-13 pairs. Male perianth ellipsoid, slightly acute at the apex, glabrous; pedicels 1-1.3 cm long, filiform, 0.5 mm thick. Fruit ellipsoid, 4.5-8.5 cm long and 4.5-5.5 cm broad, narrowed at both ends

(27) M. argentea

3. Twigs slightly stouter, 3 mm thick in the apical parts and 5 mm thick a short distance down, often rusty-tomentose on the innovations, coarsely striate but not so rough and without raised pustular lenticels and fissured bark. Leaves rigidly coriaceous, brownish white or a dirty white beneath except for the brownish midrib and nerves, shape more variable, the same and also broadly elliptic; nerves 10-18 pairs. Male inflorescence forked 1-2 times. Male perianth oblong, obtuse at the apex in bud, minutely rusty-tomentulose becoming glabrous; pedicels 7 mm — 1 cm long, thicker, 1-1.5 mm thick. Fruit ovoid-ellipsoid, 7 cm long and 4 cm broad, more rounded at the ends

(28) M. succedanea

MASTER KEY TO THE SERIES IN SECTION FATUA

1. Lax, powdery, yellowish, cinnamon-brown or less often whitish yellow scales present on the lower surface of the leaf. Flowers densely tomentose or villose. Fruit tomentose, densely tomentose, furfuraceous-tomentose or villose, less often tomentulose, tending to be larger than in the lepidote-leaved species of section Fatua, 4-5 cm long and up to 10 cm (smaller in some members of series Tenuiveniae). Twigs with some indumentum on the innovations, tomentulose, tomentose and even villose, the indumentum extending down for some distance

2. Hairs as well as scales sometimes present on the lower surface of the leaf. Hairs tending to be long, 1-3 mm, on parts such as the inflorescence axis, flowers and fruit. Leaves generally large with a wide range of dimensions, especially in series Fatuae and M. fatua with its many varieties, 9-50 cm long and 3.5-15(19) cm broad; nerves 10-30 pairs, prominent or faint beneath, oblique or curved. Male flowers large or medium sized, 6 mm — 1.7 cm long (smaller in M. lepidota); pedicels as long as the flowers, often reaching 1 cm long (absent in M. chrysophylla)

3. Flowers among the largest in section Fatua, the male 8 mm — 1.7 cm long, ellipsoid, split down 1/5—1/4 into the lobes. Leaves coriaceous with a slightly revolute margin, the hairs mostly simple and dark brown, less often pale yellow, absent in M. brassii, the lamina 16-32 cm long, average 24 cm long and 5-12 cm broad; nerves and reticulations very prominent on both surfaces giving the leaf an almost sub-bullate appearance, nerves average 22 pairs, curving widely. Fruit 6-9 cm long and 4-9 cm broad, (2-3 cm long in M. chrysophylla), globose, sub-globose or ellipsoid. Twigs without lines from petiole base to petiole base. Mostly mountain species without stilt-roots

(10) series Fuscae
3. Flowers not so large, the male (3)–6 mm—1 cm long, smaller in *M. lepidota*, campanulate or narrowly campanulate, rarely ellipsoid except sometimes in bud, split down ⅓–¾, rarely ⅓ into the lobes. Leaves chartaceous to thinly coriaceous, the hairs mostly dendroid (simple in *M. villosa*) light brown or yellowish, the lamina 20–35 cm long in the majority, 35–50 cm long in some varieties of *M. fatua* and only 9–14 cm long in *M. lepidota*, 5–8 cm broad in most and 12–19 cm broad in the largest; nerves fairly prominent but not so impressed above as in series *Fuscae*, reticulations rare or absent and the general appearance not sub-bullate, the nerves 20–30 pairs, 10–12 pairs in *M. lepidota*, straight or curving slightly. Fruit generally smaller, 2.5–7 cm long and 1–4 cm broad, up to 10 cm long in *M. fatua* var. *magnifica*, oblong to sub-globose (very variable in the varieties of *fatua*, being discoid in var. *quercicarpa*). Twigs sometimes with two faint lines. Lowland species often with stilt-roots

2. Hairs absent, only scales present on the lower surface of the leaf, the quantity less, the colour cinnamon-brown (rarely a few hairs present on the lower surface of young leaves of *M. buchneriana*). Hairs shorter on the inflorescence axis and fruit, the fruit tomentulose, less often tomentose, the hairs mostly absent on the innovations. Leaves smaller, 8–22 cm long, average 15 cm long and 2.5–9 cm broad, average 6 cm broad; nerves average 15 pairs, oblique, fine and slender, faint in parts, the interarching less distinct. Male flowers 2–4 mm long, 8 mm—1 cm long in the largest; pedicels about half as long as the flowers (12) series *Tenuiveniae*

1. Lax, powdery, yellowish or cinnamon-brown scales not present on the lower surface of the leaf. (Closely adpressed, minute whitish scales or a glaucous colour may be present especially on young leaves or the surface may dry brownish without any scales. All these states may be found in the same species. A few lax, yellow scales may be seen in *M. crassipes* and *cucullata*.) Flowers glabrous, tomentulose, less often tomentose. Fruit glabrous or tomentulose, rarely densely tomentose, tending to be smaller, 1.6–4 or 5 cm long. Twigs glabrous or nearly so except for the terminal bud

4. Bracteole or its scar some distance down on the pedicel, 1–3 mm down or even half-way down at times, only at the apex of the pedicel where it joins the perianth in very young flowers. Fruit fusiform, narrowly ellipsoid, acute and attenuate at both ends and often with a pseudo-stalk, less often oblong; stalk slender and often divided into two pedicels or branches forming a dichasial inflorescence or undivided with a single pedicel and with or (in young stages) without a smooth basal portion to the woody tubercular peduncle, the stalk tending to be shorter and thicker in species with a thick-walled pericarp and a heavy oblong fruit. Male inflorescence a woody tubercle which usually eventually elongates, becoming dichotomous in most of the species (more material and observations required for *M. flosculosa* where it has remained simple). Flowers tubular, especially the male, tomentulose to glabrous, not densely tomentose, 8 mm—1.5 cm long, often minutely 3-angled at the apex in bud, later split down for a very short distance, about 1/5 of the whole perianth, by the minute reflexed lobes; pedicels very slender, as long as or longer than the flower; bracteole very small, 1 mm long or less; stalk of staminal column glabrous or pubescent. Leaves small or medium size-class, 4–23 cm long, average 15 cm long, some of them among the smallest in the genus, mostly elliptic, rarely elliptic-oblong, enisform in one species; nerves 8–23 pairs, fine but distinct on both surfaces, often impressed above, curving widely, line of interarching indistinct; reticulations present at times. Small trees, 1.5–15 m high (with two larger exceptions) half of them mountain species (13) series *Tubiflorae*
4. Bracteole or its scar always at the junction of the pedicel and the perianth, not some distance down on the pedicel. Fruit quite a different shape, neither fusiform nor attenuate at both ends; stalk shorter and stouter proportionately, seldom dividing into two branches or two pedicels as a result of a dichasial inflorescence. Male and female inflorescences a woody tubercle, mostly simple or with 1–3–5 short, often unequal branches but not regularly dichotomous. Flowers, especially the male, not tubular, tomentulose to tomentose, rarely 1.5 mm long (except in M. subalulata) usually smaller and split down more, ¼–¼ at the apex in the male by the non-reflexed perianth lobes; pedicels as long as or usually shorter than the flowers; bracteole longer, 2 mm long or more; stalk of staminal column glabrous or more often pubescent. Leaves usually larger, less often the same size, all the other features variable. Trees of various heights, rarely moun-

tain species

5. Male flowers ellipsoid or oblong-ellipsoid, considerably longer than broad; pedicels mostly longer than the flowers (shorter in M. concinna and insipida). Veins of the leaves much curved. Fruit globose, sub-globose or oblong; stalk rather short but usually slender, 1–5 mm thick

6. Leaves small size-class, generally 5–15–(20) cm long and 1–7.5 cm broad with 10–18 pairs of nerves, petiole 8 mm—1.5 cm long and 1–2 mm thick. No lines or ant swellings present on the twigs. Fruit 1.5–3.5 cm long and 1–2.5 cm broad without an apiculus except when very young; stalk 3–7 mm long and 1–3 mm thick. Sterile apiculus of staminal column not usually present

(14) series Cimiciferae

6. Leaves mostly medium, sometimes large size-class, 15–40 cm long and 3.5–15 cm broad with 15–30 pairs, average 22 pairs of nerves, petiole 1–2.5 cm long and 2.5–3 mm thick. Two lines usually present from petiole base to petiole base on the twigs, ant swellings present in M. subalulata. Fruit 1.6–4 cm long and 1.3–3.5 cm broad, usually with an apiculus; stalk 3 mm—1.2 cm long and 3–7 mm thick. Sterile apiculus of staminal column acute and better developed than in any of the other series, 1.5–2 mm long in M. subalulata (15) series Subalulatae

5. Male flowers ovoid or sub-globose, sometimes appearing obovoid when viewed with the bracteole uppermost, the latter in this position then concealing most of the flower, not much longer than broad; pedicels longer or mostly shorter than the flowers. Veins of the leaves straight or curving slightly. Fruit various shapes, the stalk short but usually stouter

7. Leaves 17–32–(40) cm long and 6–12–(15) cm broad, broadest above the middle, the base rounded or bluntly acute; nerves prominent on the lower surface, equidistant and straight, not curving much, secondary nerves absent or very few. Male flowers 5–8 mm long; pedicels longer or as long as the flowers. Fruit tending to be ovoid or sub-globose

8. Leaves usually drying a pale brown or yellowish brown above, often pale or whitish beneath, the base rounded, emarginate or sub-cordate; nerves 16–22–(30) pairs, average 20 pairs, straight; petiole tending to be long in some of the species, 1.5–5 cm, average 3.5 cm long; reticulations sometimes distinct beneath. Male perianth 5–6 mm long; pedicels 1–1.5 mm thick. Fruit tending to be light brown in colour, glabrous to tomentulose. Stilt-roots present in two species

(16) series Heterophyllae

8. Leaves usually drying a medium brown above, whitish beneath only in M. andamanica (always?), the base acute to bluntly acute; nerves 12–22 pairs, average 17 pairs, straight or curving slightly; petiole 1.5–3.5 cm long; reticulations absent. Male perianth 4–5 mm long; pedicels very slender, 1 mm or less in thickness. Fruit dark brown, mostly glabrous, tomentose in M. teijsmannii. Stilt-roots present in all the species

(17) series Teijsmanniae
7. Leaves smaller, 9–25 cm long and 3–9 cm broad (except in *M. castaneifolia*) broadest at the middle, the base acute; nerves prominent or not on the lower surface, equidistant or not, straight or crooked, secondary nerves more numerous or conspicuous. Male flowers usually smaller, 4–6 cm long except 1 cm long in *M. castaneifolia*; pedicels shorter than the flowers. Fruit tending to be oblong or ellipsoid.

9. Leaves elliptic-lanceolate, elliptic-oblong or oblanceolate; length 9–30 cm, average 19 cm; breadth 3–10 cm, average 6.5 cm; nerves prominent, arising at a wide angle to the midrib, crooked and not equidistant; reticulations distinct beneath. Male flowers 4–5 mm long; stalk of staminal column mostly pubescent. Fruit glabrous, 4.5–6.5 cm long, oblong or oblong-ovoid, rounded at the apex, shortly stalked. Stilt-roots present in one species (18) series *Lauriifoliae*.

9. Leaves mostly elliptic, sometimes lanceolate; length 9–18 cm, average 13 cm; breadth 3–6 cm, average 5 cm, but larger ones from the older twigs of *M. castaneifolia* 30–60 cm long and up to 15 cm broad; nerves faint, arising at an acute angle, straight, equidistant and parallel, reticulations absent; petioles longer in proportion to the lamina than in the above series. Male flowers 4–6 mm long and up to 1 cm long in *M. castaneifolia*; stalk of staminal column glabrous. Fruit glabrous or dark brown-tomentose, 1.6–4–(5.5) cm long, ellipsoid or ovoid-ellipsoid, less often oblong, often apiculate and oblique at the apex, sessile or on a very short stalk. Stilt-roots absent (19) series *Castaneifoliae*.

10. Key to the species in series *Fuscae*

1. Leaves ovate-oblong, 20–25 cm long and 10–12 cm broad (the lower leaves not present; they are probably much longer and broader); nerves 14–17 pairs. Hairs not present on lower surface of leaf; silvery grey scales present. Male flowers rather large, 1–1.5 cm long and 4–5 cm broad, adpressed-tomentulose; pedicels 7 mm–1 cm long. Fruit not seen, probably large (29) *M. brassii*

1. Leaves oblong, sometimes elliptic-oblong, variable in length, 16–32 cm long and average 8 cm broad; nerves 18–28 pairs, average 23 pairs. Hairs and scales both present on lower surface of leaf, yellowish or brownish. Male flowers as large or smaller, stalked or sessile

2. Hairs on leaves, innovations, flowers and fruit brown dark. Flowers-stalked. Fruit large, (see below for measurements) generally shortly stalked; pericarp hard, 2–5 mm thick

3. Fruit globose or sub-globose, 6 cm or more in length and breadth, minutely dark brown-tomentulose, tending to become glabrous. Male flowers 1–1.1 cm long and 3–4 mm broad, not inflated, tomentose, the hairs very short, less than 0.5 mm long; pedicels 1 mm thick (not seen in *M. womersleyi*)

4. Hairs on lower surface of leaf less than 1 mm long. sparse, confined to the nerves and midrib, tending to disappear when old. Scales yellowish. Petioles 1.7–2.5 cm long. Scalariform reticulations fine on upper surface of leaf. Female flowers 1 cm long and 6 mm broad; pedicels 5 mm–1 cm long. Fruit 6 cm or more in diam.; stalk 1.5 cm long (30) *M. sphaerosperma*

4. Hairs on lower surface of leaf 1–2 mm long, more densely and uniformly spread over the whole surface, also some present in old leaves. Scales dark brown, becoming greyish brown later. Petioles 1–1.3 cm long. Scalariform reticulations much more prominent and more deeply impressed above. Female flowers not seen. Fruit 9 cm in diam.; stalk 5 mm long (31) *M. womersleyi*

3. Fruit ellipsoid, 7 cm long and 3.3–(4) cm in breadth; densely rusty-tomentose, a shade lighter. Male flowers 1.5–1.7 cm long and 5 mm broad, inflated, densely tomentose, the hairs 1–2 mm long; pedicels stouter, 2 mm thick. Apical leaves sub-cordate at the base (32) *M. fusca*
2. Hairs on leaves, innovations, flowers and fruit yellowish brown, light yellow when young, darker yellow when old. Flowers sessile, smaller. Male perianth 7–8 mm long and 2.8 mm broad. Fruit smaller, 2–3.3 cm in diam.; sub-lanose with longer, 3–5 mm long hairs, sessile; pericarp fragile, very thin, 1 mm or less thick. (Note hairs dense on the flowers and fruit in the var. but absent on the leaves)

(33) M. chrysophylla and its var.

**Key to the varieties of Myristica chrysophylla**

1. Undersurface of leaves densely covered with light or dark yellow, 1–3 mm long hairs, yellow scales present also, abundant; reticulations numerous and deeply impressed on the upper surface of the lamina, base rounded to subcordate; nerves 18–25 pairs; length 16–30 cm, average 20 cm; breadth 5–13 cm, average 8 cm. Fruit globose to subglobose, 2–2.3 cm in diam

var. chrysophylla

1. Undersurface of leaves without hairs, yellow scales very few or absent (seen only with low-power microscope), reticulations faint or absent on the upper surface, base rounded or emarginate, scarcely sub-cordate; nerves 18 pairs; length 17–22 cm, average 18 cm; breadth 5.5–9 cm, average 7 cm. Fruit oblong-ovoid, 2.5–3.3 cm long and 2 cm broad

var. entrecasteauxensis

11. Key to the species in series Fatuae

1. Leaves small to medium size-class, 9–20 cm long and 3–8 cm broad; nerves 10–18 pairs, average 13 pairs. Inflorescence axis 2–7 mm long. Male flowers small, 3–5 mm long and 2–4 mm broad, few in the cluster, 1–3 usually or up to 5. Fruit very thinly tomentulose, tending to become glabrous, small, 2.5–4.5 cm long. No hairs, only scales present on the lower surface of the leaves

2. Leaves 12–20–(23) cm long and 4–8 cm broad, drying blackish brown or medium brown above with greyish white or silvery scales beneath; nerves 12–18 pairs, average 13 pairs, slender, often faint, chocolate-brown on the lower surface of the leaf, the lower midrib often drying reddish; reticulations mostly absent; petiole 1.3–2 cm long and 2.5–3 mm thick. Inflorescence axis 5–7 mm long. Fruit oblong, orange-brown, 3.5–4.5 cm long and 2.3–3.3 cm broad; stalk rather long and slender, 7 mm—1 cm long and 3–4 mm broad. Stilt-roots present. Twigs 3–4 mm thick in the apical parts, lenticels almost absent. A medium sized tree, 17–25 m high

(34) M. koordersii

2. Leaves 9–14 cm long and 3–4.5 cm broad, the smallest in this series, drying greyish brown above and thinly covered with cinnamon-brown, rarely greyish white or silvery scales beneath; nerves 10–12 pairs, slender but distinct on the lower surface of the leaf, contiguous with the surrounding tissue or slightly reddish; reticulations faint but present beneath; petiole 1.15 cm long and 1.2 mm thick. Inflorescence axis 2–3 mm long. Fruit obovoid, cinnamon-brown, 2.5–3 cm long and 1–1.5 cm broad; stalk stout and thick in proportion to size of the fruit, 4–5 mm long and 4–5 mm thick, giving the latter an almost sessile appearance. Stilt-roots not reported. Twigs very slender, 1–2 mm thick in the apical parts, lenticels numerous. A taller tree 22–35 m high

(35) M. lepidota

1. Leaves larger, 20–50 cm long and 7–15 cm broad but varying much, smaller in some varieties of *fatua* such as *inutilis* and *papuana*; nerves 20–25 pairs. Inflorescence axis 5 mm—2 cm long, also stouter. Male flowers generally longer, 5–8 mm long and up to 1 cm long in *villosa*, 4–6 mm broad, many to few in a cluster. Fruit more densely tomentulose especially when young, villose-tomentose in *villosa*, larger and up to 10.5 cm long in the largest. Hairs sometimes present on the lower surface of the leaves (not always)
3. Indumentum sparse or dense, but always short, 1 mm long or mostly less, usually yellowish brown or rusty brown, occurring on the twig innovations, the petioles, the lower surface of the leaf and especially its lower midrib, the inflorescence axis, the flowers and fruits. Indumentum on the leaves mostly of scales but dendroid hairs also occurring especially in *fatua* var. *morindifolia* and var. *quercicarpa*. Twigs 3–5 mm thick in the apical parts and there minutely tomentulose, very soon glabrous, lower down dark reddish brown and finely striate with numerous lenticels. Inflorescence axis tomentose or tomentulose, the flowers usually numerous in the cluster. Male perianth of various sizes in the different varieties, 7–8 mm long in var. *fatua*, rusty adpressed-tomentose outside; pedicels 6–8 mm long. Female flowers 5 mm broad; pedicels 5 mm long. Fruit oblong, 5–7.5 cm long and 3.5–4 cm broad (smaller in some of its vars) rounded at both ends, shortly rusty furfuraceous-tomentose (denser when young or in var. *morobeensis*); stalk 1 cm long and 5 mm broad (sessile in some of the vars) (36) M. *fatua* var. *fatua*

3. Indumentum dense, adpressed, tomentose or villose, 1–3 mm long, usually pale cinnamon brown or greyish brown, also occurring on the above-mentioned parts. Indumentum on the leaves consisting of both scales and hairs, the latter simple. Twigs stouter, up to 1 cm thick in the apical parts and there densely tomentose with pale cinnamon, adpressed, 1–2 mm long hairs, lower down blackish and greyish, rough, the bark cracking but without lenticels. Inflorescence axis villose, at times almost concealing the flowers, especially the female, the flowers not numerous and usually not more than 1–2 present at any one time during flowering. Male perianth 7 mm—1 cm long, pale brown villose-tomentose outside; pedicels 4 mm long. Female flowers 8 mm broad, sessile. Fruit ovoid, 4.5–6 cm long and 3–3.5 cm broad, often oblique or uncinate at the apex, densely pale brown or less often rusty brown, velvety-tomentose with hairs 1–2 mm long; stalk 5 mm long and 5 mm broad or fruit sessile (37) M. *villosa*

**Key to the varieties of Myristica fatua**

1. Leaves large, length 20–50 cm, average 34 cm; breadth 7–19 cm, average 12 cm; nerves numerous, 20–36 pairs, average 28 pairs. Twigs stout, 4–7 mm thick in the apical parts. Fruit large, 5.5–10.5 cm long and 3–5 cm broad, smaller in var. *spanogheana*

2. Indumentum on lower surface of leaves yellow, pale yellow, whitish yellow or nearly white, very thin in amount and depth, but evenly distributed. Leaves 20–40 cm long

3. Leaves oblongate, broadest near the apex or well above the middle and gradually narrowed to the rounded base, apex obtuse or bluntly acute, lamina 20–40 cm long and 7–10 cm broad; indumentum whitish, petiole stout, 5 mm thick; nerves 35 pairs or over, more numerous than in the other varieties. Twigs very stout, 7 mm thick, rough, tomentulose and dark grey in the apical parts. Fruit mostly sub-globose or shortly oblong, 6 cm long and 5 cm broad (not quite mature) densely tomentulose, rusty or slightly reddish brown, nearly sessile or on a very short, thick, 2–3 mm long and 1 cm thick stalk. Distribution Philippines, south-east part var. *wenzeli*

3. Leaves not oblongate, mostly broadest at the middle and from there gradually narrowed to both ends, the base mostly acute, but if rounded, then ultimately acute where it joins the petiole, the apex sharply acute or acuminate, the lamina shorter in length than in the preceding, (20)–30–35 cm long and 5–15 cm broad; indumentum yellow or sometimes whitish and tending to be very thin; petiole 3–4 mm thick; nerves 20–25 pairs. Twigs more slender, 3–4 mm thick at the puberulous apex, a glossy, reddish brown, glabrous intermediate portion then present, succeeded by the oldest, greyish, striate portion. Fruit oblong, larger or smaller, tomentose or tomentulose, sessile or stalked
4. Leaves elliptic or elliptic-oblong, 7–15 cm broad, average 12 cm; nerves oblique or curving slightly. Fruit 5–7.5 cm long and 3.5–4 cm broad (smaller fruits seen may be immature), rusty furfuraceous-tomentulose, the pericarp fragile, often breaking in herbaria; stalk 1 cm long and 5 mm thick. Stilt-roots present. Distribution chiefly in the Moluccas, but also in the Philippines, south-east part var. fatua

4. Leaves oblong or oblong-lanceolate, narrower at the middle and more gradually narrowed from there to the apex, 5–10.5 cm broad, average 7 cm, the scales much less or almost absent on the lower surface but not always; nerves strictly oblique. Fruit smaller, 2.3–3.5 cm long and 1.5–2 cm broad, densely and shortly rusty-tomentose, the pericarp thicker and not fragile, the apex sometimes slightly oblique; stalk 3 mm long, the fruit nearly sessile. Stilt-roots not reported but probably present. Distribution Lesser Sunda Islands var. spanogheana

2. Indumentum on lower surface of leaves a rich yellow or a reddish yellow, denser than in the above varieties. Leaves larger, 24–48–(60) cm long

5. Fruit 7–10.5 cm long and 5 cm broad, larger than that of the other varieties. Leaves with a reddish-golden indumentum of stellate scales beneath; nerves 20–26 pairs; petioles 5–6 mm thick. Male flowers 5 mm long and 4 mm broad (but probably immature); pedicels very short, 2.5 mm long. Knee-roots reported. Peninsular India var. magnifica

5. Fruit 5.5–6 cm long and 3 cm broad. Leaves with a rich yellow or dark yellow indumentum beneath; nerves 26–32 pairs; petioles 4–5 mm thick. Male flowers longer, 7–8 mm long and 6 mm broad; pedicels 6–8 mm long. Knee roots not present

6. Leaves 10–16 cm broad, lanceolate or oblong-lanceolate, broadest below the middle and gradually narrowed upwards from the broad acute or rounded base to the acute apex; indumentum very uniform, short, consisting of scales only; secondary nerves present, shorter, often one present between two primary nerves. Twigs greyish brown-tomentulose or pubescent for a considerable distance down from the apex, also pubescent in quite old portions; no immature, folded leaf-blades below the terminal bud in the apical parts. Fruit globose with yellowish velvety tomentum, the same colour as that of the leaves, later more oblong with less dense tomentum. Distribution Celebes var. aflatins

6. Leaves 9–19 cm broad, apparently the broadest of all the varieties, oblong with nearly parallel sides, the base rounded or sub-cordate, the apex rounded and acute; indumentum denser but more patchy, furfuraceous and tending to shed, consisting of scales and dendroid hairs, longer because of the hairs; secondary nerves not observed. Twigs with ferrugineous, floccose tomentum on the innovations, but the tomentum not extending down so far as in the above variety, reddish brown smooth parts present underneath this tomentum and hidden by it, lenticels present in the older, striate, glabrous portions; several immature folded leaf-blades sometimes present below the terminal bud. Fruit oblong, the tomentum rusty-furfuraceous like that on the leaves, tending to rub off later. Stilt-roots present. Distribution northern part of New Guinea including the Mandated Territory and New Britain var. morindiifolia

1. Leaves smaller, length 12–25 cm, average 19 cm; breadth 3.5–11 cm, average 7 cm (out-sized leaves in var. papuana up to 30 cm long and in var. morotaiensis up to 30–35 cm long); nerves fewer, 16–30 pairs, average 22 pairs. Twigs more slender, 1–3 mm thick in the apical parts. Fruit smaller, 1.3–4 cm long and 1.5–4 cm broad (larger in var. platyphylla)

7. Leaves obovate, 15–26 cm long and 7–11 cm broad; nerves 20–26 pairs. Lenticels numerous
8. Twigs with two lines in the apical portions. Leaves chartaceous or thinly coriaceous, 11–25 cm long and 7–11 cm broad but out-sized ones 30–35 cm long and up to 16 cm broad occur, the indumentum very thin and whitish, disappearing when old; nerves 22–26 pairs and up to 30 pairs in these larger out-sized specimens, petioles 2.5–3 mm thick. Fruit ovoid, immature, tomentulose, becoming glabrous, light coloured. Distribution Morotai, Batjan, Obi and the Sulu Islands. Nearest to the nearly glabrous, whitish forms of var. *fattua* var. *morotaiensis*

8. Twigs without two lines in the apical portions. Leaves rigidly coriaceous, 17–26 cm long and 8–10 cm broad, the indumentum a trifile denser, cinnamon-brown, persisting; nerves 20–24 pairs, petioles 3–4 mm thick, more rigid. Fruit sub-globose, 4–5 cm long and 4 cm broad, the indumentum denser, tomentulose, the same colour as that on the leaves. Distribution Morotai, confined to Gunong Sangowo. Nearest to var. *papuana* or probably to the yellowish smaller leaved forms of var. *fattua* var. *sangowoensis*.

7. Leaves not generally obovate (one or two leaves slightly obovate among the oblong ones in var. *quercicarpa*) smaller, 13–22 cm long and 3.5–9 cm broad (a few out-sized ones up to 30 cm long in var. *papuana*); nerves 16–20–(26) pairs. Lenticels present or not.

9. Indumentum on lower surface of leaf very dense, consisting of hairs as well as scales, blackish yellow or dark yellow in colour. Fruit very peculiar, discoid with a prominent central muko and broader than long, 1.3–1.5 cm long and 1.8–2 cm broad, the indumentum rather harsh, floccose-furfuraceous and blackish brown; stalk quite long in proportion to the size of the fruit, 1.3 cm long. Distribution Papua, a single record. (Placed here in the absence of flowers; if wrongly placed then may be in section I series *Littorales*, near *M. markgraviana*) var. *quercicarpa*.

9. Indumentum on lower surface of leaf not so dense, consisting of scales only, not blackish or dark yellow. Fruit of the usual typical shape, oblong or globose without a distinct muko, never discoid and not broader than long at the base, various sizes but mostly longer, the indumentum diverse, not harsh and not blackish yellow; stalk 3 mm–1 cm long, not unduly out of proportion to the length of the pericarp, sometimes the fruit sessile.

10. Leaves cordate or sub-cordate at the base, ovate-oblong, drying a rich medium brown above and often glossy, the base very broad; midrib very clearly standing out in a groove above; nerves almost horizontal to the midrib in the basal part of the leaf; petiole short, 7 mm–1 cm long. Fruit oblong, sometimes with an oblique apex, densely rusty velvety when young, later tomentose, sessile or nearly sessile. Distribution Dutch New Guinea var. *subcordata*.

10. Leaves not cordate at the base, the lamina various shapes, elliptic-lanceolate, lanceolate, elliptic or oblong, not ovate-oblong, drying various shades above, glossy or not, the base not broad or out of proportion; midrib often in a groove but not standing out so clearly; nerves not almost horizontal in the basal part of the leaf; petiole 8 mm–2.5 cm long. Fruit oblong or not, indumentum dense or not; stalk present or fruit sessile.

11. Undersurface of leaf without indumentum. Fruit sub-globose, 1.5 cm in diam. (not quite mature), densely rusty velvety with 1–2 mm long hairs; stalk very short, 3–5 mm long or fruit sessile. Distribution New Guinea, Morobe District, a single record. (Placed here in the absence of flowers. If not a var. of *fattua*, then probably a distinct species in the same series) var. *morobensis*.

11. Undersurface of leaf always with indumentum. Fruit not sub-globose, indumentum very short, never densely tomentose or velvety; stalk longer.
12. Leaves obovate or oblong-obovate, less often elliptic-oblong, base narrowed and rounded, less often acute; length 20–35 cm, average 25 cm; breadth 7–13 cm, average 10 cm; petiole 3–3.5 mm thick; nerves 20–30 pairs, average 25 pairs. Twigs 4–5 mm thick in the apical parts and 5–6 mm thick lower down. Fruit 5–6.5 cm long and 5 cm broad (always?). Confined to the Solomons var. platyphylla

12. Leaves lanceolate, elliptic-lanceolate, oblanceolate or narrowly oblong, smaller and narrower, base mostly acute, less often rounded; length 13–25 cm, rarely 30 cm, average 20 cm; breadth 4–7 cm, rarely 10 cm, average 5 cm; petiole 2–3 mm thick; nerves 16–26 pairs, average 20 pairs. Twigs 2.5–3 mm thick in the apical parts and for some distance down. Fruit 3.4–5 cm long and 1.6–3 cm broad

13. Leaves 13–25(–30) cm, average 20 cm long and 4–7(–10) cm broad, indumentum pale yellowish or more often a rusty or medium brown beneath; nerves 18–26 pairs, average 20 pairs, oblique, the same colour as the lower surface of the leaf; petiole 1–2 cm long. Male flowers 6–9 mm long and broad; pedicels 6 mm—1 cm long. Fruit oblong or obovoid, 3.3–4.5 cm long and 2–3 cm broad; indumentum medium brown or rusty-furfuraceous; stalk 5–7 mm long and 5 mm thick. Twigs greyish brown in the apical parts, often with two distinct lines from petiole base to petiole base. Stilt-roots present. Tree 9–30 m high. Distribution wide, throughout New Guinea, Aru Islands and some of the islands off the east coast of New Guinea, also in the Solomons and the New Hebrides var. papuana

13. Leaves 13–22 cm, average 20 cm long, narrow, 4–6 cm broad, indumentum pale yellow or whitish yellow, a trifle less in quantity; nerves 16–20 pairs, average 18 pairs, some of them rather crooked, mostly reddish brown on the lower surface of the leaf; petiole 1.5–2.5 cm long. Male flowers 5–6 mm long and 2–2.5 mm broad; pedicels 4 mm long. Fruit oblong, 3–3.6 cm long and 1.6–2.3 cm broad, indumentum, m. pale yellow, very short, not furfuraceous; stalk slender, 6 mm–1 cm long and 2–3 mm thick. Twigs reddish brown in the apical parts, the two lines occasionally present, fainter. Stilt-roots not reported. Tree 4–15 m high. Distribution, confined to Samoa var. inutilis

12. Key to the species in series Tenuiveniae

1. Petiole short, 6 mm—1.5 cm long

2. Fruit cinnamon-tomentulose or sub-tomentulose with a thin fragile pericarp sometimes breaking in herbaria, 1 mm thick or less, ellipsoid to oblong, 2.5–3 cm long and 1.5–2 cm broad; stalk less than 1 cm long. Male flowers very immature, about 2 mm long, will probably reach 4 mm when mature; pedicels 2 mm long and 1 mm thick. Indumentum of scales fairly copious on the underside of young leaves, old leaves always with some trace of them. Bark of twigs rough and tending to crack in the older parts. Stilt-roots present

3. Twigs 2–3 mm thick and rusty-tomentulose in the apical parts. Leaves elliptic or elliptic-lanceolate, 8–16 cm long and 2.5–6 cm broad, the base mostly rounded; nerves 12–14 pairs, often very faint. Fruit-stalk 5–7 mm long and 3 mm thick (38) M. smythiesii

3. Twigs 4–5 mm thick and rusty-tomentose in the apical parts. Leaves lanceolate or oblong-lanceolate, larger, 9–22 cm long and 5–9 cm broad, the base rounded and often sub-cordate; nerves 11–18 pairs, more distinct. Fruit-stalk 3–5 mm long and 5 mm thick (39) M. beccarii
Sinclair — Myristica

2. Fruit rusty-tomentose with a firmer, 3 mm thick pericarp, hard and not easily broken, mostly obovoid, sometimes oblong, 4 cm long and 1.8–2 cm broad, narrowed gradually at the base into a stout stalk; stalk 1 cm long and 6 mm thick. Male flowers larger, 8 mm—1 cm long (the immature 4 mm long); pedicels 4–5 mm long and 2 mm thick. Indumentum thin on the undersurface of young leaves, adult leaves mostly *glabrous. Bark of twigs not so rough and not tending to crack in the older parts. Stilt-roots not present

(40) M. buchneriana

1. Petiole longer, 2–4 cm long.

4. Fruit with a very slender, 2 mm thick stalk. Fruit oblong or sub-globose, small, 2 cm long and 1.5 cm broad, the pericarp very thin, 1 mm or less thick; stalk 1.5–1.8 cm long. Leaves usually drying a medium brown above, narrowly oblong with parallel sides, 13–20 cm long and 4–6 cm broad; nerves faint, 20–25 pairs (41) M. pedicellata

4. Fruit with a stout, 5 mm thick stalk. Fruit various shapes, larger, the pericarp much thicker and harder; stalk longer or shorter than the above. Leaves usually drying a blackish colour above, as long or shorter but no so narrow in proportion to the length, widest at the middle or above the middle, often broadly panduriform; nerves fewer, slightly more prominent, 16–20 pairs

5. Fruit rusty to light brown sub-tomentulose, becoming nearly glabrous, oblong, oblong-ovoid or sub-globose, 3.5–4 cm long and 2.6–4 cm broad; stalk 5–8 mm long. Male flowers not seen. Female sessile, densely rusty-tomentose, 4–5 mm long and 3 mm broad. Leaves rounded at the base; length 10–20 cm, average 15 cm; breadth 4–7 cm, average 5 cm

(42) M. tenuivenia

5. Fruit rusty and densely tomentulose, obovoid, narrowed towards the base, much larger, 7 cm long and 4 cm broad, pericarp much thicker, 8 mm–1.2 cm thick but will probably become thinner at maturity; stalk 2.5 cm long. Flowers not seen. Leaves rounded and slightly emarginate at the base; length 13–15 cm; breadth 6.5–7 cm.

(43) M. archboldiana

13. Key to the species in series Tubiflorae

1. Leaves ensiform (long in proportion to width, very narrowly lanceolate and gradually acuminate towards the apex) 17–22 cm long and 2–3 cm broad, older leaves probably longer still; nerves 18–20 pairs forming very distinct loops of interarching; reticulations indistinct. Flowers not seen. Fruit 4.5 cm long and 1.3 cm broad, fusiform (like that of *tubiflora* but smaller) acute at the apex and acuminate at the base into a pseudo-stalk; stalk broken, probably very short. A shrublet 1.5 m high

(44) M. ensifolia

1. Leaves mostly elliptic, less often elliptic-lanceolate or oblong, not ensiform (not so long in proportion to width) the majority 4–15 cm long and 3–6–(9) cm broad, if longer (*flosculosa* and *cucullata*), or if narrower (*firmipes* and *guadalcanalensis*) then the length and breadth in proportion; nerves generally fewer, 8–15 pairs but up to 23 in the larger-leaved species, line of interarching distinct or not; reticulations distinct or more often indistinct. Fruit 2.5–7 cm long and 1–3.5 cm broad, fusiform, ellipsoid or oblong, acute or less often rounded at the apex, acute or rounded at the base. Small trees, average 15 m high, taller in *firmipes* and *guadalcanalensis*

*Note:*—Care should be taken with this species when using a key. The paucity or absence of an indumentum of scales on the undersurface of the leaves might unfortunately result in its exclusion from this series by those not well acquainted with it.
2. Fruit-stalk slender, 0.5–2 mm thick, (5 mm)—1–3.5 cm long. Dichotomy of the inflorescence usually early apparent; smooth-portion of main axis if present usually over 5 mm long.

3. Fruit cylindrical or oblong; pseudo-stalk present or not. Leaves reticulate beneath with prominent secondary nerves and closely adpressed, minute whitish scales. Flowers not seen

4. Leaves drying dark brown above, 14–20 cm long, narrowly oblong-ovate, base rounded or bluntly acute, apex shortly and sharply acuminate; nerves 12–16 pairs; petiole 1–1.5 cm long and 3–4 mm thick, somewhat swollen. Fruit oblong, dark brown, solitary (always?) 2.5–3 cm long and 1.5 cm broad, rounded and mucronate at the apex, narrowed into a 5–7 mm long pseudo-stalk at the base; (stalk) peduncle 2–3 mm long, pedicel 2.7–3.5 cm long and 1–1.5 mm thick

   (45) *M. gracilipes*

4. Leaves drying pale greenish or yellowish brown above, (rather like those of *M. fragrans*) 10–13 cm long, elliptic, base acute, apex bluntly acuminate or acute; nerves 10–15 pairs, more deeply curved and leaving the midrib at a wider angle; petiole 7 mm—1 cm long and 1.5–2 mm thick, not swollen. Fruit cylindrical, light brown, solitary or more often 2–4 together, 2.5–2.8 cm long, narrower, 8 mm—1 cm broad, slightly narrowed and mucronate at the apex, no distinct pseudo-stalk at the base; (stalk) peduncle 7 mm—1.2 cm long and pedicel 5–7 mm long and 1–2 mm thick

   (46) *M. cylindrocarpa*

3. Fruit elongate, fusiform or ellipsoid, acuminate at the apex; pseudo-stalk present. Leaves not distinctly reticulate beneath and secondary nerves not so prominent (they may be quite numerous, however, e.g. *cucullata*), scales present or not. Male flowers tubular, elongate or subulate, female flask-shaped (with an inflated base) or cylindrical

5. Twigs slender, 1 mm thick at the apex and 3 mm thick lower down. Leaves mostly elliptic with a slender acumen, drying a pale greyish green above and yellowish brown to glaucous greyish beneath; petiole slender, 1–1.5 mm thick (less often 2 mm thick). Flowers pale yellowish or less often reddish brown when dry; the male 1.5–2–(2.5) mm broad, their pedicels filiform, 0.2–0.3 mm thick; stalk of staminal column glabrous, very slender, half as thick as the fertile part. Fruit pendulous, mostly single, 4–7 cm long and 1.3–2.5 cm broad, the pericarp thin and wrinkled when dry; stalk very variable in length and thickness, 5 mm—2.5 cm long (including peduncle and pedicel) 0.5–2 mm thick

   (47) *M. tubiflora*

5. Twigs stouter, 2 mm or more thick at the apex and 4 mm thick lower down. Leaves more variable in shape, elliptic, elliptic-lanceolate, ovate-elliptic, obovate-elliptic or panduriform, apex bluntly acute, less often shortly acuminate, drying dark brown above and medium brown or greyish white beneath (pale or yellowish to greenish brown often with dark patches above and pale brown beneath in *cornutiflora*); petiole stouter, 2–3 mm thick. Flowers reddish or dark brown when dry; the male 2–3.5 mm broad, their pedicels 0.5–1 mm thick; stalk of staminal column adpressed-pubescent, nearly as thick as the fertile part. Fruit not pendulous, mostly in pairs on a forked peduncle, sometimes single, 3.5–4.5 cm long and 1.5–2.5 cm broad, the pericarp thicker, smooth when dry; stalk 1.5–3.3 cm long (including peduncle and pedicel) 2 mm thick, the pedicel ending in a collar-like ring or minute cupular receptacle where it joins the fruit.
6. Male flowers more or less tubular, 1 cm long and 1–3 per fascicle; bracteole-scar usually 1–3 mm below the base of the perianth in mature flowers. Female flowers 7 mm long with a 3 mm broad base. Fruit narrowly ellipsoid, much drawn out at both ends, pericarp usually drying medium to dark brown. Leaves 6–15 cm long, average 11 cm; 3.5–6 cm broad, average 4.5 cm; nerves 10–16 pairs, faint beneath, less often prominent

(48) **M. longipes**

6. Male flowers subulate, 1–1.5 cm long and 5–8 per fascicle; bracteole-scar sometimes at the base of the perianth and sometimes below, apparently taking longer to descend. Female flowers 8 mm—1 cm long with a 3–4 mm broad swollen base, more constricted between the base and the neck than in longipes. Fruit broadly ellipsoid to nearly sub-globose, much less drawn out at both ends, the apex scarcely so at all except for a short mucro when young, soon rounded, pericarp usually drying a pale colour (always?). Leaves usually broader, 8–24 cm long, average 15 cm; 6–10 cm broad, average 7 cm; nerves 16–18 pairs, usually prominent beneath

(49) **M. cornutiflora**

2. Fruit-stalk stout, 4–7 mm thick, 5 mm—1.7 cm long. Dichotomy of the inflorescence delayed or not apparent in the early stages; smooth portion of main axis present, 5 mm long or less

7. Fruit ellipsoid, 4–6 cm long and 2.5–3.3 cm broad. Leaves elliptic, chartaceous to slightly coriaceous, 4–15 cm long and 1.5–5 cm broad

8. Leaves 10–15 cm long and 3.5–5 cm broad, the apex sharply acuminate, the upper surface drying mostly dark brown, the lower with minute, closely adpressed yellowish or less often whitish scales or just a colouration; nerves 14–20 pairs, average 18 pairs; petiole 2–2.5 mm thick. Male flowers tubular, 8–9 mm long and 2.5–3 mm broad, several in a cluster from a woody tubercle, tomentulose outside; pedicels 5–7 mm long; stalk of staminal column adpressed-pubescent, as broad as but shorter than the fertile part. Twigs 3 mm thick at the apex and 4 mm thick lower down, often rough with numerous lenticels. Pericarp of fruit slightly rugose or minutely tuberculate. Tree 7–27 m high on mountains

(50) **M. crassipes**

8. Leaves smaller, more numerous, the apex bluntly acute, not acuminate, the upper surface drying dark or pale brown, the lower with or without minute scales; nerves fewer; petiole very slender, 1–1.5 mm thick. Male flowers not seen. Twigs 1–2 mm thick at the apex, lenticels not observed. Pericarp smooth, not rugose or tuberculate. Taller trees up to 34 m high, not confined to mountains

9. Stilt-roots present. Leaves thinly coriaceous, drying a greenish brown above and thinly covered with some minute, closely adpressed whitish scales beneath, elliptic, 4–8 cm long and 1.5–2.5 cm broad (among the smallest in the genus); nerves 8–14 pairs. Flowers not seen. Fruit-stalk 7 mm thick

(51) **M. firmipes**

9. Stilt-roots not reported. Leaves chartaceous, drying a pale yellowish brown above and paler still beneath without scales, narrowly elliptic, sometimes some of them falcate, 6–12 cm long and 2–4 cm broad; nerves 10–15 pairs, less distinct with more secondary nerves. Male flowers not seen. Female flowers urceolate, 4 mm. long and 2.5–2.75 mm broad; pedicels 2.5–3 mm long and bracteole 1 mm below base of perianth. Fruit-stalk 3.5 mm thick

(52) **M. guadalcanalensis**

7. Fruit oblong or oblong-ovoid, larger or smaller. Leaves broadly elliptic to oblong, more coriaceous, longer and broader, 11–23 cm long and 4–9 cm broad, average 7 cm broad
10. Leaves broadly elliptic, less often elliptic-lanceolate, drying a pale yellowish brown above, the midrib reddish brown on both surfaces; nerves 15-20 pairs, reddish brown, curving deeply and leaving the midrib at a wide angle, 70-90°, deeply impressed above, prominent and raised beneath, secondary nerves neither numerous nor conspicuous. Twigs reddish brown in the apical parts, sometimes with two faint lines running from petiole base to petiole base. Male flowers (woody tubercles only, dichasia so far not seen) perfectly tubular, 8 mm—1 cm long and 2 mm broad; stalk of staminal column pubescent at the base only, not very much thinner than the fertile part; pedicels 5 mm long; bracteole very small, about 1 mm long. Fruit 1—2, oblong-ovoid, 3 cm long and 2.5—3.5 cm broad with a 3—4 mm long pseudo-stalk, the base somewhat truncate, the apex rounded and minutely apiculate, pericarp 2 mm thick (53) *M. flosculosa*

10. Leaves oblong or oblong-elliptic, the sides often parallel for part of their length, drying a pale yellowish brown or in thin leaves a blackish brown, the midrib beneath concolorous or slightly darker than the background, not reddish brown; nerves 16—23 pairs, average 20 pairs, dark brown, or concolorous, more oblique and much thinner and finer with more numerous, secondary nerves not raised beneath. Twigs blackish in the apical parts, often angled but without the two lines. Male flowers oblong-ovoid in bud, later more tubular, (5) 8 mm—1 cm long and 3—6 mm broad; stalk of staminal column glabrous, much thinner than the fertile part; pedicels 6—7 mm long; bracteole "cucullate", larger, sheathing and almost entirely covering the young flower. Fruit solitary, narrowly oblong, longer, 3—6 cm long and 2—3.5 cm broad, rounded at both ends, pericarp 5—7 mm thick (54) *M. cucullata*

14. **Key to the species in series Cimiciferae**

1. Leaves drying a pale colour on both surfaces and often glossy above, narrowly elliptic with 10—15 pairs of faint or distinct nerves, the base acute, sometimes rounded in *insipida*, the apex variable (see below). Flowers when dry pale yellowish brown, oblong-ellipsoid or sub-cylindric, tomentulose to tomentose; male pedicels 0.7—1 mm thick, shorter than the flowers which are almost sessile. Fruit pale brown, oblong; stalk 3—5 mm long. Seed pale brown when dry

2. Leaves drying a pale greenish brown above and pale yellowish brown beneath, 10—20 cm long and 2.5—7.5 cm broad, average 5 cm broad, base acute or rounded, apex obtuse; nerves fairly prominent beneath, distantly spaced, the lower midrib only a shade darker than the lower surface when dry; petiole 1.5—2 mm thick. Twigs 2—3 mm thick at the apex. Male flowers densely tomentose, 5—6 mm long and 2.5—3 mm broad; pedicels 2—3 mm long. Staminal column with or without an acute, sterile apiculus. Fruit 2.5—3.5 cm long and 1.5—1.8 cm broad; sometimes with a few weak, 0.5—1 mm long, dendroid hairs, becoming glabrous; stalk 5 mm long and 3 mm thick. A tree of coastal dunes with a wide distribution (55) *M. insipida*

2. Leaves drying pale greenish brown above, paler brown but not yellowish beneath, 5—11 cm long and 1—3 cm broad, average 2—5 cm broad (among the smallest and narrowest in the genus), base acute, apex acuminate; nerves faint beneath, closely spaced, the lower midrib often reddish brown when dry; petiole more slender, 1 mm thick. Twigs 1 mm thick at the the apex. Male flowers tomentulose, 4—5 mm long and 1—2 mm, average 1.75 mm broad; pedicels 0.5—2 mm long. Staminal column with an acute sterile apiculus. Fruit smaller, 1.8—2 cm long and 1—1.2 cm broad, the smallest in the genus, thinly scaly-furfuraceous, soon becoming glabrous; stalk 3—5 mm long and 1—2 mm thick. A Rare tree of river banks, confined to New Guinea (56) *M. concinna*
1. Leaves drying a blackish or medium brown and most often dull above, brownish or glaucous beneath, more variable in shape, mostly elliptic, also elliptic-lanceolate, narrowly lanceolate and less often ob lanceolate (slightly smaller than in *insipida*) with 13–18 pairs of distinct nerves, the base acute, the apex generally acuminate, though at times acute to obtuse. (The leaves should be carefully compared and checked with those of *M. fragrans* in the case of sterile material where they are, in *fragrans*, more glossy above with fewer, 8–11 pairs of nerves). Flowers when dry more reddish brown, though sometimes pale, ellipsoid, tomentulose to puberulous, male pedicels very slender, about 0.3–0.5 mm thick and slightly longer than the flowers, 5–6 mm long. Fruit varying in colour, often darker, rusty-tomentulose, globose or sub-globose, less often slightly oblong; stalk 5–7 mm long. Seed brown when dry. A taller tree than the above two species with a very wide distribution

(57) *M. globosa*

15. Key to the species in series Subalulatae

1. Trees 3–10 m high. Twigs often swollen and inhabited by ants, 5 mm —1 cm thick in the apical parts, the two lines from petiole base to petiole base sometimes raised into thin narrow wings. Leaves mostly oblong but variable, often broadest above the middle, panduriform or obovate, drying a medium brown or a greyish brown above, often glaucous beneath or whitish grey in mountain specimens, the base rounded, acute in small leaves, occasionally cordate; 20–40 cm, average 30 cm long and 7–15 cm, average 10 cm broad; nerves 20–30 pairs, average 25 pairs. Male flowers large, 1–1.5 cm long and 3–5 mm broad, acute at the apex, rusty-tomentulose outside, split down 1/7–1/4 way into the lobes; pedicels 1–1.5 cm long; stalk of staminal column glabrous, apiculus very prominent, 1.5–2 mm long. Fruit dark brown when dry, 1.6–2.8 cm long and 1.3–2 cm broad, sub-globose to slightly longer than broad, usually gradually narrowed into a subulate apex; stalk short, 3 mm long and 3 mm thick, rarely 5 mm long, the fruit sometimes appearing sessile

(58) *M. subalulata*

1. Trees 6–43 m high. Twigs not swollen nor inhabited by ants, 3–5 mm thick in the apical parts, the two lines never winged. Leaves oblong or elliptic, often widest at the middle, only occasionally obovate, less variable, drying differently above and beneath, the base acute or rounded, the lamina smaller in size; nerves 15–28 pairs. Male flowers smaller, 3–5 mm long and 2 mm broad, obtuse at the apex, densely pale brown-tomentose outside, split down 1/4–way into the lobes; pedicels shorter; stalk of staminal column pubescent, the apiculus prominent but not so long as in the above species. Fruit pale brown when dry, larger, 3.5–4 cm long and 2.5–3.5 cm broad, sub-globose, oblong or ovoid, rounded at the apex and not gradually narrowed or subulate; stalk longer, 7 mm —1.2 cm long and 5–7 mm thick

2. The two lines on the twigs very distinct and sharp, especially near the apex, the young smooth portions usually over 8 cm long, the older slightly rough. Leaves elliptic or oblong-elliptic, 14–22–(32) cm, average 19 cm long and 6–8 cm broad, drying a dark glossy brown or blackish brown above, only slightly paler beneath, the base generally rounded, less often acute and the margins not wavy; nerves 15–20 pairs. Stalk of staminal column completely covered with hairs; male pedicels 5–7 mm long. Fruit sub-globose (obovoid when young) tomentulose, later glabrous

(59) *M. sulcata*

2. The two lines on the twigs very faint at the apex, the smooth portions much shorter, 5–8 cm long, the older tending to be rougher. Leaves narrowly oblong with nearly parallel sides, 15–26 cm long and 3.5–7 cm, average 5.5 cm broad, drying a medium brown above with some reddish blotches or uniformly dark brown in old leaves, often whitish or cinnamon coloured beneath, the base acute, less often rounded, the margins undulate or slightly serrulate; nerves 18–28 pairs, average 22 pairs. Stalk of staminal column with basal hairs only; male pedicels 4–5 mm long. Fruit oblong (ellipsoid when young), glabrescent becoming glabrous

(60) *M. undulatifolia*
16. Key to the species in series Heterophyllae

1. Twigs with 2 lines from petiole base to petiole base on the twigs. Leaves oblong; length 20-35 cm, average 27 cm; breadth 5-13 cm, average 9 cm; petiole short, 1.5-2 cm long, lower surface of lamina drying a pale brown but not white, the 16-22 pairs of oblique nerves the same colour; secondary nerves and reticulations absent or almost so. Inflorescence axis rather short and mostly without a smooth basal part, usually not more than 1 cm long (occasionally up to 3 cm), the smooth part, if present, 3-5 mm long only. Male flowers tomentulose to minutely puberulous or nearly glabrous, 5 mm long and 4 mm broad, split down \( \frac{1}{2} \)-way into the lobes; pedicels 6 mm long. Staminal column with an apiculus, stalk densely pubescent. Fruit thinly tomentulose, soon glabrous and without warts, the pericarp thin and rather brittle, tending to break, 3-3.5 cm long and 2-2.8 cm broad; stalk 5 mm long and 4 mm thick. Tree of river banks and at the edges of mangroves subject to inundation, 6-36 m high with stilt-roots (61) *M. hollungii*

1. Twigs without 2 lines from petiole base to petiole base on the twigs. Leaves oblong but more variable in shape, also oblong-lanceolate, oblanceolate or obovate, size also more variable, often the same but also (see below) longer or shorter; petiole longer, 2-5 cm long, lower surface of lamina usually a waxy white with the 15-30 pairs of nerves darker; secondary nerves and reticulations often present. Inflorescence axis longer, 1-4 cm long with a very much longer, 1-2 cm long smooth basal portion (not seen in *kajewskii*). Male flowers densely tomentulose (not seen in *kajewskii*) only slightly larger, 5-6 mm long and 6 mm broad, split down \( \frac{1}{2} \)-way into the lobes; pedicels 5-7 mm long. Staminal column without an apiculus, the stalk glabrous or with a few hairs at the base only. Fruit densely and shortly tomentulose often with small warts, the pericarp hard and not breaking, size the same or much larger

2. Fruit large, 7-8.5 cm long and 5.5-7.5 cm broad, pale brown-tomentulose, the pericarp 5-8 mm—(1 cm) thick; stalk 5 mm—2 cm long and 1 cm thick. Leaves oblong, 17-35 cm long and 6-12 cm broad, average 10 cm broad, the base rounded, occasionally sub-cordate, secondary nerves and reticulations usually present beneath; primary nerves 18-25 pairs, dark brown if the upper surface of the leaf is dark, reddish if the upper surface of the leaf is paler. Flowers unknown. Tree of the lowland rain forest, 10-25 m high with stilt-roots (62) *M. kajewskii*

2. Fruit smaller, 3-4.5 cm long and 2.5-4 cm broad but larger in var. *gillespieana* reaching 6 cm in diam. when mature, reddish brown or pale brown, more distinctly warded, the pericarp thinner, 2 mm thick; stalk 6 mm—2 cm long and 3-5 mm thick in most of the varieties, but again stouter, 8 mm—1 cm thick in var. *gillespieana*. Leaves more variable in shape (see key to the varieties for details) 14-34 cm long, sometimes up to 40 cm long, 5-15 cm broad, average 9 cm broad, base rounded or often sub-cordate, secondary nerves and reticulations not so distinct, sometimes absent but the reticulations clear beneath in var. *insularis*; primary nerves 15-22 pairs and up to 30 in var. *gillespieana*, usually reddish brown beneath. Tree of wooded hill-slopes, 8-30 m high without stilt-roots (63) *M. hypargyraea* and its *vars*

*Note:*—Except for the large fruit, the characters in 2 (1) and 2 (2) for separating these two species are minor and not very satisfactory. Even the large fruit of species 62 is shared with that of *M. hypargyraea* var. *gillespieana*. See notes after *M. kajewskii* in the text for an opinion on its status.
Key to the varieties of Myristica hypargyraea

1. Leaves mostly oblong. Fruit large, 6 cm in diam. or smaller, 3 cm long and 2.7 cm broad. Fruit-stalk stout or slender

2. Leaves oblong or oblong-lanceolate; length 14–34 cm, average 23 cm; breadth 5–11.5 cm, average 7 cm; base rounded, less often bluntly acute; nerves 16–21 pairs, average 19 pairs; petiole 2–3 cm long. Fruit sub-globose or slightly longer than broad, 3.2–3.5 cm long and 2.5–2.7 cm broad, minutely warted; stalk slender, 2.2 cm long including peduncle and pedicel and 3–4 mm thick. Twigs 4 mm thick in the apical parts. Tree 10–20 m high, confined to Samoa var. hypargyraea

2. Leaves oblong with nearly parallel sides; length 20–40 cm, average 23 cm; breadth 7–14 cm, average 9 cm; base rounded, emarginate or sub-cordate; nerves 18–30 pairs, average 22 pairs; petiole 2–4 cm long. Fruit sub-globose or globose (more ellipsoid when young) 6 cm in diam., not warted; stalk stout, 1–1.5 cm long and 8 mm—1 cm thick. Twigs 6 mm thick in the apical parts. Tree 8–30 m high, confined to Fiji and Tonga var. gillespieana

1. Leaves obovate. Fruit smaller (see below). Fruit-stalk slender, 5–6 mm thick

3. Twigs 4 mm thick in the apical parts. Leaves thinly chartaceous, drying pale greyish brown above, obovate or less often slightly oblong, 22 cm long and 8 cm broad; nerves 15–18 pairs, secondary nerves and reticulations absent beneath; petiole 2 mm thick. Fruit globose to sub-globose. 3–4.5 cm long and 3–4 cm broad, warts faint, nearly absent; stalk 6 mm long. Confined to the Banks Group var. guillauminiana

3. Twigs 3–5 mm thick in the apical parts. Leaves chartaceous, sometimes thinly coriaceous, pale or medium brown above, obovate to broadly obovate, 25–38 cm long and 10–15 cm broad; nerves 17–22 pairs, secondary nerves and reticulations often present beneath; petiole 3–4.5 mm thick. Fruit obovate, 4–4.5 cm long and 2.8 cm broad, often warted; stalk 5 mm—1.5 cm long. Confined to the Caroline Islands (Palau) var. insularis

17. Key to the species in series Teijsmanniae

1. Twigs moderately slender, 3–4 mm thick in the apical parts and downwards for some 10 cm. Leaves chartaceous, gradually narrowed from the middle or above the middle to the acute base; length 12–26–(35) cm; petiole 1.5–3 mm thick; nerves slender. Inflorescence axis often with a smooth portion below the scar-covered reproductive part. Perianth tomentulose or tomentose. Fruit glabrous or dark brown-tomentulose

2. Leaves rhombic, widest at the middle, 9–12 cm broad (4.5 cm in small ones) covered with minute, closely adpressed silvery scales beneath when young; nerves 12–22 pairs. Male flowers tomentulose, 5 mm long and 3 mm broad; bracteole 2.5 mm long. Fruit ovoid to oblong, glabrous, 5–6.5 cm long and 3–3.5 cm in diam. (64) M. andamanica

2. Leaves oblanceolate, mostly widest above the middle, 4–7 cm broad, drying brown with a glaucous tinge beneath without visible scales; nerves 14–18 pairs. Male flowers brown-tomentose, 7–8 mm long and 4–5 mm broad; bracteole 6–7 mm long. Fruit sub-globose to globose, dark brown-tomentulose, 4 cm in diam. (65) M. teijsmannii

1. Twigs stout, 5–7 mm thick in the apical parts and downwards for some 10 cm. Leaves thickly coriaceous, the sides often nearly parallel, less often curving or broadest above the middle, the base bluntly acute or rounded; length 18–40 cm; petiole 4 mm thick; nerves stout. Inflorescence axis thicker, usually without a smooth portion. Perianth nearly glabrous. Fruit minutely puberulous becoming glabrous, ovoid-globose (66) M. crassa
18. Key to the species in series Laurifoliae

1. Leaves chartaceous, drying light to dark brown beneath, 9-20 cm, average 16 cm long and 3-9 cm, average 6 cm broad, base acute or cuneate, seldom rounded or if so, acute where it joins the petiole, apex acuminate or acute; primary nerves 10-18 pairs; reticulations faint beneath. Male flowers minutely rusty, adpressed-tomentulose outside, 3-3.5 mm broad. Staminal column with an acute or less often obtuse apiculus, its stalk nearly glabrous with a very few short hairs. Twigs 2-3 mm in the apical parts, reaching 4-5 mm thick in the oldest (67) M. ceylanica (typical)

1. Leaves slightly more coriaceous, drying glaucous or greyish-silvery beneath (at least when young) with dark reddish brown surfaces, 13-30 cm, average 22 cm long and 6-10 cm, average 8 cm broad, base acute or often rounded and then acute where it joins the petiole, apex acute; primary nerves 14-20 pairs; reticulations forming a fine lax network beneath. Male inflorescence simple, bifurcate or with 3-4 short knarled (dactyloid) branches. Male flowers densely dark rusty-tomentose, 2.5 mm broad. Staminal column with a rounded sterile apiculus, its stalk densely rusty-tomentose. Twigs slightly stouter, 3-4 mm thick in the apical parts and 4-6 mm in the oldest (68) M. dactyloides

Key to the varieties of Myristica ceylanica

1. Twigs 2-3 mm thick in the apical parts, and 4-5 mm thick in the oldest, reddish brown in varying shades according to the distance down from the apex, greyish in the oldest. Leaves mostly chartaceous, 9-20 cm long, average 16 cm; 3-9 cm broad, average 6 cm; nerves moderately distinct on both surfaces or fainter on the upper; petioles mostly 2 mm thick, occasionally 3 mm var. ceylanica

1. Twigs 3-4 mm thick in the apical parts and 5-6 mm thick lower down, much stouter than in the above variety, darker, purplish or dark reddish brown, probably greyish in the oldest (lowermost parts not present). Leaves smaller and more coriaceous, 9-18 cm long, average 13 cm; 4-6 cm broad, average 5 cm; nerves more deeply impressed above and more prominent and thicker on both surfaces; petioles 3-3.5 mm thick, 1 mm thicker than in the above variety var. cagayanensis

19. Key to the species in series Castaneifoliae

1. Leaves 8-24 cm long and 2-9 cm broad, midrib 1-4 mm broad below, nerves 12-20 pairs, slender beneath; reticulations not usually visible beneath; petiole 1-4 mm thick. Twigs 1.5-5 mm thick in the apical parts. Male inflorescence axis 2 mm-1.5 cm long and 1-5 mm thick, smooth basal portions sometimes present

2. Leaves chartaceous, less often coriaceous, secondary nerves fairly numerous, petioles 1-2 mm thick. Twigs 1-3 mm thick in the apical parts. Fruit dark or light brown, minutely tomentulose, 1-2.5 cm broad, the apex rounded, or narrowed and attenuate, sometimes apiculate or oblique; stalk 3-8 mm long and 3-5 mm thick. Male perianth 4-6 mm long, minutely tomentulose, tomentose in some of the varieties of lancifolia

3. Leaves abruptly acute or cuneate at the base, the petiole 8 mm -1.5 cm long and up to 2 cm long in var. bifurcata; reticulations rarely present above, absent beneath; nerves 12-15 pairs, fine beneath but usually distinct, see key to the varieties for details. Male flowers oblong or oblong-ellipsoid, 4-6 mm long and 1.8-3 mm broad. Fruit oblong, ellipsoid or sub-globose, very variable, larger or smaller than in species no 70, see key to varieties; stalk 3-8 mm long and 3 mm thick (69) M. lancifolia and its vars

3. Leaves mostly rounded or bluntly acute at the base; the petiole longer in proportion to the lamina, 1.5-2.5 cm long; reticulations mostly present above (not always), absent beneath; nerves 16-20 pairs, very faint beneath. Male flowers ovoid, broader, 5 mm long and 3-4 mm broad. Fruit oblong, (2.5)-3.5-3.7 cm long and 1.7-2 cm broad with the base often flat or sometimes rounded, sessile or on a very short, 3-5 mm long and 5 mm thick stalk (70) M. chartacea
2. Leaves coriaceous, secondary nerves very few or absent, petioles 3–4 mm thick. Twigs 4–5 mm thick in the apical parts. Fruit dark chocolate-brown or dark rusty brown-tomentose, 1.7–3 cm broad, the apex rounded but not attenuate, nearly always revolute and oblique; stalk 5 mm—1.7 cm long and 5–7 mm thick or absent. Male perianth longer, 1–1.2 cm long, densely tomentose, not seen in *petiolarata*

4. Petiole of apical leaves 1.8–3 cm, average 2.4 cm long; nerves 12–20 pairs, faint and not raised beneath; reticulations mostly present above, faint or absent beneath; lamina mostly dull above when dry, sometimes glossy in parts. Twigs greyish and very rough in the apical parts. Fruit mostly solitary, 4.5 cm long and 2.5–3 cm broad; tomentum dark chocolate-brown (i.e. with a blackish tinge) or a dark rusty brown, becoming less dense when old; stalk 5 mm long and 7 mm thick, sometimes almost absent (71) *M. castaneifolia* (i.e.) specimens with the apical portions of twigs only, those usually seen in herbaria)

4. Petiole of apical leaves 2.5–6 cm, average 4.5 cm long, rather long in proportion to the lamina; nerves 20–25 pairs, fainter still beneath than in species no 71; reticulations absent on both surfaces in the material at hand; lamina very glossy above when dry. Twigs usually a reddish tinge and striate in the apical parts but never so rough. Fruit often 3–4 in a cluster, smaller, 2.5–3.5 cm long and 1.7–2.3 cm broad; tomentum also dark chocolate-brown but not a rusty brown, persisting; stalk longer, 1.5–1.7 cm long, pedicels 5 mm long and 4–5 mm thick (72) *M. petiolarata*

1. Leaves 30–60 cm long and 12–15 cm broad; midrib 5– mm broad below; nerves about 30 pairs, very prominent beneath; reticulations scalariform, visible beneath; petiole 6 mm—1 cm thick. Twigs 5–7 mm thick in the apical parts. Male inflorescence axis very stout and thick, 7 cm long and 7 mm thick with numerous scars, no smooth basal portions present (71) *M. castaneifolia* (older leaves and twigs and the so-called *M. macrantha*)

**Key to the varieties of Myristica lancifolia**

1. Fruit small, 1.6–3 cm long and 1–1.5 cm broad. Male inflorescence axis not bifurcate. Leaves drying a greyish or blackish brown above, sometimes slightly glaucous beneath. Perianth chartaceous

2. Fruit 1.6–1.8 cm long and 1.4–1.5 cm broad, broadly ovoid to nearly sub-globose, rounded at both ends, the pericarp (at least when young) 3 mm thick, thicker than in the other vars. Leaves variable with narrow, intermediate and broad forms, but mostly lanceolate, sometimes broadly so, 2–6 cm broad, average 4 cm, drying greyish above or in the more coriaceous leaves blackish; nerves 12–15 pairs. Male flowers oblong-ellipsoid to ellipsoid, tomentose outside, 1.8–2 mm broad; pedicels 3 mm long. Female flowers 3 mm long and 2–2.5 mm broad

var. *lancifolia*

2. Fruit 2–3 cm long and 1–1.4 cm broad, ellipsoid or oblong-ellipsoid, narrowed towards the acute, obliquely acute or less often obtuse apex, the pericarp 0.25–0.5 mm thick. Leaves also variable, mostly elliptic and broadest at the middle, 3.5–7 cm broad, average 5 cm, drying greyish brown or medium brown above; nerves 15–20 pairs. Male flowers oblong, pubescent to slightly tomentose outside, 2.5–5 mm broad; pedicels 3–5 mm long. Female flowers 4 mm long and 3 mm broad

var. *montana*

1. Fruit larger, 3–5.5 cm long and 1.5–2.5 cm broad. Male inflorescence bifurcate or not. Leaves drying a rich brown or olivaceous above, not generally glaucous beneath. Perianth coriaceous

3. Fruit 3–4 cm long and 1.5–1.8 cm broad, oblong-ellipsoid, tomentose in patches. Twigs often with rusty hairs on the innovations. Male inflorescence bifurcate, the main axis 2–8 mm long, smooth; branched at the apex into two scar-covered, 3–5 mm long branches. Male perianth 4 mm long, densely dark brown, shaggy-tomentose with 1 mm long hairs; pedicels 2 mm long. Female flowers 5 mm long; pedicels 5 mm long. Leaves lanceolate, the margins not or slightly revolute, hairs sometimes present on the lower midrib in young leaves, 2.5–7 cm broad, average 4 cm

var. *bifurcata*
3. Fruit 4.7–5.5 cm long and 2.3–2.5 cm broad, the largest among the
vars, ellipsoid, nearly glabrous. Twigs glabrous on the innovations.
Male inflorescence not bifurcate, 3–5 mm long. Male perianth 5–6
mm long, glabrous or tomentulose; pedicels 5 mm long. Female
flowers rather large, 8 mm mm long; pedicels 4–6 mm long. Leaves
narrowly lanceolate to spatulate with strongly revolute margins,
glabrous, 2–4.5 cm broad, average 3 cm

var. clemensii

KEY TO FRUITING AND STERILE MATERIAL

1. Leaves with a lax, powdery, yellowish, cinnamon-coloured or less often
whitish indumentum of scales beneath. [This does not include whitish
or greyish colourations of minute scales or incrustations which do not
rub off easily and which may be present or absent even in the same
species, e.g. M. maxima, fragrans, tubiflora, etc.]

2. Hairs as well as scales present on the lower surface of the leaves

3. Leaves sub-bullate when fresh; nerves and especially the reticula-
tions very prominent on both surfaces. Nerves arising from the midrib
at a wide angle, usually more than 45°

4. Twig innovations, petioles and lower surface of the leaves densely
hair or tomentose with hairs 1–3 mm long

5. Leaves sub-cordate, emarginate and rounded at the base. Mature
fruit under 6 cm broad

6. Tomentum on leaves, petioles, twigs and fruit a dark or rusty
brown. Fruit large (still immature) ellipsoid, 7 cm long and 3.3 cm
broad, tomentose, the pericarp hard; stalk 1 cm long (32) M. fusca

7. Tomentum on leaves, petioles, twigs and fruit a golden or light
yellow, darkening slowly with age. Fruit much smaller, sub-globose,
2–3.3 cm in diam., sub-lanose with 3–5 mm long hairs, the pericarp
thin and fragile, sessile or nearly so

(33) M. chrysophyla var. chrysophyla

5. Leaves neither sub-cordate nor emarginate, only rounded at the
base. Mature fruit 6 cm or more broad (31) M. womersleyi

4. Twig innovations, petioles and lower surface of the leaves puberulous,
the hairs much shorter, 0.5 mm long, those on the leaves soon deciduous
(30) M. sphaerosperma

3. Leaves not sub-bullate when fresh; the nerves prominent or not but
the reticulations never so distinct, often absent. Nerves oblique, not
arising at a wide angle except sometimes in fatua var. morindiifolia

7. Twigs very rough with blackish cracking bark in the older portions,
the apical portions up to 1 cm thick and tawny villose with 1–2 mm
long hairs. Leaves often densely villose on the lower surface, especially
along the midrib and veins with pale buff or silvery simple hairs.
Fruit ovoid, also densely villose with pale brown hairs, sometimes
slightly oblique or even uncinate at the apex, sessile or on a very
short, 3–5 mm long stalk (37) M. villosa

7. Twigs smooth or striate, the bark not blackish and cracking, the
apical portions up to 5 mm thick, tomentose or puberulous but the
tomentum not so long and not villose. Leaves tomentose to nearly
glabrous on the lower surface but never villose, the hairs usually
much darker. Fruit various (see below) tomentose or tomentulose but
not villose, the hairs shorter and darker, not oblique or uncinate at
the apex, stalked

8. Leaves large size-class; length 24–46 cm, average 32 cm; breadth
9–19 cm, average 11 cm; the sides often nearly parallel, the base
sub-cordate or emarginate, the undersurface densely tomentose with
minute dendroid hairs; young folded leaves often present among the
apical leaves; nerves 25–32 pairs. Fruit broadly oblong, 5.5–6 cm
long, rusty furfuraceous-tomentose, the tomentum very dense when
young, tending to rub off with age

(36) M. fatua var. morindiifolia
8. Leaves medium to small size-class, the largest (ie. those of *guatterifolia*) not usually over 30 cm long, the sides usually curved, the base mostly acute, less often rounded, not sub-cordate, the undersurface tomentose or not; young folded leaves not present among the apical leaves; nerves 12-20 pairs. Fruit oblong or not, not usually so large, 1.3-5 cm long, the tomentum furfuraceous or not, but always present

9. Venation of leaves prominent beneath without secondary veins; scales abundant on the lower surface. Fruit not obovoid or ellipsoid

10. Lamina 15-18 cm long and 7 cm broad, hairs and scales dark yellow or blackish yellow. Fruit discoid, broader than long, 1.3-1.5 cm long and 1.8-2 cm broad (36) *M. fatua* var. *quercicarpa*

10. Lamina 15-30 cm long and 3-12 cm broad, hairs and scales cinnamon brown or sometimes silvery. Fruit not discoid, longer than broad, and much larger than the above measurements

11. Leaves lanceolate or elliptic-lanceolate, reaching 30 cm long with 15-20 pairs of nerves; hairs on the undersurface very few, sometimes absent. Tomentum on twigs and fruit soft, non-furfuraceous. Fruit oblong rusty-tomentose, 5 cm long and 4 cm broad. Tree of rocky or sandy seashores, rarely inland

(22) *M. guatteriifolia*

11. Leaves elliptic-lanceolate, more often broadly elliptic, 16-23 cm long with 12-15 pairs of nerves; hairs on the undersurface dense, especially on the midrib and veins, very short, dendroid. Tomentum on the twigs and fruit harsh, furfuraceous. Fruit ovoid-globose, minutely furfuraceous-tomentose or tomentulose, 3-3.5 cm in diam. Tree of primary forest from 184-923 m

(24) *M. markgraviana*

9. Venation of leaves faint beneath, usually with a few secondary veins, both sets more slender; scales not abundant on the lower surface, often absent or very minute, hairs also often absent. Fruit obovoid or ellipsoid

(40) *M. buchneriana*

2. Scales only, present on the lower surface of the leaves

12. Reticulations prominent and sunk above, leaves sub-bullate. Nerves curving widely and leaving the midrib at an angle of 60-90°

13. Leaves broadly ovate or ovate oblong with 14-17 pairs of nerves; lower surface with silvery scales. Fruit not seen (29) *M. brassii*

13. Leaves oblong or elliptic-oblong with 20-25 pairs of nerves; lower surface with mostly yellowish or yellowish brown scales, if silvery ones present, then those in patches only and not over the entire surface. Fruit globose or sub-globose, 6 cm or more in diam., pericarp hard, 3-4 mm thick. Repeated here as the hairs are very often absent and the scales never very abundant in the little material at hand; compare carefully with no. 31 (30) *M. sphaerosperma*

12. Reticulations not prominent and sunk above (except somewhat in *cucullata*), leaves not sub-bullate. Nerves oblique and straight or curving

14. Primary nerves fine and rather faint beneath, close together, secondary nerves similar to the primary but shorter, often numerous; indumentum of scales on leaves not very dense. Fruit usually tomentulose, less often tomentose

15. Nerves curving widely and leaving the midrib at a wide angle, 60-90°. Fruit as a result of dictotomy often in pairs on a short, thick, 5 mm long, common peduncle and if fruit is young or unripe the bracteeol scar may sometime be seen 1-3 mm below the perianth scar indicating series *Tubiflorae*

16. Pericarp slightly warty, the fruit broadly ellipsoid and bluntly acute at the apex. Leaves small size-class, 10-15 cm long and 3.5-5 cm broad, lanceolate; secondary nerves very few or absent. Twigs medium brown (50) *M. crassipes*

16. Pericarp not warty, the fruit oblong and obtuse at the apex. Leaves more variable in size, the same size but more often larger, 15-23 cm long and 4-7-(9) cm broad, oblong or elliptic-oblong; secondary nerves numerous. Twigs blackish

(54) *M. cucullata*
15. Nerves oblique and straight, usually leaving the midrib at an angle of about 45°. Fruit mostly single but if more than one together then not arising as a result of dichotomy on a common peduncle which forks or has bracteole scars in the position stated above.

17. Petiole 6 mm–2 cm long

18. Fruit large, 6–9 cm long and 3–4.5 cm broad, the pericarp hard, woody, porous and granular in cross-section, 5 mm–1.5 cm thick. Leaves acute at the base; petiole 1.2–2.2 cm long

(21) M. cinnamomea

18. Fruit not so large, the pericarp hard or not but not so thick and woody. Leaves mostly rounded at the base, less often acute; petiole 6 mm–1.5 cm long

19. Pericarp cinnamon-tomentulose, thin and fragile, sometimes breaking in herbaria, 1 mm thick or less, ellipsoid to oblong, 2.5–3 cm long and 1.5–2 cm broad; stalk less than 1 cm long. Indumentum of scales conspicuous on the undersurface of young leaves, less in old ones. Bark of twigs rough and tending to crack in the older parts

20. Twigs 2–3 mm thick and rusty-tomentulose in the apical parts. Leaves elliptic or elliptic-lanceolate, 8–16 cm long and 2.5–6 cm broad, the base mostly rounded (except in apical leaves); nerves 12–14 pairs, often very faint. Fruit-stalk 5–7 mm long and 3 mm thick

(38) M. smythiesii

20. Twigs 4–5 mm thick and rusty-tomentulose in the apical parts. Leaves lanceolate or oblong-lanceolate, larger, 9–22 cm long and 5.9 cm broad, the base rounded and often emarginate or sub-cordate; nerves 11–18 pairs, more distinct. Fruit-stalk 3–5 mm long and 5 mm thick

(39) M. beccarii

19. Pericarp rusty-tomentose, firmer, hard and not easily broken, 3 mm thick, mostly obovoid, sometimes ellipsoid, 4 cm long and 1.8–2 cm broad; stalk 1 cm long. Indumentum thin on undersurface of young leaves, adult leaves mostly glabrous and sometimes glaucous beneath. Bark of twigs not so rough and not tending to crack in the older parts

(40) M. buchneriana

17. Petiole longer, 2–4 cm long

21. Fruit oblong or sub-globose, 2 cm long and 1.5 cm broad, the pericarp very thin, 1 mm or less thick; stalk 1.5–1.8 cm long, very slender, only 2 mm thick. Leaves usually drying a medium brown above, narrowly oblong with parallel sides, 13–20 cm long and 4–6 cm broad; nerves 20–25 pairs, faint

(41) M. pedicellata

21. Fruit various shapes, larger, the pericarp much thicker and harder; stalk longer or shorter than the above, stouter, 5 mm thick. Leaves usually drying a blackish colour above, as long or shorter, but not so narrow in proportion to length, widest at the middle or above the middle, often broadly panduriform; nerves fewer, 16–20 pairs, slightly more prominent

22. Pericarp rusty to light brown sub-tomentulose, becoming nearly glabrous, oblong, oblong-ovoid or sub-globose, 3.5–4 cm long and 2.6–4 cm broad; stalk 5–8 mm long. Leaves rounded at the base; length 10–20 cm, average 15 cm; breadth 4–7 cm, average 5 cm

(42) M. tenuivenia

22. Pericarp rusty and densely tomentulose, obovoid, narrowed towards the base, much larger, 7 cm long and 4 cm broad, also thicker but will probably become thinner at maturity, 8 mm–1.2 cm thick; stalk 2.5 cm long. Leaves rounded and slightly emarginate at the base; length 13–15 cm; breadth 6.5–7 cm

(43) M. archboldiana

14. Primary nerves thicker and more prominent beneath, equidistant or well-spaced, secondary nerves not numerous and often absent; indumentum of scales dense or thin. Fruit mostly tomentose, sometimes tomentulose
23. Lenticels on twigs absent or few and not conspicuous. Combination of the following characters involve:—leaves lanceolate and nerves very straight and oblique, arising from the midrib at an angle of about 45°.

24. Leaves coriaceous, less often chartaceous, 15-30 cm long and 5-12 cm broad, average 8 cm broad: indument of scales usually fairly dense, rusty or cinnamon brown, less often a lighter brown (hairs sometimes present). Fruit densely dark brown tomentose, 5 cm long and 3-4 cm broad; stalk 1.5-1.8 cm long. Usually trees of sandy or rocky seashores, less often inland. (22) M. guatterifolia

24. Leaves chartaceous, 11-15-(20) cm long and 2-6 cm broad, average 3 cm broad; indument of scales very thin beneath, tending to disappear, usually more yellowish in colour (hairs absent). Fruit rusty-tomentulose, tending to become glabrous, 3-3.5 cm long and 2-2.3 cm broad; stalk 5 mm long. A smaller and more elegant edition of the above species with less indumentum, smaller leaves, flowers and fruit. Not confined to seashores. (23) M. agusanensis

23. Lenticels often numerous. Combinations of the abovementioned characters not specifically involved.

25. Leaves small size-class, 9-14 cm long and 3-4.5 cm broad with 10-12 pairs of nerves; petiole slender, 1-2 mm thick. Fruit obovoid, cinnamon-brown tomentulose, 2.5-3 cm long and 1-1.5 cm broad, the pericarp very hard and thick for its size; stalk stout and thick in proportion to the size of the fruit, 4-5 mm long and 4-5 mm thick, giving the latter an almost sessile appearance. (35) M. lepidota

25. Leaves larger, medium or large size-class, the nerves more numerous; petiole stouter. Fruit obovoid or not, mostly oblong, tomentulose or tomentose, often densely so, 3.3-4.5 cm long and 1.6-3 cm broad in the smallest, and 6-10.5 cm long and 3-5 cm broad in the largest, stalked or sessile; stalk stout or not but not out of proportion to the breadth of the fruit.

26. Leaves medium size-class, 12-25 cm long and 4-8 cm broad. Twigs 3-4 mm thick in the apical parts.

27. Leaves drying blackish brown above, the indument of scales on the undersurface silvery or greyish white, thin but uniform; nerves slender, drying a chocolate-brown against the silvery background. (34) M. koordersii

27. Leaves drying a medium brown above, sometimes a pale colour, the indument of scales on the undersurface brown, yellow or pale yellow (if at all silvery then mixed with some yellow) denser or more in quantity; nerves prominent, not drying a chocolate-brown colour beneath. Here are included the smaller-leaved varieties of M. fatua such as var. inutilis, papuana and subcordata. See key to its vars (36) M. fatua in part

26. Leaves large size-class, (25)-30-50 cm long and 7-16 cm broad. Twigs 4-5 mm thick in the apical parts. Here are included the larger-leaved varieties of M. fatua such as var. affinis, fatua, magnifica, morotaiensis, platypsyllyla, spanogheana and wenzelti. See key to its vars. (36) M. fatua in part

1. Leaves without a lax, powdery, yellowish, cinnamon-coloured or less often whitish indumentum of scales beneath. [This does not include whitish or greyish colourations of minute scales or incrustations which do not rub off easily and which may be present or absent even in the same species, e.g. M. elliptica, philippensis, subalulata, etc.]

28. Hairs present beneath (on young leaves)

29. Leaves drying dark brown above and greyish white beneath; hairs on the midrib beneath simple, dark brown, 1-2 mm long. Terminal bud uncinate (always?). Fruit sub-globose, dark coffee-brown-tomentose, 4-6 cm in diam. (5) M. uncinata
29. Leaves drying a medium or yellowish brown above and slightly paler brown but not whitish beneath; hairs dendroid or stellate, flocose, pale yellowish brown, 1 mm long or less, very soon caducous. Terminal bud not uncinate. Fruit ovoid or almost conical, flattened at the base, densely medium brown-tomentose or villose, 3 cm long and 2.5 cm broad (18) *M. inopinata*

28. Hairs not present beneath

30. Two lines often present on the apical portions of twigs, running from petiole base to petiole base

31. Twigs often swollen and inhabited by ants, the two lines sometimes raised and expanded into thin narrow wings. (This species is inserted once more below in case the ant swellings are not present. They do not occur on every twig and are often absent in narrow, coriaceous-leaved mountain forms) (58) *M. subalulata*

31. Twigs not swollen as a result of ants, the two lines not modified into wing-like appendages. (The next four species are more readily identified from male flowers)

32. Leaves large, 20-40 cm long and 5-15 cm broad, mostly oblong with parallel sides, the base sometimes cordate or emarginate in the oldest and largest leaves

33. Lamina 20-35 cm long and 5-13 cm broad, average 9 cm broad, drying pale brown above, sometimes with a yellowish tinge, the lower surface the same colour or paler still, the base mostly rounded, sometimes cordate or emarginate; nerves 16-22 pairs, mostly straight, oblique and not curving much. Twigs 3-4 mm thick in the apical parts. Fruit glabrescent to glabrous, pale yellowish brown, oblong or oblong-ovoid, 3-3.5 cm long and 2-2.8 cm broad. Stilt-roots present. This species is often confused with the next when sterile (61) *M. hollrungii*

33. Lamina 20-40 cm long and 7-15 cm broad, average 10 cm broad, but more variable in shape and size, drying a medium brown above, the lower surface paler brown, sometimes glaucous or whitish, the colour of the leaf on the whole being generally darker than in the above species without a yellowish tinge, the base similar but sometimes acute; nerves 20-30 pairs, average 25 pairs, arising from the midrib at a wider angle and much curved. (Mountain forms occur with smaller, more coriaceous leaves with a white undersurface and acute bases, while their twigs lack the ant swellings.) Twigs 5 mm-1 cm thick in the apical parts, less in mountain forms. Fruit rather similar, minutely tomentulose, dark to medium brown, sub-globose to oblong, 1.6-2.8 cm long and 1.3-2 cm broad. Stilt-roots not present (55) *M. subalulata*

32. Leaves smaller, 11-26-(32) cm long and 3.5-9 cm broad, oblong with parallel sides in *undulatifolia*, elliptic with curving sides in the others, the base not cordate

34. Lamina acute or rounded at the base, the lower surface with or without a whitish colouration. Fruit not arising as a result of dichotomy; pseudo-stalk not present

35. The two lines on the twigs very sharp and distinct, especially near the apex, the older portions finely striate. Leaves drying a dark glossy or blackish brown above, only slightly paler beneath, the base generally rounded, less often acute, the margins not wavy; nerves 12-20 pairs. Fruit sub-globose, (obovoid when young) tomentulose, later glabrous (59) *M. sulcata*

35. The two lines on the twigs very faint or absent (perhaps this is not a good diagnostic character and more material may show that they are normally absent) the older portions rough because of numerous lenticels. Leaves drying a medium brown above (dark brown in old or coriaceous leaves) often whitish or cinnamon coloured beneath, the base acute, less often rounded, the margins undulate or serrulate as a result of thickening; nerves 18-28 pairs, average 22 pairs. Fruit oblong (ellipsoid when young) glabrescent becoming glabrous (60) *M. undulatifolia*
34. Lamina acute or bluntly acute at the base, not rounded, the lower surface whitish or pale yellowish beneath. Fruit arising as a result of dichotomy, single or in pairs with a common peduncle, the remains of the bracteole scar if present situated a little distance below the perianth scar indicating series *Tubiflorae*; pseudo-stalk present, 3–4 mm long. (Other species in this series often angled at the apex of the twigs but the angles not produced far into lines)  
(53) *M. flosculosa*

30. Two lines not present on the apical portions of twigs from petiole base to petiole base

36. Species which have some of their leaves cordate, sub-cordate or emarginate at the base, usually seen in their largest, oldest or lowermost leaves, but this character not present in every specimen

37. Leaves very large, some of them the largest in the genus, 18–45–(50) cm long and 6–18 cm broad, smaller in apical leaves of *castaneifolia* and in some varieties of *hypargyraea*. Twigs 4 mm–1 cm thick in the apical parts

38. Leaves on the average oblong, the middle part at least with nearly parallel sides

39. Nerves prominent beneath, straight, oblique, arising at an angle of about 45° from the midrib, secondary nerves few or absent, not conspicuous; reticulations often present, scalariform

40. Leaves drying a dark or medium brown above, with or without a whitish colour beneath, large size-class, see above; nerves very prominent and raised beneath. Fruit oblong, 5–9 cm long and 3–5 cm broad, not warded

41. Lamina when dry blackish or dark brown above and slightly paler brown beneath or sometimes with a whitish or glaucous colouration of minute scales which cannot be easily rubbed off, some of the leaves at times sub-bullate. Twigs glabrous or almost so in the apical parts. Fruit minutely rusty-tomentulose, soon becoming glabrous, much wrinkled on drying  
(1) *M. maxima*

41. Lamina when dry mostly medium brown, less often darker brown above, pale or greyish beneath, occasionally whitish, slightly less coriaceous and not sub-bullate, more variable in shape and sometimes oblong-lanceolate or oblong-obovate. Twigs rusty-tomentulose or tomentose with 1–2 mm long, adpressed, light brown, less often dark brown hairs in the apical parts, especially during anthesis or with flushes of new leaves, glabrous at other times. Fruit densely rusty-tomentose but sometimes tomentulose or even glabrous when old  
(3) *M. philippensis*

40. Leaves drying a pale brown above, often with a yellowish or greenish tinge, sometimes a metallic grey, mostly whitish beneath with minute scales or wax which cannot be easily rubbed off, less often pale brown and without the scales; nerves slightly less prominent, sometimes not raised above the level of the lower surface. Fruit more variable but mostly sub-globose, often warded (see below for details of measurements)

42. Lamina oblong, 17–35 cm long and 6–12 cm broad, average 10 cm; primary nerves 18–25 pairs, dark brown beneath if the upper surface of the lamina is dark, reddish brown if it is paler. Fruit large, slightly warted, 7–8.5 cm long and 5.5–7.5 cm broad, pale brown-tomentulose, the pericarp 5–8 mm–(1 cm) thick; stalk 1 cm thick. Stilt-roots present  
(62) *M. kajewskii*
42. Lamina more variable in shape (see key to the vars for details) 14–34–(40) cm long, 5–15 cm broad, average 9 cm broad; primary nerves 15–22 pairs and up to 30 pairs in var. gillespieana, usually reddish brown beneath. Fruit smaller, 3–4.5 cm long and 2.5–4 cm broad but largest in var. gillespieana, reaching 6 cm in diam. when mature; reddish brown or pale brown more distinctly warty (but not always), the pericarp thinner, 2 mm thick, stalk thinner, 3–5 mm thick but as thick in var. gillespieana. Stilt-roots not present
(63) M. hypargyraea and its vars

39. Nerves faint beneath, curving more, arising at a wider angle, more than 45°, secondary nerves numerous, similar to the primary but shorter; reticulations absent
(6) M. neglecta

38. Leaves on the average elliptic or broadly elliptic, not or rarely oblong, the sides not parallel

43. Leaves oblong-obovate, 23–40 cm long and 10–18 cm broad, the nerves very prominent and raised beneath, the undersurface usually drying yellowish. Fruit 8–9 cm long and 4–5 cm broad obtuse at the apex, glabrous or soon glabrous, dark brown or blackish and glossy when dry; stalk 3 cm long
(2) M. papyracea

43. Leaves broadly elliptic, the largest ones 30–60 cm long and 15 cm broad but usually those seen in herbaria are from the apices of twigs, being medium size class and not always sub-cordate at the base, 15–24 cm long and 5.5–9 cm broad, the nerves prominent but those in the smaller-leaved specimens often not raised beneath, the undersurface not drying yellowish. Fruit 4.5 cm long and 2.5–3 cm broad, oblique and often apiculate at the apex, dark chocolate-brown-tomentose (sometimes tomentulose); stalk 5 mm long or almost absent
(71) M. castaneifolia

37. Leaves medium size-class, 8–30 cm long, average 18 cm long and 5–10–(12) cm broad, often drying a pale colour, especially yellowish. Twigs 2–5 mm thick in the apical parts, also tending to be paler in colour, reddish brown or pale straw-coloured

44. Leaves often whitish beneath with reddish brown nerves. Fruit often warted. (Placed under 42 (2) where most of the specimens would be classed but repeated here for those with smaller leaves under 20 cm long)

(63) M. hypargyraea and its vars

44. Leaves mostly pale yellowish brown beneath. Fruit not warted

45. Lamina lanceolate or elliptic. Fruit with dense tomentum, sub-lanose or villose, sessile or on a short thick stalk; stalk if present 5 m–1 cm long and 5 mm thick, terete
46. Leaves acute at the apex. Fruit oblong or oblone-ovoid, 2.5–3.3 cm long and 2 cm broad, sessile
(33) M. chrysophylla var. entrecasteauxensis

46. Leaves obtuse at the apex. Fruit ovoid or almost conical, flattened and horizontal at the base, 3 cm long and 2.5 cm broad, stalked
(18) M. inopinata

45. Lamina otherwise. Fruit tomentulose or glabrous, finally becoming glabrous; stalk long and slender, of dichotomous origin, consisting of a common peduncle 1–1.5 cm long and 2–4 pedicels 5 mm–1.5 cm long, 2–3 mm thick, flattened
47. Leaves ovate, obtuse at the apex; nerves fairly prominent, secondary nerves present but few and not conspicuous. Fruit 2–3.5 cm long and 1.5 cm broad, very thin-walled, the pericarp 0.5 mm thick
(19) M. schleiniizii

47. Leaves oblong, many of them panduriform, acute at the apex; nerves fine and faint, secondary nerves numerous, also fine and faint like the primary but shorter. Fruit 5–6 cm long and 3 cm broad, the pericarp thicker
(17) M. garciniiifolia
36. Species with the leaves normally rounded or acute at the base. If at all cordate or sub-cordate then these shapes may be present in the oldest and largest leaves from the lower-most parts of the twigs.

48. Leaves narrow in proportion to length, at least reaching 16 cm long and 2–3 cm broad.

49. Leaves ensiform, acute at both ends, 17–22 cm long and 2–3 cm broad; nerves prominent beneath, line of interarching distinct; margins not revolute. Fruit narrow, elongate, acute at the apex, stalk slender, 2 mm thick. (44) *M. ensifolia*

49. Leaves narrowly lanceolate or spatulate but not ensiform, the base acute and the apex acute or obtuse, 6–16 cm long; nerves often faint beneath; margins slightly revolute. Fruit not so narrow and elongate, rounded at the apex, stalk thicker. Some specimens of *lancifolia* and *gigantea* 4 cm broad would just fail to meet the requirements of this section of the key on the basis of breadth.

50. Secondary nerves present, primary and secondary very faint. Fruit 2–5.5 cm long and 1–2.5 cm broad.

51. Fruit arising as a result of dichotomy; stalk a slender flattened, 1.5–2 cm long peduncle, pedicels about 5 mm long, 2 mm thick. Leaves usually obtuse at the apex, the margins thickened. (20) *M. roselensis*

51. Fruit not arising as a result of dichotomy, stalk thicker, terete, 8 mm–1 cm long and 3 mm thick. Leaves acute or obtuse at the apex, the margins slightly revolute. (69) *M. lancifolia* var. *clemensii*

50. Secondary nerves not present or if so not at all numerous, primary usually also faint in coriaceous leaves, slightly more prominent if the leaves are thin in texture. Fruit much larger, 5.5 cm long or more and 4 cm broad. (9) *M. gigantea*

48. Leaves not conspicuously narrow in proportion to length, not narrowly lanceolate, spatulate or ensiform even if small size-class.

52. Leaves small size-class, 1–12 cm long and less often up to 15 cm long, elliptic or lanceolate or combinations of these shapes. Fruit glabrous or tomentulose.

53. Secondary nerves numerous, fine or faint, the primary similar but longer, mostly oblique.

54. Leaves abruptly acute or cuneate at the base, the petiole 8 mm–1.5 cm long and up to 2 cm long in *lancifolia* var. *bifurcata*; reticulations rarely present above, absent beneath; nerves 12–15 pairs, fine beneath but usually distinct, see key to the varieties for details. Fruit oblong, ellipsoid or sub-globose, very variable, larger or smaller than in species no 70, see key to the varieties; stalk 3–8 mm long and 3 mm thick. (69) *M. lancifolia* and its vars

54. Leaves mostly rounded or bluntly acute at the base, the petiole longer in proportion to the lamina, 1.5–2.5 cm long; reticulations mostly present above (not always) absent beneath; nerves 16–20 pairs, very faint beneath. Fruit oblong, (2.5)–3.5–3.7 cm long and 1.7–2 cm broad with the base often flat or sometimes rounded, sessile or on a very short, 3–5 mm long and 5 mm thick stalk. (70) *M. chartacea*

53. Secondary nerves absent or very few, the primary usually prominent (sometimes faint in *concina* and *longipes* but not always) usually much curved.

55. Specimens with fruit present.

56. Fruit showing certain features as a result of dichotomy, a common peduncle which usually forks into two pedicels and the remains of the bracteole scar sometimes visible 1–3 mm below perianth scar; if so then a useful character indicating series *Tubiflorae*. Fruit elongate, fusiform or ellipsoid (sometimes only one develops).
57. Peduncle and pedicels long and slender, (5 mm)-1-3.5 cm long and 0.5-2 mm thick

58. Fruit cylindrical, 2.5-2.8 cm long. Twigs reddish brown in the apical portions. Leaves drying yellowish brown above, whitish beneath with reddish brown midrib and nerves (leaves rather like those of *M. fragrans*); nerves deeply impressed above with very distinct interarching; reticulations scalariform, very prominent (46) *M. cylindrocarpa*

58. Fruit fusiform or narrowly ellipsoid, 3.5-7 cm long. Twigs greyish or greyish brown in the apical portions. Leaves drying various shades even in the same specimen, greyish, blackish or medium brown above, less often whitish beneath, the nerves not often reddish brown except sometimes in *longipes*; nerves sunk above or not, not so prominent or so deeply impressed, the interarching usually not distinct; reticulations faint, often absent

59. Twigs slender, 1 mm thick at the apex and 3 mm thick lower down. Leaves mostly elliptic with a slender acumen, drying a pale greyish green above and yellowish brown to glaucous-greyish beneath; petiole slender, 1-1.5 mm thick (less often 2 mm thick). Fruit pendulous, mostly single, 4-7 cm long and 1.3-2.5 cm broad, the pericarp wrinkled when dry; stalk very variable in length and thickness, 5 mm-2.5 cm long (including peduncle and pedicel)

(47) *M. tubiflora*

59. Twigs 2 mm or more thick at the apex and 4 mm thick lower down. Leaves more variable in shape, elliptic, elliptic-lanceolate, ovate-elliptic, obovate-elliptic or panduriform, apex bluntly acute, less often shortly acuminate, drying dark brown above and medium brown or greyish white beneath; petiole 2-3 mm thick. Fruit not pendulous, mostly in pairs on a forked peduncle, sometimes single, 3.5-4.5 cm long and 1.5-2.5 cm broad, the pericarp smooth when dry; stalk 1.5-3.3 cm long (including peduncle and pedicel), the pedicel ending in a collar-like ring or a minute cupular receptacle where it joins the fruit

(48) *M. longipes*

57. Peduncle and pedicels shorter and thicker, 5 mm-1.7 cm long and 4.7 mm thick

60. Leaves 10-15 cm long and 3.5-5 cm broad, the apex sharply acuminate, the lower surface whitish, sometimes covered with yellowish scales (this species here repeated in the key in case the yellowish scales are not obvious or have disappeared); nerves 14-20 pairs; petiole 2-2.5 mm thick. Twigs 3 mm thick at the apex and 4 mm thick lower down, often rough with numerous lenticels. Fruit 4 cm long

(50) *M. crassipes*.

60. Leaves smaller, more numerous, the apex bluntly acute, the lower surface whitish or not; nerves fewer; petiole very slender, 1-1.5 mm thick. Twigs 1-2 mm thick at the apex, lenticels not observed. Fruit 5-6 cm long

61. Leaves thinly coriaceous, drying a greenish brown above and thinly covered with some minutely, closely adpressed whitish scales beneath. elliptic, 4-8 cm long and 1.5-2.5 cm broad; nerves 8-14 pairs. Fruit ellipsoid or obovoid-ellipsoid; stalk 7 mm thick

(51) *M. firmipes*
61. Leaves chartaceous, drying a pale yellowish brown above and paler still beneath without scales, elliptic, some of them falcate, 6–12 cm long and 2–4 cm broad; nerves 10–15 pairs, less distinct, sometimes with a few secondary pairs. Fruit ellipsoid; stalk 4 mm thick

(52) M. guadalcanalensis

56. Fruit not showing the above features as a result of dichotomy and not on a peduncle forking into two pedicels. Fruit not elongate

62. Fruit small, 1.5–2.5 cm in diam.; stalk 3–7 mm long. Leaves not usually glossy when dry; nerves 12–18 pairs, distinct on both surfaces, but usually not impressed above

63. Fruit sub-globose or globose, variable in size, 1.5–2.5 cm in diam., rusty tomentulose; stalk 5–7 mm long and 3 mm thick. Leaves variable in size and shape; length 8–15–(17) cm, average 12 cm; breadth 3–5.5 cm, average 4 cm; petiole 8 mm–1.5 cm long and 1.5–2 mm thick (57) M. globosa

63. Fruit ellipsoid or oblong, 1.8–2 cm long and 1–1.2 cm broad, pale brown or yellowish brown, tomentulose, soon glabrous; stalk 3–5 mm long and 1–2 mm thick. Leaves smaller and narrower, usually drying a paler colour, pale yellowish brown but with the same reddish tinge of *globosa*; length 5–11 cm; breadth 1–3 cm; petiole 1 cm long and 1 mm thick; nerves fainter but not always

(56) M. concinna

62. Fruit large, 6–9 cm in diam.; stalk 2 cm long. Leaves usually glossy when dry (not always); nerves 7–11 pairs, distinct on both surfaces, deeply impressed above and raised beneath, stouter than those of *globosa*, 0.25–0.5 mm thick

64. Fruit sub-globose or broadly pyriform, pendulous. Twigs brownish or reddish brown in the apical parts, less often greyish. Leaves drying a yellowish or medium brown above, sometimes with a greyish or greenish tinge, the nerves usually reddish brown beneath against a whitish-reddish background or the white sometimes lacking; apex of lamina with a 1–2 cm long acumen, the point often needle-sharp, less often acute (25) M. fragrans

64. Fruit not seen but probably similar. Twigs greyish in the apical parts (always?). Leaves drying a dark chocolate-brown above, the nerves dark brown against a more intensely and uniformly whitish background without a reddish tinge; apex of lamina acute or bluntly acute (always?)

(26) M. impressinervia

55. Specimens with fruit not present, sterile only.

65. Combinations of the following characters involved:—Leaves drying yellowish brown above, whitish with reddish brown nerves and midrib beneath; nerves deeply impressed above, their line of interarching very prominent. Twigs reddish brown in the apical portions

66. Reticulations very prominent on both surfaces of the leaf; nerves 10–15 pairs. Apex of leaf acute, bluntly acute or less often shortly and bluntly acuminate

(46) M. cylindrocarpa

66. Reticulations absent above, sometimes present beneath but if so then much finer and thinner; nerves 8–11 pairs. Apex of leaf with a 1–2 cm long acumen, the point often needle-sharp, less often acute

(25) M. fragrans
65. Combinations of the above-mentioned characters not involved

67. Nerves 8–11 pairs, deeply impressed above and raised beneath; lamina often drying glossy on both sides

68. Twigs brownish or reddish brown in the apical parts. Leaves drying a yellowish or medium brown above, sometimes with a greyish or greenish tinge, the nerves usually reddish brown against a whitish-reddish background, or the white sometimes lacking; apex of lamina with a 1–2 cm long needle-sharp acumens, less often acute (25) M. fragrans

68. Twigs greyish in the apical parts (always?). Leaves drying a dark chocolate-brown above, the nerves dark brown against a more intensely and uniformly whitish background without a reddish tinge; apex of lamina acute or bluntly acute (always?) (26) M. impressinervin

67. Nerves usually more than 11 pairs, often 15, up to 20 in crassipes, not usually impressed above (sometimes in tubiflora), raised or not beneath; lamina dull or glossy

69. Twigs 3 mm thick in the apical parts and 4 mm thick lower down, reddish brown and rough with numerous lenticels (50) M. crassipes

69. Twigs 1–2 mm thick in the apical parts, varying lower down, various shades but not rough with lenticels (a few may be present)

70. Combination of the following characters involved:—Leaves drying blackish brown above and medium brown beneath, the apex sharply acuminate; nerves prominent beneath but often not raised; twigs greyish (48) M. longipes

70. Combination of the above characters not involved

71. Leaves 4–12 cm long and 1–3 cm broad, average 2.5 cm broad, usually drying a pale yellowish or pale brownish above

72. Apex of leaf acute or shortly acuminate, lower midrib drying reddish brown (56) M. concinna

72. Apex of leaf obtuse or bluntly acute, lower midrib not drying reddish brown

73. Twigs yellowish in the apical portions. Leaves chartaceous, drying a pale yellowish brown above and paler still beneath without scales, narrowly elliptic, some of them falcate, 6–12 cm long and 2–4 cm broad (52) M. guadalcanalensis

73. Twigs reddish brown in the apical portions. Leaves thinly coriaceous, drying a greenish brown above and thinly covered with some minute closely appressed scales beneath, elliptic but not falcate, 4–8 cm long and 1.5–2.5 cm broad (51) M. firmipes

71. Leaves generally larger (small one often occur) 6–15–(17) cm long and 2–5.5 cm broad, drying various shades above

74. Twigs reddish brown in the apical parts. Leaves drying a reddish-greyish brown on both surfaces, especially beneath, sometimes blackish brown above in more coriaceous leaves, the apex acute, less often acuminate; reticulations often visible beneath and forming a fine network (57) M. globosa
74. Twigs greyish in the apical parts. Leaves drying a pale greyish above, rarely with a rusty shade, paler brown beneath, sometimes whitish, the apex mostly acuminate; reticulations usually invisible beneath

(47) *M. tubiflora*

52. Leaves larger, 15–50 cm long, various shapes. Fruit various

75. Species with leaves large size-class, 30–50 cm long but many of these at times with some of their leaves below 30 cm long, sometimes 25 cm and as low as 18 cm long. Twigs 5 mm–1 cm thick in the apical parts

76. **Primary** nerves distinct and prominent on the lower surface

77. **Secondary** nerves absent

78. Nerves 18–30 pairs, oblique, straight and more or less parallel to each other. Leaves mostly oblong or oblong-obovate, the middle portion at least with the sides more or less parallel to each other, the base mostly rounded, drying various shades of brown above and whitish or not below; reticulations usually present on the lower surface, sometimes absent in *papyracea*. Fruit glabrous or tomentose. (The species here all belong to series *Maximae*)

79. Fruit minutely dark brown tomentulose, soon becoming glabrous. Twig innovations on the production of new leaves puberulous or glabrous. Leaves coriaceous, drying various shades

80. Leaves usually drying a blackish brown less often a medium brown above, glaucous or cinereous beneath, less often brownish, oblong, the scalariform reticulations often visible beneath when dry; nerves 20–30 pairs. Fruit often wrinkled and dull when dry

(1) *M. maxima*

80. Leaves usually drying a greenish yellow or greenish brown above and yellow or yellowish brown beneath, broadly oblong or oblong-obovate, the scalariform reticulations sometimes visible beneath and sometimes not when dry; nerves 20–25 pairs. Fruit smooth and shining when dry

(2) *M. papyracea*

79. Fruit medium brown-tomentose, less often tomentulose except when very old. Twig innovations on the production of new leaves tomentose or tomentulose. Leaves coriaceous but sometimes chartaceous, drying mostly medium or light brown above, greyish or whitish beneath, rarely brown

(3) *M. philippensis*

78. Nerves 18–22 pairs, slightly more curved. Leaves elliptic-oblong or elliptic, less often oblong except in the largest ones, the base acute, less often rounded, drying a rich medium brown above and whitish below; reticulations absent on the lower surface. Fruit minutely and densely tomentulose. (This species belongs to series *Uncinata*)

(4) *M. umbrosa*

77. **Secondary** nerves present, usually one secondary nerve between every two primary

81. Leaves coriaceous, 18–40 cm long and 5–12 cm broad, the sides mostly parallel, the base bluntly acute or rounded, drying brownish beneath often with a glaucous tinge; petioles 4 mm thick. Twigs 5–7 mm thick in the apical parts. Fruit 2.5–4.5 cm in diam

(66) *M. crassa*
81. Leaves chartaceous, 20–35 cm long and 5–12 cm broad (many of them will be too small to qualify for this section of the key but some will undoubtedly fall in here) widest at the middle, the sides not or rarely parallel, the base acute, whitish beneath with minute scales (probably not always?); petiole 3 mm thick. Twigs 3 mm thick in the apical parts. Fruit 5–6.5 cm long and 3–3.5 cm broad

(64) **M. andamanica**

76. Primary nerves faint on the lower surface. Secondary nerves also present and faint

82. Leaves mostly rounded at the base, oblong with nearly parallel sides, petiole 5 mm thick; nerves 30 pairs, curving widely; secondary nerves numerous

(6) **M. neglecta**

82. Leaves narrowed and mostly acute at the base, sometimes bluntly acute, elliptic, the sides not parallel, oblong sometimes in *carrii*, petiole 3 mm thick; nerves 16–22 pairs, oblique and straight; secondary nerves fewer

83. Leaves slightly coriaceous, medium brown and very glossy and waxy above when dry as if varnished. Fruit oblong, 6–7 cm long and 3–3.5 cm broad but young ones sub-globose; stalk 1 cm long

(7) **M. hooglandii**

83. Leaves chartaceous, greyish brown and dull above when dry. Fruit narrowly oblong or ellipsoid 4–5 cm long and 1.5 cm broad; stalk 1–1.5 cm long

(8) **M. carrii**

75. Species with leaves medium size-class, 15–30 cm long but a few have some leaves that reach 35 cm long, e.g. *andamanica*, *hypargyraea* and *kajewskii* as well as some under 15 cm long, e.g. *iners*, *malabarica*, *umbellata* and *elliptica*, especially its var. *simiarum*. Twigs all sizes from 2 mm up to 1 cm thick in the apical parts

84. Fruit very large, 6–10.5 cm long and 4–6.5 cm broad or 6 cm in diam. (Such large fruits often in carpological collections and not on herbarium sheets)

85. Fruit globose or sub-globose

86. Fruit dark chocolate-brown-tomentose, sometimes slightly oblique at the apex. Apex of twigs and terminal bud dark brown tomentose with adpressed, 1 mm long hairs. Terminal bud uncinate (always?). Secondary nerves not present on the leaves

(5) **M. uncinata**

86. Fruit minutely tomentulose and of various colours, not oblique at the apex. Apex of twigs and terminal bud tomentulose or glabrous. Terminal bud not uncinate. Secondary nerves usually present on the leaves, one between two primary nerves

87. Pericarp dark brown. Leaves with prominent reticulations on both surfaces, the upper surface rather dark, the lower yellowish with minute scales or cinereous or in older leaves without the scales; petiole 1.7–2.5 cm long. This species repeated here in case the scales have disappeared

(30) **M. sphaerosperma**

87. Pericarp pale brown or sometimes with a rusty tinge. Leaves without reticulations or sometimes a few faint ones present below, the upper surface a pale yellowish or a metallic greenish grey colour, the lower mostly whitish, sometimes pale brown; petiole 2–5 cm long
88. Pericarp 7–8.5 cm long and 5.5–7.5 cm broad, slightly warty. Leaves 17–35 cm long; secondary nerves and reticulations usually present beneath. Note that some of the leaves will fit into large size-class, see section 42 (1) of this key

(62) M. kajewskii

88. Pericarp 6 cm in diam., not warty. Leaves 20–40 cm long; secondary nerves and reticulations not so distinct beneath, often absent. Note that some of the leaves will fit into large size-class, see section 42 (2) of this key

(63) M. hypargyraea var. gillespieana

85. Fruit considerably longer than broad, not globose or sub-globose

89. Fruit oblong or less often oblong-ovoid

90. Pericarp densely rusty tomentose

91. Twigs in their apical parts 4–6 mm thick and densely rusty tomentose. Leaves rigidly coriaceous, often drying medium brown with patches of dark rusty brown on the upper surface; nerves 17–20 pairs, very prominent and raised beneath; petiole 3–5 cm long and 3–5 mm thick. Fruit mostly oblong but sometimes oblong-ellipsoid or oblong-ovoid

(10) M. lowiana

91. Twigs in their apical parts 1.5–2 mm thick and glabrous. Leaves chartaceous, drying medium brown above; nerves 9 pairs, faint and often not raised beneath; petiole 5 mm–1.5 cm long and 1.5–2 mm thick. Fruit mostly oblong, sometimes oblong-ovoid

(21) M. malabarica

90. Pericarp glabrous or minutely tomentulose becoming glabrous.

92. Leaves coriaceous with a fine lax network of reticulations on the pale or whitish underside. Twigs 3–5 mm thick in the apical parts

93. Leaves oblong with parallel and slightly revolute margins, the colour mostly greenish above when dry, less often pale brown; the base rounded; nerves arising at nearly right angles to the midrib and curving widely. Twigs often pale yellowish with dark patches. Fruiting peduncle (i.e. the female inflorescence axis) 4 cm long, this length indicating a section I species, the fruiting pedicels 5 mm–1 cm long

(15) M. malaccensis

93. Leaves various shapes, mostly elliptic-lanceolate or oblanceolate, widest at the middle, the sides not parallel, the colour pale greyish brown above when dry, sometimes with a pale greenish tinge, the base acute or rounded; nerves not arising at such a wide angle, oblique and often rather crooked. Twigs reddish brown. Fruiting peduncle 1–1.5 cm long, fruiting pedicels 5 mm–1 cm long

(68) M. dactyloides

92. Leaves coriaceous or chartaceous without a fine lax network of reticulations on the pale but not whitish under-surface. Twigs thicker or thinner in the apical parts (see below)

94. Lamina broadly elliptic or rhombic, 9–12 cm wide at the middle (sometimes small leaves present only 4.5 cm wide); whitish scales often beneath, later disappearing. A few leaves of this species reach 35 cm long and would fall into large size-class 75 (1)

(34) M. andamanica
94. Lamina sometimes elliptic but more often narrowly oblong or oblong-lanceolate, being more elongate and not so wide, 3–7 cm broad at the middle, the sides often parallel; whitish scales not present beneath

95. Twigs stout, 4–5 mm thick in the striate, tomentose apical parts, the tomentum best seen at anthesis or when new leaves are unfolding, the older parts rough with blackish cracking bark, the terminal bud hirsute with rusty, 1 mm long hairs. Leaves coriaceous, the petioles 2.5–3 mm thick

(11) M. maingayi

95. Twigs slender, 1–3 mm thick in the smooth, glabrous or puberulous apical parts, the older parts reddish brown or greyish, the terminal bud greyish, glabrous or puberulous. Leaves mostly chartaceous, the petioles 1–2 mm thick

96. Bark of trunk blackish. Leaves drying a pale greenish or greyish brown above and slightly paler still beneath, less often a medium brown above, the margins often parallel at the middle of the lamina; nerves faint or prominent beneath. Lenticels absent or not conspicuous on the twigs. Fruit 5–8.5–(10) cm long and 4–4.5 cm broad; fruiting peduncles 1.5–3.5 cm long, such a length would indicate that they belong to a section I species

(14) M. iners

96. Bark of trunk brownish (the most reliable character for distinguishing sterile material of this species from iners). Leaves drying a dark or medium brown, sometimes with a dark greenish, tinge above, also dark or medium brown beneath, the margins not often parallel, occasionally parallel only above the middle; nerves slender but usually prominent beneath. Lenticels often present on the twigs. Fruit usually smaller and because of its size only the largest would qualify for this section of the key, 4.5–6.5 cm long and 2.2–3.5 cm broad; fruiting peduncles 5 mm–1 cm long, short because they belong to a section II species (67) M. ceylanica and its vars

89. Fruit ellipsoid

97. Pericarp densely rusty-tomentose. (The shape of the fruit is mostly oblong in this species, see also 89 (1) and 91 (1) above.) Leaves narrowly oblong or oblong-lanceolate with more or less parallel sides; petioles 3–5 cm long. Twigs 4–5 mm thick and rusty-tomentose in the apical parts

(10) M. lowiana

97. Pericarp glabrous or tomentulose becoming glabrous. Leaves elliptic; petioles 1–3 cm long. Twigs 2–3 mm thick and glabrous or minutely rusty-tomentulose in the apical parts

98. Fruit orange when fresh, dark brown or blackish when dry, the apex often slightly oblique. Twigs pale straw-coloured with some blackish patches. Leaves pale yellowish above, with or without a whitish colouration beneath, very brittle and breaking in herbaria

(16) M. elliptica
98. Fruit yellowish when fresh, probably other colours as well, medium brown when dry, the apex not oblique. Twigs reddish brown. Leaves various colours above, whitish or silvery beneath when dry.

99. Twigs slender, 2 mm thick in the apical parts, glabrous, very rough because of raised, pustular lenticels. Leaves chartaceous, pale yellowish brown above and silvery white beneath, elliptic-lanceolate; nerves 9–13 pairs. Fruit glabrous, ellipsoid and narrowed at both ends

(27) M. argentea

99. Twigs slightly stouter, 3 mm thick in the apical parts, often rusty-tomentulose on the innovations, striate but not rough because of raised lenticels. Leaves coriaceous, medium brown above and a brownish white or dirty white beneath, the shape the same or more broadly elliptic; nerves 10–18 pairs. Fruit minutely tomentulose, becoming glabrous, ovoid-ellipsoid, more rounded at the ends

(28) M. succedanea

84. Fruit not so large or immature or absent

100. Venation on undersurface of leaf faint and usually not raised

101. Pericarp densely tomentose

102. Leaves chartaceous; petioles 5 mm–1.5 cm long and 1.5–2.5 mm thick. Twigs 1–3 mm thick and smooth in the apical parts, becoming finely striate lower down. Fruit not oblique or uncinate at the apex

103. Lamina lanceolate or ovate-lanceolate with a rounded or acute base, the lower surface sometimes with a yellowish tinge; nerves 12–18 pairs. Twigs minutely tomentulose in the apical parts. Fruit ellipsoid or obovoid. Inserted again in case the yellowish scales on the undersurface of the leaf are not present or have been shed (40) M. buchneriana

103. Lamina elliptic or elliptic-lanceolate with an acute base, the lower surface pale brown, not yellowish; nerves 9 pairs. Twigs glabrous in the apical parts. Fruit oblong or oblong-ovoid

(12) M. mabarica

102. Leaves coriaceous; petioles 1.8–6 cm long and 3–5 mm thick. Twigs 5 mm thick and longitudinally striate in the apical parts, rough lower down. Fruit often oblique or uncinate at the apex

104. Petiole of apical leaves 1.8–3 cm long, average 2.4 cm long; nerves 12–20 pairs, raised or not beneath (raised in large coriaceous leaves); reticulations mostly present above, faint or absent beneath (present in larger leaves from lower down on the twigs, see section 43 (2) of this key). Fruit mostly solitary, 4.5 cm long and 2.5–3 cm broad, tomentum dark chocolate-brown (i.e. with a blackish tinge) less often a dark rusty brown, becoming less dense when old; stalk 5 mm long and 7 mm thick, sometimes absent. Repeated here to cover the smaller leaved specimens from the apical portions of twigs, i.e. those most frequently seen in herbaria

(71) M. castanecfolia in part
101. Pericarp glabrous or minutely tomentulose becoming glabrous

105. Secondary nerves present on lower surface of leaf

106. Leaves slightly to rigidly coriaceous, oblong or oblong-elliptic, 15–23 cm. long and 4–7(9) cm broad; nerves 16–23 pairs; reticulations sometimes visible beneath, brownish against a paler background. Twigs dark grey or blackish grey, 3–4 mm thick in the younger parts, stouter ones up to 6 mm thick sometimes present; lenticels usually present. Bracteole scar if at all visible, below perianth scar on fruiting pedicel. Fruit ellipsoid when young, later oblong, the pericarp dull and dark brown; stalk 4 mm thick

(54) M. cucullata

106. Leaves chartaceous, narrowly elliptic, 8–19 cm long, average 12 cm long and 2.5–6 cm broad, average 3.5 broad; nerves 9–15 pairs; reticulations absent. Twigs reddish or greyish brown, 1–2 mm thick in the younger parts; lenticels absent. Bracteole scar if visible in the usual position and not below the perianth scar. Fruit oblong-ovoid and like that of iners, the pericarp shining, reddish brown; stalk 2–2.5 mm thick

(13) M. umbellata

105. Secondary nerves absent on lower surface of leaf

107. Twigs pale straw-coloured with dark patches here and there. Leaves elliptic, drying pale yellowish on both surfaces, sometimes whitish beneath, fragile and breaking in herbaria. (Some specimens of var. similareum dried at Manila are blackish because of too much heat). Fruit single or often 2–4 together, arising as a result of dichotomy, the peduncle and pedicels thus rather slender and elongate; the larger fruits ellipsoid, heavy and therefore solitary because of their weight and size, the smaller fruit, e.g. var. similareum globose or sub-globose, 2–4 together and showing their dichotomous origin more clearly; pseudostalk usually present, apex of fruit often oblique

(16) M. elliptica and its vars

107. Twigs reddish brown, greyish in the older parts. Leaves lanceolate or narrowly oblong with nearly parallel sides or not infrequently elliptic, drying pale brown above with a greenish tinge, paler still beneath, chartaceous but not breaking readily in herbaria. Fruit not arising as a result of dichotomy, oblong or oblong-ovoid; pseudostalk absent, apex of fruit not oblique

(14) M. iners
100. Venation on undersurface of leaf prominent and raised

108. Leaves oblong, the sides more or less parallel or at least so at the middle part of the lamina

109. Terminal bud densely tomentose or hirsute with 1–2 mm long hairs. (The ends of the hairs may be seen separate from each other as in a brush.) Pericarp tomentose except in *maingayi*

110. Twigs rather slender, 3–4 mm thick in the apical parts, the bark smooth. Fruit sessile or nearly so and therefore belonging to section II, sub-globose, densely rusty-velvety-tomentose, 1.5 cm in diam. Leaves drying medium brown beneath without any yellow scales. Inserted here as it is apparently the only variety of *fatua* without scales

(36) *M. fatua* var. *morobensis*

110. Twigs stouter, 4–6 mm thick in the apical parts, the bark rough. Fruit stalk, of various shapes, tomentose or glabrous, larger, more than 1.5 cm in diam. Leaves drying various shades beneath

111. Terminal bud uncinate at the apex (always?). Leaves drying dark chocolate brown above and whitish beneath. Fruit sub-globose, dark chocolate-brown-tomentose

(3) *M. uncinata*

111. Terminal bud not uncinate. Leaves drying otherwise. Fruit oblong, tomentose or glabrous

112. Leaves rigidly coriaceous, drying blackish brown above, the colour not uniform over the whole surface, lanceolate, the sides parallel for most of their length; petiole 3–5 cm long and 3–5 mm thick. Fruit densely woolly-tomentose

(10) *M. lowiana*

112. Leaves coriaceous, drying pale greenish yellow or greenish brown above, narrowly oblong but also sometimes elliptic, the sides often parallel but not so distinctly so as in *lowiana*; petiole 2–2.5 cm long and 2–4 mm thick. Fruit with some rusty furfuraceous scurf soon glabrous. See key to series *Maingayae* for more details

(11) *M. ma'ingayi*

109. Terminal bud not densely tomentose but glabrous, puberulous or tomentulose. (Do not confuse the very short tomentulose hairs of *crassa* and *hypargyraea* with those of the tomentose species above.) Pericarp minutely tomentulose

113. Reticulations on lamina very distinct and sunk above. Leaves drying a dark brown above (probably not always), nerves arising at or nearly at right angles to the midrib and curving widely, secondary nerves present, usually one between two primary. Fruit dark brown-tomentulose, globose. Repeated here in case the yellow scales are not present on the leaves

(30) *M. sphaerosperma*
113. Reticulations on lamina not present above. Leaves usually drying a pale yellowish brown above, medium brown in *crassa*, nerves more oblique and not at right angles to the midrib, secondary nerves not usually present except in *kajewskii*. Fruit pale or medium brown-tomentulose, sub-globose or slightly oblong.

114. Undersurface of leaves usually whitish or a pale colour; lamina chartaceous or thinly coriaceous. Twigs greyish brown in the youngest parts, lenticels numerous.

115. Petioles 2–5 cm long; secondary nerves present; reticulations present beneath. Fruit large, 7–8.5 cm long and 5.5–7.5 cm broad; stalk very stout, 1 cm thick. (62) *M. kajewskii*

115. Petioles 2–3 cm long; secondary nerves absent; reticulations not usually present beneath. Fruit smaller except in var. *gillespieana*, 3.2–3.5 cm long and 2.5–2.7 cm broad (6 cm in diam. in var. *gillespieana*); stalk, see below, usually more slender.

116. Leaves often undulate along the margins, the lamina 3.5–7 cm broad, average 5.5 cm broad. Fruit oblong and rounded at the apex, ellipsoid with a mucro when young, not warted; stalk 7 mm–1.2 cm long and 7 mm thick, rather thick in proportion to its length and the length of the pericarp. Repeated here in case the two lines are not present on the twigs. (60) *M. undulatofolia*

116. Leaves not undulate along the margins, the lamina 5–15 cm broad, not always with parallel sides. Fruit oblong or sub-globose, sometimes warted; stalk usually more slender except in var. *gillespieana*, 2–2.5 cm long and 3–4 mm thick (8 mm–1 cm thick in var. *gillespieana*). (63) *M. hypargyraea* and its vars

114. Undersurface of leaves usually medium brown; lamina rigidly coriaceous. Twigs blackish brown in the youngest parts, lenticels absent. (66) *M. crassa*

108. Leaves not oblong, mostly elliptic or other shapes, the sides curving slightly and not parallel.

117. Combination of the following characters involved:—Leaves drying pale yellow and brittle. Twigs pale straw-coloured, Fruit globose or ellipsoid, glabrous; stalk 1–3.5 cm long. Inserted here once more as nerves may be slightly raised beneath.

118. Fruit sub-globose to globose, 1.5–2 cm in diam.; pseudo-stalk very small, 2–3 mm long or absent; stalk 1 cm long and 2–3 mm thick. Leaves 10–17 cm long and 3.5–6 cm broad, some of them would fall into small size-class. (15) *M. elliptica* var. *simiarum*

118. Fruit more elongate, ellipsoid or oblong-ellipsoid, not globose, larger; pseudo-stalk 5 mm–1 cm long; stalk usually over 1 cm long. Leaves the same size or larger.
119. Fruit 7–8 cm long and 3.5–4 cm broad; stalk 2–3.5 cm long and 2–3 mm thick
(16) Myristica var. elliptica

119. Fruit 3.5–4 cm long and 2.5–3 cm broad; stalk 1.3–1.5 cm long and 4–7 mm thick
(16) Myristica var. celebica

117. Combination of the above characters not involved

120. Fruit showing certain features as a result of dichotomy, a common peduncle divaricate into two, rarely four pedicels, the number of fruits 1–4, usually 2: bracteole scar sometimes visible below the perianth scar. All trees of series Tubiflorae

121. Reticulations usually present on the leaves. Peduncle and pedicels long and slender, 2 mm–1.5 cm long and 1–3.5 cm long respectively, 1–2 mm thick

122. Leaves drying dark brown with a reddish tinge, slightly whitish beneath, becoming brown, the apex shortly and sharply acuminate; nerves 12–16 pairs; reticulations present beneath; petiole 1–1.5 cm long and 3–4 mm thick, somewhat swollen. Twigs reddish brown. Fruit 2.5–3 cm long and 1.5 cm broad
(45) Myristica gracilipes

122. Leaves drying straw-coloured with blackish areas above, the same colour but slightly paler and without the black beneath, the apex obtuse or acute; nerves 16–18 pairs; reticulations present above; petiole 1.5–2.6 cm long and 2–3 mm thick, not swollen. Twigs pale straw-coloured with blackish areas, pale grey in the older parts. Fruit 3–4.5 cm long and 2–2.5 cm broad
(49) Myristica cornutiflora

121. Reticulations absent on the leaves or occasionally faintly visible beneath. Peduncle and pedicels short and thick, 3–5 mm long and 1 cm long respectively, 4 mm thick. Inserted again in case the lines on the twigs are not present
(53) Myristica flosculosa

120. Fruit not showing the above features as a result of dichotomy

123. Fruit rusty-tomentose

124. Twigs stout in the apical parts, 4–7 mm thick. Leaves mostly elliptic, nerves 12–20–(30) pairs. Fruit-stalk 5 mm long or absent; apex of fruit sometimes oblique or uncinate. Inserted again as the nerves may be raised beneath on the leaves
(71) Myristica castaneifolia

124. Twigs slender in the apical parts, 3 mm thick. Leaves lanceolate or ovate-lanceolate, nerves 12–18 pairs. Fruit-stalk 1 cm long; apex of fruit not oblique or uncinate. Inserted again as the nerves may be slightly raised beneath on the leaves
(40) Myristica buchneriana

123. Fruit glabrous or minutely tomentulose

125. Leaves whitish beneath with reddish brown midrib and veins
126. Lamina broadly ovate with the reticulations sunk above. Fruit unknown  
(29) M. brassii

126. Lamina mostly elliptic or narrowly elliptic without such reticulations above

127. Twigs 2–3 mm thick in the apical parts. Leaves 10–25 cm long and 4–11 cm broad; nerves 9–18 pairs

128. Twigs rough with pustular lenticels, 2 mm thick and glabrous in the apical parts, 3 mm thick lower down. Leaves chartaceous, silvery white beneath and probably always so; nerves 9–13 pairs  
(27) M. argentea

128. Twigs not rough with pustular lenticels, 3 mm thick and minutely tomentulose in the apical parts, 5 mm thick lower down. Leaves mostly coriaceous, brownish white or dirty white beneath, the whiteness less uniform over the surface; nerves 10–18 pairs  
(28) M. succedanea

127. Twigs 3–6 mm thick in the apical parts. Leaves 14–30–(40) cm long and 5–15 cm broad; nerves 12–30 pairs. Most of the elliptic leaves will be medium size-class and will fall into this section of the key. The oblong ones will often be over 30 cm

129. Nerves rather straight and oblique. Fruit not warted  
(64) M. andamanica

129. Nerves usually curving more. Fruit sometimes warty. Repeated here to include specimens with elliptic leaves. Such leaves are less common and smaller than the oblong ones  
(63) M. hypargyraea and its vars.

125. Leaves not or scarcely whitish beneath (whitish in dactyloides) mostly medium or pale brown. They are often glaucous especially when fresh

130. Reticulations deeply impressed above; nerves arising at almost right angles to the midrib and curving widely; secondary nerves present. This species is repeated here as the leaves may be elliptic as well as oblong  
(30) M. sphaerosperma

130. Reticulations absent or not deeply impressed above; nerves more oblique or only curving slightly; secondary nerves absent or not numerous
131. Leaves mostly elliptic or in the elliptic series. Twigs 2–3 mm thick in the apical parts.

132. Twigs pale yellowish or yellowish brown in the younger parts. Leaves pale on both surfaces, often with a greenish tinge; nerves curving widely; secondary nerves usually present; reticulations very fine but present beneath. Fruit with a fragile, thin pericarp, pale brown, 2.5–3.5 cm long and 1.5–1.8 cm broad; stalk 5 mm long or fruit nearly sessile (55) M. insipida

132. Twigs reddish brown in the younger parts. Leaves pale or not when dry; nerves more often straight and oblique, the angle of origin much less, about 45°; secondary nerves and reticulations mostly absent beneath. Fruit with a thicker pericarp, 3 mm or more thick, medium or dark brown, larger 4.5–8.5–(10) cm long and 2.2–4.5 cm broad; stalk usually over 5 mm long

133. Bark of trunk blackish. Leaves drying a pale greenish or greyish brown above and slightly paler still beneath, less often a medium brown above. Lenticels usually absent on the twigs. Fruiting peduncle 1.5–3.5 cm long (14) M. iners

133. Bark of trunk brownish. Leaves drying a dark or medium brown above and below. Lenticels usually numerous on the twigs. Fruiting peduncle 5 mm–1 cm long (67) M. ceylanica and its var.

131. Leaves oblanceolate or obovate, narrowed to the base. Twigs 3–4 mm thick in the apical parts

134. Leaves chartaceous, very gradually and much narrowed from above the middle to a 1.5–3 cm broad base; reticulations not present beneath. Fruit globose or subglobose (65) M. teijmannii

134. Leaves coriaceous, narrowed slightly from the middle or below the middle to a 3–6 cm broad base; reticulations and some whitish scales present beneath (always?) Fruit oblong (68) M. dactyloides
KEY TO THE BORNEAN SPECIES OF MYRISTICA

1. Undersurface of leaf invested with rusty-brown, cinnamon coloured or pale yellowish hairs or scales or both, the scales lax, powdery, minute, not closely adpressed to the surface but easily scraped off. Male inflorescence axis a branched panicle or a scar-covered woody tubercle

2. Hairs and scales both present on the undersurface of the leaf. Bark reddish brown, rough and flaking but not longitudinally striate. Twigs rather stout, 5 mm.—1 cm. thick in the apical parts. Fruit oblong, tomentose or villose

3. Male inflorescence a much-branched panicle, 2–8 cm. long with a slender main axis and numerous tomentose flowers, sub-globose in bud; male perianth 4–7 mm. long, split down 1/3-way at the apex into the lobes; male pedicels 5 mm. long, female 4 mm. long. Twigs 5 mm. thick and densely rusty-tomentose in the apical parts, lower down reddish brown, striate and glabrous. Fruit oblong, rounded at the apex, rusty-tomentose; stalk 1.5–1.8 cm. long. All indumentum on leaves, innovations, inflorescence axis, flowers and fruit very short, generally a dark or rusty brown colour, that on the leaves sometimes lighter or more yellowish. Nerves of leaves 15–20 pairs. A tree of rocky, sandy sea coasts, rocky islets or never very far from the sea. Stilt-roots not reported. Throughout Borneo except in South Borneo. Many records from British North Borneo

(22) M. guatterifolia

3. Male inflorescence a short, unbranched, woody, scar-covered tubercle as in *Knema*, 1–2 cm. long with few flowers, these mostly campanulate; male perianth 7 mm.—1 cm. long, split down 1/2-way into the lobes, the villose flowers often almost hidden among the hairs of the inflorescence; male pedicels 4 mm. long or less, female flowers sessile. Twigs stouter, up to 1 cm. thick in the villose apical parts, lower down glabrous, blackish, very rough with the bark tending to crack. Fruit pear-shaped, often slightly oblique or even uncinate at the apex, pale brown or buff velvety-tomentose or villose; sessile or on a very short, 5 mm. long and 5 mm. thick stalk. All indumentum on leaves, innovations, inflorescence axis, flowers and fruit densely villose with hairs 1–3 mm. long, paler, mostly buff, that on the leaves sometimes silvery brown. Nerves of leaves 20–25–(32) pairs. Lowland forest often in the damper places. Stilt-roots mostly present. Throughout Borneo

(37) M. villosa

2. Hairs absent, scales only present on the undersurface of the leaf, mostly cinnamon-brown. Bark blackish brown, finely longitudinally striate. Twigs more slender, 2–3 mm. thick, less often 4–5 mm. thick in the apical parts. Fruit ellipsoid or oblong-ellipsoid, tomentulose, the indumentum tending to rub off

4. Fruit large, 6–9 cm. long and 4.5 cm. broad, ellipsoid, narrowed and sometimes oblique towards the apex, the pericarp thick, hard and woody, 5 mm.—1.5 cm. thick; stalk 6 mm.—1.2 cm. long. Male inflorescence axis a branched panicle, 5 cm.—1 cm. long with numerous flowers. Male perianth 6 mm. long, minutely tomentulose, narrowly oblong and 3-angled at the apex in bud; pedicels 5–6 mm. long. Twigs slender, 2–3 mm. thick in the apical parts, not flaking in the older parts. Leaves elliptic or narrowly elliptic, acute at the base, nerves faint beneath; petiole 1.2–2.2 cm. long. Stilt-roots not reported, Borneo except East and North-East Borneo

(21) M. cinnamomea

4. Fruit much smaller, 2.5–3 cm. long and 1.5–2 cm. broad, oblong-ellipsoid, rounded or very slightly narrowed at the apex, the pericarp thin, 1–2 mm. thick only; stalk 3–7 mm. long or absent. Male inflorescence a scar-covered woody tubercle, 3–5 mm.—(1 cm.) long with few flowers. Male perianth short, 2–3 mm. long (immature?), densely rusty-brown-tomentose, ovoid and not 3-angled at the apex in bud; pedicels 2 mm. long. Twigs as slender or stouter, the bark tending to crack in the older parts. Leaves elliptic or not, rounded at the base, nerves faint or not faint beneath; petiole shorter, 6 mm.—1.3 cm. long. Stilt roots present
5. Twigs 4–5 mm. thick, rusty-tomentose and striate on the innovations. Leaves coriaceous, lanceolate or oblong-lanceolate, base rounded and often emarginate or sub-cordate; nerves 11–18 pairs, sunk but visible above, fairly prominent beneath; length 9–22 cm.; breadth 5–9 cm.; petiole 6 mm.—1 cm. long. Stalk of fruit 3–5 mm. long and 5 mm. thick. Tree 15–25 m. high. Borneo except West Borneo and Brunei (39) M. beccarii

5. Twigs 2–3 mm. thick and rusty-tomentulose on the innovations. Leaves less coriaceous, narrowly elliptic or elliptic, base rounded but not emarginate or sub-cordate; nerves 12–14 pairs, very fine and faint on both surfaces, sometimes scarcely visible; length 8–16 cm.; breadth 2.5–6 cm.; petiole 8 mm.—1.3 cm. long. Stalk of fruit 5–7 mm. long and 3 mm. thick. Tree 9–18 m. high. Confined to Sarawak and Brunei (38) M. smythisii

1. Undersurface of leaf glabrous, not invested with hairs or lax, powdery, brownish or yellowish scales, but usually drying various shades of brown, slightly paler than the upper surface or quite often glaucous or greyish white but if the last colour is due to scales, then the scales very minute, not lax or powdery, but very closely adpressed to the lower surface and not easily rubbed off. Male inflorescence a lax panicle, (in elliptica often dichotomous) 2–18 cm. long with mostly opposite branches and numerous flowers, the main axis terete or often flattened, slender, not producing flowers from season to season. (The female axis is shorter but similar with fewer branches. When not too short as in certain species such as maxima it may also help in identification, but when very short and unbranched it can scarcely be distinguished from that of a section II axis)

6. Leaves large, their dimensions the longest and broadest that may be found in the Bornean species, 25–50 cm. long and 10–18 cm. broad, the base rounded; nerves 20–30 pairs, oblique, parallel, very distinct and impressed above, raised beneath. Twigs stout, 5–8 mm. thick or more in the apical parts. Bark greyish to light reddish brown, rough, flaking or not, without deep longitudinal fissures. Inflorescence axis the largest in the genus in maxima (smaller in papyracea), glabrous or tomentulose. Male perianth globose or sub-globose especially in bud. Fruit 7–9 cm. long, oblong, mostly glabrous

7. Leaves almost bullate when fresh, usually drying a blackish brown above, and glaucous or cinereous beneath (less often brownish), oblong, rounded at the base (except in apical leaves), reticulations often visible beneath when dry; nerves 20–30 pairs. Male inflorescence 10–18 cm. long, laxly branched, the lowermost branches long and slender. Male perianth thin, 4–6 mm. long, greyish, sub-tomentulose outside, becoming glabrous; pedicels slender, 1–1.5 cm. long and 0.8 mm. thick; bracteoles 2 mm. long, half as long as the young flower. Fruit dark brown, tomentulose, much wrinkled on drying, becoming less in tomentum later. Stilt-roots not reported. Bark not generally flaking. Borneo but rare in British North Borneo (1) M. maxima

7. Leaves not bullate when fresh, drying greenish yellow or greenish brown above and yellow or yellowish brown beneath, broadly oblong or oblong-obovate, rounded or sub-cordate at the base; reticulations not usually visible beneath when dry; nerves 20–25 pairs. Male inflorescence shorter, 2–5 cm. long, more condensed, with shorter, fewer, more flattened and more rigid branches. Male perianth rigidly coriaceous and much thicker, 6–7 mm. long, dark brown-tomentulose; pedicels stouter, 4–8 mm., average 5 mm. long and 1.5 mm. thick, their apices thickened up to 2.5 mm.; bracteoles nearly as long as the young flower or flower-bud. Fruit glabrous and shining except when very young, blackish and rather smooth when dry. Stilt-roots reported, probably not always present. Bark flaking in thin papery portions. Borneo except South and West Borneo (2) M. papyracea
6. Leaves never so large, small to medium size-class, 5–30 cm., average 17.5 cm. long and 1.8–12 cm., average 6.5 cm. broad; the base mostly acute, sometimes rounded; nerves 9–22 pairs, average 15 pairs, oblique or more often curving, slightly, distinct but less prominent. Twigs more slender at the apex, 2–3 mm. thick, not often reaching 5 mm. Bark brownish but more often blackish, fissured or not. Inflorescence axis smaller, glabrous or densely reddish-tomentose. Male perianth globose or not, glabrous or tomentose. Fruit generally smaller though sometimes reaching 8 cm. long, more diverse in shape, being sometimes globose or ellipsoid, generally glabrous though sometimes densely tomentose.

8. Flowers not 3-angled at the apex in bud, glabrous or tomentose. Male flowers oblong to ovoid or sub-globose, never tubular and not obliquely inserted on the pedicel; bracteole about as long as the young flower or flower-bud, not persisting. Twigs with indumentum or not, stout or slender at the apex, brownish, reddish brown or blackish. Leaves chartaceous or coriaceous, not pale straw-coloured above, not glaucous nor conspicuously whitish beneath when dry (sometimes glaucous or sub-glaucous in malaccensis and gigantea respectively), often oblong, sometimes lanceolate or oblong-lanceolate (very variable in iners), the sides often nearly parallel; nerves oblique, sometimes curving slightly, secondary nerves often present, shorter than the primary ones; reticulations sometimes present on the lower surface. Fruit various shapes, not ellipsoid, not oblique at the apex and not gibbous at the base, tomentose or if glabrous then with some rusty scurf when very young, orange or not when ripe. Stilt-roots not always present. Bark blackish, fissured or not.

9. Inflorescence axis densely rusty or reddish tomentose, also the innovations, the terminal bud, the flowers, pedicels and fruits; pedicels 1–2 mm. thick. Male perianth oblong or oblong-ellipsoid especially in bud, thick and coriaceous; bracteole 2–5 mm. long, not ciliate at the edges. Fruit never glabrous. Bark blackish, deeply longitudinally furrowed.

10. Fruit densely rusty or reddish woolly with 1 mm. long hairs, oblong, 6–8 cm. long and 4 cm. broad. Leaves lanceolate, rigidly coriaceous, drying blackish brown and extremely glossy above, deep rusty brown beneath, the sides often nearly parallel, the apex acute; length 19–30 cm; breadth 5–9 cm.; petiole 3–4.5 cm. long and 3–5 mm. thick; nerves 17–20 pairs. Twigs stout, 5–6 mm. thick in the apical parts, terminal bud also stout, 3–5 mm. thick. Male perianth 5–6 mm. long, rusty-woolly-tomentose, pedicels 4–5 mm. long and 1–1.5 mm. thick. Stilt-roots present. Tree of peat or peat-swamp forest, 10–25 m. high. Common in Sarawak and Brunei, rarer in the other divisions and absent in East and North-East Borneo (10) M. lowiana.

10. Fruit minutely rusty-tomentose with much shorter hairs, ovoid, smaller, 5.5 cm. long and 4 cm. broad. Leaves spathulate, occasionally lanceolate, narrower, coriaceous, drying an olive green or greenish brown above, sub-glaucous or pale brown beneath, the sides less often parallel, but often with slightly revolute margins, the apex obtuse, rarely acute; length 7–10 cm; breadth 2–3.5 cm.; petiole shorter and more slender, 1.8 cm. long and 1–2 mm. thick; nerves 12–18 pairs. Twigs slender, 2–3 mm. thick in the apical parts, terminal bud 2 mm. thick. Male perianth 3–5 mm. long, darker with much shorter hairs, not woolly; pedicels 1–2 cm. long, more slender. Stilt-roots not reported. Tree of dry lowland forest, taller, 30–40 m. high. Absent in Brunei, British North Borneo and South-East Borneo (9) M. gigantea.
9. Inflorescence axis glabrous or puberulous, rarely pubescent except when very young and if so the indumentum greyish or yellowish, never reddish or dark brown; other parts where hairs usually occur i.e. the innovations, terminal bud, flowers, pedicels and fruits glabrous or nearly so, if a slight pubescence present the indumentum pale, greyish or yellowish; pedicels less than 1 mm. thick, often filiform. Male perianth ovoid, globose or sub-globose, chartaceous or very thin; bracteole 1–2 mm. long, ciliate at the edges. Fruit glabrous, some yellowish brown scurf present when very young, soon lost. Bark blackish, longitudinally furrowed on not

11. Bark greyish black, flaking and deeply longitudinally fissured. Twigs slender, 1–3 mm. thick and reddish or blackish brown in the apical parts, greyish and striate in the older. Leaves chartaceous, less often coriaceous, usually drying a pale brown on both surfaces, variable in shape, mostly lanceolate (less often oblanceolate to oblong or obovate) the margins not revolute, the base acute, rarely rounded; nerves 12–15 pairs, slender, oblique, arising from the midrib at 45° or less, distinct or at times very faint beneath; reticulations faint or indistinct; length 12–20 cm.; breadth 3–6 cm. (broad forms 7.5–10 cm. broad). Male inflorescence 2–8 cm. long, depending on age. Male flowers ovoid in bud, 7–8 mm. long and 5–6 mm. broad, not 3–ridged at the apex. Fruit oblong to oblong-ovoid, 5–8.5 cm. long and 4–4.5 cm. broad, the pericarp 5 mm.—1.3 cm. thick, hard. Stilt-roots sometimes reported, certainly not always. Throughout Borneo, the commonest and the most variable species (14) M. iners

11. Bark blackish or dark brown, flaking but not longitudinally fissured. Twigs 3–5 mm. thick and rather pale and smooth in the apical parts, darker and striate in the older. Leaves coriaceous, usually drying greenish above and glaucous beneath (not always), oblong with nearly parallel sides, the margins strongly revolute, the base rounded; nerves 15–20 pairs, stouter, less oblique, arising from the midrib at a wider angle; reticulations often forming a lax network beneath; length 15–25–(33) cm., breadth 4–11 cm., average 7 cm. Male inflorescence 7–10 cm. long. Male flowers sub-globose in bud, smaller, 5 mm. long and 3 mm. broad, 3-ridged at the apex (always? This requires more investigation). Fruit oblong, 5–7 cm. long and 3 cm. broad, the pericarp thinner and more brittle when dry. Stilt-roots not reported. Throughout Borneo, common in Sarawak and Brunei (15) M. malaccensis

8. Flowers slightly 3-angled at the apex in bud, mostly glabrous, sometimes adpressed-pilose, the hairs pale if present. Male flowers nearly tubular, narrow in proportion to their length, about 2 mm. broad, obliquely inserted on the pedicel; bracteole minute, 1–1.5 mm. long and several times shorter than the whole perianth, persisting. Twigs entirely glabrous, 3 mm. thick in the apical parts, pale straw-coloured in parts and especially when fresh. Leaves chartaceous, fragile, often breaking in herbaria, drying a pale brown above, paler and sometimes glaucous or whitish beneath, oblong or elliptic-oblong, the sides not parallel; nerves rather crooked and curving, secondary nerves absent; reticulations absent. Fruit ellipsoid, often oblique at the apex and gibbous at the base, entirely glabrous, orange when ripe. For stilt-roots see below. Bark reddish brown, slightly rough but not fissured (16) M. elliptica and its vars
12. Fruit large, 7–8 cm. long and 3.5–4 cm. broad; stalk 2–3.5 cm. long and 2–3 mm. thick. Male flowers 8–9 mm. long, glabrous to slightly adpressed-puberulous outside; pedicels 5 mm. long, also glabrous. Flowers very few, 1–3 on a 2–2.5 cm. long, only slightly branched inflorescence, its branches not regularly opposite. Leaves less reliable as a diagnostic character in both varieties, being variable but usually 12–18 cm. long and 4–8 cm. broad with 12–17 pairs of nerves (28 cm. long and 12 cm. broad in saplings), may be glaucous beneath when fresh but not whitish. Tree of the fresh water swamp or peat forest 8–33 m. high with stilt-roots. Widely distributed in Borneo but no records from Brunei or British North Borneo

var. elliptica

12. Fruit smaller, tending to be more oblong, 3.5–4 cm. long and 2.5–3 cm. broad, less oblique at the apex; stalk 1.3–1.5 cm. long and 4–7 mm. thick. Male flowers smaller, 4–6 mm. long, pale brown-tomentose to densely pilose outside; pedicels 2–3 mm. long, densely tomentose. Flowers more numerous on a 2.5–4 cm. long, more branched inflorescence, its branches more regularly opposite, sometimes dichotomous. Leaves about the same size or slightly smaller with 8–11 pairs of nerves, sometimes whitish beneath. Trees of limestone, coral-limestone or sandy substrata, 20–26 m. high without stilt-roots. Confined to East and North East Borneo in a jutting peninsula of E. Kutei (including Sangkulirang and Berouw) nearest to Celebes

var. celebica

KEY TO THE NEW GUINEA SPECIES OF MYRISTICA

1. Leaves with a lax, powdery, yellowish, cinnamon-coloured or less often whitish indumentum of scales beneath. (This does not include whitish or greyish colourations of minute scales or incurulations which do not rub off easily and which may be present or absent even in the same species, e.g. M. globosa, subalulata, etc.)

2. Hairs as well as scales present on the lower surface of the leaves

3. Inflorescence axis (best seen in the male) a densely tomentose or lanose panicle 3–6 cm. long, the branches at wide angles to the main axis and loosely articulated; male flowers sub-globose or obovoid, large, 7 mm. — 1 cm. long and 5–7 mm. broad; pedicels 7 mm. — 1 cm. long; staminal column without a sterile apiculus. Leaves with an acute base, the lamina elliptic, medium size-class, 16–23 cm. long and 6–10 cm. broad; nerves 12–15 pairs, oblique; scales on undersurface often silvery as well as yellowish

(24) M. markgraviana

3. Inflorescence axis a Knema-like woody tubercle, mostly tomentose, especially the non-woody parts, less often tomentulose, short and about 1 cm. long or less, simple, occasionally very shortly bifurcate or trifurcate; flowers mostly ellipsoid but not sub-globose, as long or longer but only 2.8–5 mm. broad; pedicels various; staminal column usually with a sterile apiculus. Leaves rarely with an acute base except sometimes in buchneriana, the base mostly rounded and sometimes emarginate or sub-cordate, the lamina various shapes, mostly medium size-class, but occasionally small or large size-class; nerves more numerous, 18–25 pairs and sometimes up to 32 pairs, but about the same number, 12–18 pairs in buchneriana, oblique or more often curving; scales on undersurface usually only one colour except in sphaerosperma where some are whitish as well as yellowish

4. Reticulations on leaves absent or not distinct; nerves straight or curving slightly, usually arising at an angle of about 45°, but also sometimes at a greater angle; secondary nerves absent or only a few present here and there, not conspicuous. Male flowers 3 mm. — 1 cm. long, various shapes, sometimes ellipsoid. Tomentum wherever it occurs, i.e. on twigs, leaves, inflorescence, flowers, fruit, etc. short, 1 mm. long
5. Hairs on the undersurface of the leaves (like those of *markgraviana*) dendroid, very short, 0.5–1 mm. long but usually quite abundant; nerves on the undersurface distinct and raised, usually a darker yellow than their surrounding background tissue, not reddish brown. Tomentum of flowers yellowish. Fruit-stalk 3–4 mm. thick

6. Leaves large, oblong with nearly parallel sides and a rounded, emarginate or sub-cordate base; length 2–4–(50) cm., average 32 cm.: breadth 9–19 cm., average 11 cm.; nerves 25–32 pairs; petiole 2–4 cm. long. Twigs 4–5 mm. thick in the apical parts and often with some young folded leaves above or below the apical developing leaves. Flowers (female) about 5 mm. long with 3 mm. long pedicels (probably slightly immature). Fruit oblong, 5.5–6 cm. long and 3 cm. broad, rusty furfuraceous-tomentulose, the tomentum dense when young, tending to rub off with age

(36) *M. fatua* var. *morindifolia*

6. Leaves much smaller, oblong or obovate, the sides not parallel or parallel just for a short distance at their middle, the base mostly cuneate, less often slightly rounded, the indument on the lower surface a darker or a more blackish yellow than in the preceding species; length 15–18 cm.; breadth 7 cm.; nerves about 18 pairs; petiole 1.2 cm. long. Twigs 2–3 mm. thick in the apical portions. Flowers unknown. Fruit unique, disc-shaped and flattened with a central macro, resembling an acorn, broader than long, 1.3–1.5 cm. long and 1.8–2 cm. broad, dark yellowish brown, floccose-tomentulose

(36) *M. fatua* var. *quercicarpa*

5. Hairs on the undersurface of the leaves simple and not dendroid, about 1 mm. long but not abundant and most often not present, the scales very sparse also and soon disappearing; nerves on the undersurface less distinct and often not raised, usually reddish brown against a paler or glaucous background. Tomentum of flowers usually also with a reddish or rusty shade. Fruit-stalk 6 mm. thick. (The reddish tinge of the nerves against a pale background is a useful character in distinguishing sterile specimens of this species from the rather similar ones of *fatua* var. *papuana* and var. *subcordata*

(40) *M. buchneriana*

4. Reticulations on leaves very distinct, deeply impressed above and raised beneath, often giving the leaf a sub-bullate appearance; nerves curving widely, usually arising at an angle of 60° or more to the midrib, sometimes even at right angles, always prominent; secondary nerves present, numerous and conspicuous. Male flowers tending to be longer, usually over 1 cm. long except in *chrysophyla*, the range 7 mm.–1.7 cm. long, very clearly ellipsoid in bud and acute at both ends. Tomentum wherever it occurs on twigs, leaves, inflorescence, flowers and fruit, etc. much denser, the hairs 1.3 mm. long (series *Fuscae*)

7. Hairs, wherever they occur, dark or rusty brown. Flowers, both male and female, large, 1–1.7 cm. long and 3–5 cm. broad, stalked, the pedicels 5 mm.—1 cm. long. Hairs on fruit very short, 0.5 mm. long, longer, up to 2 mm. long in *fusca*

8. Leaves sub-cordate, emarginate or rounded at the base, densely tomentose on the lower surface. Twigs in the apical parts and at least for a considerable distance down (up to 20 cm.) also tomentose, the hairs 1 mm. or more long. Male flowers 1.5–1.7 cm. long and 5 mm. broad, the female 1 cm. long and 7 mm. broad, both sexes inflated and densely tomentose with 1–2 mm. long hairs; male pedicels 5 mm.—1 cm. long, female pedicels 3 mm. long, both 2 mm. thick. Fruit 7 cm. long and 3.3–4 cm. broad, immature, ellipsoid (but shape will undoubtedly alter) densely rusty-tomentose

(32) *M. fusca*
8. Leaves rounded at the base but not sub-cordate or emarginate, tomentose on the lower surface becoming glabrous. Twigs glabrous to tomentose in the apical parts, the tomentum not extending so far down. Male flowers 1 cm. long and 3–4 mm. broad, the female 1 cm. long and 6 mm. broad at the base (not seen in *womersleyi*) not inflated and less densely tomentose with shorter and darker hairs than in *fusca*; male pedicels 8 mm.—1 cm. long, the female 5 mm.—1 cm. long, more slender than those of *fusca*, 1 mm. thick. Fruit 6–9 cm. in diam., globose or sub-globose, the tomentum darker in colour and much less dense, minutely tomentulose.

9. Hairs on lower surface of leaf less than 1 mm. long, sparse, confined to the nerves and midrib, disappearing when old; scales yellowish or silvery, also tending to disappear; petioles 1.7–2.5 cm. long; scalariform reticulations fine on the upper surface. Fruit not reported to be aromatic; stalk 1.3 cm. long

(30) *M. sphaerosperma*

9. Hairs on lower surface of leaf 1–2 mm. long, more densely and uniformly spread over the whole surface, also some present in old leaves; scales dark brown, becoming greyish brown later; petioles 1–1.3 cm. long; scalariform reticulations much more prominent and more deeply impressed above. Fruit very aromatic; stalk 5 mm. long

(31) *M. womersleyi*

7. Hairs, wherever they occur, yellowish or golden brown, darkening slightly with age. Flowers, both male and female, smaller, 7–8 mm. long and 2.8 mm. broad, sessile and hidden among the hairs of the inflorescence. Hairs on fruit longer, 3–5 mm. long.

10. Undersurface of leaves densely covered with light or dark yellow, 1–3 mm. long hairs, yellow scales present also, abundant; reticulations numerous and deeply impressed on the upper surface of the lamina; base rounded to sub-cordate; nerves 18–25 pairs; length 16–30 cm., average 20 cm.; breadth 5–13 cm., average 8 cm. Fruit globose to sub-globose, 2–2.3 cm. in diam.

(33) *M. chrysophylla* var. *chrysophylla*

10. Undersurface of leaves without hairs, yellow scales very few or absent (can only be seen with low-power microscope); reticulations faint or absent on the upper surface; base rounded or emarginate, scarcely sub-cordate; nerves 18 pairs; length 17–22 cm., average 18 cm; breadth 5.5–9 cm., average 7 cm. Fruit oblong-ovoid, 2.5–3.3 cm. long and 2 cm. broad

(33) *M. chrysophylla* var. *entirecaustexensis*
13. Pericarp not warted, but often rugose on drying, the fruit oblong and obtuse at the apex. Leaves more variable in size, small ones the same size, but more often larger, 15-23 cm. long and 4-7-(9) cm. broad, oblong or elliptic-oblong; nerves not raised beneath, flush with the lower surface; secondary nerves numerous. Twigs blackish. Bracteole 5-9 mm. long (probably not always so long); stalk of staminal column glabrous (54) M. cucullata

12. Male flowers ellipsoid, 1-1.5 cm. long and 3-5 mm. broad, arising from woody tubercles but not dichotomous later. Bracteole or its scar at the base of the perianth but not some distance below. Fruiting axis not bifurcate as a result of dichotomy and usually only one fruit developing. Reticulations more distinct and often raised beneath, nerves very prominent, sunk above and raised beneath; lamina usually drying a dark brown above, larger, 16-32 cm. long

14. Leaves ovate-oblong, the base broad, about 9 cm. broad and rounded, sometimes emarginate, lower surface silvery but the scales rather firmly adpressed and not very lax (always?): nerves 14-17 pairs. Flowers tomentulose; pedicels 2-2.5 mm. thick. Fruit unknown (29) M. brassii

14. Leaves oblong or elliptic-oblong, the base 6 cm. broad or less and rounded, the lamina broadest at the middle and not at the base, lower surface with both silvery and yellow scales; nerves 20-25 pairs. Flowers tomentose; pedicels 1 mm. thick. Fruit large, globose, 6 cm. or more in diam.; stalk 1.5 cm. long and 5-7 mm. thick. Repeated here in case the hairs on the lower surface of the leaf are absent (30) M. sphaerosperma

11. Reticulations much less numerous, mostly absent especially above (present beneath in lepidota); nerves usually straight and not curving, the angle of origin wide or not. Yellowish scales sparse or not but usually present except in buchneriana. Trees of lowland forest, sometimes at sea-level

15. Leaves small size-class, 9-14 cm. long and 3-4.5 cm. broad with 10-12 pairs of oblique nerves; petiole slender 1-2 mm. thick. Twigs very small, 3-5 mm. long and 2-2.5 mm. broad; pedicels 2-3 mm. long. Fruit also small, 2.5-3 cm. long and 1-1.5 cm. broad, obvoid and obtuse at the apex, very thinly cinnamon-brown-tomentulose with a very hard pericarp; stalk very thick giving the fruit an almost sessile appearance, 4-5 mm. long and 4-5 mm. thick. Leaves very similar to those of fragrans except that they are dull when dry and the undersurface is yellow (35) M. lepidota

15. Leaves and all other parts mentioned above such as petioles, twigs, flowers, pedicels, fruit, etc. larger

16. Nerves prominent on the lower surface of the leaf; secondary nerves not present. Indumentum of scales thin but usually covering the entire undersurface of the leaf

17. Leaves medium brown and often glossy above when dry, rounded and sub-cordate at the base, ovate-oblong to broadly lanceolate, 15-20 cm. long and 7-9 cm. broad; petiole 7 mm.—1 cm. long; nerves more or less parallel to each other, those in the lower third leaving the midrib at an angle of 80-90°, those higher up more oblique, the angle not so great, mostly about 45°; midrib and sometimes the nerves above clearly standing out from the groove in which they are sunk. Fruit oblong with a flat horizontal base, narrowed slightly towards the rounded or (when young) rather oblique apex, densely rusty-tomentose or when young almost velvety, sessile or nearly sessile (36) M. fatua var. subcordata
17. Leaves mostly dark brown and dull above, but sometimes glossy, acute or less often rounded at the base, not sub-cordate, lanceolate, oblancoolate or elliptic-lanceolate, more variable in shape and size, 13–25–(30) cm. long and 4–7 cm. broad; petiole 1–2 cm. long; nerves mostly parallel but not always strictly so, oblique throughout, i.e. arising at an angle of about 45°; midrib and nerves only slightly impressed above and not standing out clearly from a groove. Fruit oblong or slightly obovoid, rounded at both ends, not slightly narrowed to the base, rusty-tomentulose, the much shorter tomentum tending to rub off, stalk 5–7 mm. long and 3–5 mm. broad

(36) M. fatua var pupana

16. Nerves fine, slender and often faint on the lower surface, oblique; secondary nerves present, fine like the primary but shorter. Indument of scales very thin, becoming paler or whitish in old leaves, sometimes absent in buchneriana

18. Petiole 1–1.5 cm. long. Fruit densely rusty-tomentose. Undersurface of lamina glaucous when scales are not present; the upper surface pale and dull when dry; nerves on the upper surface rather deeply impressed, those on the undersurface reddish when dry. Pedicels of female flowers 3 mm. long. Twigs minutely tomentulose in the apical parts. Inserted again in case the hairs are not present on the undersurface of the leaves. (Rather intermediate between series Fatuae and series Tenuiveniae. Do not confuse with M. fatua var. subcordata) (40) M. buchneriana

18. Petiole 2–4 cm. long. Fruit minutely tomentulose. Undersurface of lamina yellowish or rusty, greyish in old leaves, the upper surface more often dark and glossy when dry, sometimes pale and dull; nerves on the upper surface not or less deeply impressed, those on the undersurface not reddish when dry. Pedicels of female flowers 1 mm. long or flowers sessile, seen only in tenuivenia. Twigs mostly glabrous in the apical parts

19. Fruit with a very slender, 2 mm. thick stalk, oblong to sub-globose, small, 2 cm. long and 1.5 cm. broad, the pericarp very thin, 1 mm. or less thick; stalk 1.5–1.8 cm. long. Leaves usually drying a medium brown above, narrowly oblong with parallel sides, 13–20 cm. long and 4–6 cm. broad; nerves faint, 20–25 pairs. Stilt-roots reported. (Rather like M. globosa but twigs thicker, petioles and fruiting pedicels longer, the undersurface of the leaves rusty) (41) M. pedicellata

19. Fruit with a stout, 5 mm. thick stalk, various shapes, larger, the pericarp much thicker and harder; stalk longer or shorter than the above. Leaves usually drying a blackish colour above, as long or shorter but not so narrow in proportion to the length, widest at the middle, often broadly panduriform; nerves fewer, slightly more prominent. 16–20 pairs. Stilt-roots not reported

20. Fruit rusty to light brown sub-tomentulose, becoming nearly glabrous, oblong, obovoidal or sub-globose, 3.5–4 cm. long and 2.6–4 cm. broad; stalk 5–8 mm. long. Male flowers not seen. Female sessile, densely rusty-tomentose, 4–5 mm. long and 3 mm. broad. Leaves rounded at the base; length 10–20 cm., average 15 cm.; breadth 4–7 cm., average 5 cm.

(42) M. tenuivenia
20. Fruit rusty and densely tomentulose, obovoid, narrowed towards the base, much larger, 7 cm. long and 4 cm. broad, pericarp much thicker, 8 mm.-1.2 cm. thick but will probably become thinner at maturity; stalk 2.5 cm. long. Flowers not seen. Leaves rounded and slightly emarginate at the base; length 13-15 cm.; breadth 6.5-7 cm.

(43) M. archboldiana

1. Leaves without a lax, powdery, yellowish, cinnamon-coloured or less often whitish indumentum of scales beneath. (This does not include whitish or greyish colourations of minute scales or incurcations which do not rub off easily and which may be present or absent even in the same species, e.g. M. fragrans, tubiflora, umbrosa, etc.)

21. Hairs sometimes present beneath on young leaves

22. Leaves drying dark or medium brown above and greyish white beneath; hairs simple, dark brown, 1-2 mm. long on the lower midrib. Terminal bud uncinate (always?). Female flowers 2 cm. long (the largest in the genus) with dark brown tomentum, split down ½-way into the perianth lobes; pedicel 1 cm. long. Fruit sub-globose, dark chocolate- or coffee-brown-tomentose, 4-6 cm. in diam.; stalk 2.5 cm. long

(5) M. uncinata

22. Leaves drying a medium or yellowish brown above and slightly paler brown but not whitish beneath; hairs dendroid or stellate, floccose, pale yellowish brown, 1 mm. long or less, very early caducous. Terminal bud not uncinate. Female flowers 9 mm. long with yellowish brown tomentum, split down ½-way into the perianth lobes; pedicel 3 mm. long. Fruit ovoid or almost conical, flattened at the base, densely medium brown-tomentose or villose, 3 cm. long and 2.5 cm. broad; stalk 8 mm.-1 cm. long

(18) M. inopinata

21. Hairs not present beneath

23. Inflorescence axis elongate, 1-8 cm. long (longer in some western Malesian species) slender, herbaceous and producing flowers once only, the female less branched and shorter than the male (section I species)

24. Male inflorescence axis unbranched

25. Axis extremely reduced, consisting of a peduncle and a pedicel ending in a single flower. (In this species the female inflorescence axis is also often simple, consisting of a single flower)

(25) M. fragrans

25. Axis similar but ending in 3 flowers

26. Leaves 6-13 cm. long and 3.5-6.5 cm. broad with 8-11 pairs of nerves, usually glossy above when dry, the undersurface pale brown or reddish-whitish brown. Male flowers 6-7 mm. long and 2.5-3.5 mm. broad, sub-globose to ellipsoid in bud. Twigs rather glossy and smooth, not covered with pustular lenticels. Not native, always cultivated. (25) M. fragrans

26. Leaves very similar but larger, 10-20-25 cm. long and 4-6-(10) cm. broad with 9-13 pairs of nerves, dull above when dry, the undersurface always silvery. Male flowers 7 mm.-1.1 cm. long and 5 mm. broad, ellipsoid. Twigs dull and rough with pustular lenticels. Native of New Guinea but also cultivated

(27) M. argentea

24. Male inflorescence axis branched

27. Male inflorescence a branched panicle and the female similar with fewer branches but certain species may through suppression of the upper part of the main axis of the panicle then show dichotomy, e.g. series Ellip- ticae (here the paniculate inflorescence is more usual than the dichotomous). Leaves various sizes
28. Leaves mostly large size-class, 30–47 cm. long and 5.5–15 cm. broad but some of the species with smaller leaves, these at times falling into the medium size-class range, e.g. *uncinata* 18–30 cm. long, lamina dark or medium brown above and often whitish beneath; nerves 16–30 pairs. Twigs 5–7 mm. thick in the apical parts. Male inflorescence strictly a panicle. Male flowers ellipsoid or less often sub-globose, large, 1–2 cm. long and 5 mm.—1 cm. broad, not 3-angled at the apex in bud; pedicels 8 mm.—1.5 cm. long. Unfortunately information incomplete as the flowers are still unknown for several of these large-leaved species. Fruit 4–9 cm. long. (Here belong series *Uncinatae* and *Hooglandiae*)

29. Leaves often sub-cordate at the base

(6) *M. neglecta*

29. Leaves rounded or acute at the base

30. Primary nerves of leaf prominent on both surfaces, secondary nerves absent. Flowers densely adpressed-tomentose with 2 mm. long hairs (not seen in *umbrosa*). Fruit ellipsoid or sub-globose, tomentose or tomentulose

31. Leaves rigidly coriaceous, oblong-elliptic or elliptic, less often oblong except in the largest ones, 37–47 cm. long and 8.5–15 cm. broad, drying a rich reddish or medium brown and often glossy above, whitish beneath. Terminal bud straight and acute at the apex, minutely puberulous. Flowers not seen but probably large as in the next species. Fruit 6.5–9 cm. long and 4.5–5 cm. broad, densely and shortly medium brown-tomentulose. Stilt-roots sometimes present

(4) *M. umbrosa*

31. Leaves thinly coriaceous, oblong, 18–30 cm. long and 5.5–10.5 cm. broad, drying a paler or dull greyish brown above and cinereous beneath. Terminal bud uncinate (always?) with 1 mm. long, dark brown, adpressed hairs. Male flowers not seen. Female ellipsoid, large, 2 cm. long, the largest in the genus, densely tomentose with 2 mm. long, dark brown, adpressed hairs, the lobes much reflexed or uncinate. Fruit 4–6 cm. in diam., nearly sub-globose, dark choco-late-brown-tomentose. Stilt-roots not reported

(5) *M. uncinata*

30. Primary nerves of leaf more slender, usually not very distinct above, faint on the lower surface, secondary nerves present, also faint. Flowers thinly tomentulose, the hairs less than 1 mm. long. Fruit oblong to narrowly oblong, the tomentum very short, tending to become glabrous

32. Leaves mostly rounded at the base, oblong with nearly parallel sides, the petiole stout, 5 mm. thick; nerves 30 pairs, curving widely; secondary nerves numerous. Male inflorescence rather short, 1.5–2 cm. long but immature and may lengthen; flowers in a condensed raceme or pseudo-corymb at its apex. Stalk of staminal column pubescent and nearly as broad as the fertile part, the sterile apiculus acute and 1.5 mm. long

(6) *M. neglecta*
32. Leaves narrowed and mostly acute at the base, sometimes bluntly acute, elliptic, the sides not parallel (sometimes oblong in the largest specimens of *carrii* and then slightly parallel for a short distance) the petiole 3 mm. thick; nerves 16–22 pairs, oblique, straight and not curving much, not arising at such a wide angle; secondary nerves fewer. Male inflorescence 1–2 cm. long, more slender and flattened with fewer, 1–4 flowers. Stalk of staminal column glabrous, slender, much narrower than the fertile part, the sterile apiculus truncate, very short or absent

33. Tree 12–20 m. high. Leaves slightly coriaceous, medium brown and glossy and waxy above when dry as if varnished. Male flowers large, 1.3–1.6 cm. long and 8 mm.–1 cm. broad, oblong to almost sub-globose in bud, obuse at the apex; female 8 mm. in diam., ovoid-globose in bud. Male pedicels 1.3–1.5 cm. long. Fruit oblong, 6–7 cm. long and 3–3.5 cm. broad, but young ones sub-globose; stalk 1 cm. long

(7) *M. hooglandii*

33. Tree 3–7 m. high (always?). Leaves chartaceous, greyish brown and dull above when dry. Male flowers smaller, 1 cm. long and 5 mm. broad, ellipsoid in bud, acute at the apex; female unknown. Male pedicels 8 mm.–1 cm. long. Fruit narrowly oblong or ellipsoid, 4–5 cm. long and 1.5 cm. broad; stalk 1–1.5 cm. long

(8) *M. carrii*

28. Leaves mostly medium size-class, 15–30 cm. long and 1.8–11 cm. broad, but one of them *rosselensis* small size-class, lamina usually drying a yellowish colour on both sides: nerves 10–22 pairs, usually less prominent but not always. Twigs 2–5 mm. thick in the apical parts. Male inflorescence a panicule but sometimes a dichasium through suppression of the terminal part of the main axis. Male flowers oblong or slightly tubular, less often ellipsoid, smaller, 5 mm.–1 cm. long and 2–4.5 mm. broad, sometimes 3-angled at the apex in bud; pedicels 4–6 mm. long. Fruit slightly smaller, 2–6 cm. long. Here belongs series *Ellipticae*

34. Flowers especially the male prominently 3-angled at the apex in bud, the latter not deflated on drying, male perianth 8 mm.–1 cm. long and 3–4.5 mm. broad; main axis of the inflorescence generally stout, 3–4 mm. thick. Fruit 3–6 cm. long and 2.5–3 cm. broad, tomentulose to tomentose. Twigs 4–5 mm. thick in the apical parts. Leaves 16–30 cm. long

35. Leaves oblong, many of them panduriform and broadest above the middle, emarginate or subcordate at the base; nerves fine and faint, 17–22 pairs with numerous shorter secondary ones. Apical parts of the twigs and the flattened inflorescence axis glabrous. Perianth slightly tomentose at first, later nearly glabrous, the male ellipsoid and acute at the apex in bud, 8 mm. long and 3–4 mm.
broad; pedicels 5–8 mm.–(1 cm.) long and 1 mm. thick; bracteole 2 mm. long; staminal column without an apiculus. Female inflorescence 3 cm. long, slightly branched with 2–3 flowers. A species of coastal dunes

(17) M. gaciniifolia

35. Leaves oblong-lanceolate or ovate-lanceolate, not panduriform; nerves slightly more distinct, 13–18 pairs with much fewer secondary ones. Apical parts of the twigs and the terete inflorescence axis densely tomentose. Perianth densely yellowish-brown tomentose, the male oblong and obtuse at the apex in bud, 8 mm.–1 cm. long and 4–4.5 mm. broad; pedicels 4–6 mm. long and 2 mm. thick; bracteole 4–5 mm. long; staminal column with a minute apiculus. Female inflorescence shorter, 4–5 mm. long, unbranched with 1–3 flowers only. An inland species

(18) M. inopinata

34. Flowers not 3-angled or only faintly so in bud, the latter often becoming deflated on drying, male perianth 5–6 mm. long and 2–3 mm. broad; main axis of the inflorescence 1–3 mm. thick. Fruit smaller, oblong and rounded at both ends, 2–3.5 cm. long and 1.5 cm. broad, glabrous or nearly so. Twigs more slender, 2–3 mm. thick in the apical parts. Leaves 6–21 cm. long

36. Leaves thinly coriaceous, oblong to ovate with a rounded, sub-cordate or cordate base, generally drying a pale yellowish brown above, sometimes with an olive green tinge, 8–21 cm. long and 5–8.5–(12) cm. broad; nerves 10–15 pairs, raised or not but fairly distinct beneath. Male and female inflorescences with several flowers, 3 or more, female inflorescence branched. Stalk of staminal column pubescent. A sea-coast species, stilt-roots reported

(19) M. schleinitzii

36. Leaves chartaceous, lanceolate or narrowly elliptic with an acute or slightly rounded base, drying a dark or blackish green above, 6–16 cm. long, average 12 cm. long, narrower, 1.8–4 cm. broad, average 3 cm. broad; nerves 16–20 pairs, very slender on both surfaces, not raised beneath, at times indistinct. Male and female inflorescences with about 3 flowers at the ends of the branches, female inflorescence mostly unbranched. Stalk of staminal column glabrous. An inland species, stilt-roots not reported

(20) M. rosseilensis

27. Male inflorescence mostly dichotomous, the female also dichotomous or simple. Leaves medium or small size-class

37. Leaves elliptic, acute at the base, drying pale or whitish beneath with reddish brown, deeply curving nerves. Inflorescence axis terete. Male flowers ellipsoid, not 3-angled at the apex in bud; pedicels 1–1.5 cm. long; bracteole very early deciduous; staminal column with a sterile apiculus. Fruit mostly single, glabrous, large, 6–9 cm. long. Bark of trunk black. Here belong series Fragrantes
38. Leaves 6–13 cm. long and 3.5–6.5 cm. broad with 8–11 pairs of nerves, the undersurface pale brown or reddish-whitish brown. Male inflorescence axis 1–3 cm. long. Female flowers 7 mm. long and 4–5 mm. broad. Fruit broadly pyriform or sub-globose, 6–9 cm. long and nearly as broad. Not native, cultivated. See also under 26 (1) (25) *M. fragrans*.

38. Leaves larger, 10–20–(25) cm. long and 4–6–(10) cm. broad with 9–13 pairs of nerves, the undersurface always silvery. Male inflorescence 2–5 cm. long. Female flowers 1–1.2 cm. long and 5–6 cm. broad. Fruit ellipsoid, 4.5–8.5 cm. long and 4.5–5.5 cm. broad, narrowed at both ends. Native of New Guinea but also cultivated. See also under 26 (2) (27) *M. argentea*.

37. Leaves oblong, panduriform and other shapes but less often elliptic, rounded or acute at the base, sometimes emarginate or sub-cordate, usually drying a pale brown or yellowish beneath, the nerves not reddish and not deeply curving but more oblique and straight. Inflorescence axis flattened except in *inopinata*. Male flowers tubular, oblong or sometimes ellipsoid, 3-angled or faintly so at the apex in bud; pedicels 4–8 mm.–(1 cm.) long; bracteole tending to persist, rarely early deciduous; staminal column without a sterile apiculus. Fruit mostly in pairs or 3–4 as a result of dichotomy, tomentose or glabrous, smaller, 2–6 cm. long. Bark of trunk reddish brown. Here belongs series *Ellipticae*, see also under 28 (2) to 36 (2) for other details of the species.

39. Twigs 4–5 mm. thick in the apical parts. Leaves 16–30 cm. long. Fruit 3–6 cm. long, pseudo-stalk present or not.

40. Leaves mostly panduriform with very faint primary and secondary nerves. Female flowers slightly tomentose at first, later nearly glabrous, 1 cm. long; pedicels 8 mm. long, their scars often conspicuous. Fruit oblong, pale brown-tomentose as first, soon glabrous. 5–6 cm. long and 3 cm. broad, the base usually narrowed into a short pseudo-stalk; the axis glabrous, flattened, the peduncle 1–1.5 cm. long and the pedicels about the same length, thickening into a tiny cup-shaped receptacle where they join the fruit. Twigs glabrous in the apical parts. See also under 35 (1) (17) *M. garcinifolia*.

40. Leaves not panduriform but oblong-lanceolate or ovate-lanceolate with more distinct primary nerves, the secondary nerves very few. Female flowers densely tomentose, 9 mm. long; pedicels 2 mm. long, their scars not conspicuous. Fruit (not quite mature) ovoid or almost conical, yellowish brown and densely villose, 3 cm. long and 2.5 cm. broad, the base broad and horizontally flattened, not narrowed into a pseudo-stalk; the densely tomentose axis terete, the peduncle very short, 5 mm. long, the pedicels about the same length, not thickening into a cup-shaped receptacle. Twigs densely tomentose in the apical parts. See also under 35 (2) (18) *M. inopinata*.

39. Twigs 2–3 mm. thick in the apical parts. Leaves 6–21 cm. long. Fruit smaller, 2–3.5 cm. long, pseudo-stalk usually present.
41. Leaves oblong to ovate with a rounded, subcordate or cordate base, 8–21 cm. long and 5–8.5–(12) cm. broad; nerves fairly distinct beneath. Female inflorescence slightly branched or simple, 4–5 cm. long. Fruit oblong, 2–4 together, rusty-tomentulose becoming glabrous, the pseudo-stalk 3–4 mm. long; the axis flattened and variable in length, 2–2.5 cm. long including peduncle and pedicels. See also under 36 (1)

(19) M. schleinitzii

41. Leaves lanceolate or narrowly elliptic with an acute or slightly rounded base, 6–16 cm. long and 1.8–4 cm. broad; nerves very faint on both surfaces, not raised beneath, at times partly invisible. Female inflorescence simple, 1.5–2 cm. long. Fruit not seen but probably very similar to that of schleinitzii and perhaps smaller. See also under 36 (2)

(20) M. rosseulensis

23. Inflorescence axis less elongate, 1 mm.–1 cm. long, less often up to 3 cm. long and rarely longer, the main axis a short, thick, scar-covered, woody tubercle as in Knema, persistent and producing new flowers from time to time, mostly simple, sometimes with one or two very short branches, the main axis increasing very slowly in which case it may be occasionally smooth at the base with the scar-covered portion higher up (best seen in some members of series Tubiflorae where the axis later may become dichotomous), the female inflorescence similar to the male. (The majority of the New Guinea species have this Knema type of axis)

42. Combination of the following characters involved:— Fruit with dense tomentum and leaves medium size-class, 12–22 cm. long and 3.5–9 cm. broad; nerves 12–18 pairs. (The flowers are tomentose also, but not seen in M. fatua var. morobensis)

43. Leaves drying pale yellowish brown and dull above, less often medium brown, the lower surface glaucous with reddish brown, straight, slender nerves. Male flowers reddish brown-tomentose, clavate or obovoid in bud; pedicels half the length of the flowers, 4–5 mm. long. Fruit 4 cm. lang and 1.8–2 cm. broad, ellipsoid to obovoid, shortly medium to dark brown-tomentose with 0.5 mm. long hairs; stalk 1 cm. long and 6 mm. thick. This species is repeated here in case the scales on the lower surface of the leaf are not present

(40) M. buchneriana

43. Leaves drying a rich medium brown and glossy above, the lower surface the same colour or only slightly paler, the nerves not reddish brown but more or less the same colour as the undersurface, more prominent and much curving. Male flowers lanose, not clavate, not seen in fatua var. morobensis but probably tomentose; pedicels various. Fruit slightly smaller, not ellipsoid or obovoid, much more densely tomentose, see below, sessile or nearly so

44. Lamina rounded or emarginate at the base: average breadth at the middle 7cm. Male flowers golden yellow, oblong-ovoid in bud, later nearly tubular, 7–8 mm. long and 2.8 mm. broad, sessile. Fruit oblong-ovoid, 2.5–3.3 cm. long and 2 cm. broad, sub-lanose with 3–5 mm. long hairs

(33) M. chrysophylla var. entrecasteauxensis
44. Lamina acute or less often slightly rounded at the base, not emarginate; average breadth at the middle 4.5 cm. Male flowers not seen but probably like those of M. fatua var. papuana. Fruit sub-globose, 1.5 cm. in diam. (still immature) densely rusty-velvety with 1–2 mm. long hairs

(36) M. fatua var. morobensis

42. Combination of the above characters not involved

45. Leaves with a cordate, sub-cordate or emarginate base (not the apical leaves but the largest and oldest ones) see again under 59 (1) and 59 (2)

46. Lamina 20–35 cm. long and 5–13 cm. broad, average 9 cm. broad, drying pale brown above, sometimes with a yellowish tinge, the lower surface the same colour or paler still, the base if not cordate mostly rounded; nerves 16–22 pairs, mostly straight, oblique and not curving much. Twigs 3–4 mm. thick in the apical parts, the two lines which run from petiole base to petiole base not expanded into thin, narrow wings; ant swellings not observed on the twigs. Fruit glabrescent to glabrous, pale yellowish brown, oblong or oblong-ovoid, 3–3.5 cm. long and 2–2.8 cm. broad. Stilt-roots present. A tree of river banks subject to inundation, also in the upper drier parts of the mangrove. Forms from drier situations and higher altitude with narrower leaves and without stilt-roots

(61) M. hollrungii

46. Lamina 20–40 cm. long and 7–15 cm. broad, average 10 cm. broad but more variable in shape and size, drying a medium brown above, the lower surface paler brown, sometimes glaucous or whitish, the colour of the leaf on the whole being generally darker than in the above species without a yellowish tinge, the base similar but more often acute especially in apical or small leaves; nerves 20–30 pairs, average 25 pairs, arising from the midrib at a wider angle and much curved. Twigs 5 mm.–1 cm. thick in the apical parts, less in mountain forms, the two lines which run from petiole base to petiole base raised and expanded into thin, narrow wings; ant swellings often present on the twigs. Fruit rather similar, minutely tomentulose, dark to medium brown, sub-globose to oblong, 1.6–2.8 cm. long and 1.3–2 cm. broad. Stilt-roots not present. A wide-spread tree of many ecological situations but usually avoiding wet places. (Mountain forms occur with smaller, more coriaceous leaves with a white undersurface and acute bases, while their twigs lack the ant swellings)

(55) M. subalulata

45. Leaves not cordate, sub-cordate or emarginate at the base

47. Bracteole or its scar some distance down on the pedicel, usually 1–3 mm. down, present only at the junction of the pedicel and the perianth in very young flowers. Fruit fusiform, narrowly ellipsoid, acute and attenuate at both ends and often with a pseudo-stalk, less often oblong; stalk slender and often divided into two pedicels or branches forming a dichasial inflorescence or undivided with a single pedicel and with' or (in young stages) without a smooth basal portion to the woody tubercular peduncle, the stalk tending to be shorter and thicker in species with a thick-walled pericarp and a heavy
oblong fruit. Male inflorescence a woody tubercle which eventually elongates, becoming dichotomous in most of the species (more material and observations required for *M. flosculosa* where it has remained simple). Flowers especially the male, tubular, tomentulose to glabrous, not densely tomentose, 8 mm.-1.5 cm. long, often minutely 3-angled at the apex in bud, later split down for a very short distance, about 1/5, by the minute reflexed perianth lobes; pedicels very slender, as long as or longer than the flowers, bracteole very small, 1 mm. long or less. Leaves small or medium size-class, 4-23 cm. long, average 15 cm. long; nerves 8-23 pairs, fine but distinct on both surfaces, often impressed above, curving widely, line of interarching distinct; reticulations present at times. Small trees 1.5-15 m. high, many of them mountain species.

Here belong the members of series *Tubiflorae*

48. Leaves ensiform (long in proportion to width, very narrowly lanceolate and gradually acuminate towards the apex) 17-22 cm. long and 2-3 cm. broad, older leaves probably longer still; nerves 18-20 pairs, forming very distinct loops of interarching; reticulations indistinct. Flowers not seen. Fruit 4.5 cm. long and 1.3 cm. broad, fusiform (like that of *tubiflora* but smaller and narrower) acute at the apex and acuminate at the base into a pseudo-stalk; stalk broken, probably short. A shrublet 1.5 m. high

(44) *M. ensifolia*

48. Leaves mostly elliptic, less often elliptic-lanceolate or oblong, not ensiform (not so long in proportion to width) the majority 4-15 cm. long and 3-6-(9) cm. broad, if longer (*flosculosa* and *cucullata* or if narrower *firmipes*) then the length and breath in proportion; nerves generally fewer, 8-15 pairs but up to 23 in the larger-leaved species, line of interarching distinct or not; reticulations distinct or more often indistinct. Fruit 2.5-7 cm. long and 1-3.5 cm. broad, fusiform, ellipsoid or oblong, acute or less often rounded at the apex, acute or rounded at the base. Small trees 15 m. high, taller in *firmipes*

49. Fruit-stalk slender, 0.5-2 mm. thick (5 mm.)-1-3.5 cm. long. Dichotomy of the inflorescence usually early apparent, smooth portion of the main axis if present usually over 5 mm. long

50. Fruit cylindrical or oblong; pseudo-stalk present or not. Leaves reticulate beneath with secondary nerves and closely adpressed, minute whitish scales. Flowers not seen

51. Leaves drying dark brown above, 14-20 cm. long, narrowly oblong-obovate, base rounded or bluntly acute, apex shortly and sharply acuminate; nerves 12-16 pairs: petiole 1-1.5 cm. long and 3-4 mm. thick, somewhat swollen. Fruit oblong, dark brown, solitary (always?) 2.5-3 cm. long and 1.5 cm. broad, rounded and mucronate at the apex, narrowed into a 5-7 mm. long pseudo-stalk; (stalk) peduncle 2-3 mm. long, pedicel 2.7-3.5 cm. long and 1-1.5 mm. thick

(45) *M. gracilipes*
51. Leaves drying pale greenish or yellowish brown above (rather like those of *M. fragrans*) 10–13 cm. long, elliptic, base acute, apex bluntly acuminate or acute; nerves 10–15 pairs, more deeply curved and leaving the midrib at a wider angle; petiole 7 mm.–1 cm. long and 1.5–2 mm. thick, not swollen. Fruit cylindrical, light brown, solitary or more often 2–4 together, 2.5–2.8 cm. long, narrower, 8 mm.–1 cm. broad, slightly narrowed and mucronate at the apex, no distinct pseudo-stalk at the base; (stalk) peduncle 7 mm.–1.2 cm. long and pedicel 5–7 mm. long and 1–2 mm. thick

(46) *M. cylindrocarpa*

50. Fruit elongate, fusiform or ellipsoid, acuminate at the apex; pseudo-stalk present. Leaves not distinctly reticulate beneath and secondary nerves not so prominent (they may be quite numerous, however, e.g. *cucullata*), scales present or not. Male flowers tubular, elongate or subulate, female flask-shaped (with an inflated base) or cylindrical

52. Twigs slender, 1 mm. thick at the apex and 3 mm. thick lower down. Leaves mostly elliptic with a slender acumen, drying a pale greyish green above and yellowish brown to glaucous-greyish beneath; petiole slender, 1–1.5 mm. thick (less often 2 mm. thick). Flowers pale yellowish or less often reddish brown when dry, the male 1.5–2–(2.5) mm. broad, their pedicels filiform, 0.2–0.3 mm. thick; stalk of staminal column glabrous, very slender, half as thick as the fertile part. Fruit pendulous, mostly single, 4–7 cm. long and 1.3–2.5 cm. broad, the pericarp thin and wrinkled when dry; stalk very variable in length and thickness, 5 mm.–2.5 cm. long (including peduncle and pedicel), 0.5–2 mm. thick

(41) *M. tubiflora*

52. Twigs stouter, 2 mm. or more thick at the apex and 4 mm. thick lower down. Leaves more variable in shape, elliptic, elliptic-lanceolate, ovate-elliptic, obovate-elliptic or panduriform, apex bluntly acute, less often shortly acuminate, drying dark brown above and medium brown or greyish white beneath (pale or yellowish to greenish brown often with dark patches above and pale brown beneath in *cornutiflora*); petiole stouter, 2–3 mm. thick. Flowers reddish or dark brown when dry; the male 2–3.5 mm. broad, their pedicels 0.5–1 mm. thick; stalk of staminal column adpressed-pubescent, nearly as thick as the fertile part. Fruit not pendulous, mostly in pairs on a forked peduncle, sometimes single. 3.5–4.5 cm. long and 1.5–2.5 cm. broad, the pericarp
thicker, smooth when dry; stalk 1.5–3.3 cm. long (including peduncle and pedicel), 2 mm. thick, the pedicel ending in a collar-like ring or minute cupular receptacle where it joins the fruit.

53. Male flowers more or less tubular, 1 cm. long and 1–3 per fascicle; bracteole-scar usually 1–3 mm. below the base of the perianth in mature flowers. Female flowers 7 mm. long with a 3 mm. broad base. Fruit narrowly ellipsoid, much drawn out at both ends, pericarp usually drying medium to dark brown. Leaves 6–15 cm. long, average 11 cm. long; 3.5–6 cm. broad, average 4.5 cm. broad; nerves 10–16 pairs, faint beneath, less often prominent.

(48) M. longipes

53. Male flowers subulate, 1–1.5 cm. long and 5–8 per fascicle; bracteole-scar sometimes at the base of the perianth and sometimes below, apparently taking longer to descend. Female flowers 8 mm. –1 cm. long with a 3–4 mm. broad, swollen base, more constricted between the base and the neck than in longipes. Fruit broadly ellipsoid to nearly subglobose, much less drawn out at both ends, the apex scarcely so at all except for a short mucro when young, soon rounded, pericarp usually drying a pale colour (always?). Leaves usually broader, 8–24 cm. long, average 15 cm. long; 6–10 cm. broad, average 7 cm. broad; nerves 16–18 pairs, usually prominent beneath.

(49) M. cornutiflora

49. Fruit-stalk stout, 4–7 mm. thick, 5 mm.–1.7 cm. long. Dichotomy of the inflorescence delayed or not apparent in the early stages, smooth portion of the main axis rarely present, 5 mm. long or less.

54. Fruit ellipsoid. Leaves elliptic, chartaceous to slightly coriaceous, 4–15 cm. long and 1.5–5 cm. broad.

55. Leaves 10–15 cm. long and 3.5–5 cm. broad, the apex sharply acuminate, the upper surface drying mostly dark brown, the lower yellowish or whitish; nerves 14–20 pairs, average 18 pairs; petiole 2–2.5 mm. thick. Twigs 3 mm. thick in the apical parts and 4 mm. thick lower down, often rough with numerous lenticels. Male flowers tubular, 8–9 mm. long and 2.5–3 mm. broad, several in a cluster from a woody tubercle, tomentulose outside; pedicels 5–7 mm. long; stalk of staminal column adpressed-pubescent. Pericarp slightly rugose or minutely tuberculate. Mountain tree

(50) M. crassipes
55. Leaves 4–8 cm. long and 1.5–2.5 cm. broad (the smallest in the genus) the apex bluntly acute, not acuminate, the upper surface drying a greenish brown, the lower sometimes with some minute, closely adpressed whitish scales, becoming glabrous; nerves 8–14 pairs; petiole 1–1.5 mm. thick. Twigs 1–2 mm. thick in the apical parts, lenticels not observed. Flowers not seen. Pericarp smooth, not rugose or tuberculate. Tree of ridge crests at 100 m. altitude

(51) M. firmipes

54. Fruit oblong or oblong-ovoid. Leaves broadly elliptic to oblong, more coriaceous, longer and broader, 11–23 cm. long and 4–9 cm. broad, average 7 cm. broad

56. Leaves broadly elliptic, less often elliptic-lanceolate, drying a pale yellowish brown above, the midrib reddish brown on both surfaces; nerves 15–20 pairs, reddish brown, curving deeply and leaving the midrib at a wide angle, 70–90°, deeply impressed above, prominent and raised beneath, secondary nerves neither numerous nor conspicuous. Twigs reddish brown in the apical parts, sometimes with two faint lines running from petiole base to petiole base (not always). Male flowers (arising from woody tubercles, dichasia so far not seen) perfectly tubular, 8 mm.–1 cm. long and 2 mm. broad; stalk of staminal column pubescent at the base only; pedicels 5 mm. long; bracteole very small, about 1 mm. long. Fruit 1–2, oblong-ovoid, 3 cm. long and 2–2.3 cm. broad with a 3–4 mm. long pseudo-stalk, the base somewhat truncate, the apex rounded and minutely apiculate, pericarp 2 mm. thick

(55) M. flosculosa

56. Leaves oblong or oblong-elliptic, the sides often parallel for part of their length, drying a pale yellowish above or in thin leaves a blackish brown, the midrib beneath concolorous or slightly darker than the background, not reddish brown; nerves 16–23 pairs, average 20 pairs, dark brown or the same colour as the background, more oblique and much thinner and finer with numerous secondary nerves, not raised beneath. Twigs blackish in the apical parts, often angled but without the two lines. Male flowers oblong-ovoid in bud, later more tubular, (5)–8 mm.–1 cm. long and 3–6 mm. broad; stalk of staminal column glabrous; pedicels 6–7 mm. long; bracteole "cucullate", larger, sheathing and almost entirely covering the young flowers. Fruit solitary, narrowly oblong, longer, 3–6 cm. long and 2–3.5 cm. broad, rounded at both ends, pericarp 5–7 mm. thick

(54) M. cucullata
47. Bracteole or its scar always at the junction of the pedicel and the perianth, not some distance down on the pedicel. Fruit quite a different shape, neither fusiform nor attenuate at both ends, globose, sub-globose or oblong, stalk shorter and stouter proportionately, seldom dividing into two branches or two pedicels as a result of a dichasial inflorescence. Male and female inflorescences a woody tubercle, mostly simple, less often with 1-3-(5) short, often unequal branches but not dichotomous. Flowers, especially the male, not tubular, tomentulose to tomentose, rarely 1.5 cm. long (except in *subulatula*) usually smaller and split down more, 1/4 at the apex in the male by the non-reflexed perianth lobes; pedicels as long or usually shorter than the flowers, bracteole longer, 2mm. long or more. Leaves usually larger, less often the same size, all their other features variable. Trees of various stature, rarely mountain species

57. Leaves mostly medium size-class, sometimes a few of them large size-class, 15-40 cm. long and 3.5-15 cm. broad; veins prominent, 18-30 pairs. Apical portions of the twigs usually with two lines running from petiole base to petiole base, absent mostly in *undulatifolia* (more observation required for *undulatifolia*). Male flowers 5 mm. -1.5 cm. long and 3-5 mm. broad; pedicels 5 mm.-1.5 cm. long. Fruit 1.5-4 cm. long and 1.3-3.5 cm. broad; stalk 5 mm.-1.5 cm. long

58. Flowers glabrous, puberulous or minutely tomentulose, the male 5 mm.-1.5 cm. long and 3-5 mm. broad. Lamina 20-40 cm. long and 5-15 cm. broad, mostly oblong with parallel sides

59. Lamina 20-35 cm. long and 5-13 cm. broad, average 9 cm. broad, drying pale brown above, sometimes with a yellowish tinge, the lower surface the same colour or paler still; nerves 16-22 pairs, straight or not curving very much. Ant swellings not present on the twigs and the two lines which run from petiole base to petiole base not expanded into wings. Male flowers glabrous or puberulous, sub-globose or ovoid-globose, rounded and obtuse at the apex in bud, 5 mm. long and 4 mm. broad, split down 1-way by the lobes; staminal column with a densely pubescent stalk and a very short, 0.5 mm. long sterile apiculus; pedicels 6 mm. long. This species is often confused with the next especially when sterile. For more information see section 46 (1) and 46 (2) of this key

(61) *M. hollrungii*

59. Lamina 20-40 cm. long and 7-15 cm. broad, average 10 cm. broad, but more variable in shape and size, drying a medium brown above, the lower surface paler brown, sometimes glaucous or whitish, the colour of the leaf on the whole being generally darker than in the above species without a yellowish tinge;
nerves 20–30 pairs, average 25 pairs arising from the midrib at a wider angle and much curved. Ant swellings often present on the twigs except sometimes in coriaceous-leaved mountain forms, the two lines from petiole base to petiole base often raised and expanded into narrow wings. Male flowers rusty-tomentulose, narrowly ellipsoid-clindrical, narrowed towards the slightly acute apex in bud, 1–1.5 cm. long and 3–5 mm. board, split down \( \frac{1}{2}-\frac{3}{4} \) way by the lobes; staminal column with a glabrous stalk and a 1.5–2 mm. long sterile apicus; pedicels 1–1.5 cm. long (but much shorter in immature flowers) (58) **M. subululata**

58. Flowers densely tomentose, the male 4–5 mm. long and 2 mm. broad. Lamina 11–26–(32) cm. long and 3.5–9 cm. broad, oblong with parallel sides in _undulatifolia_, elliptic with curving sides in _sulcata_.

60. The two lines on the twigs very distinct and sharp, especially near the apex. Leaves drying a dark glossy or blackish brown above, only slightly paler beneath, the base generally rounded, less often acute, the margins not wavy; nerves 12–20 pairs. Stalk of staminal column completely covered with hairs; male pedicels 5–7 mm. long. Fruit sub-globose (obovoid when young) tomentulose, later glabrous (59) **M. sulcata**

60. The two lines on the twigs very faint or absent (perhaps more material may show that they are normally absent). Leaves drying a medium brown above (dark brown in old or coriaceous leaves) often whitish or cinnamon coloured beneath, the base acute, less often rounded, the margins undulate or serrulate as a result of unequal thickening; nerves 18–28 pairs, average 22 pairs. Stalk of staminal column with basal hairs only; male pedicels 4–5 mm. long. Fruit oblong (ellipsoid when young) glabrescent, later glabrous (60) **M. undulatifolia**

57. Leaves mostly small size-class, sometimes a few of them medium size-class, e.g. _M. insipida_ and some of the varieties of _lancifolia_, 5–15–(20) cm. long and 1–7.5 cm. broad, average 4 cm. broad; veins prominent or faint, 10–15 pairs. Apical portions of the twigs without two lines running from petiole base to petiole base. Male flowers smaller, 2–5 mm. long and 2–3 mm. broad; pedicels 1–6 mm. long. Female flowers also proportionately smaller. Fruit generally smaller, 1.5–2.5 cm. long and 1–2.5 cm. broad but some as large, e.g. _M. lancifolia_ var. _elemensii_ and var. _bifurcata_. On the whole species with many similarities to those in section 57 (1) but smaller in all their parts.
61. Primary nerves faint and slender on the lower surface, well spaced and much curving, secondary nerves few and not conspicuous; reticulations present or not, fine and slender. Bracteole very early deciduous. Stalk of staminal column mostly pubescent (pubescent or glabrous in *globosa*). Pericarp thin and not very hard, breaking, shrinking or wrinkled on drying. Here belong the species of series *Cimiciferae*. See under the key to series *Cimiciferae* for other details.

62. Leaves 10–22 cm. long and 2.5–7.5 cm. broad, drying pale yellowish and glossy above, slightly paler still beneath, the midrib and nerves the same colour or slightly darker but not reddish brown. Male flowers 5–6 mm. long, pale brown-tomentose; pedicels only 2–3 mm. long. Fruit oblong, 2.5–3.5 cm. long and 1.5–1.8 cm. broad, at first sparsely covered with 0.5–1 mm. long, pale dendroid hairs which soon break off, soon nearly glabrous; stalk short, 5 mm. long. A tree of coastal dunes with a wide distribution

(55) *M. insipida*

62. Leaves slightly smaller, 5–17 cm. long and 1–5.5 cm. broad, drying various shades but usually darker and dull above, slightly paler beneath and sometimes with a glaucous shade, the midrib and nerves of the midrib only usually reddish brown. Male flowers 4–5 mm. long, reddish brown or pale brown-tomentulose; pedicels various, see below. Fruit various shapes but generally smaller, 1.5–2.5 cm. long and 1–2.5 cm. broad, minutely tomentulose becoming glabrous; stalk various

63. Leaves 8–17 cm. long and 3–5.5 cm. broad; petiole 1.5–2 mm. thick. Male flowers 5 mm. long and 3 mm. broad; pedicels 5–6 mm. long. Fruit globose or sub-globose, dark or light brown, 1.5–2.5 cm. in diam.; stalk 5–7 mm. long

(57) *M. globosa*

63. Leaves smaller and narrower, 5–11 cm. long and 1–3 cm. broad; petiole 1 mm. thick. Male flowers 4–5 mm. long and 1–2 mm. broad; pedicels 0.5–2 mm. long. Fruit ellipsoid or oblong, very pale yellowish brown, 1.8–2 cm. long and 1–1.2 cm. broad; stalk 3–5 mm. long

(56) *M. concinna*

61. Primary nerves faint and slender on the lower surface, sometimes scarcely visible, straight and oblique, not curving, secondary nerves more numerous, similar to the primary but shorter, the two sets rather close together; reticulations absent; the midrib slightly more raised above than in 61 (1). Bracteole often persistent. Stalk of staminal column glabrous. Pericarp thin but hard and durable, usually smooth, not wrinkled nor breaking on drying

(69) *M. lancifolia* and its *vars*
MYRISTICA


Pre-Linnaean Name: Palala Rumph. Herb. Amb. 2 (1741) 14.

TYPE OF THE GENUS: Myristica fragrans Houott.

Some of the earlier references are not straightforward and easy to *cite since at that time the genus Myristica contained the other genera Knema, Horsfieldia, Gymnacranthera, etc. and these have

*Foot note:*—These and other references which I have left out are better cited under the family name Myristicaceae and not under the generic name Myristica.
to be excluded from it by adding the words “pro parte” or when not too complicated by mentioning the actual sections or species. Warburg (1897) was the first to divide *Myristica* into its present-day genera, though Loureiro, as early as 1790 recognized *Knema* as a separate genus. Willdenow (1806) had also recognized *Horsfieldia*. Blume, Hooker *filius* and Thomson and Alphonse De Candolle divided *Myristica* into sections and these correspond more or less with what are now the genera. Blume puts the true *Myristica* species in section *Myristica* Bl. and creates two sections *Knema* and *Pyrrhosa* to separate *Knema* and *Horsfieldia* from the true *Myristica* species. Although his section *Myristica* contains several true *Myristica* species and includes *M. fragrans*, the type of the genus, it does not correspond with my section *Myristica* for it has some others which belong to my section II. Hooker *filius* and Thomson create sect. *Eumyristica* for what they believe are true *Myristica* species. Alphonse De Candolle puts some of the species into sect. *Eumyristica*, with a sect. *Caloneura* A.DC. for the rest. He creates other sections for the remaining genera. Unfortunately, even with all these sections, they put species which later turn out to be *Gymnacranthera* and *Horsfieldia* into the sections reserved purely for *Myristica*. In one case *M. obtusijolia* Wall. does not even belong to the family. Also their sections *Eumyristica* and *Caloneura* do not correspond to any of my two sections. Warburg was also the first to divide *Myristica* into series.

**The Sections of Myristica**

*Myristica* sect. I *Myristica*

*Inflorescentia mascula* gracilis, herbacea, elongata, 3–18 cm. longa, raro 5 mm.–1 cm. longa, paniculata, rami oppositis raro alternatis praedita vel in una serie dichotoma, praetar apices floriferos levis, post anthesin decidua. *Inflorescentia feminea* brevior, saepe simplex. *Columna staminalis* primitiva, quam in sectione *Fatua* magis contracta, stipite brevissime vel fere obsoletu, apiculo sterili plerumque nullo. *Folia* subitus generaliter elepidota atque epilosa (quatuor species tantum squamulas laxis vel pilos habent). *Fructus* quam in sectione *Fatua* maior, saepe 7–10 cm. longus.

**TYPE:** *Myristica fragrans* Houtt.

*Myristica* sect. II *Fatua* J. Sinclair, sect. nov.

*Inflorescentia mascula* lignosa, tuberculiformis, brevis, vulgo 5 mm.–1 cm., interdum 1–5 mm. vel 3–7 cm. longa, 1 mm.–1 cm. crassa, simplex vel irregulariter 2–5–dactylina vel in una serie dichotoma, omnino cicatricosa vel inferne nonnihil levis, persistentis, gradatim incrementis minutiissimis augens, iterum atque iterum eodem apice flores novos efferens. *Inflorescentia feminea* similis, brevior. *Columna staminalis* quam in sectione *Myristica* generaliter in partes tres i.e. stipitem, antheras atque apiculum sterilem clarius divisa. *Folia* subitus saepe squamulis laxis vel pilis tecta. *Fructus* quam in sectione *Myristica* plerumque minor.

**TYPE:** *Myristica fatua* Houtt.
sect. Myristica

Inflorescence axis not persistent but of short duration, producing flowers during one flowering period or season only and not from time to time. Male inflorescence a panicle with opposite, rarely alternate branches developing in acropetal succession (the oldest and longest branches at the base, the younger towards the apex of the axis) and bearing stalked flowers in umbellate or sub-umbellate fashion at the ends of the branches, the oldest primary branches often branching again in a similar way; less often the inflorescence a dichotomous cyme, the main axis forked into two equal branches, with or without a central flower, the fork occasionally repeating the dichotomy and rarely the inflorescence reduced to a peduncle with 2–3 flowers or a single flower; main axis smooth at the base, often flattened, slender, herbaceous, never a woody scar-covered tubercle (scar-covered reproductive portions are rare but may be present at the ends of the main branches); total length of the inflorescence 3–8 cm. long, reaching 18 cm. in M. maxima and 16 cm. in a few others, 5 mm.–1 cm. the minimum size. Female inflorescence similar but much shorter with fewer branches or unbranched in which case it may then resemble that of a section II inflorescence, though usually its extreme base will be smooth. Staminal column rarely with any development of a sterile apiculus, the stalk about as thick as the fertile part (exception series *Fragrantes and partly series Hooglandiae). Leaves generally without lax, powdery yellow or brownish scales and hairs on the lower surface; four species only have such scales and two of these four have hairs as well. Fruit generally larger than those in section II, several with dimensions of 7–10 cm. long occur.

sect. Fatua

Inflorescence axis persistent and of unlimited growth, producing new flowers from season to season, elongating slowly with each fresh crop of flowers. Male inflorescence a short, thick, scar-covered, woody tubercle as in *Knema*, mostly unbranched with stalked, rarely sessile flowers borne in umbels or racemose-umbels at its apex also in acropetal succession, if branched then the branches similar but shorter than the main axis, 2, rarely 5, arising together or irregularly; in one series the inflorescence a dichotomous cyme but some of its members having woody tubercles only; main axis rarely with a smooth portion at the base free of scars, but if so (especially in species with dichotomy) then the scar-covered portion higher up at the end of the axis or its branches (such smooth basal portions may be present or absent in the same species and although they are short, 1–5 mm. long, reaching a maximum of 1 cm. long, care should be taken not to mistake them for those of a section I species); total length of the axis 5 mm.–1 cm. long but 1–5 mm. long in the smallest, 3 cm. long in several species and rarely 7 cm. long, much stouter

*Foot note:*—This series has an apiculus to the staminal column as in section Fatua so fortunately stands as a connecting link between these two sections, indicating that they are not subgenera, but form a natural group.
than in section I, usually 5 mm. thick, with 1 mm. the minimum and 1 cm. the maximum thickness. Female inflorescence similar to the male but shorter. Staminal column nearly always with a sterile apiculus, the stalk usually thinner than the fertile part. More species have the lax, powdery scales and hairs than in the first section (nearly one third of them). Fruit generally smaller, average 4–5 cm. long, a few species reaching the 7–10 cm. class while the smallest fruits, 1.8–2 cm. long, occur in this section.

THE SERIES AND SPECIES OF SECTION I

1. SERIES MAXIMAE


Twigs stout, 5 mm. or more thick and nearly smooth in the apical parts, mostly glabrous or in philippensis with some tomentum on the innovations, lower down striate. Leaves coriaceous, glabrous, large size-class, 18–50 cm. long and 6–18–(20) cm. broad, those of M. maxima being about the broadest in the genus, drying medium brown to dark brown or even blackish above, paler brown, cinereous or yellowish beneath, mostly oblong, sometimes oblong-obovate and less often oblong-lanceolate, the base mostly rounded, sometimes sub-cordate or acute, apex rounded and then obtuse or acute, less often simply acute; nerves 18–30 pairs, very prominent, oblique and nearly parallel; reticulations faint, sometimes a few seen beneath in maxima; petiole 2–3 cm. long and up to 5.5 cm. long in papyracea. Male inflorescence a much branched panicle with opposite branches, the longest in the genus in maxima, 10–18 cm. long, but only 2–5 cm. long in papyracea, the axis thin and often flattened, rather fragile, glabrous or with some tomentum and usually numerous small flowers. Female inflorescence, similar but smaller, more condensed with fewer and shorter branches. Male flowers rather small, the perianth thin, glabrous to tomentose, globose or sub-globose in bud, split down ½–⅔-way by the rather erect, non-reflexed lobes, 5–8 mm. long and 4–6 mm. broad; pedicels slender, fragile, 4 mm.–1.5 cm. long; staminal column obtuse at the apex, mostly without a sterile apiculus, stalk glabrous or pubescent, stout and about as thick as the fertile part; bracteole 2–6 mm. long, bracts often seen in philippensis where they are rather large and up to 2 cm. long in the female inflorescence but very soon caducous. Female flowers larger than the male, 8–9 mm. long, urceolate with reflexed lobes. Fruit large, 5–9 cm. long and 3–5 cm. broad, oblong, glabrous or densely dark brown-tomentose, smooth or wrinkled on drying; stalk 5 mm.–3 cm. long and 5 mm. thick, — 3 species, M. maxima, papyracea and philippensis.

TYPE SPECIES: M. maxima Warb.

*Foot note:*—As Uphof in Nat. Pfl. 17a2 (1959) 214–217 only copied Warburg's system of classification of series no further reference under series in this article will be made to him.
The chief characters of this Western Malesian series are the large coriaceous leaves with prominent, oblique nerves, the stout twigs and thick terminal bud, the long, much-branched, slender inflorescence with numerous small globose or sub-globose flowers, the slender pedicels, much longer than the flowers, the staminal column often without an apiculus, its stalk rather clumsy and ill-defined and the large fruit. These are all rather primitive characters which show that this series is one of the least advanced in section I. The male inflorescence in *M. maxima* is one of the best examples of the branched panicular type on which the genus is divided into two sections. It is also the longest inflorescence in the genus. It does not grow thick or woody nor does it persist and produce flowers the following season. Series *Maxima* is closest to two other large-leaved ones in New Guinea, namely *Uncinatae* and *Hooglindiae*. The arrangement of the male flowers in the inflorescence of *M. papyracea*, a species confined to Borneo approaches that of *M. neglecta* in series *Hooglindiae*. In Western Malesia and particularly in Malaya series *Maxima* leads on to two other closely related series, namely *Maingayae* and *Malabaricae*. In series *Maingayae* the leaves have become slightly smaller, and smaller still in series *Malabaricae*. The flowers, too, have become slightly smaller, but have retained the same shape in this last series and so has the fruit decreased in size. The flowers have changed their shape to oblong in series *Maingayae* but here differ more as they have together with the inflorescence axis taken on a dense tomentose or woolly, reddish brown indumentum, while the fruit is not any smaller.

Warburg has also put *M. maxima* and *philippensis* into this series but not *papyracea* as it was unknown in his day.


**SUMATRA ATJIEH:**

**EAST COAST:** Tamiang, Perupok, bb9794 (BO).

**PALEMBANG:** Bajung Lintijir, Thorennaar (Endert) Nos. 55E1P551 (BO, L); 55E1P572 (BO, L) & 55E1P601 (BO, K, L, P); Banjuasin & Kubestreken, Thorennaar (Endert) Nos. 55E1P623 (BO, L); 55E1P624 (BO, G Boiss., K, L, P, SING, U) & Grashoff Nos. 878 (BO, L); 908 (BO, L, SING) & 919 (BO, L); Dermo Enim, Teijsmann 3794 (BO, CAL).
PULAU SIMALUR: Achmad 613 (BO, L, SING).
MENTAWAI ISLAND: Pulau Sipora, Iboet 507 (BO, L, SING); Kloss S.F.N. 14772 (BO, K, SING).
BRUNEI: Sungei Ingei, Ashton 118 (BO, K, KEP, L, SAR, SING).
WEST BORNEO: Melawi, B. Melaban Ketchil (Ketjit), bb28342 (A, BO, K, L, SING); Lianggagang, Hallier 2851 (BO, L, SING).
SOUTH AND SOUTH-EAST BORNEO: Keminting near Kuala Kuantan, Sampit River Region, Kostermans 8053 (K, L); Dirungsilarung, Puruktjahu, bb10175 (BO); Mukret, Ma., Terreh, bb10077 (BO).
EAST AND NORTH-EAST BORNEO: Melinau, Tidungsche Landen, bb17819 (A, BO, L); Berouw, bb19139 (A, BO, L); No. 24 L. Iboet, West Kutei, Endert 2576 (A, K, L); Mo. Antjalong, bb16511 (A, BO, L); Central Kutei, Gunong Sahari, Belajan River, Forman 468 (BO, K, L, P, SING); Belajan River, G. Kelepok near Tabang, Kostermans 10450 (K, L, SING); Sungei Tiram, Kutei, Schut K.6 (BM, BO, K, L, P, SING); East Kutei, Sungei Kerajaan, north of Sangkulirang, Kostermans 5805 (BO, K, L, P, PNH, SING); Mentawir River Region near G. Mentawir, Balikpapan, Kostermans 10144 (BM, K, L, P, SING); Sungei Wain Region, north of Balikpapan, Kostermans 4476 (BO, K, L); Sungei Mukun near Sangasanga, Samarinda, Kostermans 7718 (BO, K, L, PNH, SING); Loa Djanan, west of Samarinda, Kostermans 6389 (BO, K, L, PNH, SING).
PULAU NUNUKAN: Zainal Abidin 23 = bb34625 (BO, K, L); Bulungan, Kabiran, S. Bengalow, bb11692 (BO).
BRITISH NORTH BORNEO: Tumundong Camp, Sandakan, James Ah Wing SAN 19037 (L); Beaufort Hill P.F.R., Beaufort, G. Mikit SAN 30172 (K,L, SAN, SING); ulu Mendalong, 6 miles S.S.E. of Malaman, G.H.S. Wood SAN 16808 (KEP, L, SAN SING).
DISTRIBUTION: Malay Peninsula and Borneo.

TYPE MATERIAL: M. maxima Warb. King's collector Nos. 5513 & 6960; Scortechini 1872; Curtis 1497 and Beccari 1556 all syntypes. See Gard. Bull. Sing. 16 (1958) 341 for distribution of type material.

King had only three collections of this Malayan species to work with, and wrongly identified it with M. bracteata A.DC. from the Philippines of which he had not seen all the syntypes. There was none of Cuming's material of bracteata available to him though he had seen Wallich 6800 A & B cultivated in Calcutta Botanic Gardens, reputed to have come from Mauritius and named bracteata by Alphonse De Candolle. He tried to match this with the Malayan material and unfortunately thought it was the same. M. bracteata A.DC., however, must be replaced by the older M. philippensis Lamk while M. maxima Warb. is the correct name for the Malayan and Bornean plant. For further notes see under M. philippensis.

A special leaf-measuring exercise was carried out to compare the measurements of herbarium material with those from leaves on the living tree and to find out if there were any significant differences. Measurements from the tree on Lawn Z, Botanic Gardens, Singapore show that many of the leaves reach 45 cm. long but only a few are over 50 cm. Some were 18–20 cm. broad and one had a petiole 4 cm. long. The largest I could find and reach from the ground was 54 cm. long and 17.5 cm. broad, its petiole being 3 cm. long and the nerves 33 pairs. It is unlikely, however, that any of those higher up on the tree will measure more in length. These measurements are greater than those taken from herbarium sheets and published in Gard. Bull. Sing. 16 (1958) 339 as length 25–40 cm.; breadth 10–16 cm.; petiole 2–3 cm. long; nerves 23–30 pairs. No. doubt the maximum length of other large-leaved species will also be greater than what the measurements from herbarium specimens show.

(2) Myristica papyracea J. Sinclair, sp. nov.—Fig. 1.

Species valde affinis M. maximae a qua foliis flavidis in sicco, inflorescentia compacta, breviore, dense brunneo-tomentella, pedicellis brevioribus atque crassioribus, bracteolis majoribus, floribus magis coriaceis, fructibus nitido-glabris inter alia recedit.

Arbor excelsa, 22–37 m. alta, radicibus epigeis nonnullum praedita. Cortex atro-griseus, assulas tenues papyraceas abscidens (in arboribus juvenilibus assulae probabiliter subnullae); latex roseus exilis. Ramuli sat crassi, glabri, atro-brunnei, supra in partibus apicalibus fere leves, 5–8 mm. in diam., infra in partibus adultis rugulosi vel excidentes, 8 mm.–1.2 cm. in diam. Folia coriacea glabra, supra in vivo atro-viridia, nitida, subtus pallida,
Fig. 1. Myristica papyracea J. Sinclair.
Sinclair — Myristica

135

supra in sicc vel in foliis delapsis flavo-viridia etiam nitida, subitus flavo-brunnea, oblongo-ovobata vel saepe late oblonga, 23-40 cm. longa, 10-18 cm. (vulgo 13 cm.) lata, apice obtusa vel rotundata, basi plerumque cordata vel saepe rotundata; nervi 20-25-jugati, obliqui, paralleliter striati, fusco-tomentella, brevi-ramosa, ramuli 2-3; flores apicibus ramulorum fasciculati. Perianthium masculum 6-7 mm. longum, 5 mm. latum, coriaceum, extus fusco-tomentellum, intus glabrum, in lobos tres, acutos, ovatos \( \frac{1}{4}-\frac{3}{4} \) -fissum, bracteola obtusa, mox decidua, perianthia fere aequilonga; pedicelli striati, 4-8 mm. (vulgo 5 mm.) longi; columna staminalis oblongo-cylindrica, 4 mm. longa, apiculus obtusus, stipites sterilis 2 mm. longus, antheris aequilongus, glaber, antherae 9-10. Inflorescentia feminine ut in mascula. Flores femininei masculis quoque similes, sed ab eis perianthii lobis patentioribus, pedicellis breviornibus, 4-5 mm. longis differentes; ovarium ovoideum, 3 mm. longum, ferrugineo-tomentosum, stigma bilobatum glabrum. Fructus oblongus, ligneus, 8-9 cm. longus, 4-5 cm. latus, glaber, flavus in vivo, nitidus, atro-fuscus vel nigrescens in siccum; stipites 3 cm. longus. Semen 6 cm. longum, 3 cm latum, nitido-fuscum in siccum.

Lofty tree, 22-37-(43) m. high, sometimes with stilt-roots. Bark dark grey, flaking in thin papery strips (in young trees these flakes probably not present); sap pink, not copious. Twigs quite stout, glabrous, dark brown, nearly smooth and 5-8 mm. in diam. in the apical parts, slightly wrinkled, or flaking and 8 mm.-1.2 cm. in diam. in the old parts. Leaves coriaceous, glabrous, dark green and shining above when fresh with a pale lower surface, yellowish green when dry or in fallen leaves, also shining above, yellowish brown beneath, oblong-ovobate or often broadly oblong, apex obtuse or rounded, base mostly cordate, often rounded; nerves 20-25 pairs, oblique, parallel, depressed above, prominent and raised beneath; reticulations few, scalariform, inconspicuous or often not visible; length 23-40 cm; breadth 10-18 cm., average 13 cm.; petiole 3-5.5 cm. long, average 4 cm. Male inflorescence 2-5 cm. long, flattened, dark brown-tomentulose, longitudinally striate, slightly branched with 2-3 short branches and the flowers fascicled at the ends of the branches. Male perianth 6-7 mm. long and 5 mm. broad, coriaceous, dark brown-tomentulose outside, glabrous inside, split down \( 1\frac{1}{4} \) into the three acute, ovate lobes, bracteole obtuse, early deciduous, almost as long as the perianth; pedicelli striati, 4-8 mm., average 5 mm. long and 1.5 mm. thick, thickening up to 2.5 mm. at their apices; staminal column oblong-cylindrical, 4 mm. long, with a minute, obtuse apiculus, stalk equal to the anthers, 2 mm. long, glabrous; anthers 9-10. Female inflorescence as in the male. Female flowers similar to the male, the lobes of the perianth
Gardens' Bulletin, Singapore — XXIII (1968)

more patent, the pedicels shorter, 4-5 mm. long; ovary ovoid, 3 mm. long, rusty-tomentose, stigma bi-lobed, glabrous. Fruit oblong, woody, 8-9 cm. long, 4-5 cm. broad, glabrous, yellow when fresh, dark brown or becoming black and glossy when dry: stalk 3 cm. long. Seed 6 cm. long, 3 cm. broad, dark brown and shining when dry.

BORNEO SARAWAK:

1st Division:—slopes of Gunong Gaharu, Serian, Sungai Sabal Tapang, Nahar SAR 12680 (SAR) and Sinclair 10233 (A, B, E, K, L, SAR, SING).

4th Division:—Ulu Sinrok, Similajau F.R., Ashton SAR 18329 (L, SING).

EAST AND NORTH-EAST BORNEO:

Berouw, Mt Ilas Bungaan, Kostermans 13878 (CANB, K, L, SING); West Kutei, Bukit Lajang, bb16162 (BO, L); East Kutei, Sungai Susuk Region, Kostermans 5732 (BO, K, L, PNH, SING); Mentawir River Region, Ballikpapan District, Kostermans 10150 (CANB, K, L, P, SING).

BRITISH NORTH BORNEO:


CULTIVATED:


DISTRIBUTION:

Borneo except West and South Borneo.

TYPE MATERIAL:

Wood A4775 (A, KEK, L, MEL, SAN, SING holotype).

A lofty tree from Borneo with thin, papery, flaking bark, leaves drying yellowish or some bright shade of yellow, a short, dark brown rusty-tomentulose inflorescence and a glabrous fruit. It is nearest to M. maxima in vegetative characters but takes after philippensis in floral ones, especially the size of the bracteole, the nature of the tomentum on the perianth and in the stalked staminal column. Regarding the colour of the leaves on drying, there is one specimen Kamis 4280 in which the colour is not yellowish but dark brown like that in maxima. Otherwise the yellow colour seems to be fairly constant and should help in distinguishing the two species. There should be no difficulty at all when flowers are present. The perianth is much more coriaceous and thicker than that of maxima; the pedicels, too, are thicker, especially the male. The thick perianth is the most striking difference; others, including the shorter male inflorescence axis, are given in the accompanying table.
Differences between *M. maxima* and *M. papyracea*

<table>
<thead>
<tr>
<th>Characters</th>
<th><em>M. maxima</em></th>
<th><em>M. papyracea</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bark</td>
<td>Not generally flaking (perhaps there is flaking in very old trees).</td>
<td>Flaking in thin papery portions.</td>
</tr>
<tr>
<td>Leaves</td>
<td>Drying black or dark brown above and greyish or blackish brown beneath.</td>
<td>Drying greenish yellow or greenish brown above and yellow or yellowish brown beneath. Useful in identification.</td>
</tr>
<tr>
<td>(1) Colour</td>
<td>Oblong, less often oblong-obovate.</td>
<td>Broadly oblong or oblong-obovate.</td>
</tr>
<tr>
<td>(2) Shape</td>
<td>Rounded or acute at the base, occasionally subcordate.</td>
<td>Cordate or sub-cordate, less often rounded.</td>
</tr>
<tr>
<td>(3) Base</td>
<td>Long and lax, glabrous or glabrescent with some short, sparse, greyish tomentum.</td>
<td>Much shorter and more condensed with dark brown, short tomentum.</td>
</tr>
<tr>
<td>Male inflorescence</td>
<td>Short with a few branches. Tomentum when present as in the male.</td>
<td>Short but with stouter or more rigid branches. Tomentum dense as in the male.</td>
</tr>
<tr>
<td>Female inflorescence</td>
<td>Slender.</td>
<td>Shorter and thicker.</td>
</tr>
<tr>
<td>Pedicels</td>
<td>About half as long as the flower.</td>
<td>Nearly as long as the flower.</td>
</tr>
<tr>
<td>Bracteoles</td>
<td>Perianth 4-6 mm. long when dry, thin, sparsely tomentulose outside with greyish or greyish brown hairs, becoming glabrous. Staminal column sessile or stalk 2 mm. long. Anthers 6-10.</td>
<td>Perianth 6-7 mm. long, more coriaceous, dark brown tomentulose outside, the tomentum much denser. Stalk of staminal column 2 mm. long. Anthers 9-10.</td>
</tr>
<tr>
<td>Female flowers</td>
<td>Perianth thin, tomentum as in the male.</td>
<td>Perianth more coriaceous, tomentum as in the male.</td>
</tr>
<tr>
<td>Fruit</td>
<td>Rusty brown-tomentulose.</td>
<td>Glabrous and shining except when very young.</td>
</tr>
</tbody>
</table>
(3) **Myristica philippensis** Lamarck Hist. Acad. Roy. des Sc. Paris 

Tree 6–15 m. high. *Bark* blackish brown, longitudinally fissured. *Twigs* glabrous except the innovations and terminal bud which are covered with light or less often dark brown, 1–2 mm. long, adpressed hairs, stout, 3–4 mm. thick at the apex, lower down dark reddish brown, sometimes with a purplish tinge and longitudinally striate and finally, in the oldest parts, 4–5 mm. thick, dark greyish brown and fissured. *Leaves* varying somewhat in texture, size and shape, chartaceous to coriaceous, rather brittle, oblong, oblong-obovate or less often oblong-lanceolate, glabrous, medium green and slightly glossy above with paler midrib and veins, drying a dark brown if thin, and usually a medium brown with an olive tinge if thick, dull or at times retaining some gloss, glaucous beneath or paler green with yellowish green midrib and nerves, the latter brown when dry, apex acute, rounded or in very large leaves occasionally sub-cordate; midrib flat above and

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*Miq. Fl. Ind. Bat. There are two volumes both numbered 1. The above reference is in the alternate volume. It may also be quoted as 12.*
Fig. 2. *Myristica philippensis* Lamarck.

lying in a groove, prominent beneath; nerves 18–30 pairs, oblique and nearly parallel, equidistant, sunk above, raised and prominent beneath; length 18–45 cm., rarely 50 cm., average 30 cm., breadth 6–14 cm., average 10 cm., petiole stout, 2–3 cm. long. Male inflorescence a large panicle, the oldest about 6–10 cm. long, several arising laterally on each side of the youngest portions of the twigs, i.e. on the innovations of the present year’s growth, these inflorescences developing in basifugal succession towards the terminal bud which usually remains unopened at the time of flowering (see note below), the main axis of each individual inflorescence and the axis of its branches flattened and light brown or greyish brown, adpressed-tomentulose, the branches opposite, ending dichotomously in 3 flowers or in fascicles of 4–6 flowers, the youngest or apical flower in the centre; bracts of the inflorescence conspicuous and numerous but soon deciduous, leaf-like and acute at the apex, the largest up to 2 cm. long. Female inflorescence as in the male, but much shorter, 2–3 cm. long, with fewer branches and fewer flowers. Male flowers rather fragile, tomentulose outside with the same kind of tomentum as on the inflorescence axis, bracts and pedicels, glabrous inside, sub-globose or ovoid in bud, obtuse at the apex, 5–8 mm. long and 5–6 mm. in diameter, split down at the apex into the 3 obtuse, rather erect perianth lobes; bracteole at the base of the perianth, half surrounding it, thin, 1–3 lobed and obtuse at the apex, 4–6 mm. long; pedicels slender, 7 mm.–1 cm. long and 1–1.5 mm. thick; staminal column cylindrical or club-shaped, the fertile part 4–5 mm. long and the sterile, pilose stalk 1.5–2 mm. long, anthers 8–10 (Warburg states 14–20), extending right up to the obtuse apex of the column with a very short sterile portion or sometimes without any. Female flowers similar to those of the male, but slightly larger, up to 9 mm. long, more coriaceous and with the perianth segments reflexed and slightly acute at the apex; ovary ovoid, 4 mm. in diam., adpressed-tomentose, narrowed at the apex into the glabrous, bifid stigma; pedicels 4–5 mm. long. Fruit tomentulose or minutely and shortly rusty-brown-tomentose, but varying a good deal in the amount of tomentum and in the time it persists, sometimes nearly glabrous before maturity or not glabrous at all, oblong and obtuse at both ends, occasionally sub-globose or sub-globose only when young, 5–8 cm. long and 3–4 cm. in diam. (a 12 cm. long fruit was once collected from a tree cultivated in Madagascar), the wall thick but getting thinner as the fruit ripens; stalk 5–8 mm. long and 5 mm. thick. Seed narrowly oblong, conform to the fruit, dark brown and slightly glossy when dry.
Fig. 3. *Myristica philippensis* Lamarck.

PHILIPPINES s.l.:

Loher Nos. 6717 (K, M, US) & 6719 (K, M); Sonnerat s.n. (G).

MINDORO:

Bongabong River, Merritt 3686 (K).

LUZON:

Prov. Ilocos Norte:—Klemme 7128 (US); Merrill & Darling 13873 (BO, CAL); Bangui to Claveria, Ramos 33020 (BO, CAL, L); Bangui, Parañaque 31260 (NY).


Prov. Isabela:—Ilagan, Vidal 3569 (K).

Prov. Ilocos Sur:—Paraiso nos. 13005 (BO); 23619 (A, US) & 25464 (A).


Prov. Zambales:—Maule 385 (US); Medina 23545 (US); Botolan, Merrill 2984 (BM, K, NY, US); Elgincolin 27840 (UC).


Prov. Rizal:—Ahern’s Collector 3190 (BO, K, NY, US); Loher Nos. 13918 (M, UC) & 15050 (A); Botanic Garden, Manila, Loher Nos. 4194 (K) & 6713 (K, M) with Knema glomerata also mounted on sheet; Manila, Calawan, Callery 33 (P); Antipolo, the following three, Ahern’s Collector 99 (A, NY); Merrill 178 (A, BM, BO, CAL, K, L, NSW, NY, P, US, W) & Vidal 855 (FI, K, L); Bosoboso, Merrill 2834 (BM, K, NY, US); Ramos 1053 (A, BO, CAL, NY, US); Loher 5195 (CAL, K, M, US); Bosoboso, San Jose, Morong, Vidal 1678 (FI, K, L); Tanay, Merrill 2304 (A, K, NY, US).

Prov. Laguna:—Los Baños, Elmer 8314 (BO, BP, CAL, E, FI, K, NY); Dahican River, Ramos 1118 (BRSL, FI, G, M, U, US, Z); San Antonio, Ramos 20531 (P, US); Mt. Makiling, Canicosa 9716 (PNH); Forestry School 20111 (US); Foxworthy Nos. 9 (A); 31 (US); 54 (US) & 20th Nov. 1914 (US); M.D. Sulit Nos. 2 (A); 5 (NY) & 3431 (PNH); Whitford 19730 (K, L, P).

Didrichsen, Galathea Expedition, ex Herb. Wallich Nos. 2129 (C) as M. macrophylla, probably an error for M. macrocarpa Bl. & 2134 (C) as M. sylvestris (non Houtt.) Sieber; Gaudichaud, date 1837 (CAL, G, P) voyage of the Bonite; Griffith 4333 (K, P) as M. grandiflora Wall. & M. madagascariensis (non Lamk) Vent.; Wall. Cat. Nos. 6800a (BM, CAL, E, K) & 6800b (BM, BR, CAL, CGE, E, G & Prodr., K, M) as M. sylvestris (non Houtt.) Sieber, and M. grandiflora Wall. both introduced from Mauritius. The epithet grandiflora does not appear in Wall. Cat. but is taken from the herb. sheet, Wall. Cat. 6800b (K).
MARTINIQUE:

DISTRIBUTION:

TYPE MATERIAL:

St Pierre, Hahn 1137 (K, P); Hohenacker 784 (M).

Philippines.

M. philippensis Lamk, Sonnerat s.n. (G, P herb. Juss. holotype). M. commersonii Bl., Commerson s.n. date 1821 (G & Prodr., L) M. muscadier palla bois. M. macrocarpa Bl. This is the nux moschata quarta seu oblonga et maxima of Camello in Ray, Hist. Pl. 3 append. p. 58 (without description). There is no type specimen preserved but Blume names it M. macrocarpa by reference to trees in Hort. Bot. Manila ex Mt Balete & St Matheus and Camello’s publication. He apparently did not see any connection between it and philippensis. Warburg states that it cannot be proved absolutely that the two are the same although most probably they are. The only other species it could be is M. ceylanica (cumingii) and to this I also agree. M. luzonica Blanco, several plants from several localities mentioned, but no type specimen preserved. M. bracteata A.DC. Bojer, date 1833 (G Prodr.); Callery 33 (P); Cuming 1481 (BM, C, CGE, FI, G & Boiss., K, L, M, NY, P, UPS); Wall Cat. 6800 (BM, BR, CAL, CGE, E, G & Prodr., K, M); Du Petit Thouars s.n. (G & Prodr., P); Sieber 365 (BP, BR, E, G & Prodr. & Boiss., L, NY) etc. See A.DC. Prodr. p. 192. M. bracteata var. longifolia A.DC., Cuming 829 (BM, CAL, CGE, FI, G & Boiss., K, MEL, P). M. grandiflora Wall. Cat. 6800b, see note above under CALCUTTA.

VERNACULAR NAMES:

Bagir (Ilk.); balintua (Sub.); dogan (Tag., Bik.); dugan (Tag.); dugoan (Tag.); dugon (Tag.); duguan, the most widely used name (Tag., Pamp.); durugo (Tag.); hindurugu-babae (Tag.); kuta (Ting.); lagu (Yak.); mabolonggubat (Tag.); malamabolo (Pang.); matumbau-babae (Tag.); mundara (Ilk.); palong (Ilk.); paraya (Pamp.); pau (Ting.); talang-talang (Tag.); talihagan (Neg.); tambalau (Sbl., Tag.); tambalau-babae (Tag.); tambau (Tag.); tatalong (Sub.).

A common species, widely distributed in the Philippines from low and medium altitudes up to 1,000 ft. and hence some variation in the leaves and in the tomentum of the fruit. King confused the Malayan M. maxima with this species. He called the Malayan plant bracteata A.DC. He states, however, that he had not seen any Philippine specimens. He saw the specimens cultivated in Calcutta from Mauritius but failed to distinguish them from the Malayan. He was not in a fortunate position since the Malayan plant was then known only from three collections. The leaves of philippensis are like those of maxima but less coriaceous and do not usually dry a black colour. The inflorescence is smaller, less laxly branched and with thicker branches and stouter pedicels. The bracts are larger and bracteata would be a good name if it had had priority. The bracteoles, too, are larger and the whole inflorescence, including the flowers is covered with a denser and more brownish coloured tomentum than in maxima. The fruit,
also, is more densely tomentose especially in the younger stages. Sterile specimens of *philippensis* can at times be confused with those of *M. ceylanica* (*cumingii*). The leaves are generally larger and the twigs thicker in the former, but I have seen material of *philippensis* with small leaves and thin twigs which if sterile would be impossible to distinguish from *ceylanica*, especially *ceylanica* with large robust leaves. The nearest relative to *M. philippensis* in New Guinea is *M. uncinata*. See notes under that species. The flowers appear before the leaves in the Philippines where there are marked dry and wet seasons. However, in the damp climate of Bengal the leaves probably appear before or at the same time as the flowers. This is actually seen in *Didrichsen 2129* and *2154* ex Herb. Wallich from Calcutta where the leaves above the flowers are well developed. See also heading “Inflorescence” in the Introduction.

The plant quoted as *M. philippensis* Lamk by Markgraf in *Bot. Jahrb.* 67 (1935) 158 (Schlechter 16789) from New Guinea is *M. markgraviana* A.C. Sm.

*Myristica philippensis* Lamk, cultivated in Mauritius and Calcutta has been wrongly identified and quoted in the other literature as *M. sylvestris* Houtt. and also as *M. madagascariensis* Lamk, the latter now in *Brochoneura*. See under CULTIVATED above, where they are mentioned in detail. It was at that time thought to be native in Mauritius. Sieber and Ventenat were responsible for these errors in identification. *M. sylvestris* Sieber or sensu Sieber has nothing to do with *M. sylvestris* Houtt. which is now *Horsfieldia sylvestris* (Houtt.) Warb. *Myristica madagascariensis* Vent. or sensu Vent. is not *M. madagascariensis* Lamk now a synonym of *Brochoneura acuminata* (Lamk) Warb. but *M. philippensis* Lamk. Bojer in his catalogue *Hort. Maurit.* (1837) 275 also refers to *M. madagascariensis* Lamk but again the citation should not be Lamarck but (non Lamk) Bojer. This catalogue contains a list of names of plants with their localities only but no descriptions or valid publications of new species. Alphonse de Candolle in his *Prodromus* sorted out the erroneous names of Sieber and Ventenat and placed them as synonyms of his *M. bracteata*. This name, of course, has now to be replaced by the older *M. philippensis* Lamk.

2. SERIES UNCINATAE

series *Uncinatae* J. Sinclair, ser. nov.

*Ramuli* in partibus apicalibus 5 mm. crassi. *Gemma terminalis* apice uncinata, pilis appressis 1 mm. longis induta. *Folia* coriacea, magna 18–47 cm. longa, 5.5–15 cm. lata; nervi 16–22-jugati, obliqui, leviter curvati; nervi secundarii et reticulationes nulli. *Flores masculi* nondum collecti. *Flores feminei* (in *M. uncinata* tantum visi), pauci, pro genere maximi, 2 cm. longi, ellipsoides, pilis 2 mm. longis fuscis appressi, in lobos uncinatos ½-fissi; pedicelli 1 cm. longi. *Fructus* magnus vel modicae dimensionis, 4–9 cm. longus, 4–6 cm. latus, tomentosus.

TYPE SPECIES: *M. uncinata* J. Sinclair.
Twigs 5 mm. thick and dark brown-pubescent on the apical portions, glabrous and coarsely longitudinally striate in the older portions, the terminal bud stout and in *M. uncinata* uncinate at the apex with 1 mm. long, adpressed, dark brown hairs. *Leaves* coriaceous, oblong or elliptic-oblong, drying a rich medium brown or a greyish brown above, whitish or cinereous-glaucous beneath, large size-class, 37–47 cm. long in *umbrosa* and smaller, 18–30 cm. long in *uncinata*, 5.5–15 cm. broad, 10.5 cm. being the maximum in *uncinata*, base mostly rounded, sometimes cuneate in younger leaves, apex acute; midrib prominent and in *uncinata* the lower midrib sometimes with dark brown hairs, soon glabrous; nerves 16–22 pairs, prominent, oblique but slightly curved, secondary nerves absent; reticulations more or less absent; petiole 1.5–4 cm. long, rather stout. *Inflorescence*, the female only seen, 5 mm.–1 cm. long, flattened, simple or with a few branches, section I type. *Flowers* known only from the female in *uncinata*, rather remarkable, being the largest in the genus, 2 cm. long, ellipsoid in bud with 2 mm. long, adpressed, dark brown hairs, similar to those on the innovations, inflorescence axis and pedicels, split down ½-way into the acute, reflexed or uncinate lobes; ovary 5 mm. in diam., densely pilose; pedicels 1 cm. long. *Fruit* large or medium-size, 4–9 cm. long and 4–6 cm. in diam., densely dark chocolate-brown, tomentose or tomentulose, sub-globose, ellipsoid when young; stalk 5 mm.–2.5 cm. long and 5 mm. thick — 2 species, *M. umbrosa* and *uncinata*.

A small series with large leaves near to series *Maximae* and series *Hooglandiae*. It is unfortunate that the male inflorescence and male flowers are absent in its two species as this would have told us more about the relationship of the series to its neighbour-series *Maximae* and *Hooglandiae*. However, from the remarkable female flowers which are present in *M. uncinata*, it is possible to predict, to a certain extent, what the male flowers and inflorescence will be like. The male flowers in *Myristica* are nearly always smaller than the female with the same colour of indumentum. Where the female flowers are lacking in *M. umbrosa* we still can tell the colour of their indumentum from that of the fruit which is present. This then means that the male inflorescence and flowers in *umbrosa* will be densely reddish brown-tomentose and dark chocolate brown-tomentose in *uncinata*. The size, appearance and shape of the inflorescence axis and flowers will be less certain. However, the inflorescence is probably laxly branched and fairly long but not so long as in *M. maxima*. It will probably reach 6 cm. or more and the flowers will be larger but not so large as the female flowers of *uncinata*. Their shape would either be oblong or ellipsoid like the female of *uncinata*. So thus we have a series differing from series *Maximae* in its larger, and fewer but more tomentose male flowers and densely tomentose inflorescence axis, being on analogy with series *Maingayae* which also differs from *Maximae* in the rusty-tomentose and differently shaped (oblong) flowers. The tomentulose or nearly glabrous inflorescence axis and flowers of series *Hooglandiae* would then compare with or be on an analogy with those of series *Malabaricae*. 
Series *Hooglandiae* is separated from series *Uncinatae* chiefly by the absence of secondary nerves in the leaves of the latter, but also by the flowers and inflorescence densely tomentose in *Uncinatae* and tomentulose or nearly glabrous in *Hooglandiae*. There are other differences too, such as the more distinct primary nerves and the shape of the staminal column in series *Uncinatae*.

(4) *Myristica umbrosa* J. Sinclair. *sp. nov.*—Fig. 4.

Species ex affinitate *M. uncinatae* a qua foliis magis coriaceis, supra in sicco praeclaro-brunneis, nitidis, fructibus modice brunneis, tomentellis distinguitur.

Arbor 18–26 m. alta, radicibus epigeis interdum praedita. *Cortex* nigro-brunneus, longitudinaliter fissuratus et assulas tenues abscidens; latex roseus. *Ramuli* in partibus apicalibus 5 mm. crassi, atro-brunnei, tomentelli vel (gemma terminali inclusa) cinereo-brunnei, tomentelli, infra in partibus adultis 5–8 mm. crassi, glabri, rugosi valde longitudinaliter striati. *Folia* rigide coriacea, oblonga vel elliptico-oblonga, supra in vivo nitida, in sicco praeclaro-brunnea, nitida sed non semper, subitus glauca vel albido-squamulosa, apice acuta, basi cuneata vel in foliis vetustioribus rotundata, 37–47 cm. longa, 8.5–15 cm. lata; costa prominens, lata, utrinque elevata, supra prope basim foliae plana; nervi 18–22-jugati, utrinque elevati, gradatim ascendentes et curvati, subitus in sicco brunnei; reticulationes non generaliter visae sed interdum supra visibles, paucae, tenuissimae, scalariformes; petiolus 2–4 cm. longus, profundè canalicularus, marginibus involutus provisus. *Inflorescentia fructifera* tantum visa; axis brevissimus, 5 mm–1 cm. longus, applanatus, simplex vel bifurcatus. *Flores masculi* femineique non visi. *Fructus* unicus vel bini, dense molliter tomentellus modice brunneus, late ellipsoideus in juventute, oblongo-ovoideus (vel probabiliter subglobosus) in senectute, in sicco apice leviter acutus vel apiculatus, 6.5–9 cm. longus, 4.5–5 cm. latus, cum lineo suturali prominenti; stipes 5 mm–1 cm. longus, 5 mm. crassus. *Arillus* roseus. *Semen* in vivo fere nigrum, in sicco atro-fuscum nitidum, 4.5 cm. longum, 2 cm. latum.

Tree 18–26 m. high, sometimes with stilt-roots. *Bark* blackish brown, longitudinally fissured and flaking in thin portions; sap red. *Twigs* 5 mm. thick and dark brown-tomentulose or (including the terminal bud) ashy-brown tomentulose in the apical portions, 5–8 mm. thick, glabrous, rugose and coarsely longitudinally striate lower down in the older parts. *Leaves* rigidly coriaceous, oblong or elliptic-oblong, glossy above when fresh, drying a rich, medium brown and often glossy also, but not always, lower surface glaucous or whitish with minute scales, apex acute, base cuneate or in the older leaves rounded; midrib prominent, broad, raised on both surfaces, but flat near the base on the upper surface; nerves 18–22 pairs, raised on both surfaces, gradually ascending and curving, brown on the lower surface when dry;
Fig. 4. Myristica umbrosa J. Sinclair.

reticulations not generally present, but now and then visible on the upper surface, few, very slender, scalariform; petiole 2-4 cm. long, deeply channelled with inrolled margins; length 37-47 cm.; breadth 8.5-15 cm. Inflorescence axis (seen only in the fruiting material) very short, 5 mm.-1 cm. long, flattened, simple or with two branches (not tuberculate with scars as in Knema). Male and female flowers unknown. Fruit single or in pairs, densely and shortly tomentulose, of a rich medium brown shade, broadly ellipsoid when young, oblong-ovoid (or probably subglobose) when mature, 6.5-9 cm. long and 4.5-5 cm. broad, the apex acute or apiculate (see note below), the line of the suture prominent; stalk 5 mm.-1 cm. long and 5 mm. thick. Aril pink. Seed almost black when fresh, dark brown and shining when dry, 4.5 cm. long and 2 cm. broad.

NEW GUINEA PAPUA:  Northern District:—Kokoda, Carr 16410 (BM, CANB, K, L, SING); about 1 km inland from Iwaia Village, Robinson Bay, Hoogland & MacDonald 3421 (CANB); about 3 km north of Divinikoari Village, Hoogland 3522 (A, BM, CANB, K, L, LAE, US).

T.N.G. Central District:—Sogeri Region, Lane-Poole 206 (BRI).

Morobe District:—Busu Hills near Lae, Floyd N.G.F. 5634 (LAE); Morobe, Womersley N.G.F. 2957 (BRI, CANB, K, LAE).

DISTRIBUTION:  Known only from the above collections.

TYPE MATERIAL:  Carr 16410 (BM, CANB, K holotype, L, SING).

VERNACULAR NAMES:  Inene (Sogeri Region); po'i (Orokaiva language, Iwaia Village); sopa (Orokaiva language at Mumuni).

A handsome species, conspicuous by the large leaves with a white under-surface, and drying a rich medium brown on the upper surface. It has a limited distribution and ascends to 370 m. (1,200 ft.) on ridges and lower hill slopes. Because of the large leaves, affording shade and casting a shadow, I have named it *umbrosa*. The leaves and fruit recall those of *M. philippensis* (series Maximae) but I have placed it in series Uncinatae as it is closer to *M. uncinata*. Unfortunately both male and female flowers are unknown but they are probably large like those of *uncinata* which I have kept out of series Maximae chiefly on account of the larger flowers and their different shape. The leaves of *M. umbrosa* are larger and more coriaceous than those of *M. uncinata* and dry a lighter shade of brown. The colour of the fruit is a medium brown with shorter hairs and not the dark chocolate colour of *M. uncinata*.

Here are some further notes on the fruit of *M. umbrosa*. The rather large fruit is ellipsoid when young and oblong-ovoid when older, but I think its shape is really nearly subglobose when mature and without an acute or apiculate apex. With the Canberra duplicate of Hoogland & MacDonald 3421 are a number of dry
fruits in a bottle. These have shrunk very much on drying and the walls have collapsed, accentuating the acute apex and the ellipsoid shape. In other fruits preserved and pressed, but rather squashed on the herbarium sheet, Womersley 2957, the shape is almost globose while that of Carr 16410 from the Canberra collection, also preserved in a bottle, is oblong-ovoid and not ellipsoid. In this specimen, the walls have shrunk less, but even here the fruit would tend towards a more globose shape still, had there been no apical shrinkage. I have, many times, observed the effects and distortions caused by drying the fruits of other Myristica species in the sun. Those with a globose fruit appear quite altered in shape and tend to be ellipsoid when thus dried, more so if halves or longitudinal sections are selected. Young fruits are usually at first pointed at each end and appear to have a beak (Hoogland 3522) and also cf. M. fusca, but they “fill out” and tend to be more sub-globose as they mature, the pericarp-wall becoming thinner and thinner.

(5) Myristica uncinata J. Sinclair, sp. nov.—Fig. 5.

Species affinis M. philippensi a qua nervis foliorum paucioribus, supra minus insculptis, floribus ellipsoidis non subglobovis, dense atro-brunneis pilosis, apice uncinatis, fructibus subglobovis, atro-brunneis non modice brunneis nec ferrugineis differt.

Arbor 30 m. alta. Cortex non visus, Ramuli in partibus hornotinis fusco-pubescentes, saepe striati, in anotinis rugulosi, glabri; gemma terminalis pilis atro-brunneis 1 mm. longis appressis dense obiecta, apice uncinata. Folia tenuiter coriacea, oblonga, glabra nisi ad costam inferiorem foliorum junioriorum, in sicco supra griseo-brunnea vel modice brunnea et subtus cinereo-glaucia nervis costaeque atro-brunneis, apice acuta vel obtuse acuta, basi rotundata; 18–30 cm. longa, 5.5–10.5 cm. lata; costa prominens, utrinque plana vel leviter elevata; nervi 16–20–jugati, obliqui, nonnunquam irregulariter curvati, supra graciles, leviter insculpiti, subtus elevati, magis distincti; reticulationes nullae; petiolum 1.5–2 cm. longum. Inflorescentia (feminea tantum visa); axis applanatus, 1 cm. longus, pilosus, 1–2–florus, ex ramulo hornotinoto folioso ortus. Flores femininei coriacei, in alabastro ellipsoides, extus piloso, pilis atro-brunneis 2 mm. longis appressis praediti, intus cremei, glabri, 2 cm. longi in lobos acutos uncinatos et reflexos †-fissi; pedicelli 1 cm. longi, fusco-pilosi; bracteola rigida, mox decidua, parte basali persistente, semi-circulari, margine incrassato leviter insculpito; ovarium ovoideum, 5 mm. in diam., dense pilosum; stylus glaber (stigma bilobato incluso) 2–3 mm. longus. Fructus subglobovis, nigro-brunneus vel coffeato-tomentosus, 4–6 cm. in diam.; stipes 2.5 cm. longus, 4–5 mm. crassus. Semen oblongum 3.5 cm. longum, 2.3–2.5 cm. latum.

Tree 30 m. high. Bark not seen. Twigs dark brown-pubescent and often striate in the portions of the present year’s growth, glabrous and rugulose in those of the previous year’s; terminal bud uncinate, densely covered with adpressed, 1 mm. long, dark
Fig. 5. Myristica uncinata J. Sinclair.
brown hairs. *Leaves* thinly coriaceous, oblong, glabrous except for some 1–2 mm. long simple hairs on the lower midrib of the younger leaves, drying greyish brown or medium brown above and cinereous-glaucous with dark brown nerves and midrib beneath, apex acute or obtusely acute, base rounded; midrib prominent, flat or slightly raised on both surfaces; nerves 16–20 pairs, oblique but sometimes rather crooked, slender above and slightly grooved, raised beneath and more distinct; reticulations absent; length 18–30 cm.; breadth 5.5–10.5 cm.; petiole 1.5–2 cm. long. *Inflorescence* (the female only seen): the axis flattened, 1 cm. long, pilose, 1–2-flowered, arising near the apex on leafy twigs of the present year's growth. *Female flowers* coriaceous, ellipsoid in bud, 2 cm. long, pilose outside, with adpressed, 2 mm. long, dark brown hairs, similar to those on the innovations, inflorescence and pedicels, glabrous and cream-coloured inside, split down ½-way into the acute, reflexed or uncinate perianth lobes; pedicels 1 cm. long, dark brown-pilose; bracteole rigid, early deciduous, the base persisting, semi-circular with a thickened, grooved margin; ovary ovoid, 5 mm. in diam., densely pilose; style glabrous, 2–3 mm. long, including the bi-lobed stigma. *Fruit* sub-globose, dark chocolate or coffee brown-tomentose, 4–6 cm. in diam.; stalk 2.5 cm. long and 4–5 mm. thick. *Seed* oblong, 3.5 cm. long and 2.3–2.5 cm. broad.

**NEW GUINA PAPUA:**

**Central District:**—Boridi, *Carr Nos. 14907 (CANB, K, L, SING) & 14908 (A, BM, CANB, K, L, SING).

**DISTRIBUTION:**

Papua, known only from the above.

**TYPE MATERIAL:**

*Carr 14907* (BM, CANB, K, L, SING holotype).

A rare or little-known tree, collected at altitude 1,385 m. (4,500 ft.). I have named it *uncinata* because of the hooked terminal bud and the perianth lobes, uncinate at the apex. The outstanding features are the large female flowers, the largest in the genus. They are ellipsoid in bud, cream-coloured on the inside, dark brown, densely pilose on the outside and have uncinate perianth segments. Other parts of the plant have this similar, dark-coloured tomentum, namely the terminal bud, young twigs, inflorescence axis, pedicels and ovary. The hairs on the sub-globose fruit, also of the same dark colour, are much shorter. There are very few *Myristica* species with this colour of tomentum and scarcely any so densely covered with such long hairs on the flowers. The leaves, however, are closest to those of *M. philippensis* and sterile material of *uncinata* can be readily confused with that species. When I first saw Carr's plant, I indeed thought it was *philippensis* with a new extension of its geographical range but was puzzled to find no records from Celebes or the Moluccas. The leaf of *philippensis*, however, has more veins and these are sunk and more deeply grooved on the upper surface of the leaf. *M. uncinata* is related to a group of species, all with somewhat similar characters. These species are *carrii*, *hooglandii*, *neglecta* and *umbrosa*. For other information see under these species.
3. SERIES HOOGLANDIAE

series Hooglandiae J. Sinclair, ser. nov.

Ramuli in partibus apicalibus 5–7 mm. crassi. Folia magna, 20–42 cm. longa, 6.5–13 cm. lata; nervi 16–30–jugati, tenuissimi, obliquiusculi, nervi secundarii inter primarios dispositi; reticulatae nullae. Inflorescentia mascula 5 mm.–2 cm. longa, complanata, simplex vel laxe ramosa, pauciflora, nonnunquam persistentes, saepé distichae. Flores masculi magni, 1–1.5 cm. longi, 5 mm.–1 cm. lati, ellipsoidei, tomentelli vel fere glabri, in lobos acutos \( \frac{1}{2} \)-fissi; pedicelli 8 mm.–1.5 cm. longi; stipes columnae staminalis quam pars fertilis angustior, an semper? (M. neglecta excepta, vide descr.). Fructus oblongus vel angusto-ellipsoideus, minute tomentellus, 4–7 cm. longus, 1.5–3.5 cm. latus; stipes gracilis, 1–1.5 cm. longus.

**TYPE SPECIES:**

*M. hooglandii* J. Sinclair

Twigs glabrous, smooth, purplish or brownish grey and 5–7 mm. thick in the apical parts, wrinkled and greyish brown in the older. Leaves mostly chartaceous, drying a medium brown or pale brownish grey above, very glossy and waxy as if varnished in *hooglandii*, glaucous, ash or whitish beneath, oblong, oblong-elliptic or narrowly elliptic, large size-class, 20–42 cm. long and 6.5–13 cm. broad; nerves 16–30 pairs, very fine and slender, slightly oblique; secondary nerves present; petiole 1.5–4 cm. long. *Male* inflorescence few-flowered, 5 mm.–2 cm. long, the axis flattened, simple or laxly branched. *Male flowers* large, 1–1.5 cm. long and 5 mm.–1 cm. broad, ellipsoid or ovoid-ellipsoid, greyish brown to golden-brown-tomentose or nearly glabrous, split \( \frac{1}{4} \)-way down into the acute lobes; pedicels 8 mm.–1.5 cm. long, slender with the bracteole at their apex; staminal column obtuse or truncate at the apex without a sterile apiculus, the stalk glabrous, shorter and much narrower than the fertile part, rather different in *neglecta* with an acute, sterile apex and a thick, adpressed-pilose stalk, the stalk nearly as broad as the fertile part but much shorter; bracts sometimes persisting, distichous in *M. carrii*. *Female flowers* more swollen than in the male, 6–8 mm. in diam., the lobes reflexed. *Fruit* oblong or narrowly ellipsoid, minutely rusty-tomentulose, 4–7 cm. long and 1.5–3.5 cm. broad; stalk slender, 1–1.5 cm. long — 3 species, *M. carrii, hooglandii* and *neglecta*.

The chief features are the large leaves with the fine venation of primary as well as secondary nerves, the rather short and lax inflorescence with few branches, the large flowers with very little indumentum, the slender pedicels, the variable staminal column, rather different in *M. neglecta* and the narrowly oblong, nearly glabrous fruit. *M. neglecta* and *hooglandii* are close to each other in their venation, while *carrii* has fewer secondary nerves. The flowers of *carrii* however, are closest to those of *neglecta*. However, *carrii* is probably nearest, after all, to *hooglandii*, their staminal columns being almost exactly alike while that of *neglecta* with an apiculus seems a bit out of place here. It is nearer to that of
M. papyracea in series Maximae but that of papyracea has a longer, glabrous stalk. The relationship to the other series of section I is discussed under series Uncinatae. Series Hooglandiae is confined to New Guinea.

(6) Myristica neglecta Warb. Monog. Myrist. (1897) 542 t. 17 f. 1–3; Markgraf in Bot. Jahrb. 67, 2 (1935) 170. — Fig. 6.

Tree 25 m. high. Bark brown, flaking in long narrow strips; wood reddish brown. Twigs (only the upper portion, 18 cm. long, present) stout, 7mm. thick, glabrous except the terminal bud, purplish brown, shining, nearly smooth. Leaves slightly coriaceous, but brittle on drying, dark green above, greyish green beneath, drying a greyish green above and greyish brown beneath, oblong, apex acute, base rounded or sub-cordate; midrib very distinct, raised on both surfaces, especially on the lower; nerves 30 pairs, oblique, parallel, sunk above, very fine and faint on both surfaces; reticulations absent; length 32–40 cm.; breadth 11–12.5 cm.; petiole glabrous, very stout, 4 cm. long and 5 mm. thick. Male inflorescence a non-tuberculate peduncle, 1.5–2 cm. long (may lengthen or branch later) bearing a condensed pseudo-raceme of flowers at the apex. Male flowers 1.3–1.5 cm. long and 6–8 mm. broad, narrowly ellipsoid, minutely greyish brown or golden brown-tomentulose outside, the apical teeth 2 mm. long or $\frac{1}{3}$ of the whole perianth, triangular, bluntly acute; staminal column 1.3 cm. long and with 8–10 anthers, the apical sterile portion 1.5 mm. long and acute, the stalk 3 mm. long, adpressed-pilose with light brown hairs; bractole amplexicaul, rigid, recurved, 1–3 mm. below base of perianth (always?); pedicels 1–1.4 cm. long and 1.5 mm. thick. Female flowers as long as the male, but broader and swollen at the base due to the flask-shaped ovary; pedicels shorter and thicker than in the male, about 6 mm. long; ovary tapering at the apex into the stigmas, densely covered with light brown, adpressed hairs. Fruit very immature, ellipsoid, narrowed to an acute or slightly apiculate apex, but probably becoming sub-globose later, 3 cm. long and 2 cm. broad; medium brown-tomentulose; stalk 7 mm. long and 3 mm. broad.

NEW GUINEA VOGELKOP (DUTCH WEST NEW GUINEA):

Ramoi, Sorong (Soron), Beccari Fl Acc. Nos. 7702 (Fl); 7703 (Fl); & 7704 (Fl); road from Steenkool to Tembuni at km 20.5, van Royen 3498 (CANB, K, L, SING, UC).

DISTRIBUTION:

Very rare. Confined to the above.

TYPE MATERIAL:

Beccari Fl Acc. Nos. 7702; 7703 and 7704 (all Fl).

A rare tree of primary forest at low altitude. Beccari’s material consists of a leaf and separate, detached male and female flowers. The leaf, on account of its very faint veins and because of its detachment led Warburg to doubt whether it belonged to the Myristicaceae. He suggested that it might be that of Fagraea. Beccari, however, was right. The leaf is genuinely that of Myristica as can be seen clearly in van Royen’s better material collected recently. The immature fruit is nearest to that of umbrosa, the-
Fig. 6. Myristica neglecta Warb.
tomentum slightly less. The leaves are rather similar also, but their veins are different, being fainter and more slender with numerous secondary nerves. *M. neglecta* is a problematic species, however, and I am not quite satisfied that I have it in the correct series. The staminal column is more like that of a section II species, being unlike that of *M. carrii* and *hooglandii*. The rather short inflorescence also is rather different but it may lengthen later. I can see no trace of bract or pedicel scars on the basal portion of it so it seems to be alright for that of a section I species. Some characters show a resemblance to those of series *Tenuiveniae*, especially to *M. bunchneriana* but the leaves are too large and lack the lax, yellow, powdery scales of that series. There is a trace of scales deeply embedded in the leaf tissue but these are of an ash grey, not different from what we see in section I cf. the closely allied series *Maximae* and *Uncinatae*. For this reason I cannot say that *neglecta* belongs to series *Tenuiveniae*. I should like to see more leaves. The flowers are too large for *Tenuiveniae* but not tomentose enough.

At a late date, long after the above notes were written, I insert this final paragraph. There is some resemblance between this species and large-leaved specimens of *cucullata*. Some of its flowers do show the scars of the bracteoles a little distance below the base of the perianth as in *cucullata*, but I do not know how far this is constant. It may be that *neglecta* belongs to series *Tubiflorae* and should be placed there next to *cucullata*. Its leaves, however, are larger than any known from that series and probably it is better to leave it in series *Hooglandiae* until we know more about it.

(7) *Myristica hooglandii* J. Sinclair, sp. nov. — Fig. 7.

Probabiliter *M. neglectae* affinis praecipue in aspectu foliorum, sed nervis magis distinctis, paucioribus, alabastris oblongis vel fere subglobosis, lato-lobis perianthii longioribus, obtusis, stipite columnae staminalis angustiore differt.

Arbor 12-20 m. alta. Cortex extus 5 mm. crassus, longitudinaliter fissus et abscidens, intus rubro-brunneus; latex atro-ruber. *Ramuli*, gemma terminali excepta, glabri, in partibus juvenilibus leves, purpureo-brunnei, in vetustioribus rugosi, griseo-brunnei. *Folia* chartacea vel tenuiter coriacea, oblongo-elliptica, vel angusto-elliptica, glabra, supra nitidissima (etiam in sicco), atro-viridia in vivo, modice brunnea in sicco, subitus albido-cinerea, 22-42 cm. longa, 6.5-11 cm. lata apice et basi acutiuscula, costa utrinque convexo-elevata; nervi 17–22–jugati, leviter obliqui, irregulariter curvati, graciles, utrinque prominuli, leviter elevati sed nonnunquam subobscuri, subitus modice brunnei, nervi secundarii breviore, gracillimi indistincti; reticulationes fere obsoletae; petioli 2-3 cm. longi. *Inflorescentia* lateralis vel subterminalis ex axilla bracteae orta, ipsa in ramulis brevibus lateralibus posita, applanata, 1-2 cm. longa, appresso pubescens, pauciflora (floribus 1–4). *Flores masculi* coriacei, odorati, ovoideo-ellipsoidei, 1.3-1.6 cm. longi, 8 mm. — 1 cm. lati, in alabastro oblongi vel fere subglobosi, extus griseo-brunnei, tomentelli, intus glabri, cremei, apice in lobos tres obtusos
Fig. 7. *Myristica hooglandii* J. Sinclair.

Gardens' Bulletin, Singapore — XXIII (1968)

$\frac{4}{1}$-fissi; pedicelli 1.3–1.5 cm. longi; bracteolae rigidae, subrotundatae recurvatae, apice pedicellorum affixaæ; bracteae bracteolis similes, diu persistentes; columna staminalis 5–6 mm. longa, 2.5–3 mm. lata, prismatica, in diam. triangularis, apice triangulariter excavata, antherae 12–13 in excavatione apicali inflexae; stipes tenuis brevis, quam columna angustior, glaber. *Flores feminei* masculis similes, sed ovoideo-globosi, 8 mm. in diam.; perianthium in lobos acutos reflexos partitum; ovarium ovideum, 6–7 mm. in diam., pilis appressis 2 mm. longis indutum; stigma glabrum, 1–2 mm. longum, bifidum. *Fruccs* lignosus, oblongus (immaturus subglobosus) 6–7 cm. longus, 3–3.5 cm. latus, primum ferrugineotomentellus, deinde subglaber; stipes 1 cm. longus. *Arillus* coccineus. *Semen* 3.5 cm. longum, 1.2 cm. latum, nigro-griseum, (pallido-stramineum in sicco).

Tree 12–20 m. high. *Bark* 5 mm. thick, longitudinally fissured and flaking; inner bark reddish brown; sap dark red. *Twigs* glabrous except for the terminal bud, smooth and purplish brown in the young parts, wrinkled and greyish brown in the older. *Leaves* chartaceous or slightly coriaceous, oblong-elliptic or occasionally narrow-elliptic, glabrous, very glossy on the upper surface, even when dry, dark green above, drying a medium brown, whitish beneath, somewhat acute at the base and apex, midrib convex and raised on both surfaces, nerves 17–22 pairs, slightly oblique, somewhat crooked, slender, faint and raised on both surfaces, but sometimes rather obscure, medium brown beneath; secondary nerves shorter, very slender and not distinct; reticulations not very clear; length 22–42 cm.; breadth 6.5–11 cm.; petiole 2–3 cm. long. *Inflorescence* with a flattened, 1–2 cm. long axis, few-flowered (flowers 1–4), arising in the axil of a bract and lateral or sub-terminal on a short, usually lateral branch of the present year’s growth, the terminal bud and other leaf-buds of which have still not opened at the time of flowering. *Male flowers* scented, coriaceous, ovoid-ellipsoid, 1.3–1.6 cm. long, 8 mm.–1 cm. broad, oblong or almost sub-globose in bud, greyish-brown-tomentulose outside, glabrous and cream-coloured inside, split $\frac{4}{1}$–way down into the obtuse perianth lobes; pedicels 1.3–1.5 cm. long; bracteoles rigid, sub-rotund, recurved, attached to the apex of the pedicels; bracts similar, persistent for a long time; staminal column 5–6 mm. long and 2.5–3 mm. broad, prismatic, more or less triangular in cross-section with a shallow, triangular depression at the apex, stalk short, slender, glabrous; anthers 12–13, extending to and bent back into this apical depression (cf. some species of *Horsfieldia* and *M. philippensis*). *Female flowers* as in the male, but ovoid-globose, 8 mm. in diam., perianth lobes acute, reflexed; ovary ovoid, 6–7 mm. in diam., covered with 2 mm. long, adpressed hairs, stigma glabrous, 1–2 mm. long, bifid. *Fruit* hard, oblong (sub-globose when young), 6–7 cm. long and 3–3.5 cm. broad, at first rusty-tomentulose, later sub-glabrous; stalk 1 cm. long. *Aril* bright red. *Seed* 3.5 cm. long and 1.2 cm. broad, dark grey, but pale straw-coloured when dry.

D'ENTRECASTEAUX ISLANDS:

DISTRIBUTION: Seems to be confined to S.E. Papua and the D'entre- casteaux Islands.


VERNACULAR NAMES: *Dzagarat* (Onjob language at Naukowe); *fufèri* (Orokaiva language at Mumuni); *jaganat* (Onjob language at Koreaf, Tufi sub-district); *torua* (Baruga language at Guruguru).

A tree of the primitive forest at low elevations. I have compared it with the species in series *Maximae* and *Uncinatae* which have large, somewhat similar leaves with an ashy-brown or whitish pubescence. It is a very distinct species and will be distinguished from these others by the leaves, extremely glossy on the upper surface, even when dry, looking as if they had been waxed over with car polish, and by the larger flowers, obtuse at the apex. The latter character, a most important one, will distinguish this species beyond all doubt, from the others. The flowers of *carrii* and *neglecta* look somewhat similar, but are all narrower and with shorter, acute, not obtuse perianth lobes. In *M. umbrosa* (flowers not seen) the leaves are sometimes also glossy above when dry, but they lack the more artificial, polished look of Hoogland's Nutmeg. *M. neglecta* is near on account of the rather similar, obscurely veined leaves; its flowers are also similar in one or two characters. The staminal column, however, is different, since it has a sterile, acute apex and an adpressed pilose stalk. The staminal column of *hooglandii*, on the other hand, is more like that found in *maxima* and also in some *Horsfieldia* species. The origin and development of the inflorescence, arising laterally on a short twig of the present year's growth, is like that found in *M. philippensis* in that this short twig, itself usually lateral, is still bare of leaves at the time of flowering. There is a well-developed terminal bud and also some lateral leaf buds. These produce leaves after the flowers have fallen, but in certain Malay Peninsula species, *M. lowiana*, *maingayi* and *maxima* (these I have personally observed for this type of growth), the leaves appear first and are well developed at anthesis. This type of growth, exhibited in *M. hooglandii* and *philippensis*, is probably influenced and brought about by the drier and more seasonal climate of the Philippines and New Guinea. In the
damper, humid and more equable climate of Malaya the growth of the leaves will be more rapid and the resting period of the leaf-buds shorter. Hence the leaves will appear with the flowers. It would be interesting to grow *M. hooglandii* and *philippinesis* in Malaya and to see later how the trees react to the climate. They might then behave like the Malayan species *M. lowiana*, *maingayi* and *maxima*. Or, will the effects of climate throughout the ages have altered the genoplasm to such a degree that reversion is now no longer possible? I do not think so. (See notes under *M. philippinesis* regarding Didrichsen Nos. 2129 and 2154 and also under the heading *Inflorescence* in the Introduction.)

(8) *Myristica carrii* J. Sinclair, sp. nov. — Fig. 8.

A *M. hooglandii* cui proxima haec species foliis minus coriaceis supra opacis non nitidis, floribus angustioribus apice acutis, fructibus angustioribus distinguitur. Etiam affinis *M. uncinatae* a qua foliis tenuioribus, floribus cinereo-tomentellis, fructibus anguste ellipsoideis tomentellis differt.

Arbor 3–7 m. alta. Cortex atro-brunneus longitudinaliter fissuratus; latex ruber. *Ramuli* glabri, brunneo-grisei, rugosi, 5–7 mm. crassi. *Folia* chartacea, oblonga vel angusta oblonga, glabra, opaca (non nitida), supra grisea vel pallido-griseo-fulvula (in sicco), subtus cinereo-glaucu, apice obtuse acuta vel obtusiuscula, basi acuta vel cuneata, 20–38 cm. longa, 7–13 cm. lata; costa utrinque convexo-elevata, in parte basali 3–4 mm. lata: nervi 16–20-jugati, gracillimi, utrinque prominuli, levissime elevati, prope margines indistincte anastomosantes; nervi secundarii breves, supra saepe visi, subtus pauciores; reticulationes nullae; petiolum 1.5–3 cm. longus. *Inflorescentia* vulgo ex ramulis tenuibus brevissimis 2–3 cm. longis orta vel aliquando ex hornotinis ramulorum normalum emergens; axis eius planus, cinereo-pubescentis, 2–3-florus, 5 mm.–1 cm. longus, axillaris; bracteae inflorescentiae distichae, semicirculares, rigidae, cicatricibus earum trochlearibus, marginibus incrassatis et canaliculatis. *Flores masculi* ellipsoidei, 1 cm. longi, 5 mm. lati, utrinque acuti, extus cinereo-tomentellis, intus cremei, glabri, apice in lobos ½–I-fissi: pedicelli graciles, 8 mm.–1 cm. longi, apice bracteolati; columna staminalis 4–5 mm. longa, sine acipulo sterilis, antheris 12–14, stipites glaber gracilis, 0.5–1 mm. longus, quam columna ½-angustior. *Flores feminei* ignoti. *Fructus* anguste ellipsoideus, minute ferrugineo-tomentellus, 4–5 cm. longus. 1.5 cm. latus; stipites tenuis, 1–1.5 cm. longus. *Arillus* coccineus. *Semen* in vivo ex collectore fere nigrum, in sicco pallido-brunneum, 3 cm. longum, 8 mm. latum.

Tree 3–7 m. high. *Bark* dark brown, longitudinally fissured; sap red. *Twigs* glabrous, brownish grey, rugose, 5–7 mm. thick. *Leaves* chartaceous, oblong or narrowly oblong, glabrous, dull, drying a greyish or pale brownish grey above, glaucous or ash grey beneath, apex obtusely acute or somewhat blunt, base acute or cuneate; midrib raised and convex on both surfaces, 3–4 mm. broad at the base; nerves 16–20 pairs, very slender and fine on
Fig. 8. Myristica carrii J. Sinclair.
both surfaces, very slightly raised, anastomosing indistinctly at the margins; secondary nerves short, often present above, fewer beneath; reticulations absent; length 20–38 cm.; breadth 7–13 cm.; petiole 1.5–3 cm. long. Inflorescence usually arising on the youngest, very short, slender, 2–3 cm. long twigs, the terminal bud of which opens after flowering, or sometimes on ordinary twigs of the present year’s growth; axis flattened, cinerous-pubescent, 2–3-flowered, axillary, 5 mm.–1 cm. long; inflorescence bracts distichous, semi-circular, rigid, their scars resembling a pulley with thickened, grooved margins. Male flowers ellipsoid, 1 cm. long and 5 mm. broad, acute at both extremities. ashy-tomentulose outside, glabrous and cream-coloured inside, split down ½–¾-way by the perianth lobes; pedicels slender, 8 mm.–1 cm. long. with an acute bracteole at the apex; staminal column 4–5 mm. long without a sterile apiculus, anthers 12–14, stalk glabrous, slender, 0.5–1 mm. long and about ½ narrower than the column. Female flowers unknown. Fruit narrowly ellipsoid, minutely rusty-tomentulose, 4–5 cm. long and 1.5 cm. broad; stalk slender, 1–1.5 cm. long. Aril bright red. Seed almost black when fresh, but drying pale brown, 3 cm. long and 8 mm. broad.

NEW GUINEA PAPUA:  Northern District:—Kokoda, Carr Nos. 16128 (CANB, K, L, SING); 16129 (CANB, K, SING) & 16344 (BM, CANB, L, SING); about 3 km. north of Divini-koari Village, Hoogland Nos. 3521 (A, CANB, K, L, LAE) & 3702 (CANB, L, LAE).

DISTRIBUTION: Confined to the above in lowland primary forest.

TYPE MATERIAL: Hoogland 3521 (A, CANB, K holotype, L, LAE).

VERNACULAR NAMES: Fufèri; para (Orokaiva language at Mumuni).

This species is nearest to *M. hooglandii* but differs in the less coriaceous leaves which do not have that waxy bloom above. The flowers are smaller and are acute, not obtuse at the apex, best seen in bud. The fruit is narrower and more elongate. The staminal column, with its narrow stalk, is very similar in both.

4. SERIES MAINGAYAE


Twigs 5–6 mm. thick and with some rusty indumentum on the apical parts, more slender, 2–3 mm. thick in *gigantea*, striate, greyish or blackish in the older parts, terminal bud always covered with some reddish or brownish hairs. Leaves coriaceous, glabrous, drying olive green or medium brown above, sometimes blackish brown, paler brown beneath, narrowly oblong, oblong or elliptic-lanceolate, the base acute, the apex acute or obtuse, small to
medium size-class, 7–30 cm. long and 2–9 cm. broad; nerves 12–20 pairs, oblique or slightly curving, prominent; secondary nerves present; petiole 1.8–2.5 cm. long and up to 5 cm. long in *lowiana*. Male inflorescence always covered with reddish or dark brown tomentum, most marked and almost woolly in *lowiana*, the axis a much branched panicle, 2.5–16 cm. long and 3–4 mm. thick, more slender, 1–2 mm. thick in *gigantea*. Male flowers with the same kind of indumentum as on the inflorescence, reddish or dark brown-tomentose, woolly-tomentose in *lowiana*, oblong, obtuse at the apex in bud, 3–6 mm. long, the lobes erect to obliquely spreading in flower; pedicels 1–5 mm. long and about 1–1.5 mm. thick but not filiform, bracteole 2–5 mm. long; staminal column without any development of the sterile apiculus, acute at the apex, the pubescent stalk as long and as broad as the fertile part. Fruit mostly oblong, sometimes ovoid, large, 5.5–10.5 cm. long and 4–6.5 cm. broad, almost glabrous with some furfuraceous scurf to tomentose or densely woolly-tomentose; stalk 5 mm.–2.5 cm. long — 3 species, *M. gigantea*, *lowiana* and *maingayi*.

**TYPE SPECIES:** *M. maingayi* Hk. f.

The most outstanding feature of this series is the dense indumentum of the innovations, terminal bud, inflorescence axis, flowers and pedicels. It varies from tomentose to woolly and is reddish, rusty or dark brown in colour. Thus, the densely tomentose inflorescence will at once separate this series from the glabrous or less often puberulous one of series *Malabaricae*. The thickness of the main axis and branches of the inflorescence is greater than that in series *Malabaricae*. This applies also to the pedicels, the twigs and the terminal buds. The leaves too, tend to be more coriaceous and the petioles stouter. Some of these contrasting measurements do not always hold for *gigantea* which has smaller leaves, petioles, flowers, pedicels, bracteoles, etc. than in the other two and approaches nearer to some of the measurements in series *Malabaricae*. The leaves are much smaller than those of series *Maximae* and the flowers are of a different shape, oblong and not globose or sub-globose. Warburg has also placed *gigantea* and *maingayi* in this series but not *lowiana* because he was misled by King who confused flowering material of *crassa* with *lowiana*.


**Synonym:** *M. motleyi* Warb. Monog. Myrist. (1897) 400 et 673 t. 14 f. 1 quoad Motley 145, nomen nudum, Warb. msc.

**SUMATRA WEST COAST:** Sidjungdjung, Muara, *bb5816* (BO, L).

**INDRAGIRI:** Teluk Region near camp Dewin I, Central Sumatra, *W. Meijer* 4221 (L, SING).


WEST BORNEO: Melawi, Tjatit, Bukit Gontuk, bb27000 (BO, K, L, SING); Melawi, Bukit Melaban Ketchil, bb28323 (BO, K, L, SING).

EAST AND NORTH-EAST BORNEO: Berouw, bb18495 (A, BO, L); West Kutei, Bukit Lajang bb16284 (BO, L); Central Kutei, Belajan River near Long Bleh, Kostermans 10225 (K, KEP, L, P, SING); Salimbatu, bb11176 (BO); 29299 (BO, L) and 29323 (BO, K, L, SING).

LABUAN: Motley 145 (CAL, K).

PULAU NUNUKAN: Near British border, Paymans 11 = bb34613 (L).

DISTRIBUTION: Sumatra, Malay Peninsula and Borneo.

TYPE MATERIAL: King's Collector Nos. 5866 (CAL, K, MEL, SING, UPS) & 6050 (CAL, CGE, E, FI, K, KEP, P, SING, US) and Scortechini 1949 (BM, CAL, FI, G, K, L).

Apart from its relations with M. maingayi [see Gard. Bull. Sing. 16 (1958) 345 and 350], this species superficially resembles M. lancifolia var. clemensii from New Guinea in the leaves but is not in the least related to it. M. motleyi was not validly published by Warburg as he did not have enough material for a proper description. He gave it the name M. motleyi only in the illustrations and on page 673. He refers to it as Motley 145, a sterile Myristica, on page 400 of the text in the notes on M. maingayi.


I have now seen one female inflorescence of this species. It will be noted that the female flowers were hitherto unknown, Sinclair in Gard. Bull. Sing. 16 (1958) 345. There is nothing unusual about them. They are more or less what I expected they would be i.e. like those of M. lowiana's nearest allies. A description is now given.
Female inflorescence (only one seen) a 1 cm. long, unbranched, rusty-tomentose, 2–3 mm. thick peduncle, bearing 3 sessile flowers at its apex. Perianth more swollen and more ovoid than in the male due to the shape of the ovary, 5 mm. long and 4 mm. broad, the tomentum also as in the male, the lobes short and recurved, extending down about ¼-length of the whole perianth; ovary rusty-tomentose, filling the perianth and conforming to its shape.


RIOUW ARCHIPELAGO: Pangka, Karimun, *bb7361* (BO).


BORNEO SARAWAK: 1st Division:—Kuching, *Haviland & Hose 3645* (CAL, K, SAR).


A peat swamp forest species nearest to *M. maingayi* but distinguished from the latter by its woolly-tomentose fruit. See notes in *Gard. Bull. Sing.* 16 (1958) 347. The tomentum at the apical portions of the twigs and the distance it extends downwards, mentioned as a character for separating this species from *maingayi*, is not now so important as it was first thought to be. This tomentum will be present at each flush of new leaves and flowers but will tend to disappear when the leaves are mature. The male flowers are slightly smaller than those of *maingayi*, 4–5 mm. long and 2–2.5 mm. broad as against 5–6 mm. long and 3.5–4 mm. broad in *maingayi*. *M. lowiana* has only recently been discovered in British North Borneo.

I venture to place *M. hackenbergii* Diels as a synonym of *M. lowiana*. The type material of Diels's species, *Hackenberg* 86 male and 86a female, collected at Sampit in South Borneo and deposited in Herb. Berlin was destroyed during World War II. Diels says that it is near *M. guatteriifolia*, but I think it cannot be that species since he states that the undersurface of the leaves are glabrous and that the bark is black. Further the plant was not obtained from the seashore. His description agrees very well with that of *M. lowiana* which has been recorded from Sampit. It is not likely that *M. hackenbergii* represents anything new or Kostermans and other collectors who have worked in this area would surely have met with it.

(11) *Myristica maingayi* Hk. f.


A specimen in fruit from Sumatra, Hoeta Padang, Asahan, East Coast, *Krukoff* 4384 (A, BO, BR, BRI, G, L, NY, SING, US) is probably *M. maingayi* rather than *M. gigantea*, but confirmation of *maingayi* as a record from Sumatra should be postponed until more adequate material is at hand. There is no reason why it should not occur in Sumatra.
5. SERIES MALABARICA


Twigs slender, glabrous except for the thin, elongate, acute, puberulous terminal bud, smooth, reddish brown and 1–3 mm. thick in the apical parts, greyish and finely striate in the older parts, slightly thicker, 3–5 mm. thick and paler in the apical parts in malaccensis. Leaves mostly chartaceous, less often slightly coriaceous, drying medium or pale brown above, often with a greenish shade, paler beneath, glaucous or cinereous in malaccensis, glabrous, varying a lot in shape, lanceolate, elliptic-lanceolate, narrowly elliptic or oblong, the base mostly acute, occasionally rounded, the apex acute or acuminate, small to medium size-class, sometimes as long as those in series Maingaya but on the average just slightly smaller, 8–25–(33) cm. long and 2.5–10 cm. broad; nerves distinct or sometimes faint, 9–20 pairs, average 15 pairs, oblique or more often curving; secondary nerves sometimes present, very faint; reticulations very faint or absent except in malaccensis; petiole slender, 5 mm. — 2.5 cm. long. Male inflorescence a slender branched panicle, (unbranched in umbellata) 2–10 cm. long with numerous flowers, the axis fragile, 1–2 mm. thick only, mostly glabrous or puberulous, never tomentose, if at all pubescent as occasionally in the young inflorescence of iners then the indumentum pale in colour, greyish or pale yellow, never rusty, dark brown or reddish. Male flowers mostly glabrous or with the indumentum (if present) like that of the inflorescence axis and pedicels, globose, sub-globose or ovoid in bud, 5–8 mm. long, and 3–6 mm. broad, split down ¼-way into the non-reflexed lobes; pedicels 5 mm. — 1 cm. long, about twice as long as the flowers, filiform, less than 1 mm. thick. Female inflorescence shorter than the male, the flowers broadly ovoid or urceolate, often inflated (iners) with reflexed lobes. Fruit mostly subglobose, also oblong, variable in size, large to medium, 5–10 cm. long and 3–6 cm. broad, mostly glabrous or becoming glabrous, densely rusty-tomentose in malabarica; stalk slender, 5 mm. — 3.5 cm. long — 4 species, M. iners, malabarica, malaccensis and umbellata.

TYPE SPECIES: M. malabarica Lamk.

The outstanding features are the glabrous or nearly glabrous inflorescence, flowers and pedicels. In fact there is a tendency for hairs to be absent on all the parts where they normally occur. If present they are usually grey or pale yellowish, the exception being those on the rusty-tomentose fruit of M. malabarica. Other features to note are the chartaceous leaves, the tendency for the nerves to be fainter than they are in series Maingaya, the acute base and the slender petioles, the globose or sub-globose male flowers and their filiform pedicels. As already pointed out, this series is nearest to series Maingaya. Some might prefer to unite them or to have the following classification:—series Malabaricae, subspecies Malabaricae and subspecies Maingaya. The differences between the two series are not very great. In fact differences in
the rank series, i.e. between one series and another in any genus can never be great. In series Malabaricae, the leaves, inflorescence axis and pedicels are all much thinner than in series Maingayae. In fact the species in series Malabaricae are more elegant and glabrous editions of the species in series Maingayae. Further comparisons will show that the staminal column has an obtuse apex and not the conical, acute apex seen in Maingayae. Otherwise it is similar, the glabrous or pubescent stalk being as long and as broad as the fertile part. The sterile apiculus is absent in both series.

M. iners, the commonest species, has a wide distribution in Sumatra, the Malay Peninsula and Borneo. M. malaccensis is nearest to it and could easily be confused with it so numerous details for separating the two have been fully set out in the keys. M. malabarica is confined to the swamp forests of peninsular India and should be easily recognized by its large tomentose fruit and numerous small globose flowers and small leaves. M. umbellata from the Philippines is rare and not likely to be met with. Its male inflorescence axis is slender and unbranched and the flowers are in umbels on filiform pedicels.

I agree that all the species placed by Warburg in series Malabaricae belong there except M. andamanica. M. umbellata is not there as it was unknown in his day. He was not able to account for iners which he had seen in fruit only, but he has correctly placed its synonym M. fallax in this series.


Pre-Linnaean Literature: (Panam-Palka) Panem-Palka, Rheede, Hortus Malabaricus 4 (1683) 9 t. 5 quoad inflor. masc. tantum. *Nux myristica major*, *spuria malabarica*, Ray, Hist. Pl. 2 (1688) 1524. *Nux myristica spuria*, Plukenet, Almagest. (1696) 265. Note:—For list of other pre-Linnaean names (but some of these are *M. dactyloides* Gaertner) see Warb. page 403.—Fig. 9.

Tall tree 25–30 m. high with stilt-roots. Bark greenish black, smooth with lenticular spots (Gamble), but probably becoming longitudinally striate when old; sap red. Twigs glabrous, smooth to finely longitudinally striate, medium brown and 2–3 mm. thick from the apex to some distance down, only slightly thicker, 4 mm. or so at 10–16 cm. down where the bark may begin to crack. Leaves chartaceous, thin, the youngest almost membranous, elliptic or elliptic-lanceolate, glabrous, shining above, dull below, drying a medium brown above and slightly paler beneath, apex acute or bluntly acute, base acute; midrib lying in a groove above, raised beneath; nerves about 9 pairs, oblique, sunk above and raised beneath; not prominent, sometimes very faint beneath, curving and interarching at the margins, a secondary one sometimes present between a primary pair; reticulations very faint, sometimes visible above, forming a lax. sunk network, absent beneath; length 10–16 cm; breadth 3.5–4.5 cm; petiole slender, 5 mm.—1.5 cm. long. Male panicles rather numerous, 4–6 cm. long, laxly branched, the axis slender, flattened, the flowers sub-umbellate at the tips of the ultimate branchlets. Male flowers sub-globose to ovoid, obtuse in bud, the perianth 3–4 mm. in diam., thin, reddish brown and covered with a minute greyish brown pubescence outside, lobes short, triangular; staminal column with 10–15 anthers (usually 10) 3 mm. long, including the 0.75 mm. long, densely tomentose, swollen stalk, bluntly acute to slightly apiculate at the apex; bracteole sub-orbicular, closely applied to the base of the flowers, 2 mm. long and covered with the same pubescence as in the flowers, the margins pubescent also, but not ciliate; pedicils filiform, 5–8 mm. long and less than 1 mm. thick. Female flowers larger than in the male and in simple, few-flowered, rather stout umbels not much longer than the petioles; ovary 5 mm. in diam. and 4 mm. high, ovoid-globose, densely rusty-tomentose; stigmas sessile, 2-lobed. Fruit in clusters of 2–3, less often single, oblong or oblong-ovoid, bluntly pointed at the apex, densely rusty-tomentose, up to 10 cm. long and 4–6 cm. broad with a thick, fleshy pericarp. Aril scarlet when fresh, orange when dry with many fine narrow laciniations, the ends of these forming a convolute conical mass at the apex of the fruit. Seed oblong, shining, brown, 4–4.5 cm. long and 2.5 cm. broad; cotyledons divaricate, sub-connate with very slightly undulate margins, not laciniate.
Fig. 9. *Myristica malabarica* Lamarck.

**Sinclair — Myristica**

**Peninsular S.L. India**


**Bombay**

No date, Dalzell *s.n.* (CAL, DD);

South Concan — Gibson *s.n.* (A, K, P) on the A & K sheets is also mounted *M. dactyloides*. That on the K sheet is named *M. contorta* by Warburg.

North Kanara:— Malimane, *Bor* 11282 (DD, PNH); Talbot 3720 (DD, K); Devimane, *Bor Nos.* 11315 (DD, PNH, SING); 11552 (DD, SING) & 11593 (DD); top of Devimane Ghat, Kumta-Srssi Road, *Fernandes 171* (A); North Kanara without locality, *Talbot 10* (CAL); Wuddu Ghat, *Talbot Nos.* 301 (CAL) and 302 (CAL, E); Coompta, *Talbot, 27th Nov.* 1882 (DD).

**Mysore**

South Kanara:— Beddome *s.n.* (PDA);

Beddome Nos. 15 (PDA); 6713 (SING); 6714 (BM); 6715 (SING) and 6716 (SING).


Kerala:— Malabar:— Plains near Nilambur, *Beddome s.n.* (K).

Cochin:— Kavalay, *Meebold s.n.* (CAL)

Travancore:— *s.l.*, C. C. Calder & M. S. Ramaswami 1431 (CAL); Colataorpolay, *Bourdillon Nos.* 91 (CAL); 115 (CAL, K); 118 (K); 1202 (DD) and Lawson, *26th November, 1893* (K); Alleppey (Aleppe) *Wall. Cat* 6787 (K); *sub nom.* *M. notha* Wall., “Wild Nutmeg from Aleppe”; Quilon, *Wight Nos.* 870 (E) and 2490 (A, K, P).

**DISTRIBUTION:**

West Coast of Peninsular India in the damp valleys at the foot of the Ghaats.

**TYPE MATERIAL:**

*M. malabarica* Lamk, no type specimen preserved or quoted but his description is based on four pre-Linnaean names three of which are cited at the end of the literature under my species No. 12, *M. malabarica*; the other is *Nux indica oblonga*, J. Bauhin, *Hist. Plant.* 1 page 339, which I think must be *M. dactyloides* Gaertner. See also my notes after that species. *M. dactyloides* Wall. (non Gaertn.) *Wall. Cat.* 6786; this is actually given as *M. dactyloides* Gaertner in the *Wall. Cat.* Wallich thought it was the true *dactyloides* Gaertn. *M. notha* Wall., *Wall. Cat.* 6787; the actual author’s name “Wall.” is not added after *notha* in the
Gardens' Bulletin, Singapore — XXIII (1968)

Wall. Cat., but is implied. *M. tomentosa* (non Thunb. nec Sprengel) Graham. Graham gives South Concana as the type locality, refers to the plant as *M. tomentosa* Sprengel, Syst. 3 p. 65 and also cites Rheede's unfortunate t. 5 which is partly *M. malabarica* Lamk and partly *M. dactyloides* Gaertn. He does not quote any collectors' numbers but does state "Can this be the *M. dactyloides* of Col. Sykes?" The specimen collected by Sykes is correct as *M. dactyloides*. Since Graham names his species *tomentosa* he probably had in mind *M. malabarica*, a tree with a tomentose fruit but misidentified it as *M. tomentosa* of Sprengel which is the same as *M. tomentosa* Thunberg, now *M. fatua* var. *fatua*. However, *M. tomentosa* sensu Graham must again be quoted in the literature under *dactyloides* Gaertner since he referred to Rheede's ambiguous plate in his citation.

VERNACULAR NAMES: Jangli-jaiphal; kaiphal and ranjaiphal (Hindi); kanagi (Kanarese); panam-palka (Malayalam, Malabar); pattiri (Tamil); pind-i-kai = seeds (Kanarese); ponnam-panau (Malayalam); rampatri = mace (Hindi).

ECOLOGY:

There is an article by K. Krishna Moorthy on the "Myristica Swamps in the Evergreen Forests of Travancore" in *The Indian Forester* 86, 5 (May 1960) 314 where he says that in the valleys of the Shendurney, Kulathupuzha and Anchal ranges of Travancore (Kerala) a distinct plant association is noticeable. It fringes sluggish streams in flat-bottomed valleys, the altitude of which is below 1,000 feet. The whole area is subject to more or less complete inundation during the greater part of the year and certainly between the months of June and January. The height of the forest is usually about 80–100 feet and the trees have clean and comparatively slender boles. The whole association is evergreen in character and occurs in the midst of tropical evergreen rain forest. The ground is covered more or less completely by the looped "knee roots" which are very similar in appearance to those of mangroves. The floristics are as follows: I. *Myristica magnifica* (very frequent), *M. laurifolia* (occasional), *M. canarica* [now Gymnacranthera farquhariana] (frequent), *M. malabarica* (occasional), *Lagerstroemia flos-reginae* (frequent), *Lophopetalum wightianum*, *Antheophalus cadamba*, *Eugenia montana* and *Carallia integerrima* (occasional). II. Undergrowth is sparse and consists of certain aroids, and sedges growing gregariously where the ground is not covered with the "knee roots" and where
overhead-light penetrates on the floor, as on the margins. The tree composition of the association is remarkably constant and the predominant species is *Myristica magnifica*. He goes on to say that it is rather unfortunate that most of these swamps have been destroyed due to the clamour for land for food production. They are easily converted into ideal paddy land but it remains to be seen how far these paddy fields will offset the serious depletion of ground water resources of which these swamps were evidently the reservoirs. He proposes the name “Myristica swamp” for this association.

**USES:**

Probably no special uses now-a-days. According to Gamble the wood has been used for building, but is only moderately hard and not durable. The aril (Bombay mace or *rampatri*) and the nuts (*ran-jaiphal*) were exported from North Kanara via Bombay to Germany where they were used as an adulterant with true nutmegs, but they have little value as a spice, being almost flavourless. Bombay mace is easily detected from true mace by chemical tests. The oil has been used for ulcers and allaying pain and for purposes of illumination. The aril has been used to stop vomiting and as a nervine tonic. Both the aril and the nutmegs have been roasted along with unripe plantains and a little opium by Indians in Ambon to cure dysentery. Dymock states that Rumphius relates that in 1683 a minister of Amboyna was given three roasted nuts by his wife in mistake for nutmegs to cure a chronic diarrhoea; in a few hours he became giddy, making strange gestures and talking wildly, nor did he get any relief until he had taken several cups of tea and been blooded. He then slept profoundly and perspired very freely. On waking, no bad effects remained, and the diarrhoea had ceased. Rumphius remarks that if he had taken three real nutmegs, he would have suffered much more. According to *Watt's Dictionary* the nuts are roasted and ground into powder as an astringent for diarrhoea; the expressed oil as a stimulating applicant to indolent ulcers and an anti-rheumatic; the aril to stop vomiting.

The most important character for separating this species from *inners, malaccensis* and *umbellata* is its rusty-tomentose fruit. It differs from the first in the fewer veins in the leaves, and from the second by its smaller leaves, not rounded at the base and their much fainter venation. From *umbellata* it differs in having a branched male inflorescence, the flowers more spherical and smaller and the leaves broader with fewer veins.
The only other Indian species with tomentose fruit is *M. fatua* var. *magnifica*, but that has a short, woody, *Knema*-like inflorescence and brown or cinnamon scales on the lower surface of much larger leaves. Lamarck definitely states in his description that the fruits of *malabarica* are tomentose, but some of the pre-Linnaean references on which he bases his description are not altogether in agreement. There is no doubt, however, as to the plant he had in mind as his own description of it agrees with our present species. His figure, unfortunately, must be excluded as it is almost exactly the same as that of Gaertner's *M. dactyloides* which he must have copied. This drawing depicts the seed and embryo but not the fruit. Lamarck would surely have rejected the drawing, had the fruit been present, for then he would have noticed the absence of hairs on the pericarp. The embryo, also, is quite unlike that of *malabarica* or at least different from that figured by Warburg for *malabarica* and copied from him by myself.

Rheede in his description, makes no mention of the fruit being tomentose but states that it was greenish yellow ("fructus extus viridi-flavescentes") which is the colour of the fruit of the majority of the glabrous species. His drawing, as far as I can see, consists of two different species. The leafy twig with the fruit must be *M. dactyloides* Gaertner, synonym *M. laurifolia* Hk. f. et Th. as the fruit there is glabrous and one leaf shows the characteristic secondary venation and reticulations of that species. He does not fill in the rest of the leaves with the reticulations, but shows the main veins only. The male inflorescence and flowers, (it would be drawn from a different specimen as *Myristica* is dioecious) is that of another *Myristica* species. It is of the branched, panicular type and must be that of true *M. malabarica* since that is the only Indian species with this type of inflorescence apart from *Gymnacranthera farquhariana* (*G. canarica*). This latter one is ruled out because it has very much larger leaves than *malabarica*.

(13) *Myristica umbellata* Elmer, Leaff. Phil. Bot. 5 (1913) 1816; Merrill, En. Phil. Fl. Pl. 2 (1923) 180. — Fig. 10.

Small tree about 12 m. high, with spreading branches, the ultimate ones numerous, lax and slender. *Bark* smooth or scaling in thin flakes, greyish, inner bark reddish brown. *Twigs* greyish brown, glabrous, slightly striate, the ultimate very slender, 1 mm. thick, nearly smooth, the terminal bud narrow, tapering to an acute apex, minutely puberulous. *Leaves* chartaceous to coriaceous, narrowly elliptic, dark green and shining above when fresh, greyish beneath, drying a pale greenish brown above and a pale greyish brown beneath, the apex obtuse, the base sharply acute and slightly decurrent on to the petiole; midrib lying in a groove and sunk above, raised and reddish brown beneath; nerves 9–15 pairs, oblique, extremely fine and faint on both surfaces, a
Fig. 10. *Myristica umbellata* Elmer.

secondary nerve sometimes present between two main ones; reticulations absent; length 8–19 cm, average 12 cm.; breadth 2.5–6 cm., average 3.5 cm.; petiole 1–2.5 cm. long. **Male inflorescence** a very slender, axillary, glabrous, sub-terete, 1–2 cm. long peduncle. unbranched, the flowers borne in a perfect umbel at its distal end. **Male flowers** glabrous, oblong-ovoid, thin, chartaceous, obtuse at the apex in bud, but their 3 lobes acute at the apex, split down ¼-way by the lobes, 6–7.5 mm. long and 3–4 mm. broad below the middle; staminal column 5.5 mm. long with 10 anthers, the stalk glabrous, fleshy, about as long and as broad as the fertile portion, broader than it at its base, the apex of the column narrowed gradually to a blunt point, the anthers reaching right up to the extreme apex; pedicels slender, 7 mm.—1 cm. long and less than 1 mm. thick, spreading, glabrous, sub-compressed; bracteole early deciduous, its remains represented by a minute, 0.25 mm. long ridge at the apex of the pedicel. **Female flowers** not seen. **Fruit** in clusters of 1–3, pendant, egg-shaped, yellowish green, covered with some minute rusty-tomentum when young, soon glabrous, 5 cm. long and 3–3.5 cm. broad, slightly immature, pericarp hard and thick; stalk 1–2 cm. long and 2.5–6 mm. thick.


**DISTRIBUTION**: As above. Rare.

**TYPE MATERIAL**: Elmer 12820 and 13166 syntypes.

A rare tree of the Philippines in lowland forest from 230–800 m. (750–2,600 feet). The chief features are the faint venation of the leaf, the unbranched, umbellate male inflorescence with slender peduncle and almost filiform pedicels and the glabrous fruit. There is some alliance with *M. malabarica* as has already been pointed out under that species, but the leaves of *umbellata* are narrowly elliptic with more veins and the flowers more regularly umbellate in the inflorescence. *M. umbellata* is also close to *cinnamomea*, the leaves being almost the same, except that they lack the pale brown scales seen on the lower surface of the latter. Further, in *cinnamomea* the male inflorescence is branched and its axis and pedicels much thicker. The flowers are covered with tomentum and the perianth is sharply 3-angled in bud. The stalk of the staminal column is tomentose and not glabrous, the bracteole persists longer and the very much thicker, rusty-scaly pericarp does not become glabrous. It is rather unique that the male inflorescence is unbranched in *M. umbellata*. Perhaps we cannot rely on this for, so far, male flowers are represented by but a single gathering. It is to be hoped that the tree is not entirely extinct.


Tree 10–36 m. high; stilt-roots sometimes present. Bark brittle, greyish black, flaking, longitudinally fissured; wood white, turning reddish; sap pink, watery, copious. Twigs with dark reddish brown bark which tends to crack; youngest parts slender, 1–3 mm., average 2 mm. thick at the apex, glabrous with an elongate, slender, minutely pubescent terminal bud. Leaves extremely variable in texture, size and venation, generally chartaceous, but often coriaceous, medium to dark green above and shining to dull, paler green and dull beneath, drying pale or dark above, generally paler below, mostly lanceolate but also oblong-lanceolate to oblounge or occasionally somewhat obovate, base acute, less often rounded, rarely cuneate and decurrent on to the petiole, apex acute; midrib flat, lying in a groove flush with the upper surface, 1 mm. broad, paler green than the rest of the leaf, raised and yellowish green beneath; nerves 12–15 pairs, distinct above, usually faint beneath, but in many cases also very distinct beneath, oblique, but usually curving near the margin, the line of anastomosis broken or indistinct, also at times less oblique and curving more gradually; reticulations faint or indistinct; length 12–20 cm; breadth 3–6 cm., but ranging from 7.5–10 cm. broad in the broadest forms (including M. wyatt-smithii and in Mohd Shah & Kadim 506 from Kelantan); petiole 1.5–2.5 cm. long, slender. Male inflorescence an axillary panicle, 2–8 cm. long, its length depending on its age, the flowers borne in sub-umbels on the shorter secondary branches which are much condensed for some time and then expand at anthesis with a lax effect; pedicels short and thick for a long time, then lengthening and becoming slender, 5 mm. — 1 cm. or more
Fig. 11. *Myristica iners* Bl.

long and 1 mm. or less in thickness; bracteoles at the base of the flower, 1-2 mm. long, deciduous, minutely ciliate at the margins. Male flowers ovoid, narrowed towards the apex, rusty-puberulous outside, varying in the amount of tomentum, 7-8 mm. long and 5-6 mm. broad, membranous, split down about \( \frac{1}{2} \) -way by the 3 acute lobes; androecium 6 mm. long with 9-10 anthers and ending in a blunt apex; stalk minutely tomentose, 3 mm. long or as long and as broad as the fertile part, much shorter when young. Female inflorescence 1-3 cm. long, much less branched, the pedicels stouter, 3-4 mm. long. Female flowers campanulate; ovary sub-globose, minutely rusty-pubescent. Fruit glabrous when mature, minutely rusty-scyal when young, pale yellow, oblong to oblong-ovoid, variable in size, 5-8.5-(10) cm. long and 4-4.5 cm. broad, line of dehiscence faint; pericarp 5 mm.-1.3 cm. thick; stalk rather slender, 1.5-3.5 cm.long. Aril bright red, divided nearly to the base or down to 1 cm. from it, the divisions more numerous and narrower towards the apex. Seed shining, brownish black, 4.2-5 cm. long.

<table>
<thead>
<tr>
<th>INDO-CHINA</th>
<th>SOUTH VIETNAM (COCHIN-CHINA):</th>
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<tr>
<td>CAMBODIA: Chaburi, Makham, Ban Ang, Put 419 (BKF); Salak Pet, Kaw Chang, Kerr Nos. 9237 (BK, BM) and 9237a (BK, BM, K).</td>
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| PENINSULAR DIVISION: | Tambon, Kao Panom, Krabi, Kerr 19392 (BK, BM, K); Nakawn Sritamarat, Kiri-wong, Khao Na Rawn, Piernehit 382 (BKF, SING); Trang, Chawng, Din 240 (BKF, SING); and Put 255 (BKF); Klawng Ton, Satul, Kerr 14591 (BK, BM). |

| SUMATRA ATJEH: | Gajo Loeus, Gunong Agosan, bb22429 (BO, L, SING). |
|-------------|-------------------------------------------------
| TAPANULI: Pulau Musala (Mursala), Pulau Poene, Sibolga, bb3772 (BO); Aek Labuan, P. Poene, bb19290 (A, BO, L); Pangkalan Tapoes Complex, Sibolga and Ommanladen, Manduamas, bb28189 (BO, L); Baroes, P.T. Complex bb28442 (BO, L, SING). |
| WEST COAST: Duku, Painan, bb3128 (BO, L). |
| EAST COAST: Pulau Berhala, Wyatt-Smith K.F.N. 76458 (KEP). |

| INDRA GRI: Indrag, Uplands, Lake Mengkuang, bb27505 = Buwalda 86 (BO, L, SING) and Buwalda 6619 (BO, G, K, L, P, SING); Kuala Belias,* Buwalda 6718 (BO, K, L, SING); Riouw and Ond., Indrag, Uplands, Belimbing, bb28561 (BO, L, SING) and R. & O., Muara Pedjanki, bb27482 (BO, L). |
| DJAMBI: Betaro, bb12862 (BO). |
| BENKULEN: Redjang, Lobok Binjai, bb2300 (BO, L). |

*Foot-Note:— Buwalda 6718 in not typical iners. It may be atypical maxima or of hybrid origin.
PELEMBANG:  S.L., T1285 (BO).
Lematang Ulu, Grashoff 239 (BO, U);
Lematang Ilir, the following four:—
Semangus Reserve, bbNos. 31680 (BO, K,
L, SING) & 31957 (BO, L) and Gunong
Megang (Dorst) Thorenaar T3P543 (BO,
SING) and T3P599 (BO). Suka Radja,
Sungei Rupit, Forbes 2971 (A, BM, Fl,
P, SING); Rawas, Grashoff 1120 (BO,
L), Banjusain & Kubestreken, the follow-
ing four:— Musi Ilir, bb 18653 (A, BO); s.1
57E1P591 (BO, SING) and 185E2P942
(BO). Banjuasin & Kubestreken, the follow-
ing four:— Musi Ilir, F.A. Verduyn
Lunel T.B. 1081 (BO); Mangsang, Musi
Ilir, bb 18653 (A, BO); s.1 57E1P591 (BO,
SING) and 185E2P942 (BO). Bajunglint-
jir, the remainder:— Endert 57E1P591
(BO, L, SING, U); Endert 57E1P575
(BO, L, SING); (Endert) Thorenaar
57E1P596 (BO, L, SING); Endert
57E1P589 (BO, L) and 185E2P1005 (BO, L,
SING).

MALAY PENINSULA: Kedah, Penang, Perak, Trengganu,
Pahang, Selangor, Malacca, Johore, Singa-
pore. For list see Gard. Bull. Sing. 16
(1958) 365. The following new records
are added:—

KELANTAN: Kampong Gobek, Kerilla Estate,
Mohd Shah & Kadim 506 (A, E, K, L,
PNH, SING).

NEGRI SEMBILAN: Sungei Menyala, Port Dickson,
Wyatt-Smith K. F. Nos. 64474 (KEP); 64754
(KEP) & 64785 (KEP) and Kochummen
K.F.N. 72496 (KEP).

JAVA S.L.: Herb. de Bunge (P); Kollmann, date
1891 (G. Boiss.); Korthals s.n. (BO, CAL,
L, U); Teijmsman 13913 (BM) and
Teijmsmann s.n. (L).

WEST JAVA: S.l., Forbes 544 (BM, BO, G);
Prov. Bantam:—Tiemara, Udjung Kulon,
Koorders 5264 (BO); Gunong Pajung,
Reinwardt s.n. (L); Pandeglang, Sangiang,
Ja 3960 (A, BO, L).

Bogor Prov:—Natur Monument Dungus
Iwul, about 10 km. from Djasinga, Bogor,
Ja 1959 (BO); G. Salak and Seribu,
(localities not given on sheets) Blume s.n.
(C, CAL, L, M, NY, P, S, U).

Prov. Preanger:—Pelabuanratu, Sukabumi,
Koorders Nos. 5249 (BO, CAL, K, L,
P) and 5252 (BO); Tasikmalaya,
Koorders Nos. 43398 (BO, L) and 47611
(BO); G. Gede, Sukabumi, Ja 3136 (A,
BO, L).
Sinclair — Myristica

**Mid Java:**

Pekalongan, Subah, Koorders 27480 (BO, L); Oengaran, Semarang, Horsfield s.n., K sheet is 683 (BM, CGE, K, U).

**East Java:**

S.I., not Amboina, Forbes 1157 (A, BM, CAL); Besuki, Gunong Kemiri Sanga, Backer 30870 (BO).

**Borneo Sarawak:**

1st Division:—Semengoh Forest Reserve, Kuching, Tinggi SAR 43 (KEP, SAR, SING); Matang, Beccari 1590 (FI); Bako National Park, Brüning SAR 6744 (SING); Sabal F Reserve, Gunong Gaharu, Serian, Nahar SAR Nos. 12668 (K, L, SAR, SING); 12684 (K, L, SAR, SING); and 12685 (K, L, SAR, SING) and Sinclair 10235 (A, B, E, K, L, SAR, SING); Gading F Reserve, Lundu, Browne 63 (KEP, SAR); Gunong Santubong east, Haji Bujang SAR 12795 (K, L, SAN, SAR, SING).

3rd Division:—Sungei Nangar, Matu Daro Protected Forest, Binatang, Santusi bin Tahir SAR 12320 (K, L, SAR, SING); left bank of Rejang River, 10 km. below Belaga, Segaham Range, near Belaga airfield, M. Jacobs 5424 (CANB, G, K, L, SAR, SING).

4th Division:—Baram, Haviland & Hose 3289 (K); Entoyut River, Baram District, Hose 392 (BM, K, PNH); near Long Kapa, Mt. Dulit, Ulu Tinjar, Richards Nos. 1522 (K, SING) and 1615 (A, K, SING).

**Brunei:**

Andulau F. Reserve, Ashton, Symthies & Wood SAN 17502 (BRUN, KEP, L, SING).

**West Borneo:**

Sanggau, Emperit, bb14239 (BO) sterile.

**South and South-East Borneo:**

Sampit, bb7935 (BO); Ben. Dajak, Terusan, bb9882 (BO).

**East and North-East Borneo:**

Mara, Bulungan, bb10760 (BO) intermediate, approaching malaccensis but leaves with rounded and acute base on same specimen; Salimbatu near Bulungan bb11238 (BO); West Kutei the following two:—Sabintulung, bb15868 (BO); near L. Puhus, Endert 5001 (BO, K, L); Berouw, bb Nos. 12141 (BO); 12171 (BO) and 18981 (BO, L); E. Kutei, Sangkulirang, Kampong Palawan, bb11898 (BO) intermediate, approaching malaccensis; S. Susuk Region, E. Kutei, Kostermans Nos. 5475 (BO, K, KEP, L, P, PNH, SING) and 5597 (BO, K, L, PNH, SING) this last one intermediate somewhat, approaching malaccensis; Loa Haur, West of Samarinda, Kostermans Nos. 6789 (BM, BO, G, K, L, PNH, SING) and 6972 (BO, K, L, SING); Sg. Wain Region, North of Balikpapan, Kostermans 4400 (BO, K, L); Berikan Bula, Peak of Balikpapan, Kostermans 7451 (BO, K, L); Gunong Beratus, Peak of Balikpapan, Sulamandau, Kostermans 7600 (BO, K, L, PNH, SING).
Gardens' Bulletin, Singapore — XXIII (1968)

BRITISH NORTH BORNEO: Serudong, Tawau, W. Meijer SAN 19541 (L); Sepilok Forest, Sandakan, Kadir A2570 (BO, CANB, K, KEP, SAN, SING); Sepilok Forest, Compt 12, Sinelair 8948 (A, B, E, K, L, M, SAN, SING); Cpt 13, Wood A1967 (K, KEP, L, SAN, SING) and Compt 16, Sinelair 9293 (A, B, BM, E, K, L, M, SAN, SING); Sibugal River, Agilianna 3887 (A, BO, K, NY, UC, US); Mt Kinabalu, Penibukan Ridge, Clemens Nos. 30324, 30524 (A, BM, BO, G, K, L, M, NY, UC); 40614 (A, BM, G, K, L, M) and 40947 (A, BM, G, K, L, M, UC); Ranau above hot springs, W. Meijer SAN 24053 (K, L, SING).

PULAU NUNUKAN: Paymans 149 (DD, L).

CULTIVATED: All in Hort. Bog. — Beccari 4027 = FI Accession Nos. 7680 (FI) and 7682 (FI) as var. megalocarpa Warb. nom. ined.; IVG 73 (A, US); IVG 77 (US); IVG 99 (NY, US); IVH 17 Sinelair 10034 (E, K, SING) & s沉浸在 collector (NY).

DISTRIBUTION: Southern Indo-China (Cochin-China and Cambodia), Southern Siam (South Eastern and Peninsular Divisions), Sumatra, Malay Peninsula, West Java, less abundant in Mid and East Java, Borneo, all territories.


VERNACULAR NAMES: Chandaeng; chan pa (Siam); kayu luo (Sundanese); kumpang; kumpang kiong (Sarawak); lakka (Sundanese); pala meliedjok (P. Mendanau).

Since I dealt with this species in Gard. Bull. Sing. 16 (1958) 363, I have seen much more material, especially many Bogor specimens collected in Sumatra. I have repeated and enlarged the description to include the numerous variations, since M. iners is very polymorphic in regard to its leaves. My original description refers to the typical form which has narrow, chartaceous, lanceolate leaves with an acute base and the nerves faint or indistinct on the lower surface. Although there are many forms and variations, I find I cannot group them into distinct varieties as they grade into each other without any relation to geographical distribution.
Thus the typical form, originally from Java, but also found in Sumatra, Malay Peninsula and Borneo, with narrow leaves, average breadth 2–3.5 cm, leads on through broader forms (4–8 cm broad) to *M. wyatt-smithii* and a somewhat similar plant from Kelantan, *Mohd Shah & Kadim 506* having leaves 8–10 cm. broad. (Incidentally I have now transferred *M. wyatt-smithii* from a synonym of *malaccensis* to a synonym of *iners*, see notes under *malaccensis*). I have seen other sheets of *iners* with broad and narrow leaves on the same specimen. The leaves are coriaceous as well as chartaceous and may have a broad rounded base or an acute one and there may be leaves with acute and rounded bases on the same specimen. The venation on the lower surface may be distinct as well as faint. In fact there are examples of specimens with every combination of the following characters:—1 narrow leaves, 1a broad leaves, 2 chartaceous leaves, 2a coriaceous leaves, 3 rounded base, 3a acute base, 4 strong venation, 4a weak venation and I find that combinations of such characters have no relation to geographical grouping. These combinations may be further complicated by plants having both the contrasting characters 1 and 1a, etc. being present in the same specimen, producing a reticulate pattern with each form grading into the next and not a series of isolated intra-specific taxa. Of all the forms there is one which is more distinct from the rest. Here the leaves are chartaceous, narrow with a cuneate base almost decurrent on to the petiole, but the upper part of the leaf near the apex is rounded, obtuse and broadens out, ending in a 1 cm. long apiculus so that the shape is somewhat obovate. This is seen in *Kostermans 6789* and 6972 from Loa Haur, East Borneo. I might have named them as a separate variety had it not been that some of the leaves on *Kostermans 6789* have almost parallel sides and an acute or rounded, non-cuneate base. Further these two sheets lead on, on the one hand to *Kostermans 5475* which is somewhat similar but the leaves are slightly more coriaceous, broader for the most part, and narrowed to a rounded base. On the other hand they pass on to a series with leaves similar in texture i.e. chartaceous with an acute base and distinct venation but even among these, there are specimens with a rounded base. The apex of the leaf does not broaden out and the sides are sometimes nearly parallel. Examples of such are the plants that have been called *M. fallax* and *cumingii* var. *floribunda*, *Beccari 1590* and *Richards 1522* and 1615 and similar sheets *Kadir A2570, Sinclair Nos. 8948 & 9293* and *Wood A1957*. These in turn grade into specimens with more coriaceous leaves and a rounded base.

The compact or lax inflorescence is no guide either to subdivision. The inflorescence when young is rather compact with thick pedicels and branches. These remain close together for a long time, but just before flowering elongate and become lax, the pedicels then appearing quite slender. Such plants with lax, mature inflorescences have been called *M. fallax* and *M. cumingii* var. *floribunda*.
One, at times, meets with specimens which look deceptively intermediate between \textit{iners} and \textit{malaccensis} or approach \textit{malaccensis}. They may be of hybrid origin, but since all seem to me to be nearer to \textit{iners}, I have placed them under that species rather than with \textit{malaccensis}. An example is \textit{Kostermans} 5597 which has rounded and acute leaves on the same specimen, the nerves rather numerous and like those of \textit{malaccensis}, but the texture of the leaf too thin and the margins not reflexed. \textit{Hose} 392 is somewhat less intermediate. For differences between \textit{M. iners} and \textit{malaccensis} see notes under the latter.

The original spelling of \textit{M. vordermannii} was \textit{M. vordermanni} Warburg. This is corrected to \textit{M. vordermannii} in Flora Malesiana 1, 1 (1950) 550, the double \textit{i} being in accordance with the Code. But since the collector’s name was Adolphe Guillaume Vorderman, I have to alter it to \textit{M. vordermannii}.


Tree 5–20 m. high. \textit{Bark} blackish brown or dark reddish brown, flaking in a general longitudinal pattern, but not furrowed, flakes scale-like, small, thin, brittle; sap copious, dark red. \textit{Twigs} glabrous, rather pale and smooth in the younger parts, darker, striate and sometimes flaking in the older, 3–5 mm. thick at the apex. \textit{Leaves} coriaceous, oblong, elliptic-oblong with the sides nearly parallel, or panduriform, glabrous, dark glossy green above and retaining some of the glossy green colour when dry, pale green beneath and dull, the margins slightly revolute; nerves 15–20 pairs, leaving the midrib at almost right angles and curving gradually to the margins, impressed above and raised beneath, reticulations invisible or faint above, more distinct beneath and at times forming a loose network; length 15–25–(33) cm; breadth 4–11 cm., average 7 cm.; petiole 1.5–2.5 cm. long. \textit{Male inflorescence} an axillary panicle, 7–10 cm. long, bearing the flowers in sub-umbellate cymes; bracteoles 2 mm. long, reniform, membranous, tomentulose with ciliate margins; pedicels 3 mm. — 1 cm. long and less than 1 mm. thick. \textit{Male flowers} oblong, obtuse in bud, slightly coriaceous, tomentulose with greyish hairs outside, 5 mm. long and 3 mm.
broad, 3-angled at the apex with three blunt teeth extending about half-way down the perianth; androecium 2.5–3 mm. long when mature, including the 0.5–1 mm. long, swollen, pilose stalk, anthers 7–8, the apex of the column slightly convex or nearly flat without an apiculus. Female inflorescence very short, 7 mm. — 2 cm. long, little branched. Female flowers and bracteoles as in the male, but the perianth a little longer and more swollen; ovary densely tomentose. Fruit oblong, 5–7 cm. long and 3 cm. broad, pale yellow, minutely rusty-tomentulose, becoming glabrous when old, pericarp very thin and brittle when mature and dry, one to several fruits present on a rather slender, 4 cm long axis, the individual stalks 5 mm. — 1 cm. long, thickening into a cone at the base of the fruit. Aril orange-red. Seed filling the carpel, dark brown when dry.

MALAY PENINSULA: Selangor, Malacca and Pahang. For list see Gard. Bull. Sing. 16 (1958) 358. Delete the Bukit Lagong records of Myristica wyatt-smithii mentioned there and transfer to M. iners. The Kedah record is only M. iners.

BORNEO SARAWAK: 1st Division:—Kuching, Beccari Nos. 652 (FI, G, K, M, NY, P, S); 666 (FI, G, K, M, P) & 1270 (FI); Matang, Beccari Nos. 1574 (A, FI, G, K, P) & 1575 (FI); Semengoh Forest Reserve, Kuching, Haji Bujang SAR 12752 (K, L, SAR, SING); Sinclair Nos. 10178 (K, L, SAR, SING) & 10194 (A, B, E, K, L, SAR, SING) and Yacup 9350 (BO, K, L, SAR, SING); Sungei Sabal Tapang, Serian, Sinclair 10280 (A, E, K, L, SAR, SING); Gunong Gaharu, Serian, Sinclair 10286 (E, K, L, SAR, SING); Bako National Park, Telok Tajor, Ardzi & Rashid SAR 10251 (K, L, SAR, SING); Gunong Gading, Beccari 2328 (FI).

3rd Division:—Path to Bukit Kementan. Ulu Muput Kanan, Anap, Ilias Paie SAR 19511 (L).

4th Division:—Tatau, Kakus-Pandan F. Reserve, Brünig SAR 11956 (SAR, SING); Lambir Hills F.R., Miri, Dan b. Haji Bakar SAR 4365 (SAR, SING); Gunong Api, Baram, Anderson SAR 4343 (SAR, SING).

BRUNEI: Andulau F. Reserve, Ashton BRUN Nos. 577 (BO, K, KEP, L, SAR, SING) and 5945 (BO, K, KEP, L, SAR, SING); Sungei Belait at Kuala Ingei, Ashton BRUN 186 (BO, K, KEP, L, SAR, SING) probably; north slopes of Bukit Patoi. Temburong, Ashton, Smythies & Wood SAN 17126 (BRUN, K, KEP, L, SING); ¾ mile south of summit of Bukit Patoi, Ashton, Smythies & Wood SAN 17421 (KEP, L, SING).

SOUTH AND SOUTH-EAST BORNEO: Hayup, Hubert Winkler 2405 (BM, BO, K, L, P, PNH, SING, Z).


Since I dealt with *M. malaccensis* in *Gard. Bull. Sing.* 16 (1958) 356 much more material has been received and I have been able to add notes about the bark characters and other aspects of external morphology not mentioned there. A fresh description of this species is therefore now given. *M. malaccensis* is near to *iners* and at one time, I thought that I might have to unite them. However, I have now seen both species growing in the Semengoh Forest in Sarawak and from the appearance of the bark they can at once be separated. The Dyak collectors whose local knowledge of the forest and trees is considerable, assured me that the two trees were quite distinct from each other. The colour of the bark and its flaking is about the same in both, but that of *malaccensis* does not have the longitudinal fissures seen in *iners*. The twigs of *malaccensis* are much thicker at the apex than those of *iners* while the leaves of the former also are generally more coriaceous and broader, dry a greenish colour above, are more rounded at the base, with the margins slightly inrolled towards the lower surface and the veins more prominent and less oblique, leaving the midrib at a wide angle and curving gradually from midrib to margin. However, there are specimens of *iners* in which the leaf is also coriaceous and broad and the veins equally prominent, curving gradually from midrib to margin. The male flowers in *malaccensis* are sub-globose in bud and smaller than in *iners* where they are more ovoid and slightly narrowed to the apex. The three ridges on the perianth does not seem to be present in *iners*.

It will be noticed that I have transferred *M. wyatt-smithii* from a synonym of *malaccensis* to a synonym of *iners*. It is really only a broad-leaved form of *iners* (also see notes under *iners*) and the ciliate character of the bracteole seen in *wyatt-smithii* does not serve to separate *malaccensis* from *iners* as both have ciliate bracteoles. I have now seen a great deal of material of the latter since my account of it in *Gard. Bull. Sing.* 16 (1958) 363 was written.

*Foot-note:*—The specimens from East-Borneo may be atypical *maxima* with very thin leaves.
6. SERIES ELLIPTICAE


Twigs pale straw-coloured, pale brown, or reddish brown, less often dark (rosselensis) generally glabrous or nearly so except inopinata. Leaves chartaceous or thinly coriaceous, sometimes breaking in herbaria, medium to small size-class, glabrous, drying a pale yellowish brown above, often glaucous beneath when fresh and becoming a similar pale brown when dry, whitish, very closely adpressed scales (never lax or powdery) sometimes present in elliptica var. celebica, the white colour often (not always) persisting when dry, base acute, generally rounded, sometimes emarginate or sub-cordate; nerves distinct or faint, secondary nerves present except in elliptica. Inflorescence axis slender and often flattened, branched or simply bifurcate, the branches opposite, the lowermost generally at a wide angle, the uppermost smaller and more oblique. Perianth elongate, tubular, ellipsoid, strongly three-angled at the apex and for some distance down (garciniifolia, inopinata and to a less extent in elliptica) the angles very faint or absent in schleinitzii and rosselensis, often obliquely attached to the pedicel, the bracteole small, much shorter than the flower, also obliquely attached and adpressed to the base of the flower but diverging from it higher up towards its own apex i.e. the apex of the bracteole. Female flowers urceolate with reflexed lobes. Stamininal column usually without a sterile apiculus, its stalk glabrous or pubescent and smaller than the fertile part (sterile apiculus present in inopinata and sometimes seen in rosselensis. More observations should be made). Fruit generally rather small, largest in elliptica, glabrous or becoming glabrous, less often tomentulose, rarely densely villose (inopinata), ellipsoid or oblong, gibbous at the base and oblique at the apex in elliptica, slightly oblique in garciniiifolia. 5 species — elliptica, garciniiifolia, inopinata, rosselensis and schleinitzii.

Type species: M. elliptica Hk. f. et Th. var. elliptica.

Series Ellipticae is linked to series Malabaricae especially through M. elliptica. The lack of secondary nerves in that species separates it from the remaining New Guinea members of the Ellipticae which have them, but ally it to series Malabaricae where secondary nerves are mostly absent. The twigs, glabrous in all species except inopinata, also indicate a relation with series Malabaricae. An important difference between the two series is that the male perianth has changed its shape from the globose or ovoid of series Malabaricae to the ellipsoid or almost tubular of Ellipticae. In addition the perianth has become three-angled at the apex in bud in most of the species including elliptica. Only one species in the Malabaricae, namely M. malaccensis has a three-angled perianth.
The ridges there are not always distinct but the trait has at least appeared. Series *Ellipticae* is also related to series *Cinnamomeae* through the presence of a similar three-ridged perianth but differs in the absence of the powdery cinnamon scales on the undersurface of the leaf.

It will be noticed that Warburg has only one species, namely *elliptica*, in series *Ellipticae*, and that he has put the others into two separate series viz. *Schleinitzii* and *Celebicae*, the latter consisting of the two species *M. celebica* and *M. simiarum* which he did not unite with *M. elliptica*. He saw only fruiting specimens of *garciniifolia* and did not know where to place it. The remaining species were unknown in his day.


**var. elliptica** — **Fig. 12G and H.**

**SIAM**

- Peninsular Division: Tako, Langsuan, *Put 1693* (BK, BM, K);
- Khao Luang, Nakawn Sritamarat, *Smitinand 850* (A, SING);

**SUMATRA**


**WEST COAST**

- Ophier, Air Bangis, *bb19848* (A, BO, L);
- Sidjungdjung, *Teijssmann 477* (BO, U);
- Priaman, *Teijssmann & Diepenhorst 482* (BO, U);
- Priaman, *Diepenhorst 2570* (U) & *Teijssmann 2082* (BO, U).

**EAST COAST**

- Sibolangit, *Löhring 5578* (BO, L, U);

**INDRAGIRI**

- Riouw & Ond., Indrag. Bovenlanden, Belimbing *bb28470* *Buwalda 247* (BO, P); Indrag. Bovenlanden, Kuala Lau, *Buwalda 6862* (K, L, SING); Kw. Keritang *bb28698* (BO).

**DJAMBI**

- Simpang, *bb13148* (BO).
PALEMBANG: S.I., Dorst 154E1P846 (BO, SING) & 154E1P940 (BO, L, SING); Banjusain, Selubut, Thorenaar T1208 (BO); Bosch Samiang, B. van Vreeden 138 (BO); Banjusain & Kubestrekren, Grashoff 881 (BO, SING) & Thorenaar T1141 (BO).

BANKA: Rias, bb15395 (BO); Surgei Slan, Teijsman s.n. (BO); Toboailei, Teijsmann s.n. (BO).

BILLITON: Tanjong Pandan, Bantan, Air Malih, bb9172 (BO) & bb10238 (BO).

RIOUW ARCHIPELAGO: Gunong Bientang, Teijsmann s.n. (BO).


BORNEO SARAWAK: 1st Division:—Kuching, Becari Nos. 287 (FI); 613 (FI, G); 702 (FI, G, K, P) & 3550 (FI, G, K, P); Haviland & Hose 3726 (K); Dickson 91 (SING); Mt Poi, Clemens 20118 (A, BO, NY, SAR); Surgei Ensebang, Balai Ringin Protected Forest, Serian, Muas SAR 13367 (K, L, SAN, SAR, SING). 4th Division:—S. Kelawit, Tatua, Ashton SAR 16467 (L, SING).

WEST BORNEO: S.I., de Vriese s.n. (L); Teijsmanu & de Vriese s.n. (L); Landschap Kubu, Ambawang, bb7150 (BO, L); Kapuas, Teijsmann Nos. 8681 (BO, FI, SING) & 8682 (BO); Surgei Landak, Teijsmann s.n. (BO); Suka Lanting, Hallier 24 (BO).

SOUTH AND SOUTH-EAST BORNEO: Sampit, Buwalda 7956 (A, BO, K, L); near Sampit, Kostermaas 4687 (BO, K, L); Gunong Pematton, Korthals s.n. (CAL, L).

EAST AND NORTH-EAST BORNEO: S.I., Jahei, date 1893 (BO, SING) probably on the border of west Borneo; Surgei Makalam near Samarinda, E. Kutei, Kostermaas 6125 (A, K, L, P, PNH, SING).

DISTRIBUTION: Peninsular Siam, Sumatra, Malay Peninsular and Borneo except Brunei and British North Borneo.


VERNACULAR NAMES: Chan-muang (Pen. Siam): sunkit-sunkit (Sumatra, Indrag. Ulands); swamp nutmeg (English); tabah: tajam penggali (Johore).
This species is allied to *M. garciiniifolia* and *M. schleinitzii*. It is perhaps nearest to the latter in the shape and structure of the flowers. Both have similar bracteoles with the flower inserted rather obliquely on the pedicel. The tubular perianth, sharply angled at the apex is common to all three, while the same number of anthers and the presence of hairs on the stalk of the staminal column are also features in common. *M. elliptica* differs from the other members of its series in not having secondary nerves. For other differences see under these species.

The typical form of *M. elliptica* is a fresh water swamp forest tree with a large oblong fruit, glabrous or slightly pubescent flowers and a glabrous or sometimes pilose stalk to the staminal column. The flowers of its other two varieties are smaller, more numerous and densely pilose. See under these varieties and in the key for more details. The var. *celebica* is in some respects nearer to var. *elliptica* cf. the fruit, but its flowers are closer to those of var. *simiarum*, a variety or subspecies with a much smaller fruit. The geographical distribution of the three forms is interesting, especially the occurrence of var. *celebica* in Borneo. The species may have been distributed by birds, but I have pointed out in *Gard. Bull. Sing.* 16 (1958) 214 that the fruits and seeds of *M. elliptica* even without the aril float. The small-fruited forms such as var. *celebica* and *simiarum* would be readily carried and disseminated by birds or water while the larger fruit of var. *elliptica* might be distributed by water only so hence its occurrence in wet places. *M. elliptica* var. *elliptica* does not occur in Brunei or North Borneo, the parts of Borneo nearest to the Philippines so it is absent also from the Philippines. The variety *simiarum* is entirely absent from Borneo. It does not even occur in those nearest parts just mentioned which are opposite to the Philippines so there is less chance of it turning up in other parts of Borneo. This distribution would explain why it is rather different from the other two varieties, and might also be a good reason for classifying it as a subspecies rather than a variety. Variety *celebica* on the other hand occurs in that part of East Borneo, the jutting peninsula of East Kutei, which is at no great distance from Celebes while the typical variety *elliptica* is also present in East Borneo, the nearest locality to that of var. *celebica* being at Samarinda just south of the East Kutei peninsula.


Fig. 12. Myristica elliptica Wall. ex Hk. f. et Th. and its varieties.


Tree 5–15 m. high Bark slightly rough, reddish or greyish brown; wood white; sap dark red, copious. Twigs medium brown, glabrous and nearly smooth when young, older parts striate and straw-coloured. Leaves chartaceous, very brittle when dry and breaking in herbaria, medium green and glossy above, glaucous beneath with yellowish green lower midrib and veins, drying a pale yellowish brown, often with a blackish tinge, or sometimes nearly black (black when heat is used), elliptic, ovate-elliptic or ovate; nerves 8–11 pairs; length variable but generally smaller than the typical form, 10–17 cm., average 12 cm.; breadth 3.5–6 cm. Male inflorescence 3–5 cm. long, branched several times, the first pair of branches often at right angles to the main axis, the scars of fallen pedicels often prominent, the flowers clustered at the apices of the ultimate branches in racemose-umbels. Male perianth yellow and densely adpressed, dark rusty-tomentose or pilose outside, tubular, obliquely attached to the pedicel and 3–angled at the apex as in the typical form, 4–6 mm. long when dry; staminal column 2.5 mm. long, obtuse at the apex without an apiculus, stalk 1 mm. long, densely rusty-pilose, anthers 8–10; pedicels 2–3 mm. long, densely rusty-tomentose. Female inflorescence shorter. Female perianth as in the male, but urceolate and swollen with reflexed segments. Fruit glabrous, orange, globose or sub-globose, rounded and then minutely and obliquely apiculate at the apex, 1.5–2 cm. in diam.; stalk slender, 2 mm. thick and 1 cm. long. Aril dark red, much divided into narrow segments. Seed mottled with dark and lighter brown when fresh.

FORMOSA
BOTEL
TOBAGO
ISLANDS:

PHILIPPINES
BATAN
ISLANDS:

LUZON:

Taito, Botel Tobago (Hung-tou-yn; Lanyu or Kotosho Island) Y. Kikuchi 2630 (TI); Mt Iraranai, Tyosyun Sata 1270 (Z).

Batan Island, Mt Iraya, Ramos Nos 80064 (NY) & 80173 (K, NY, SING).


Prov. Isabela:—Ilagan, Vidal 3570 (K).


Prov. Rizal:—Calawan, Manila, Callery 34 (G Prodr., P).

Prov. Laguna:—Mt. Makiling, Curran 13155 (BM, K, L, P, US); Forestry School 20112 (BM, K, L, P US); Mt. Makiling, Foxworthy, 18th Nov. 1914 (US); Sinclair 9469 (A, E, K, L, P. SING) & Villamil 20398 (US).

Prov. Quezon:—the following three Tayabas, Curran 10219 (US); Mauban, Ramos 19465 (US); Infanta—Siniloan Trail, Ramos & Edaño 29206 (A, K, P, US); Mt. Binuang, Ramos & Edaño 28709 (K, US).

Prov. Camarines:—Curran 10641 (CAL); Ramos 1543 (A, BM, BO, BRI, CAL, G, L, NSW, NY, P, PNH, SING).


Prov. Albay:—Casiguran, Vidal 3550 (K).


Prov. Davao:—A. de Mesa 27584 (K, US).

Prov. Zamboanga del Norte:—Frate 38347 (L).

DISTRIBUTION: Philippines and Formosa (Botel Tobago Island).

VERNACULAR NAMES: Antao-nikuzuki (Formosa, Japanese): anuping (Sul.); duguan (C. Bis.); lupat (Ilk.); paria (Tag.); pokipok (Ilk.); tambalau (Tag.).

Differs from the typical form in the smaller, more numerous flowers which are more densely clustered at the ends of a more branched inflorescence. The flowers and pedicels are more densely pilose outside and not glabrous to slightly pilose. The stalk of the staminal column is densely pilose as compared with glabrous or slightly pilose in the typical form. The best distinguishing character is the fruit, 1.5–2 cm. in diam., globose as against the oblong, 7–8 cm. long one in var. *elliptica*; the fruit-stalk is more slender. The leaves though generally smaller, are variable and of little use in distinguishing it from those of the other two forms. I reduced *M. simiarum* to a vareity of *elliptica* in *Gard. Bull. Sing.* 16 (1958) 356, but some botanists may prefer to regard it as a subspecies. I would have regarded it as a subspecies myself, had it not been for the existence of a more intermediate variety, namely var. *celebica* from Borneo, Celebes and the Moluccas which has a slightly larger fruit, but not so large as that of the typical form. As pointed out both var. *elliptica* and var. *celebica* occur in East Borneo. At least I cannot separate the Bornean material from that of Celebes. It is important that a cytological study should now be made of these forms, the taxonomy of which cannot be settled further in the herbarium.


*Synonym:* *M. fragrans* (non Houtt.) Miq. f. *sylvestris* Miq. Ann. Mus. Bot. Lugd.-Bat. 1, 2 (1864) 205; Ann. 2, 1 (1865) 48 sub *M. celebica* Miq. — Fig. 12F.

Tree 20–26 m. high. Leaves as in var. *elliptica*, variable in size, 14–24 cm. long and 4–8 cm. broad. Male inflorescence 2.5–4 cm. long, similar to that of var. *simiarum*, but usually with fewer flowers. Male flowers as in var. *simiarum*, densely adpressed, rusty-pilose or sericeous outside, glabrous inside, 4–6 mm. long and 2 mm. in diam.; pedicels 2–3 mm. long; anthers 8–10, stalk of staminal column densely adpressed-tomentose. Female flowers also
similar to those of var. simiarum. Fruit larger than that of var. simiarum and oblong with a prominent, oblique apiculus at the apex, and often ridged along the line of dehiscence, 3.5–4 cm. long and 2.5–3 cm. broad, pericarp 3–4 mm. thick; stalk thicker, 1.3–1.5 cm. long and 7 mm. thick (4 mm. thick in the Bornean specimens).

BORNEO EAST AND NORTH-EAST BORNEO:

Mt. Ilaas Bungaan, Berouw, Kostermans Nos. 13772 (BM, CANB, K, KEP, L, P, SING) & 13866 (K, L, SING); Mt. Medadam, north of Sangkulirang, Kostermans 13365 (BO, K, L); Gunong Sekrat, south-east of Sangkulirang, E. Kutei, Kostermans 5895 (BO, K, L, P, PNH, SING); Sg. Susuk Region, E. Kutei, Kostermans 5623 (BO, K, L, PNH, SING).

CELEBES NORTH PENINSULA:

Minahassa, Manado, Koorders Nos. 18155 (BO) & 18159 (BO); Forman 371A (BO, K, L, SING); Teijsmann 5872 (BO, SING, U); de Vriese s.n (CAL, K, L, U); Gunong Kawatak, Minahassa, Alston 16254 (BM); Lemo. Manado, bb Nos. 7524 (BO) & 7543 (BO); Bang-gai, Pongian, bb31880 (A, BO, L); Lolombulan near Paku-ure, Koorders 18143 (BO); Gunong Klabat, bb13058 (BO); Forman 272 (K) & Koorders Nos. 18165 (BO, L) & 18166 (BO, K, L, P); Mt. Masarang, Tomohon, Forman 201 (K, L); Wagio Crater, Mt. Mahawae, Tomohon, Forman 372 (L); Tondano, Forsten s.n. (L) Makalongso, Tondano, Koorders 17437 (BO); sine coll. (L) as M. fallax Miq., nom. nud. in sched. (ined.); the next seven Ratahan or near Ratahan:—near Liwitung Koorders Nos. 18144 (BO) & 18154 (BO, L); Ratahan. Koorders 18168 (BO, L); Pulah, Koorders 18187 (BO); near Ratahan, Koorders 19749 (BO); Ratahan, Koorders 24064 (BO, L) & Teijsmann 5801 (BO, U). The following four Kaju-watu, Manado:—Koorders Nos 18139 (BO, L); 18160 (BO, L); 18161 (BO, K, L, P) & 18162 (BO, K, L, P), Totok near Rutatolok, Koorders 18163 (BO, L); Bolaang, Solog, Mongondow, bb19609 (A, BO, L); Palu, Sidaunta, Manado, bb28230 (A, BO, K, L, SING); Tuloa, Gorontolo, bb13678 (BO).

CENTRAL CELEBES:

Malili, Maleku, bb23908 (BO, L).

SOUTH WEST PENINSULA:

Palopo, Batang, bb20897 (BO, L).

PULAU MOENA:

Raha, Wasalangka, bb21331 (A, BO, L).

MOLUCCAS BATIAN:

Teijsmann & de Vriese s.n. (L, U); de Vriese (L, MEL).

BURU:

de Vriese's n. not seen.

SULA ISLANDS:

Kali Wai Gaj, bb28806 (A, BO, K, L, SING) and 28814 (A, BO, K, L, SING); Bovenloop, Wai Fowata, bb28824 (A, BO, K, L, SING); P. Mangoli, bb29828 (A, BO, L, SING) and 29830 (BO, L, SING).
DISTRIBUTION: East Borneo (Peninsular part of E Kutei including Sangkulirang and neighbourhood), Celebes and Moluccas (Batjan, Buru and Sula Islands).

TYPE MATERIAL: Myristica celebica Miq., Forsten s.n. (L) Tondano; Teijsmann 5801 (BO, U) Ratahan; de Vriese s.n. (L, MEL) Batjan; de Vriese s.n. Buru, no specimen seen, perhaps none preserved. All syntypes.

VERNACULAR NAMES: Dahan-ritek (Celebes); kena-poa (Sula Islands); lawoting-ritek (Cel.); montikus (Cel.); parias (Baree dialect, Cel.); rahaan (Cel.).

USES: Wood for house construction.

This variety is close to var. simiarum in the hairiness and size of the flowers but has a larger fruit with a thicker stalk. I cannot separate the Bornean specimens from those of Celebes. The tree is found in that part of East Borneo which is nearest to Celebes, namely a jutting peninsula of East Kutei including Sangkulirang and Berouw. The Bornean records are from limestone or coral-limestone, rather different from the swampy habitat of var. elliptica. Unfortunately the Celebes records give little indication of the substrata on the labels, but I have noted, "sand, and rocky ground". In the Philippines, var. simiarum is often found on hillsides. My specimens are from the rocky, almost dried-up bed of a stream on the hillside at Mt Makiling. The variety elliptica with the large fruit, as pointed out, prefers swampy ground when it develops stilt-roots. It can grow in dry ground in which case there is then little or no production of stilt-roots.

Teijsmann 5872 (BO, SING, U) Manado was identified by Miquel with a query as a wild form of Myristica fragrans in Ann. I, page 205 namely Myristica fragrans forma sylvestris e Celebes strips masc. spontanea? In Ann. II, page 48 he corrects himself, placing it under M. celebica.

(17) Myristica garciniiifolia Warb. Monog. Myrist. (1897) 125 t. 19; Mgf in Bot. Jahrb. 67, 2 (1935) 169.—Fig. 13.

Tree 13-25 m. high with small buttresses (= stilt-roots?). Bark dark brown, not fissured or flaking; sap scarlet, copious. Twigs smooth, glabrous, reddish brown and 4-5 mm. thick in the young or apical parts, greyish and tendency to crack lower down. Leaves coriaceous or parchment-like, glabrous, oblong, many of them panduriform, broadest above the middle, acute at the apex and narrowed towards a rounded, emarginate or sub-cordate base, drying light to medium brown on both surfaces, the upper generally glossy, the lower dull; midrib flat above, raised beneath; nerves 17-22 pairs, very faint on both surfaces, more distinct in thin-leaved specimens, close together, oblique with a pair of secondary nerves between many of the primary ones; reticulations invisible or very indistinct, scalariform; length 16-30, average 18 cm.; breadth
Fig. 13. *Myristica garciniifolia* Warb.

5.5—11 cm.; petiole 2 cm. long, reddish brown when dry. Male inflorescence a glabrous or almost glabrous flattened axis, 4 cm. long, branched dichotomously into 2 or 3 lesser branchlets, the flowers developing in racemose-umbels on the short ultimate branchlets which elongate and bear the scars of fallen flowers when old. Male perianth yellow, at first covered with loose floccose tomentum, soon glabrous or almost so, 8 mm. long and 3-4 mm. broad, ellipsoid, sharply angled in the upper half due to the perianth lobes which extend down \( \frac{1}{2}-\frac{3}{4} \) the length of the flower, lobes ovate, acute at the apex; staminal column narrow-cylindric, obtuse at the apex, the fertile portion 4 mm. long, reaching the apex without an apiculus, the stalk densely rusty-tomentose, 1 mm. long, anthers 10-12; bracteole very small, 2 mm. long, at the base of the flower on one side and adpressed to it, ovate, acute or obtuse; pedicels 5-8 mm.—(1 cm.) long, slender, 1 mm. thick, striate, flattened. Female inflorescence axis 3 cm. long. Female flowers rather similar to the male, but fewer in the inflorescence, 1 cm. long and 5 mm. broad; ovary rusty-tomentulose with two glabrous, divaricate, sessile, stigmatic lobes; pedicels 8 mm. long, 3 mm. thick, stouter than in the male. Fruit usually in pairs on the forked peduncle, oblong, pale brown-tomentulose at first, glabrous when old, 5-6 cm. long and 3 cm. broad; peduncle 1-1.5 cm. long and 2-3 mm. thick, pedicel 1-1.5 cm. long, expanding into a 4-5 mm. thick, cup-shaped receptacle in which the fruit sits. Seed 3.5 cm. long and 1.5 cm. broad.

NEW GUINEA

DUTCH NORTH NEW GUINEA:

Atasrip 79 also numbered 716 (BO, L); Nabire, Kanehira & Hautusima 11518 (A, BO, TNS); Humbolt Bay, Beccari Fl Acc. Nos. 7735 (FI) & 7735a (FI); Polimac, Hollandia, Iwanggin BW5202 (L, SING) & Koster BW1162 (CANB, K, L, SING); Tami River, Hollandia, Runtoboy BW3326 (K, L, SING); Cycloop Mts above Hollandia, Koster BW4320 (K, KEP, L, SING); Sekoli, south of Lake Sentani, Schram BW9461 (L, SING).

DISTRIBUTION:

As above, very local, but common in the Cycloop Mts.

TYPE MATERIAL:

Beccari Fi Acc. Nos. 7735 (FI) and 7735a (FI), Humbolt Bay. In Warburg’s day the FI material apparently had not yet been given an accession number. He quoted Beccari s.n., Humbolt Bay. This was the only material he saw then. The two sheets are obviously from the same gathering and are both type material. If one wishes to chose one of these sheets as a holotype, although it is not necessary, he is at liberty to do so. The one is as good as the other so let 7735 (FI) be the holotype and 7735a an isotype.

VERNACULAR NAMES: Paa (Skou dialect); itaie and itaiu (Kem-toek).
A tree with a very local distribution in coastal rain forest or not very far from the coast, ascending to 90 m. It is noted for its glabrous leaves, parchment-like with very faint nerves, the flattened inflorescence axis, the perianth at first floccose-tomentose and later glabrous, strongly 3-angled at the apex, and the pubescent stalk of the staminal column. I have placed it with *M. schleinitzii* and *elliptica* on account of the pale yellow glabrous leaves, the similar type of inflorescence, flowers and bracteoles, and the glabrous fruit. *M. schleinitzii* is also confined to coastal dune but has a much wider distribution extending to the D’entrecasteaux Islands, New Britain, New Ireland and the Solomons. It differs from *garciniifolia* in having more slender, paler twigs, fewer but more distinct veins in the leaves, a more slender and longer inflorescence with smaller, hairy flowers, not or faintly 3-angled at the apex and a smaller fruit with thinner pericarp.

(18) *Myristica inopinata* J. Sinclair, sp. nov.—Fig. 14.

Species ex affinitate *M. rosselensis* et *M. schleinitzii* a quibus innovationibus, inflorescentia, floribus fructibusque dense tomentosis, pedicellis floriferis crassioribus distinguishitur.

Arbor 20 m. alta. *Ramuli* novelli 5 mm. crassi, pilis brevibus dendroideis ferruginei, sub indumentum leves, nitidi, rubro-brunnei; partes adultae non visae. *Folia* subcoriacea, supra in sicco glabra, nitida, modice brunnea, subtus in juventute pilis stellatis pallido-brunneis laxe tecta, mox glabra, pallidiora vel flavido-brunnea, oblongo-lanceolata vel ovato-lanceolata, 16–27 cm. longa, 7–10 cm. lata, basi rotundata vel marginata, apice abrupte obtusa; nervi 13–18–jugati, supra leviter depressi, utrinque gracilissculi, sensim arcuati sed saepe irregulariter curvati, prope margines indistincti vel evanidi, interdum nervus secundarius unicus inter duos primarios visus; reticulationes supra laxe depressae, non valde distinctae, subtus invisibles; petioli tomentosi mox glabri, 2 cm. longi, 3–4 mm. crassi. *Inflorescentia mascula* ferrugineo-tomentosa, axis levis, sine cicatricibus, 1–2 cm. longus, simplex vel brevissime bifurcatus. *Flores masculi* coriacei, ferrugineo-tomentosi sub indumentum apice valde 3-angulati, 8 mm.–1 cm. longi, 4–4.5 mm. lati, in alabastro oblongi et apice obtusi, in lobos ½-fissi; columna staminalis minute apiculata, pars fertilis 5 mm. longa cum 8–10 antheris, stipes 2 mm. longus supra glaber, basi pilis setosis, 1 mm. longis praeditus; pedicelli 4–6 mm. longi, vulgo 4 mm., 2 mm. crassi; bracteolae floribus ½-breviores, tomentosae, mox deciduae. *Inflorescentia feminina* multo reducta, pedunculus communis 4–5 mm. longus in pedicellos duos 2 mm. longos et 3 mm. crassos divisus. *Flores femininei* 9 mm. longi, 7 mm. lati, urceolati cum dentibus reflexis; ovarium ovoideum, ferrugineo-tomentosum. 5 mm. longum 6 mm. latum, basi pilis setosis ornatum, stigma glabrum, lobis obtusis. *Fructus* (nondum maturus) ovoideus vel fere conicus, basi applanatus, dense flavido-villosus (pilis 2–3 mm. longis) 3 cm. longus, 2.5 cm. latus; pedunculus 5 mm. longus; pedicelli 3–5 mm. longi, 5 mm. crassi.
Fig. 14. Myristica inopinata J. Sinclair.

Tree 20 m. high. Young twigs 5 mm. thick, rusty with short dendroid hairs, smooth, shining and reddish brown underneath the indumentum; adult parts not seen. Leaves sub-coriaceous, glabrous, shining and medium brown above when dry, loosely covered beneath when young with pale brown stellate hairs, soon glabrous, paler or yellowish brown, oblong-lanceolate or ovate-lanceolate, rounded at the base, slightly sub-cordate or emarginate in the oldest and largest leaves, abruptly obtuse at the apex; nerves 13–18 pairs, slightly depressed above, somewhat slender on both surfaces, gradually arching but often rather crooked, indistinct near the margins, sometimes a single secondary nerve seen between two primary ones; reticulations sunk and lax above, not very distinct, invisible beneath; 16–27 cm. long, 7–10 cm. broad; petioles tomentose, soon glabrous, 2 cm. long and 3–4 mm. thick. Male inflorescence rusty-tomentose, the axis smooth without scars, 1–2 cm. long, simple or very shortly bifurcate. Male flowers coriaceous, rusty-tomentose, 8 mm.–1 cm. long and 4–4.5 mm. broad, oblong, obtuse at the strongly 3-angled apex in bud, the angles seen after removing the indumentum, split down ⅓-way into the lobes; staminal column minutely apiculate, the fertile part 5 mm. long with 8–10 anthers, the stalk 2 mm. long, glabrous above, covered at the base with 1 mm. long setose hairs; pedicels 4–6 mm., average 4 mm. long, 2 mm. thick; bracteoles ⅓ the length of the flowers, tomentose, soon deciduous. Female inflorescence much reduced, a common peduncle, 4–5 mm. long, divided into 2 mm. long and 3 mm. thick pedicels. Female flowers 9 mm. long and 7 mm. broad, urceolate with reflexed teeth; ovary ovoid, rusty-tomentose, 5 mm. long, 6 mm. broad, furnished at the base with setose hairs, stigma glabrous with obtuse lobes. Fruit (not quite mature) ovoid or almost conical, flattened at the base, densely medium brown-villosse, (the hairs 2–3 mm. long) 3 cm. long and 2.5 cm. broad; peduncle 5 mm. long; pedicels 3–5 mm. long and 5 mm. thick.

NEW GUINEA PAPUA: Milne Bay District:—Louisiade Archipelago, Rambuso, Sudest Island, Brass Nos. 28055 (A, CANB, K, L), and 28126 (A, BO, K, L).

DISTRIBUTION: Known from the above only. On a ridge in rain forest, altitude 150 m.

TYPE MATERIAL: Brass 28055 (A, CANB, K holotype, L).

A section I species which seems to be allied in a fair measure to M. rosselensis and schleinitzii, two species in the same geographical area. There is a certain suggestive similarity in the leaves, all having an obtuse apex and rather fine venation. Those of schleinitzii differ in usually having a cordate base. Those of the present species are covered with a loose tomentum beneath but it drops off very soon. The inflorescence axis, a section I type without scars, is also similar, being short, simple or only once branched. It is stouter with thicker pedicels than in the other relatives and is densely invested like the flowers, fruits and young twigs with
medium brown tomentum, this serving as a good diagnostic character for separating the species from its allies. The perianth is seen to be strongly 3-ridged at the apex when the thick indumentum is removed, a character which some of the members of this series with more glabrous perianths show, cf. especially *M. garcinifolia*. No details of bark characters are given. The trees were in flower in mid-September and young fruit was also present at the same time.


**Synonyms:** *M. mas* (non Rumphius) Labil. Relat. du Voy. à la Rech. de la Pérouse 1 (1799) 237. *M. spanogheana* (non Miq.) K. Schum. in Bot. Jahrb. 9, 2 (1887) 200. *M. faroensis* Hemsl. in Ann. Bot. 5 (1891) 506.—**Fig. 15.**

Tree 6-15 m. high with pyramidal branching and stilt-roots. *Bark* dark brown with numerous, fine, longitudinal fissures, flaking in thin, narrow strips; inner bark pink with copious, red watery sap; wood straw-coloured, becoming pinkish. *Twigs* slender, 2 mm. thick in the apical parts, pale brown, yellowish brown or less often reddish brown, finely longitudinally striate. *Leaves* thinly coriaceous, glabrous, almost distichous, oblong or often ovate, apex obtuse, base rounded or cordate, rarely acute, drying a pale brown or yellowish brown with a pale greenish tinge above, greyish or paler still below; midrib lying in a groove above, raised beneath; nerves 10–15 pairs, fine and usually sunk above, more prominent beneath, curving and ascending gradually to the margins, the line of anastomosis faint and broken in places; reticulations invisible above, occasionally a few faint ones seen beneath; length 8–21 cm.; breadth 5–8.5–(12) cm.; petiole 1–2 cm. long. *Male inflorescence* glabrous, 5–7 cm. long, branched, the first two branches often at right angles to the main axis, the axis flattened, the ultimate branches when old marked with the scars of fallen flowers, the flowers in racemose-umbels at the ends of these branches. *Male flowers* cream, usually obliquely attached to the pedicel, membranous, oblong (ellipsoid in bud), puberulous with pale brown hairs when young, becoming glabrous, split down about ½-way into the perianth lobes, 5–6 mm. long and 2.5 mm. broad, obtuse at the apex in bud and with an acute or obtuse, tomentose bracteole at the base; anthers 6–8–(10) without an apiculus, 2.5
Fig. 15. *Myristica schleinitzii* Engler.

mm. long on a pubescent, 1.5–2 mm. long stalk; pedicels slender, hair-like, 5 mm. long. Female inflorescence 4–5 cm. long, less branched and with shorter branches than in the male. Female perianth urceolate with reflexed teeth, 5 mm. long and 4 mm. broad; ovary 4 mm. long and 3 mm. broad, ovoid, light brown-tomentose, slightly rostrate at the apex and with a minute bi-lobed stigma. Fruit oblong, glabrous, yellowish, medium brown when dry, 2–3.5 cm. long and 1.5 cm. broad including the 3–4 mm. long pseudo-stalk, very thin-walled, the pericarp when dry only 0.5 mm. thick; stalk slender, 2–2.5 cm. long (including peduncle 1.5 cm. and pedicels 5 mm.–1 cm. long) and 2–3 mm. thick. Aril red, much divided. Seed oblong, greyish brown, shining.

NEW GUINEA PAPUA: S.I., South East New Guinea, Chalmers 7 (MEL).

Milne Bay District:—Kirikirikona. Cruttwell 32 (K); Cape Vogel Peninsula between Tapio & Kai-yo Bay, Hoogland 4329 (A, BM, CANB, L, LAE); Menapi, Brass 21764 (A, G, K, L, LAE).

Central District:—Doini Forbes 18 (MEL).

T.N.G.

Sepik District:—Torricelli Range. Schlechter 14512 (BO, BRSL).

Madang District:—Bogia coast. Robbins 1717 (CANB); Stephansort, Nyman Nos. 46 (BM, BRSL, UPS) & 1039 (BRSL, UPS); probably Astrolabe Bay, Ledermann 6514 (SING); Bili-Bili Island, Astrolabe Bay, Warburg 20712 (C, L, M, P); Friedrich Wilhelmshafen, Siar, Astrolabe Bay, Biro Nos. 159 (BP) & 163 (BP) & Nyman 1049 (UPS).

Morobe District:—Sio Mission, Clemens 8000 (A, B, SING); Kalueng, Finschhafen, Hollrung 153 (BO, K, MEL); Bumi River, Finschhafen, Lauterbach Nos. 1346 (BO, BRSL, CAL, L, S, SING) & 1492 (L); Finschhafen, Warburg 20710 (C, FI, G & Boiss., L, M, P) & date 1889 (M): Bulu, Schlechter 16037 (E, G, K, NY); Bongu, Lauterbach 771 (BRSL).


NEW BRITAIN: S.I., Waterhouse 919 (K); Ulamona, Nair N.G.F. 1873 (BRI, LAE); Massawa, Schlechter 13723 (BM, BO, BRSL, K).

NEW IRELAND: S.I., Labillardière s.n. (FI, G); Souo Island, Labillardière s.n. (G). Port Carteret, Barclay 3530 (BM, BRI); Lamehat, P.O. Kavieng, Peekel 16 (BO); Duke of York Islands, Bradtke 296 (BRI, MEL, NSW).

SANTA ISABEL: Tasia, Brass 3288 (BO, BR1); Karua Island, Meringe Lagoon, Whitmore BSIP 2684 (L, LAE, SING); Fara Island, Guppy 209 (K) on label as Faro.

NAVOTANA ISLAND: Brass 3237 (A, BM, BO, BR1, G, L).

NEW GEORGIA GROUP: Baga Island, Whitmore's collectors BSIP 3011 (L, SING); Gizo Island, Whitmore's collectors BSIP 5626 (L, SING).

DISTRIBUTION: Beach and strand forests on the east coast of Papua and New Guinea, New Britain, New Ireland and the Solomons. Specimens from the Tami Islands, Mioko and the Hermit Islands in Berlin Herbarium were destroyed. In New Britain, said to be common in the Calophyllum-Kwilia association on basaltic outcrops near the sea.

TYPE MATERIAL: M. schleinitzii, Naumann, 20th July 1875, New Hanover (B holotype) destroyed. M. faroensis, Guppy 209 (K).

VERNACULAR NAMES: Jagurnata (Onjob language at Koreaf, Milne Bay District); mogisigisi (N.E. Division of Papua); pohrapapura (Gabo-bora language at Tapio, Milne Bay District). U-we-pekira (Bougainville Island, Solomons).

A tree of the coastal sand dunes or beach and strand forest, nearest to M. rosselensis but also resembling the rarer M. garciniifolia and replaced by it in Dutch North New Guinea. The chief features are the glabrous leaves, often with a cordate base, pale brown on drying, the branched, flattened inflorescence with small, oblong to ellipsoid male flowers on very slender pedicels and the oblong, thin-walled fruit with slender stalks. I have also grouped it with M. elliptica and M. garciniifolia. The flowers are nearer to those of elliptica while the leaves seem to be nearer to those of garciniifolia. The habitat is similar to that of garciniifolia. For other notes see under these species.

M. schleinitzii, Hollrung 153 was wrongly named M. spanogheana by K. Schum. in Bot. Jahrb. 9 (1887) 200 and also wrongly given as M. mas Rumphius by Labillardière in his Relat. du Voy. à la Rech. de la Pérouse 1 (1799) 237. This is not the M. mas of Rumphius. M. mas Rumphius or rather Nux myristica mas is now M. fattua Houtt.

(20) Myristica rosselensis J. Sinclair, sp. nov.—Fig. 16.

Species ex affinitate M. schleinitzii, a qua radicibus epigeis carentibus, foliis brevioribus angustioribus, basi acutis vel rotundatis (non cordatis), nervis minus distinctis, floribus paucioribus, stipite columnae staminalis glabro inter alia recedit.

Arbor 7–25 m. alta. Ramuli rubro- vel nigro-brunnei, longitudinaliter striolati, graciliusculi, supernae 2 mm. crassi, inferne 4–5 mm. crassi, gemma terminali excepta, glabri; gemma ipsa elongata, tenuis, griseo-puberula apice acuta. Folia chartacea, glabra, lanceolata vel anguste elliptica, supra in sicco nitida, virido-brunnea, subtus pallido-griseo-brunnea, marginibus fere parallelis
notata; costa inferiore rubro-brunnea, apice obtusa vel obtuse acuta, basi acuta vel leviter rotundata, 6–16 cm. longa, vulgo 12 cm., 1.8–4 cm. lata, vulgo 3 cm.; costa supra insculpta, subtus paullo elevata; nervi 16–20–jugati, obliqui, utrinque tenuissimi, interdum prope apice marginesque evanescentes; reticulationes subnullae; petioli 1–1.5 cm. longi, tenues. *Inflorescentia mascula* paniculata, in superiore tertia distali parte tantum ramosa; axis primarius glaber, tenuis, complanatus, 4–6 cm. longus, 2 mm. latus; ramuli secundarii oppositi, 1–2–jugati, horizontaliter vel patentissime dispositi, breves, 2 mm.–2 cm. longi, basi leves, complanati, sursum saxe cicatricibus pedicellorum delapsorum obtecti, apice cum floribus 2–3–(5) coronati. *Flores masculi* flavidi, fragrantes, oblongo-cylindrici vel ellipsoidi, membranacei, extus in juventute appresso-tomentelli mox glabrescentes, 5–6 mm. longi, 2–3 mm. lati, apice in lobos tres obtuse acutos \( \frac{1}{4} \)-fissi; columna staminalis 5 mm. longa, apice leviter angustata, ibique apiculo obtuso minuto sterili coronata, stipes glaber, 2.5 mm. longus, partem fretillum in longitudine et latitudine aequans, antherae 8; bracteola 1 mm. longa, apice obtusa, ad basim perianthii affixa, pedicelli filiformes, 4–5 mm. longi. *Inflorescentia feminea*: axis simplex, 1.5–2 cm. longus, ut in mascula complanatus, apice cum floribus 3–4 in cymulam simplicem terminatus; pedicelli quam masculi breviore et crassiores, 2–4 mm. longi, 1 mm. crassi. *Flores feminei* glabri, urceolati, etiam fragrantes, 4–6 mm. longi, 3 mm. lati, apice in lobos obtusos brevissimos reflexos \( \frac{1}{4} \)-fissi; ovarium ferrugineo-tomentosum, 3.5 mm. longum, apice angustatum; stigma obtuse bi-lobatum; bracteola minuta, squamiformis, reflexa. *Fructus* non visus.

Tree 7–25 m. high. Twigs reddish or blackish brown, finely longitudinally striate, somewhat slender, 2 mm. thick at the apex and 4–5 mm. thick lower down, glabrous except for the terminal bud which is itself elongate, thin, greyish-puberulous, and acute at the apex. *Leaves* chartaceous, glabrous, lanceolate or narrowly elliptic, often with the margins nearly parallel, drying a dark greenish brown and glossy above, pale greyish brown beneath with the lower midrib reddish brown, obtuse or bluntly acute at the apex, acute or slightly rounded at the base; midrib sunk above and lying in a groove, slightly raised beneath; nerves 16–20 pairs, oblique, very fine on both surfaces, sometimes vanishing near the apex and margins; reticulations hardly any; length 6–16 cm, average 12 cm.; breadth 1.8–4 cm., average 3 cm.; petiole 1–1.5 cm. long, slender. *Male inflorescence* paniculate, branched only in the upper distal third; primary axis glabrous, thin, flattened, 4–6 cm. long and 2 mm. broad; secondary branches opposite, 1–2 pairs, arising horizontally or at a wide angle, short, 2 mm–2 cm. long, the basal part smooth and flattened, higher up covered with the scars of fallen pedicels and with 2–3–(5) flowers at the apex. *Male flowers* yellow, fragrant, oblong-cylindrical or ellipsoid, membranous, adpressed-tomentulose outside when young, soon becoming glabrous, 5–6 mm. long. 2–3 mm. broad, split down \( \frac{1}{4} \)-way at the apex into the three obtusely acute lobes; staminal column 5 mm. long, with a minute, obtuse,
Fig. 16. *Myristica rosselensis* J. Sinclair.

sterile apiculus at the slightly narrowed apex or apiculus absent, stalk glabrous, 2.5 mm. long, equaling the fertile part in length and in breadth, anthers 8; bracteole 1 mm. long, obtuse at the apex and attached to the base of the perianth; pedicels filiform, 4–5 mm. long. **Female inflorescence:** the axis simple, 1.5–2 cm. long, flattened as in the male and with 3–4 flowers grouped at the apex in a simple little cyme; pedicels shorter and thicker than the male ones, 2–4 mm. long and 1 mm. thick. **Female flowers** glabrous, urceolate, also fragrant, 4–6 mm. long and 3 mm. broad, split down ⅓-way at the apex into the very short, obtuse reflexed lobes; ovary rusty-tomentose. 3.5 mm. long, narrowed at the apex; stigma with two rounded, obtuse lobes; bracteole minute, scale-like, reflexed. **Fruit** not seen.

**NEW GUINEA PAPUA:** Milne Bay District:—Louisiaide Archipelago, Mount Sisa, Misima Island. Brass 27447 (A, K, L); Mount Riu, Sudest Island, Brass 27961 (A, K, L); Abaleti Island, Brass 28245 (A, K, L).

**DISTRIBUTION:** Confined so far to the Louisiaide Archipelago. Frequent on the crests of ridges in rain forest. 50–450 m altitude.

**TYPE MATERIAL:** Brass 27477 (A, K holotype, L).

The distinctive or noteworthy features of this tree are the narrow leaves with faint venation and almost parallel sides, the thin, flattened, sparingly branched inflorescence axis, indicating a section I species, the slender pedicels, the thin, glabrous male perianth, the urceolate, Vaccinium-like female one with reflexed lobes and the glabrous stalk of the staminal column which is as broad as the fertile part where they meet. The leaves at once recall those of M. lancifolia var. clemensi, a section II species, and in the absence of flowers care should be taken not to confuse them with those of the latter. They also resemble the leaves of M. iners, M. gigantea and M. umbellata.

The nearest ally is M. schleinitzii, a more robust edition of the present plant. Unlike schleinitzii, it does not appear to have stiltroots and so far has not been found in maritime situations. The leaves are smaller and narrower with much finer venation and not cordate or sub-cordate at the base. They usually dry a dark green above and not pale brown. The flowers are a trifle narrower and fewer and have a glabrous stalk to the staminal column in contrast to the pubescent one of schleinitzii. The female inflorescence is unbranched in the material available.

M. rosselensis shows a relationship with the preceding series Malabaricae through M. umbellata, especially as stated above, in the leaves. Both species have rather similar leaves with faint venation, those of umbellata tending to be wider at the middle, more cuneate at the base and slightly decurrent on to the petiole. The inflorescence axis of M. umbellata in the few sheets that exist is unbranched and not flattened and there are no conspicuous pedicel scars as the flowers all seem to open about the same time. I, however, do not see any great systematic value in the flattened axis as iners and some other species may have terete as
well as flattened ones. If further collections of *umbellata* can be obtained, I should not be surprised if they do show some examples with a branched or flattened axis, especially in specimens where the axis is large and well developed. The male flowers of *umbellata*, although larger and more numerous in the umbel with much longer pedicels, resemble those of *rosselensis* in some respects. Both are thin in texture and dry the same colour. Those of *rosselensis* are slightly pubescent when young but glabrous as in *umbellata* when mature. Their shape, however, is rather different and for this reason they are in a different series. The staminal column in both is almost exactly the same. The glabrous stalk is about the same length as the fertile part and passes into it without any constriction or change in breadth.

### 7. SERIES CINNAMOMEAE

**series Cinnamomeae** J. Sinclair, *ser. nov.*


(1897) 377 quoad *M. cinnamomea* King tantum.

**Ranuli** graciles, in partibus apicalibus 2–3 mm. crassi. *Folia* parva vel modicæ dimensionis, 15–20 cm. longa, 3–6.5 cm. lata, subtus squamulis cinnamomeis induta; nervi 14–20–jugati, nervi secundarii inter primarios conspersi; reticulationes nullae. *Inflorescentia mascula* brevis, 5 mm.–1 cm. longa, ramis 1–2 paribus praedita. *Flores masculi* 6 mm. longi, minute pubescentes, in alabastro 3–angulati, in lobos reflexos ½–fissi; pedicelli floribus aequilongii; columna staminalis vix vel non apiculata, stipes pubescentes partì fertili aequilongii. *Fructus* magnus, 6–9 cm. longus, 4.5 cm. latus, lignosus, ellipsoideus, nonnunquam basi leviter gibbosus, minute tomentellus.

**TYPE SPECIES:** *M. cinnamansea* King

**Twigs** slender, 2–3 mm. thick and cinnamon-brown-tomentulose in the apical parts, striate and dark brown lower down. *Leaves* thinly coriaceous, drying greenish brown above or pale yellowish brown, densely covered beneath with lax or powdery, cinnamon-brown scales but no hairs, elliptic or narrowly elliptic, medium to small size-class, 15–20 cm. long and 3–6.5 cm. broad, the base acute, the apex bluntly acute; nerves 14–20 pairs, fine and faint beneath, secondary nerves present; reticulations absent; petiole 1.2–2.2 cm. long, slender. *Male inflorescence* short, 5 mm. — 1 cm. long, terete with 1–2 pairs of opposite branches. *Male flowers* strongly 3–ridged at the apex in bud, 6 mm. long, minutely pubescent, split down ½–way by the slightly reflexed lobes; pedicels 5 mm. long, as long as the flowers; bracteoles minute, 2 mm. long; staminal column without a sterile apiculus or if present very minute and reduced. stalk pubescent, as long as the fertile part. *Fruit* rather large, 6–9 cm. long and 4.5 cm. broad. woody, thick-walled, ellipsoid, sometimes slightly gibbous at the base, minutely rusty or cinnamon-tomentulose — 1 species, *M. cinnamomea*. 
This series is close to series *Ellipticae* because of the flowers being strongly 3-angled at the apex, but differs from it chiefly in the presence of the lax, powdery cinnamon scales on the lower surface of the leaf. Other minor characters of difference are the more coarsely striate twigs and the darker bark. I may be putting too much stress on scales and perhaps series *Cinnamomeae* should be united with series *Ellipticae*. *M. cinnamomea* appears to be connected with the section II species *M. beccarii* and *smythiesii* or their archetypes. Could it have given rise to them? The existence of these section II species also with similar scales is an indirect reason for keeping *M. cinnamomea* apart from the *Ellipticae* in a series of its own. Thus, if *M. beccarii* and *smythiesii* can be kept out of series *Fatuae*, the one next to their own series, then similarly can *M. cinnamomea* be kept out of series *Ellipticae*. Sterile material or material in fruit of *M. cinnamomea* should also be compared with these two species as all three species could be confused. However, in spite of this, *M. cinnamomea* although common, has no synonyms and has not, as yet, been mistaken for these two species. I have included a special key for sterile material in case there is any difficulty.

Series *Cinnamomeae* is also close to series *Littorales*, resembling it in the shape of the leaves with their oblique nerves and secondary nerves and in the presence of the cinnamon scales in both. The latter, however, differs in the presence of hairs as well, the larger flowers, not 3-angled at the apex and in the different staminal column.

It is a "good thing", once more, that series *Cinnamomeae* shows an affinity with both series *Ellipticae* and *Littorales*. It would be odd if it were stuck in here without connections, reasons or resemblances. In fact, its presence does much to illustrate the continuity of the natural sequence and the wonderful uniformity which extends from species to species and series to series.

Warburg puts *M. cinnamomea* into a series *Suavis* with a most heterogeneous assortment of unrelated species from both sections I and II. He has *M. suavis*, *cumingii* and *tristis* in this series. *M. suavis* itself is a synonym of *M. crassa* which belongs to series *Teijsmanniae*.


The female flowers have now been obtained. I describe them from the Singapore duplicate of a specimen collected by Wyatt-Smith:—Kampong Gajah F.R., Perak, Malaya. *Wyatt-Smith K.F.N.* 78635.

Female inflorescence a very short, 3–5 mm. long main axis with 2–4 flowers. *Female perianth* 4–5 mm. long and 3 mm. broad, ovoid or urceolate, split down nearly to the middle by the lobes.
which are erect and obtuse at the apex; ovary pale brown-tomentose, 2 mm. long and 1 mm. broad at the base; pedicels 4-5 mm. long and longitudinally 1-2-sulcate; bracteole about half as long as the perianth.

INDRAGIRI: Kuala Belilas, Biwaldia 6741 (BO, K, L, SING).
PALEBRANG: Bajunglintir, Endert 236 (BO); 183E1P884 (BO, L, SING, U) & Dorst 183E1P942 (BO, L, SING); Banjusain & Kubestreken, Grashoff 913 (BO).


4th Division:— G. Mulu, Baram, Anderson & Keng K12 (A, BO, K, L, SAN, SAR, SING).

WEST BORNEO: Melawi, Tjatit, B. Gontuk, bb27019 (BO, L).

BUNGEI: Bukit Telingan, Rampayoh, Ashton BRUN 21 (K, KE, L, SAR, SING): mile 7, Kuala Abang Road, Ashton BRUN 5097 (K, KE, L, SAR, SING); Ulu Ropan-Belalong watershed, Ashton BRUN 5244 (K, KE, L, SAR, SING); Andulau F.R., Ashton & Whitmore BRUN 581 (BO, K, KE, L, SAR, SING).

SOUTH AND SOUTH-EAST BORNEO: Puruk Tjahu, bb10022 (BO).

EAST AND NORTH-EAST BORNEO: Lelebulan Teputsey, Jaheri 951 (BO).

BRITISH NORTH BORNEO: Batu 17, Apas Road, Tawau, Ahan Gibor SAN 29565 (L, SAN, SING); Sepilok Forest Reserve, Jalan Hujong Tanjong, W, Meijer SAN 20022 (SING); Compi 8, Sepilok F.R., Nicholson & Charington SAN Nos. 17726 (K, KE, L, SING) and 21553 (L, SING); Cpt. 12, Sepilok F.R., Sinclair 8950 (B, E, K, L, M, SAN, SING); Kabili F.R., Sales 1489 (K, L); Lungmans, 6th mile railway on the only big ridge, Whitmore SAN 17651 (K, L, SING); mile 3, British Borneo Timber Co. Concession, Bukit Garam, Kinabatangan, Wood A4748 (KEP, L, SAN, SING); Sungei Sapi, Beluran, Suluh Tingguan SAN 18788 (SING) and SAN 36312 (L, SAN); mile 1½ Beaufort Road, Papar, J.K. Lajangah SAN 32198 (L, SAN); mile 1½ north-east of Beaufort Township, Wood SAN 15066 (K, KE, L, SAN, SING).
Distinguished from *M. beccarii* by the leaves with longer petioles, fainter nerves, and with an acute, seldom rounded base. The inflorescence is totally different, a branched, flattened axis, bearing umbellate cymes, never a condensed, *Knema*-like, woody tubercle as in *beccarii*. The fruit is larger with a much harder and thicker pericarp. See also *M. snythiesii* for differences.

8. SERIES LITTORALES


*Twigs* 2–4–(5) mm. thick and rusty-furfuraceous-tomentose in the apical portions, reddish brown to greyish brown and striate in the oldest portions. *Leaves* chartaceous, less often coriaceous, drying medium brown often with a dark greenish lustre above, the lower surface covered with hairs and lax powdery scales, varying in colour, cinnamon brown, yellowish, pale yellow or whitish, the hairs very few or absent in *agusanensis* and densest in *markgraviana*, the lamina elliptic to elliptic-oblong or lanceolate, medium to small size-class, 11–30 cm. long and 3–12 cm. broad, the base acute, the apex acute or bluntly acute, less often acuminate; nerves 12–20 pairs, prominent, oblique and parallel, secondary nerves very few and faint; reticulations faint, mostly obscured by the scales on the lower surface; petiole 1.5–2.5 cm. long. *Male inflorescence* a 2–8 cm. long, laxly branched, rusty-furfuraceous panicle, the flowers numerous in *guatteriifolia* and *agusanensis*, fewer and much larger in *markgraviana*. *Male flowers* densely tomentose, globose or sub-globose in bud, 2–7 mm. long, larger, 7 mm.–1 cm. long in *markgraviana*, split down ½–½-way into the lobes; pedicels about as long as the flowers, 2–7 mm. or 7 mm –1 cm. long; bracteole ovate to orbicular, closely adpressed to the flower, 1.5–3.5 mm. long, depending on the size of the flower, early caducous; staminal column oblong or cylindrical with an obtuse apex and no sterile apiculus, the stalk very short, thick and pubescent. *Female inflorescence* shorter than the male with fewer branches. *Female flowers* ovoid-globose with reflexed teeth. *Fruit* oblong to ovoid-globose, medium sized, 3–5 cm. long and 2–4 cm. in diam., tomentulose to tomentose; stalk 5 mm.–1.8 cm. long–3 species, *M. agusanensis*, *guatteriifolia* and *markgraviana*.

*TYPE SPECIES:* (*M. litoralis* Miq.) = *M. guatteriifolia* A.D.C.
There are several outstanding features which should make recognition easy. The distinctly branched slender panicles will tell at once that this is a series in section I. The presence of both hairs and lax scales will also help greatly in determining the series since *Littorales* is the only one in section I that has both hairs and scales on the lower surface of the leaf. The elliptic leaves with oblique and parallel nerves are characteristic and the staminal column too, is distinct. *M. guatteriifolia* will always be associated with the sea-shore and with small rocky islands. It can be spotted at a distance. It is absent from muddy places, preferring rocks or sand. It has a wide distribution. *M. agusanensis* is a more elegant replica of it from the Philippines. *M. markgraviana* from New Guinea fits in very well here, but, as is reasonably expected, owing to geographical separation, has greater differences. The flowers and pedicels are larger and the leaves are smaller. It is also the only species in section I from New Guinea that has both hairs and scales.

Warburg lists *M. guatteriifolia, cookii, riedelli* and *litoralis* as belonging to this series but the last three are now synonyms of the first. The other two species *M. agusanensis* and *markgraviana* were unknown in his day.


**BURMA:**


Foot-note:—* This is the original spelling.
INDO-CHINA:
South Vietnam (Cochin-China):
All from Pulau Condor, Capt. Phillips (Cook's 3rd Exp.)(BM, C); Harmand, date 1875-77 (K, P); Herb. Pierre (Deerry) 5433 (BM, BO, BR, CAL, E, G & Boiss., K, P).

SUMATRA TAPANULI:
West Coast: Pulau Poene, Sibolga, bb19664 (A, BO, L).
Benkulen: Mid Sumatra, Koorders 10384 (BO).
Palembang: Tanjong Serawai, bb1812 (BO, L); Redjang, Sukomarindu, bb8865 (BO).
Banka: Rembio, Buurman van Vreeden 135 (BO).
Billiton: Lobok Besar, Kostermans & Anta 389 (BO, K, L, SING).
Riouw Archipelago: Pulau Karimon, Koorders 121 (BO).

MALAY PENINSULA:

JAVA
S.L.: Hasskarl & Teijssmann s.n. (L); Horsfield Nos. (4) (CGE, K); 297 (K) and 623 (BM).
West Java: Prov. Bandung, Herb. Pierre 5460 (P); Pulau Dua, Djakarta, J. J. Smith Dec. 1906 (BO); Pendjaliran, Djakarta, J. J. Smith 64 (BO).
Mid Java: The following Kedungjati, Separamang:— Koorders Nos. 543a (BO, K); 5229 (BO, CAL, K, L); 5230 (BO, L); 5231 (BO, L); 5232 (BO, L); 5233 (BO, K, L); 5234 (BO); 5235 (BO, P); 5236 (BO); 13143 (BO, CAL, K, L, P); 24876 (BO); 25300 (BO); 26099 (BO); 27227 (BO, K, L); 27230 (BO, SING); 28132 (BO). Japara or Djapara, Div. Taju, Afd. Djuwana, Koorders Nos. 35030 (BO) & 35031 (BO); Japara, Teijssmann s.n. (BO, L, P, U) the P duplicate collected by Teijssmann, has Herb. Pierre 5457 on the label. Pierre used his own number for unnumbered collections which he acquired for his herbarium. Tjabak:— Koorders Nos. 42288 (BO); 42302 (BO); 42315 (BO); 42329 (BO) and 42356 (BO); Kediri, Rembang, Tambakredjo, Sekar, Ja 1607 (BO); Rembang, Thorenaar 3 (BO).

ISLANDS NEAR S.W. BANTAM:
Pulau Panaitan, near Tjiharashas, van Borssum Waakkes Nos. 352 (BO) and north of Mt Parat, 797 (BO, L); Pulau Peutjiang, (Kostermans) UNESCO 7 (BM, G, K, KEP, L, SING).

KANGEAN ARCHIPELAGO:
Pulau Kangean:— Tambajangan, Baucker Nos. 27612 (BO, K, L, U, SING) & 27824 (BO, L, SING) & Paliat, Baucker 29419 (BO); Desa Kangajan, Dames 2 (BO); Djoekoeng-djoekoeng, Dommers 203 (BO).

MADURA:
M. Geger, Teijssmann 1756 (BO).
PULAU BAWEAN:

KARIMUNJAWA ARCHIPELAGO:
Pulau Karimunjawa, Japara, Semarang, *Ja 1712* (BO); Karimun Islands, *Teijsmann, June 1854* (BO).

LESSER SUNDA BALI ISLANDS

BORNEO SARAWAK:
4th Division:—Miri River, Baram District, *Hose 532* (BM, G, K, P, PNH, SING); *Miri, Md. Salleh SAR 1456* (KEP, SAR, SING); *Miri Road, M. Forest Staff, M. SAR 9778* (K, L, SAR, SING).

BRUNEI:

WEST BORNEO:
Palo, *Becking 36* (BO) & *56* (BO).

EAST AND NORTH-EAST BORNEO:

BRITISH NORTH BORNEO:
LABUAN: Motley 139 (CAL, K).
PULAU LAUT: Sei Sakujang, bb2357 (BO).
PHILIPPINES
BALABAC ISLAND: Vidal 3556 (K).
PALAWAN: S.1., Curran 3839 (BO, K, P); Danao 21590 (A, NY, US); Dawara, Mactan 7437 (NY, US); Taytay, Merrill Nos. 9253 (BM, CAL, K, L, NSW, NY, P, PNH, SING, US) & 9353 (BO, BRI, CAL, K, L, NSW, NY, P, PNH, US); Puerto Princesa, Cenabre Nos. 29153 (BK) and 29189 (A, BO, SING, W).
MINDORO: Merrill Nos. 8607 (BR) & 8640 (NSW).
LUZON: S.1., Lobay n.s. (K).
Prov. Ouezon (Tayabas)—Aguilar 20185 (US); Pagbilao, Merrill Nos. 1917 (K, NY, SING, US); 1924 (K, NY, US) & 2849 (BM, K, P, NY); Guiayangan, Merrill 2052 (A, CAL, K, NY, SING, US); Pitoga. Merrill 2117 (K, US); Malbog, Oro 30713 (SING, Z); Kinataktutan, Oro 30801 (NY, SING).
Prov. Camarines—Alvarez 23698 (A, SING, US); de Mesa & Magistrado 26511 (BM, BO, L).
MASBATE: Palanoc, Vidal 3553 (K).
GUIMARAS ISLAND: Gamill 281 (BM, NSW, NY, US); M. D. Sulit 11778 (A, L, PNH).
SULU ISLANDS: Vidal 3562 (K).
BASILAN: Miranda 18973 (DD) very glabrous form; Reillo 1167 (BRSL, FI, G, M, U, US, Z); Mt Bulanting. Hutchinson 130 (BRI).
MINDANAO: Proc. Zamboanga.—Ahern 590 (US); Quadras 294 (US); Malangas, Zamboanga del Sur, Ramos & Edaño 36982 (A, BM, BR1); Whitford & Hutchinson 9454 (US).


DISTRIBUTION: Burma, Indo-China (Cochin-China, P. Condor), Sumatra, Malay Peninsula (east coast only), Java, Bali, Borneo, Philippines.


VERNACULAR NAMES: Philippines.—Alanagni (Sul.); barakbak (Neg.); daguan (S.L. Bis.); dalihagan (Neg.); dogan (S.L. Bis.); doguan (Tag. P. Bis.); dugan (Tag., P. Bis.); duguan (Tag., Bik.); kamas (Sul.); lago (Tagb.); laho (Kuy.); talang-bundok (Tag.); tugan (Tag.).

USES: Sometimes for timber in North Borneo, but not to any extent.

A very distinct species related to M. agusanensis Elmer. It should be best recognized by the brown or silvery stellate scales on the undersurface of the leaves. Other diagnostic features are the brown bark, the branched inflorescence with sub-globose, rusty-tomentose flowers and pedicels and the densely tomentose fruit of the same colour. Further it is a coastal species of the sandy and rocky sea-shore (there are not many maritime Myristicaceae). It may grow inland on a coral, granitic-sand, or limestone substratum. Its presence on small rocky islands is likely due to the fact that these are usually uninhabited and the tree is left undisturbed to flourish. It is especially common in Brunei on the strand forest (white sand) forming a belt at the back of Casuarina equisetifolia, just across and east of the Sungei Belait. It is also common on remote and lonely places on the east coast of Malaya from Johore to Trengganu, but never on the west coast of Malaya. It should be looked for on rocky islands south of Singapore. There are
two gatherings by Rock from the Mekong river-valley in the Shan States, Burma, in male flower and fruit. I have examined these closely and cannot separate them from guatteriifolia. The nearest locality to this somewhat unexpected one is Pulau Condor, an island off the Mekong Delta in South Vietnam and the locus classicus for the synonym M. cookii. It will be noticed that guatteriifolia ends in Bali, the Wallace Line passing between Bali and Lombok. Could its male inflorescence axis have contracted and the yellow scales on the lower surface of its leaves become less giving way to fatua var. spanogheana, a variant of fatua which might be mistaken for it? The latter actually begins in Sumbawa but further search for it should be made in the deep valleys of mountainous Lombok.


Tree 9–12 m. high, branched at the top in a dense crown. Bark brown, flaking slightly in small portions; sap red. Twigs slender, 2–3 mm. thick from the apex to some distance down, medium to dark brown, glabrous, striate. Leaves chartaceous, less often thinly coriaceous, lanceolate, shining to dull and glabrous above, covered with minute silvery, cinnamon brown or yellowish scales beneath, especially in young leaves, often becoming glabrous when old, apex narrowed, acute, acuminate or sometimes the acumen blunt, base acute, midrib lying in a groove above, raised beneath; nerves 15–18 pairs, fine and sunk above, raised beneath, oblique, leaving the midrib at an angle of 45°, equidistant, sometimes with a secondary nerve between the primary ones: reticulations not visible above, sometimes visible beneath, but fine and faint, forming a lax network; length 11–15–(20) cm.; breadth 2–6 cm., average 3 cm.; petiole 1.5–2.5 cm. long, slender, deeply grooved. Male inflorescence 2–5 cm. long, a branched panicle or sometimes unbranched with clusters of sub-umbellate flowers at the ends of the branches. Male perianth rusty-tomentose outside, cream and glabrous inside, 2–4 mm. long, in bud subglobose, becoming oblong and obtuse at the apex, the lobes spreading or slightly reflexed in flower; bracteole at the base of the flower, semi-circular, amplexicaul, 1.5–2 mm. long; pedicels 2–3 mm. long; staminal column cylindrical, obtuse at the apex,
Fig. 17. *Myristica agusanensis* Elmer.

1.5–2 mm. long, the pubescent stalk \( \frac{3}{4} \) the length of the total structure; anthers 7–8. Female inflorescence shorter and less branched than the male. Female perianth as in the male, but ovoid and more swollen; ovary 1.8 mm. long and 1 mm. in diam., ovoid, adpressed-tomentose, narrowed at the apex into the bi-lobed stigmatic surface. Fruit single or in pairs, oblong or ellipsoid, rusty-brown-tomentulose, becoming glabrous, thin-walled when dry, 3–3.5 cm. long and 2–2.3 cm. broad; stalk 5 mm. long.

PHILIPPINES

S.L.: Loher 6716 (K, M).
MARINDUQUE: Vidal 1679 (K) the Fl & L duplicates are *Knema glomerata*.
BASILAN: *Mindanao:*

DISTRIBUTION: Philippines except in the north. In primary forest up to 800 m.


VERNACULAR NAMES: Baloi (Bik.); dugoan (Mbo.); malatalang (Tag.).

It should not be difficult to see that this species is related to *M. guatteriifolia*. It is, *par excellence*, a more elegant edition of it. Although close in many ways, it is not liable to be confused with *guatteriifolia*. The leaves with similar veins and cinnamon or yellow scales beneath are smaller, narrower and much thinner in texture. The indumentum is not so dense and does not persist so long. The inflorescence and flowers are very similar. They are, however, much smaller in all their parts, miniature replicas of those of *guatteriifolia*. The smaller fruit is not densely tomentose, but minutely tomentulose, becoming glabrous later. Finally *M. agusanensis* is not a sea-shore species like its ally.
M. sorsogonensis Elmer, without a description, is a nomen nudum. It was never validly published although it was distributed as Elmer 16010 and later confirmed by both Elmer and Merrill as a synonym of M. agusanensis.


*Synonym: M. philippensis* (non Lamk) Mgf in Bot. Jahrb. 67, 2 (1935) 158.—Fig. 18.

Tree 5–30 m. high with the lower branches nearly horizontal and when old with small buttresses. *Bark* medium to dark brown, finely longitudinally fissured, flaking vertically when old in rectangular strips; sap brownish red. *Twigs* densely and shortly medium brown, furfuraceous-tomentose on the apical parts for some distance down, 3–3.5 mm. thick but glabrous, medium grey, slightly rough and stouter, (5–6 mm. thick) lower down. *Leaves* chartaceous, sometimes thinly coriaceous, drying a glossy, greyish green on the upper surface, glabrous above except when young on the lower part of the upper midrib, covered beneath with minute, silvery or cinnamon scales and on top of these bedecked with a very short, furfuraceous, medium brown tomentum of branched or dendroid hairs, the latter rubbing off easily, but persisting for a longer time on the midrib and nerves and at least some of it present in the oldest leaves, elliptic, occasionally elliptic-lanceolate, the apex acute, bluntly acute, sometimes shortly acuminate and occasionally obtuse, base acute to bluntly acute: midrib and the 12–15 pairs of slender, oblique, nearly parallel and equidistant nerves sunk above and raised beneath with a very clear line of sub-marginal interarching beneath: reticulations absent or very few, widely-spaced in scalariform fashion on the lower surface; length 16–23 cm., average 19 cm.: breadth 6–10 cm., average 8 cm.; petiole 1.5–2 cm. long, shortly tomentose becoming glabrous, flat or scarcely grooved on the upper surface. *Male inflorescence* a panicle, 3–6 cm. long with several branches, the latter generally opposite and leaving the main axis at a wide angle, the lowermost usually at right angles, loosely articulated (the lateral branches and pedicels breaking and separating in herbaria into a number of segments so that it is difficult to see the exact configuration), the whole structure including perianth, pedicels and bracteoles densely tomentose or lanose with branched, 1–1.5 mm. long hairs, pedicels 7 mm.–1 cm. long. *Male flowers* obvoid to sub-globose in bud, split down ½-way at the apex into the lobes, 7 mm.–1 cm. long and 5–7 mm. broad, rather fleshy, remaining inflated when dry and not opening very much at the apex, glabrous inside: lobes oblong-deltoid, obtuse to sub-acute at the apex, incurved or slightly erect, neither spreading nor reflexed; bracteole 3.5 mm. long and 3.5 mm. broad, closely adpressed to the flower and surrounding it on one side, ovate to orbicular, obtuse at the apex, concave and glabrous inside: staminal column sessile or nearly sessile, cylindrical or obtusely trigonous, obtuse at the apex without a sterile apiculus, 4–5 mm. long and 2.5 mm. broad, the stalk 1 mm. long or less, glabrous
Fig. 18. *Myristica markgraviana* A. C. Smith.

but arising from a ring of hairs at the bottom of the perianth; anthers (7)—10—12, reduced anthers with only 1 loculus sometimes filling up spaces between the normal anthers. Female inflorescence shorter and less branched than in the male, also loosely articulated. Female flowers ovoid-globose, 7 mm. long and 7 mm. broad; ovary obovoid, rusty-lanose, the hairs 2—4 mm. long; pedicels 7 mm.—1 cm. long, stout, gradually thickened from a 3 mm. broad base to a 4—5 mm. thick apex, a small collar present at their apices where they are attached to the ovary. Fruit ovoid-globose, flattened at the base, medium brown and minutely furfuraceous—tomentose, 3—3.5 cm. long and 3—3.5 cm. broad and with a prominent groove of dehiscence; stalk 1 cm. long and 5—7 mm. thick.

NEW GUINEA PAPUA:


T.N.G.

Madang District:—Minjim sub-district, Kambo, Stephansort, Schlechter 16789 (A, E, G, K, L, NY, S, Z) not Kaulo as stated by Markgraf and A. C. Smith; Ramu Valley, about 5 miles south-east of Faita airstrip, lower slopes of Bismarck Range, Saunders Nos. 296 (CANB, L, LAE); 310 (CANB, L): 364 (CANB, L); 384 (CANB, L, LAE); 409 (CANB, L); 415 (CANB, L); 419 (CANB, L); 425 (CANB, L); 426 (A, BM, CANB, K, L, LAE); 428 (CANB, L, LAE); 443 (CANB, L); 491 (CANB, L); 499 (CANB, L, LAE); 526 (CANB, L, LAE, US) not Gymnacranthera paniculata var. zippeliana as stated by me in Coll. List to Gymnacranthera; 533 (CANB); 537 (CANB); 538 (CANB, L) & 562 (CANB, L).

Morobe District:—Quembung, Clemens 1142 (B, L, SING) & 2183 (A, B, SING); Wareo, Clemens 1877 (B, SING); Busu River, Henty N.G.F. 14928 (K, L, LAE).

DISTRIBUTION:

Papua and the Mandated Territory of New Guinea. The altitude records are from 600—3,000 feet (184—923 m.).

TYPE MATERIAL:

Clemens 1142 (A holotype, B, L, SING).

VERNACULAR NAMES:

Hokol; kolokol; saksak (Amele); galas; gedagod; gilus; ‘mobo; ubub (Bilia); dzidzit; gaiqihab; gegeram; kisek; kuat; muruara; susiuk; yambuang (Dumpu); amu; gamuka or more frequently gamukua; gomugala; tua; wawau;wine (Faita); talela (Upper Waria).

This is a very distinct species and not likely to be confused with any other. It has an unusual combination of characters, namely a branched inflorescence (section I type) and the presence of both scales and hairs on the lower surface of the leaf. No other species in section I, except agusanensis and guatterii folia has such a combination. In these two, in very young leaves there are hairs among the scales. These soon drop off, however, and then only the scales remain. The flowers, though smaller, and the staminal column, are both comparable with those of markgraviana.
Other noteworthy features of *markgraviana* are the elliptic, "medium size-class" leaves, glossy on the upper surface when dry, the large, sub-globose or obovoid, densely rusty-tomentose flowers with a large bracteole, and the tomentose fruit, flattened at the base.

There is not much fertile material of *markgraviana* available. Of the many specimens collected by Saunders and quoted here only two are fertile. His specimens show good leaf samples and have informative notes, but only the young upper tomentose part of the twig has been collected. The Schlechter specimen 16789 was wrongly identified by Markgraf [Bot. Jahrb. 67 (1935) 158] as *M. philippensis* Lamk, a species which does not occur in New Guinea.

9. SERIES FRAGRANTES


Twigs generally slender, glabrous or with very little tomentum, 1–2 mm. thick in the apical parts, stouter in *succeedanea*. Leaves mostly chartaceous, sometimes coriaceous, small to medium size-class, 6–20 cm. long and up to 25 cm. long in *succeedanea* but average 15 cm., 3.5–6.5–(11) cm. broad, glabrous but covered beneath in varying degrees with very closely adpressed, minute silvery or whitish scales, these neither powdery nor lax and not easily rubbed off, sometimes not present in *fragrans* or present only on its young leaves, denser in *argentea*, the base acute, the apex acute or acuminate to apiculate: nerves 8–13 pairs and up to 18 in *succeedanea*, prominent and much curved, brownish or reddish brown when dry beneath. *Inflorescence axis* 1–5 cm. long, very slender, the axis and branches 1–2 mm. thick, usually only once forked at the apex into two branches, sometimes 2-forked, at times not branched at all but with single flowers male or female arising from the main axis; pedicels filiform. *Male flowers* thin in texture, sub-globose to ellipsoid in bud, rounded or slightly acute at the apex, generally glabrous, less often minutely tomentulose, 1–1.3 cm. long, 3–4 mm. long only in *impressinervia*, split down 1/5–1/6-way at the apex into the obliquely spreading or slightly reflexed lobes; staminal column with a very small obtuse apiculus, the stalk almost as long as the fertile part, about the same thickness or slightly thinner, glabrous or tomentose; bracteole very small and early deciduous. *Female flowers* more swollen than the male with reflexed lobes. *Fruit* glabrous, large, up to 10 cm. long, pyriform or ellipsoid, pendulous, aromatic.—4 species, *M. argentea*, *fragrans*, *impressinervia* and *succeedanea*.

**TYPE SPECIES:** *M. fragrans* Houtt.

A distinct series differing in many ways from the others in section I. One of the chief differences is seen in the branching of the inflorescence, following a dichotomous pattern or not
branched at all and often with single flowers. Other features are the rather small elliptic leaves with widely curved venation, the tendency to get rid of hairs on most parts where they normally occur, the reddish brown slender twigs, rough with lenticels in argentea, the rather large flowers and in particular the elongate shape of the male.

There seems to be some relation through the dichotomy of the inflorescence to the species in series Tubiflorae. There also seems to be some relationship with series Ellipticae where the species sometimes show dichotomy by suppression of the terminal part of the main inflorescence axis above the first pair of lateral branches.

I have united Warburg’s series Speciosae with his (Frangrans) Fragrantes. M. speciosa is not different from M. succedanea but he puts the latter in series Fragrantes. Series Fragrantes could be divided into subseries Fragrantes and subseries Speciosae with M. fragrans and impressinervia in the first and argentea and succedanea in the second.


Foot-note:—* See Index Lond. 4 (1930) 350 for illustrations mostly from text-books on general botany.
Gardens' Bulletin, Singapore — XXIII (1968)


I NATIVE. M. fragrans is native in Ambon and Banda but some of the following may be from trees cultivated there.

MOLUCCAS s.l.: Ex Herb. Burman 2382 (G) in Houttuyn’s handwriting and from his herbarium; ex Herb. Houtt. s.n. (L) 2 sheets in Houttuyn’s handwriting, L Acc. Nos. 908133–1765 and 908133–1784; s. coll., probably Vahl (L) dedit Houtt., L Acc. No. 908133–1797.

AMBON: S.1., Atasrip 1 (BO, SING); Forsten s.n. (L); Labillardière s.n. (Fl, G, P); Lesson d’Urville s.n. (P); Robinson Nos. 245 (A, BM, BO, K, L, NY, P, US) and 246 (A, CAL, K, P, SING, US) as nux myristica; Ventenat s.n. (G); de Vriese, date 1860 (A, L, LY); Hatiu Besar, b010149 (BO); Batu Merah, Rant 823 (BO).

BANDA: Atasrip 2 (BO, SING); ex Herb. Vahl s.n. also ex Herb. Houttuyn (C) dedit Houttuyn; Challenger Expedition. Moseley, date 1875 (BM, K); Christopher Smith, May 1797 (BR Herb. Roxb., G, MEL, NSW, SING) & C. Smith 299 (BM) these two probably all one collection; Teijssmann & de Vriese s.n. (L, U); Thunberg s.n. (S).
II CULTIVATED. The northern Moluccan specimens from Ternate, Batjan and Obi are listed here. It is unlikely that they are native.

INDIA S.L.: Wall. Cat. 6785b (K) Herb. Roxb. as M. aromatica; Wall. Cat. 6785c (K) Herb. Heyne as M. moschata; Wall. Cat. 6785d (K) Herb. Finlayson as M. aromatica; Herb. Burman s.n. (G).

WEST BENGAL: Bot. Gard. Calcutta, Herb. Pierre 5430 (P); Wall. Cat. 6785f (K) as M. moschata; Roxburgh s.n. (P); Gaudichaud 187 (G) ex Herb. Wall.

MADRAS: S.I., Wight Nos. 109 (E) & 2814 (E); Nilgiris, Gamble 11558 (K); Kuttalam (Courtallam), Beddome 6732 (BM); Wall. Cat. 6785a (CAL, CGE, G, K); Wight 722 (E) & Palunctotta, Courtallam, Wight 2488 (CAL, E, K, L, P).

KERALA: Cochin:— Bolghati, Gamble, Sept. 1894 (K).

NICOBARS: Philippi, date 1843 (C).

CEYLON: S.I., Dyke 79 (A, K, P); Pailett (Herb. Lemann) s.n. (CGE); Nilambre Estate, Galeta Road, Worthington 3021 (BM); Kandy, Worthington 5589 (BM); the remainder Botanic Gardens, Peradeniya, Appuhandy, 6th Feb. 1952 (PDA); Baker 124 (A, BO, C, E, K, NSW, P, DUA, U, UC, Z); Pearson 963 (CGE) & F.W. de Silva, 5th Oct. 1929 (PDA) & 8th Aug. 1931 (PDA).

INDO-CINA

SOUTH VIETNAM (COCHIN-CINA): Cochinchina, Expedit. Harmand, Godfroy 814 (P); Botanic Garden, Saigon, Alleizette 6151 (L).

SIAM CENTRAL DIVISION: Bangkok, Lakshnakara 435 (BM, BK).

PENINSULAR DIVISION: Trang, Collins 2352 (BM, K, P, US); Trang Chawng, Smitinand F.D. 8583 (BKF).

SUMATRA S.L.: Forbes, date 1881-82 (BM); de Vriesse (L).

EAST COAST: Bindjei, Langkat, Lörzing 16826 (K, L); Medan, Lörzing 13283 (K, L); Ria na Poso, between Djoema Tombak & Taratak, Tana Djawa, Sibolangit, Barilet 8283 (NY, US); Sibolangit, Lörzing Nos. 5220 (BO, K, L, U) & 5504 (BO, L); Aer Djoman, Asahan, Rahmat Si Boeea Nos. 8242 (A) and 8368 (A, L).


JAVA S.L.: Blume s.n. (BO, BR, C, L); Herb. Chislaw, date 1813 (G Prodr.) as M. vera; Friedmann, date 1846 (BR); Hasskarl s.n. (L); Junghuhn, date 1855 (LY) type of M. laurella Gandoger; M. le Comte Hoffmanteg, date 1857 (G Prodr.); Reinwardt s.n. (L); Waitz s.n. (L); Zollinger Nos. 392 (Fl, G, Boiss. & Prodr., K, L, P, Z) 1310 (S) & 1313 (BM, Fl, G & Boiss., P, Z).
WEST JAVA: The following Bogor or Hort. Bog.:—
Barhey, date 1891 (G Boiss.); Gilbert (IVH 55) (BR, K); Fevrell & Heide, May
1922 (S); Koorders Nos. 39669 (BO);
Pledang. Koorders 39670 (BO); Nyman,
12th Sept. 1897 (UPS); Sinclair Nos.
10032 (IVH 69) (A, B, E, K, L, M, NY,
SING) and 10033 (IVH, 55) (SING);
von Steenis 416 (BO); Teijsmann s.n. (G
Boiss., MEL, P); Warburg Nos. 1740
(C, Fl, G Boiss., L, M) and 11006 (G
Boiss., P); collections from trees num-
bered in Hort. Bog.:—IVG 76 (A, BO,
NY, SING, US): IVG 76a (BO. SING);
IVH 69 (NY, US) & IVH 70 (BO, NY,
Nos. 33975 (BO) & 33976 (BO): Tjionmas,
Brink f. 1614 (BO, U): Tjibalagung,
Bakh. f. 3611 (BO, L): near Djakarta
(Batavia). Kollmann (BM, G Boiss.).


BORNEO SARAWAK: Kuching. Beccari Fl Acc. Nos. 7659 (FI) &
7660 (FI).

PHILIPPINES LUZON: Prov. Laguna, Mt Makiling, M.D. Sulit
15023 (L, PNH).

CELEBES NORTH PENINSULA: S.l., C. Hose 819 (BM, K); Boowl =
(Boeol). Taba-muang. Kaudern 7 (L);
Minahassa, Don du Major (Herb. Sau-
viniere) s.n. (P).

MOLUCCAS TERNATE: Atasrip Nos 7 (BO, SING): 19 (BO,
SING); 123 (BO); 124 (BO); 125 (BO);
129 (BO) & 130 (BO, SING): Beccari
Fl Acc. Nos. 7661 (Fl): 7662 (Fl); 7663
(Fl); 7664 (Fl); 7665 (Fl); 7666 (Fl);
7667 (Fl); 7672 (Fl) & 7673 (Fl); 7699
(Fl); 7700 (Fl) & 7701 (Fl); Palatunin,
K.P.M., Beguin Nos 786 (BO); 787 (BO,
L); 788 (BO); 789 (BO) & 1382 (BO);
s.1, Teijsmann 7821 (BO).

BATJAN: Teijsmann 5891 (BO, CAL, PDA, U); de Vriese s.n. (L).

OBI: Atasrip Nos. 111 (BO, K, L) & 112 (BO, SING); de Vriese s.n. (L).

NEW GUINEA VOGELKOP (DUTCH WEST NEW GUINEA):

Fak-Fak, Expt. Garden, Kalkman BW
Nos. 6340 (L. SING); 6341 (KEP, L,
SING); 6342 (L. SING) & 6347 (KEP,
L. SING).

AFRICAN ISLANDS ZANZIBAR: Sacleux, June 1891 (P).

MAURITIUS (ILE-DE-FRANCE): Cére (Herb. Lamarck) s.n. (P) several
sheets; Labillardière s.n. (FI, G, P);
Maire (Herb. Lamarck) s.n. (P); Lahaye
s.n. (G Prodr.); Martin s.n. (G); Sieber
Nos. 126 (BM, BP, E, G & Prodr., K, L,
P) & 258 (BP, E, G & Prodr., L, P) as
M. moschata; Thunberg (Herb. Jussieu)
Richard Cat. No. 16700 (P).

REUNION (BOURBON): Boivin 1293 (G & Boiss., P); Perrotet,
dates 1820 (G Prodr.) & 1821 (G); Potier
s.n. (K, P).
WEST INDIES S.L.: Herb Lindley 1123 (L)
JAMAICA: Castleton Gardens, Harris, 4th July 1903 (UC).
MARTINIQUE: Decaisne, date 1871 (P); L’Hahn Nos. 345 (BM, FI, G & Boiss., K) and 346 (BM, G & Boiss.); L’Hahn, date 1867–1870 (P).
ST. VINCENT: Lindley, date 1827 (G Boiss., MEL).
GRENADE: The Bower, St. Georges, Broadway 4393 (BR); Belvedere, Eggers 6153 (P).
TOBAGO: Scarborough, Broadway 4828 (BM, E, G).
TRINADAD: Botanic Garden, St. Ann’s, Broadway 5220 (E, G, UC).

SOUTH AMERICA
FRENCH GUIANA (CAYENNE): Poiteau, date 1824 (K, P); Richard date 1874 (G & prodr.); Herb. Jussieu, Richard Cat. 16700a (P); Sagot 1234 (BM, P).
SURINAM (DUTCH GUIANA): Splittgerber 534 (L).
BRASIL: S.1., Lund 179 (G Prodr.); Rio Negro, Martius s.n. (L); Para, Burchell 9577 (K, P); Bot. Garden, Rio de Janeiro, s. coll. (BR); Guillemine, date 1839, Cat. No. 113 (G & Prodr., P) & Miers 3391 (K).

DISTRIBUTION: This tree is native in the Southern Moluccas, but probably most of the collectors listed here obtained it from plantations rather than from the forest. None of them states the type of habitat on the labels, and there are no recent collections. Blume says that it is native in Ceram, but I have seen no collections. The Portuguese first found it wild in Banda and pigeons are known to have carried seeds and spread it to various surrounding islands. There are collections from Ternate where it was obtained when Europeans first began to exploit the trade, but I have placed the Ternate material under “Cultivated” as it may not be native there.

TYPE MATERIAL: See at the end of the notes where it is more convenient to deal with this subject.

VERNACULAR NAMES: Buah pala (Malay); bunga pala (Malay = the mace); chan-thet (Laos and Siam); jaddikai (Tamil); jadi pattiri (Tamil = the mace); julphal (Hindi); japatr (Hindi = the mace); jouzuttib or jouzalteib (Arabic); jouzbewa (Persian); low how (Hokien); muskatmuss (German); noix muscade (French); nootmuskaut (Dutch); nos moscada (Portugese); nutmeg (English); sadikka; saddikka (Ceylon), Sinhalese); sadikkai (Ceylon, Tamil); tou k’ou (Mandarin); tow khow (Cantonese).

Sinclair — Myristica 229


The inflorescence, although less branched than that of species such as guatteriiifolia, lowiana, maxima, philippensis and others, is still typical of that of section I. The main axis of the male inflorescence is slender, 1-1.5 cm. long and branches dichotomously at the top into two equal, slender branches. Rarely are there more than two branches. These vary in size with age, but they are shorter than the main axis. They continue to grow at the apex bearing few flowers on slender pedicels. The portion bearing the bract and pedicel scars is slightly thickened. The older this portion the more scars will there be. Sometimes the male inflorescence is entirely simple with a single flower. The female axis is usually unbranched with only one flower. The main portion of it is also slender and not a woody-knob like that of a section II species or of a Knema. The student will learn to recognize that he is still dealing with a section I species.

The other members of this series, namely argentea, impressinervia and succedanea have a somewhat similar inflorescence, also with less branches than the species mentioned at the beginning of these notes. For the chief differences and similarities see the notes under each of the members of series Fragantes. Other species have leaves somewhat similar to those of fragrans. These are globosa, lepidota and tubiflora. See also under these for differences.

The page number of the reference for M. fragrans Houtt. in Nat. Hist. 2, 3 (1774) is 333 and not 233 as stated in many of the older publications. This error seems to have been perpetuated faithfully.

In a recent paper "Vegetative Propagation of Nutmeg (Myristica fragrans) in Grenada, West Indies" in Trop. Agric. 41, 2 (1964) 141, R. Nichols and A. M. Cruickshank review the old as well as the most recent methods in vegetative propagation of nutmeg. As a result of a hurricane in 1955 in Grenada, many of the nutmeg trees were damaged and the production of the crop fell by a half. To offset this loss investigations were started by the Regional Research Centre in Trinidad and the Department of Agriculture in Grenada with a view to improve existing methods of vegetative propagation. The best results were obtained from approach-grafting with marcotting second and although these two methods gave good results on a commercial scale they can still be improved considerably. Ordinary propagation from cuttings was too slow
and required extreme care. This technique has never become an established commercial practice with nutmegs, but recently considerable success has been achieved with rubber (another species difficult to root) using mist propagation. If more female nutmeg plants were readily available and the rubber methods tried out, the results might be better. If successful such methods would be cheaper than marcotting or approach-grafting.

Here are the details of the type material:—

*Mystistica fragrans* Houtt. Houttuyn bases his description mostly on that of Rumphius, *Herb. Amb. 2* (1741) 14 but also refers to C. Bauhin, Clusius, Dodonaeus and Weinmann and to the names *nux moschata fructu rotundo* of Bauhin and *nux myristica foemina* of Clusius. The type locality is Banda but he does not select any actual specimen as a type. There is, however, authentic material named but not collected by him. Vahl and Burman(n) gave him specimens for his herbarium, but these must have been collected not by themselves, but by someone else. Houttuyn's own herbarium with the sheets from these here-mentioned botanists is now incorporated in various national herbaria. His sheets are best cited as *ex Herb. Houtt.* There is one lot *ex Herb. Vahl* from Banda (C. W.). The C sheet is cited by Merrill in *J. Arn. Arb.* 19 (1938) 342. The W sheet was destroyed. There is another sheet bearing Houttuyn's handwriting in G *ex Herb. Burman*, Moluccas, sine locality. There are two sheets in L without locality, bearing Houttuyn's handwriting and a third sheet, also without locality, probably given to him by Vahl.

*M. amboinensis* Gandoger, *de Vriese* s.n., *date 1860* (L, LY holotype) Ambon.

*M. aromatica* Swartz, based on flowers in spirit from Banda and Mauritius, kept by Joseph Banks in his Museum (now the British Museum) and fruit from that illustrated by Thunberg in *Act. Holm.* (1782) 46 and the same as *nux moschata.* Lamarck and Swartz both published *M. aromatica* independently of each other, each making no reference to the other. It may be that Swartz, aware of the reading of Lamarck's paper at the meeting of the Académie Royale in 1788 in Paris and knowing that its publication would be delayed, "beat him to it" and published *M. aromatica* Swartz in 1788. Lamarck's paper, although being "for the year 1788" did not actually appear till 1791 so the priority goes to Swartz. In this paper of Lamarck's it will be noticed that he cites authors' names and references for species not published by himself but where there is no name it clearly shows that the species was his own. In his later account for *Myristica* in the *Encycl. Méth. Bot.* page 385 he certainly puts his own name to *M. aromatica,* leaving out all reference to Swartz. We can draw our own conclusions. Lamarck bases his species mostly on Cérè's description with a list of references to C. Bauhin, Clusius, Piso, Lobelius, Plukenet, Ray (Raj.), Valentini, Rumphius, Blackwell, Garcia and Sonnerat.
M. laurella Gandoger, Junghuhn s.n., date 1855 (LY holotype) Java.

M. moschata Thunb. Thunberg s.n., (S) Banda. This sheet is not quoted under the original description, but the author refers to Herb. Amb. and to the plate t. 4 there. On pages 16 and 18 of Herb. Amb. the name nux moschata is given.

M. officinalis L.f. There is a type specimen in the Linnaean Herbarium, Burlington House, London, which I was kindly allowed to inspect. This can be taken as the type of M. officinalis L.f. It is numbered 1204.1 both on the sheet and in Savage, A Catalogue of the Linnaean Herbarium (1945). On the sheet is also written Myristica vera H.B. The word Myristica is in the handwriting of Linnaeus and vera in J. E. Smith’s. I am indebted to Dr. W. T. Stearn of the British Museum who showed and explained to me the Museum’s microfilm copy of this sheet.


(26) Myristica impressinervia J. Sinclair, sp. nov. — Fig. 19.

Species in seriem Fragrantes ponenda atque affinis M. argenteae, succedaneae et fragranti a quibus floribus minoribus dense strigosotomentosis differt. A. M. fragranti, cui proxima, foliis apice minus acutis, subtus albidis, floribus campanulatis, stipite columnae staminalis piloso recognoscitur.

Arbor 6 m. alta, ramosissima. Ramuli graciles, 2 mm. crassi, glabri, sat grisei vel partim nigro-grisei, longitudinale striatuli. Folia chartacea, elliptica, nonnunquam oblongo-elliptica, supra in sicco atro-brunnea, subtus argentea, costa nervisque brunneis exceptis, basin versus rotundata, immo basi abrupte acuta, apice acuta vel obtuse acuta, 8–12 cm. longa; 4.5–6 cm. lata; costa supra insculpta, subtus elevata; nervi 8–11-jugati, supra valde impressi, subtus distincti, tenues, elevati, marginem versus gradatim curvati; reticulationes nullae; petioli 1–1.3 cm. longi, tenues, 1–1.5 mm. crassi. Inflorescensia mascula 1.5–5 cm. longa, gracilis, teres, strigoso-tomentosa, apice vulgo bifurcata vel interdum trifurcata, ramuli secundarrii 5 mm. — 2 cm. longi, floribus 3–5 in cymis monochasialisibus praediti. Flores masculi ± unifarii, introrsi, coriacei, late campanulati (in alabastro globosi), extus dense ferrugineo-stringosi, intus cremei, glabri, 3–4 mm. longi, 4 mm. lati, apice in lobos tres obtuse acutos ½-fissi; columna staminalis (stipes inclusus) 3 mm. longa, cylindrica vel in juventute doleiformis et sessilis, in apicem sterilem brevem obtusum terminata; antherae 8–12; stipes pilosus vel tomentosus, 1 mm. longus, basi latus, apice angustatus; pedicelli ut in floribus tomentosi, graciles, 5 mm. longi; bracteola simili modo tomentosa, semi-ornicularis, amplexicaulis 2–3 mm. longa. Flores feminei et fructus non visi.
Fig. 19. Myristica impressinervia J. Sinclair.

A tree 6 m. high, much branched. Twigs slender, 2 mm. thick, glabrous, medium grey or blackish grey in parts, finely longitudinally striate. Leaves chartaceous, elliptic or sometimes oblong-elliptic, drying dark brown above and silvery beneath with brown lower midrib and nerves, rounded and then abruptly acute at the base just above the petiole, acute at the apex; midrib sunk above, lying in a groove, raised beneath; nerves 8-11 pairs, very strongly impressed above, distinct, slender and raised beneath, curving gradually towards the margin; reticulations absent; length 8-12 cm; breadth 4.5-6 cm; petiole 1-1.3 cm. long, slender, 1-1.5 mm. thick. Male inflorescence 1.5-5 cm. long, slender, terete, strigose-tomentose, commonly bifurcate, less often trifurcate at the apex, the secondary branches 5 mm.—2 cm. long, bearing 3-5 flowers in monochasial cymes. Male flowers more or less in one row, facing inwards towards the axis or towards the flowers of the opposing twin branch, coriaceous, broadly campanulate (globose in bud), densely rusty-strigose outside, cream-coloured and glabrous inside, 3-4 mm. long and 4 mm. broad, split down half-way at the apex by the 3, obtusely acute perianth lobes; staminal column, including its stalk 3 mm. long, cylindrical or barrel-shaped and sessile when young. obtuse at the short, sterile apex, its stalk 1 mm. long, tomentose or pilose, broad at the base and narrowed at the apex where it joins the anthers; anthers 8-12 with shallow cup-shaped pollen grains; pedicels slender, tomentose like the perianth, 5 mm. long; bracteole with similar tomentum, semi-ornicular, amplexicaul, 2-3 mm long. Female flowers and fruit not seen.

CELEBES CENTRAL CELEBES: Tolala, Kjellberg 2427 (BO, S holotype).

DISTRIBUTION: Known only from the above, on limestone.

TYPE MATERIAL: See above.

This species I have put into series Fragrantes along with M. argentea, succedanea and fragrans. It agrees with the first two in having the lower surface of the leaves whitish, but the leaves themselves are smaller, being of the same shape and size as those of fragrans. It might, indeed, be mistaken for fragrans if sterile, but fragrans has a more acute leaf apex. It has the nerves impressed on the upper surface of the leaf as are those of the other three species. It also differs from the rest in its smaller, densely strigose-tomentose flowers, succedanea being the nearest with tomentulose flowers. M. fragrans and argentea have them glabrous. Its flower buds are obtuse at the apex, like those fragrans and succedanea. In argentea they are acute. The stalk of the staminal column is tomentose or pilose like that of succedanea whereas it is glabrous in argentea and fragrans. The last character is probably not important and I do not know how far it is reliable. However, to sum up, the main diagnostic characters of impressinervia are the "fragrans" type of leaf with slender petiole, sunk nerves and whitish undersurface and the tomentose-strigose flowers.
I have chosen the name *impressinervia* so as to call attention to another species — *M. impressa* Warb. with which I at first associated it, but after having carefully compared the descriptions of both, I have come to the conclusion that they do not agree. *M. impressa* Warb. was collected in Celebes only by Warburg, but unfortunately the single gathering was destroyed in Berlin during the war. The details are:—

**Myristica impressa** Warb. Monog. Myrist. (1897) 537 t. 15 f. 1–3.


*M. impressa* is described as having sunk veins and a white undersurface to the leaves, but the veins are oblique and not curved gradually towards the margins. The petiole is 2–3 mm. thick, whereas it is slender and 1–1.5 mm. thick in my species. Unfortunately there are no flowers and the description of the fruit is not very helpful as *M. koordersii* and *elliptica* var. *celebica* both from Celebes have a somewhat similar fruit. *M. koordersii* has a white undersurface to the leaves and those of *elliptica* var. *celebica* are also at times whitish. *M. koordersii* usually has an oblong leaf, with parallel sides, but I have seen a specimen from Bogor, *Teijsmann 472*, where some of the leaves are ovate or ovate-oblong (those of *impressa* were described as ovate or obovate-lanceolate). The ovate leaves of *Teijsmann 472* are those from the extreme apex of a twig and so therefore are not typical. *M. impressa* is certainly not *M. lancifolia* var. *bifurcata* while the only other known species from Celebes, *M. fata* var. *affinis* is ruled out since it has yellow scales on the undersurface of the leaf. *M. impressa* may have been an atypical specimen of *koordersii*, but since the evidence is not conclusive and the type is lost, I have, with regret, to relegate it to “Excluded Species”.


*Synonym:* *M. finschii* Warb. Monog. Myrist. (1897) 534 *pro parte*; Schum. et Lauterb. Fl. Deutsch. Schutzgeb. i.d. Südssee (1900) 328 *pro parte.* — [Fig. 20.](#)

Tree 15–20 m. high, sometimes with stilt-roots. *Bark* dark grey or blackish grey with very small roundish scales or flaking portions arranged in a longitudinal pattern; sap red. *Twigs* slender, 2 mm. thick at the apex, 4 mm. thick 20–30 cm. lower down, dark brown, rough with numerous raised lenticels and tending to crack in the
Fig. 20. *Myristica argentea* Warb.

oldest portions. *Leaves* chartaceous, mostly elliptic-lanceolate, but sometimes oblong-lanceolate, drying a pale yellowish green above and white beneath with minute silvery scales except on the brick-coloured midrib and nerves, apex sharply acuminate or apiculate with a 1–2 cm. long acumen; midrib and the 9–13 pairs of nerves sunk above, prominent beneath, the latter curving gradually and ascending to the margin, the asper rather crooked at times, reticulations not generally visible except under a lens, forming a scalariform series; length 10–20–(25) cm.; breadth 4–6–(10) cm.; petiole 1.5–2 cm. long. *Male inflorescence* slender, 2–5 cm. long, simple or mostly once forked, the forks bearing the scars of fallen flowers and bracts towards their apices. *Male flowers* 3–5 with slender pedicels 1 mm. or less thick and 1–1.3 cm. long; bracteoles very early caducous (not seen), but their basal remains forming a ring near the base of the perianth; perianth ellipsoid, 7 mm.—1.1 cm. long and 5 mm. broad, medium brown and glabrous outside or sometimes with a few, very minute, adpressed hairs, glabrous and greenish white inside, bluntly acute at the apex and split down \( \frac{1}{2} \)-way; staminal column with 10–12 anthers, ending in a minute, obtuse, sterile apex (or the sterile apex wanting), the stalk glabrous and 3 mm. long, the fertile portion 6 mm. long and slightly thicker than the stalk. *Female inflorescence* 1–1.5 cm. long, the main axis usually simple, but sometimes bifurcate, the 8 mm.—1 cm. long pedicels thicker than in the male, 1.5–2 mm. thick. *Female flowers* ovoid-ellipsoid, 1–1.2 cm. long and 5–6 mm. broad, narrowed into a beak-like apex; ovary flask-shaped, minutely light brown-tomentose, 3–4 mm. broad and 7 mm. long including the beak-like stigmatic portion. *Fruit* 4.5–8.5 cm. long and 4.5–5.5 cm. broad, ellipsoid, narrowed slightly at both ends, glabrous, yellow with some brown pustules, medium brown and very hard when dry; stalk 1 cm. long and 3 mm. thick. *Aril* thin, red. *Seed* oblong-cylindric, broadening at the base, blackish brown, shining, 3.5–4 cm. long.

**NEW GUINEA**

**Vogelkop**

(DUTCH WEST NEW GUINEA):

Between Andai and Bivac II, *Thyama 1908* (*RINR*); Kambu Keeper, *Atasrip 707* (BO, L); Rorise, Babo, *Aet (Lundquist) 169* (BO, L) & *bb32713 = Lundquist 94* (BO, L); Siaar (Secar) MacCluer Gulf, *Warburg 20717* (C, FI, G Boiss., L, M, P); Itaro, east of Teminabuan, *Schram BW Nos. 6158* (L) and 6159 (L); Fakfak, Kampong Agonda, Babo, *bb32986 = Lundquist 267* (BO, L); Agricultural Exp. Garden, Fak-fak, *Kalkman BW Nos. 6343* (L, SING); 6344 (K, L, SING) & 6346 (K, KEP, L, SING); Pulau Faor (Faur) *Beccari 42* (FI); Bahagdan, *bb22222 = Z. Salverda 302* (A, BO, L, SING); Wairoro, Geelvink Bay, *Beccari FI Acc. Nos. 7733* (A, FI); 7733a (FI); 7733b (FI) & 7733c (FI).

Foot-note: — *RINR* = Royal Institute for Natural Resources, Tokyo.
DISTRIBUTION: Dutch West New Guinea. Mostly cultivated. Fairly common but not well represented in herbaria. Schram BW Nos. 6158 and 6159 from primary forest, sandy clay on limestone rock, are stated to be rather common.


VERNACULAR NAMES: Akum (Malbrat language); gagom (Naramasa); heen (Iha); kakomo (Yense); long nutmeg; Macassar nutmeg; Papuan nutmeg (English).

USES: The Papuan nutmeg is cultivated to some slight extent in Dutch West New Guinea, but the aromatic properties are faint in the nut. The aril, Macassar mace, has more fragrance than the nut and has been used to mix with true mace. The nut, however, is used medicinally mostly in Java, as a substitute for the nuts of M. fatta.

The nut is larger and longer than that of M. fragrans and the aril is thinner and less divided. It has about four major laciniations. The leaves are larger than those of M. fragrans and are at once distinguished by their silvery white undersurface. They are less coriaceous than those of succedanea. Warburg has observed stilt-roots, but I do not know if they are always present. Perhaps, in dry ground, they may be absent or greatly reduced. The twigs are rough with numerous lenticels and this should distinguish argentea from the other species in this series. The male flowers are larger than those of fragrans being more elongated and more acute at the apex. The stalk of the larger staminal column is glabrous in both species but pubescent in succedanea and impressinervia.

According to Markgraf, page 169 M. finschii consists of loose fruit of M. fatta var. papuana and a leafy twig of M. argentea.


*See p. 239.
M. speciosa Warb. in Ber. d. Pharm. Ges. (1892) 219 t. (without number) f. 11; Die Muskatnuss (1897) 365 t. 3 f. 7 et Monog. Myrist. (1897) 453 t. 17 f. 1–4; Heyne, Nutt. Pl. 1 (1927) 647 — syn. nov.

Nomen: Pala Radja, see Teijsmann in Natuurk. Tijdsch. Ned. Ind. 23 (1861) 337 = M. radja Miq. [non pala radja Rumphius, Herb. Amb. 2 (1741) 16 t. 4 f. h = M. fragrans Houtt. with an abnormal fruit and very small nut]. — Fig. 21.

Tree 8–10 m. high with stilt-roots (always?) and a pyramidal crown. Twigs glabrous except at the rusty-tomentulose apex, stout, 3 mm. thick near the apex, 5 mm. thick lower down, aromatic, medium brown, rough, but not nearly so rough or warded as in argentea, the bark tending to shrink and crack. Leaves rigidly coriaceous, broadly elliptic, elliptic-lanceolate, oblong-lanceolate, less often oblong-ovate or oblanceolate dark green and shining above, sometimes even when dry, pale to medium brown above when dry, covered beneath with brownish white or dirty white, minute silvery scales when young, these tending to be shed in old leaves, the lower midrib and nerves brownish or reddish brown, base acute or rounded and then acute, apex rounded and then shortly and bluntly acuminate, the acumen 5 mm. — 1 cm. long, margins slightly revolute; nerves 10–18 pairs (average 13 pairs) from faint to impressed above, prominent beneath, oblique or slightly curving, interarching indistinctly at the margins; reticulations faint or mostly invisible; length 11–25 cm. (average 15 cm.); breadth 4–11 cm. (average 6 cm.); petiole 1–1.5 cm. long, deeply furrowed. Male inflorescence rusty-tomentulose, usually bifurcate and sometimes each branch forking again, the main axis 1–2 cm. long and about 3 mm. thick; pedicels 7 mm. — 1 cm. long and 1–1.5 mm. thick. Male flowers 7 mm. — 1 cm. long and 4 mm. broad, oblong, obtuse at the apex in bud, medium brown-tomentulose outside, cream-coloured and glabrous inside, fragrant, split down 1/5–1/4 by the minute perianth lobes; bracteole cup-shaped, almost surrounding the flower, early deciduous; staminal column ending in a small blunt apiculus, fertile portion 4–6 mm. long, narrowed to the apex and nearly as broad at the base as the 2 mm. long, pubescent stalk; anthers 8–10. Female inflorescence shorter than the male, 5 mm. — 1 cm. long, simple or occasionally bifurcate; pedicels 1 cm. long and 1.5–2 mm. thick. Female flowers fragrant, ovoid, narrowed to the apex, 7 mm. — 1 cm. long and 5 mm. broad. the lobes acute, reflexed and about 1/4 the length of the whole perianth; ovary rusty-tomentulose. Fruit tomentulose becoming glabrous, sub-globose to ovoid-ellipsoid, slightly narrowed towards both ends with a cushion of thickening just above the stalk, 7 cm. long, 4 cm. broad and the pericarp 1 cm. thick; stalk 1 cm. long. Seed broadly oblong, tending towards sub-globose, 3 cm. long and 2.5 cm. broad, endosperm aromatic.
Fig. 21. *Myristica succedanea* Reinwardt ex Bl.

MOLUCCAS TERNATE: Atasrip Nos. 4 (BO); 126 (BO, SING); 127 (BO SING) & 128 (BO, SING); Beccari FI Acc. Nos 7694 to 7698 (FI); Beguin 1006 (BO, L); Teijssmann Nos 7586 (BO, K.L, MEL) & 7587 (BO, C, K, L); Teijssmann s.n. (BO, L).

TIDORE: Gunong Mala-Mala, H.J. Lam 3713 (BO, K, L) as Gosora Onin; Toppo Reinwardt s.n. (CAL, L, P).

BATJAN: Beccari FI Acc. Nos. 7730 (FI); 7731 (FI); 7731a (FI); 7731b (FI) & 7731c (FI); Teijssmann 5621 (BO) another sheet in BO is fatua var. fatua; (Herb. Pierre 5454) = Teijssmann s.n. (P); Teijssmann s.n. (C, MEL, P, U); Teijssmann & de Vriese s.n. (L); de Vriese s.n. (BO, C, L, M); Gunong Sibella, Warburg 18297 (B burnt) and Warburg s.n., date 1888 (G Boiss., P).

CULTIVATED: Hort. Bog. IVH 85 (BO, L); IVH 84a (BO, L); IVH 86, Sinclair 10028 (A, B, E, K, L, SING) and IXB 4 (BO, L) & Woerjantoro 98 (L); Hort. Bog./ IXB 4a (BO, L); Nyman s.n. (UPS); Teijssmann s.n. ex Batjan (U) type of M. radja Miq.

DISTRIBUTION: Northern Moluccas, Ternate, Tidore and Batjan. Has been cultivated in Halmahera (Pala Maba or Halmahera nutmeg) see Warburg in “Die Muskatnuss”, page 370, but no specimens seen in herbaria. Except where cultivated it is a tree of mountain forests and is probably rare to-day.

TYPE MATERIAL: M. succedanea Reinwardt ex Bl., Toppo, Tidore, Reinwardt s.n. (CAL, L holotype, P) this was given the msc. no 1501 see de Vriese p. 94. Blume adopted the name M. succedanea from Reinwardt, either from the latter’s herbarium sheets or his manuscript or both. M. succedanea var. brevifolia Scheffer et Teijssmann, nomen nudum, Ternate, Teijssmann 7586 (BO holotype, K, L, MEL). M. radja Miq. cult. Hort. Bog. ex Batjan, Teijssmann s.n. (C, MEL, P, U lectotype) pro parte, altera pars = detached unripe fruit from Batjan and detached nuts without arils from Halmahera (L) = M. fragrans, see note below under M. radja. M. schefferi Warb. Ternate, Teijssmann s.n. (BO) as Pala Onin or Onem; cult Hort. Bog. Warburg s.n. (B burnt) and Ternate, Beccari FI Acc. Nos 7694 to 7698 (FI) probably all one collection, also as Pala Onin. M. speciosa Warb., syntypes, Batjan, Beccari FI Acc. Nos 7730 (FI) and 7731 (FI); G. Sibella, Batjan, Warburg 18297 (B not seen, burnt) and Teijssmann s.n. which is also the type of M. radja Miq., cited above.
VERNACULAR NAMES: Gosora onin or gosara onin (Tidore); pala hutan (Batjan); pala maba or Halmahera nutmeg (Halmahera) this name used by Warburg for succedanea: pala onin or onem (Ternate) for schefferi. Teijsmann informed Warburg, see Die Muskatnuss, page 372 that this plant originally had come from Onin a district in New Guinea near the MacCluer Gulf and was cultivated in Ternate. He must have been misinformed, however, as succedanea is never found in New Guinea, but argentea comes from near the MacCluer Gulf. If M. succedanea did come from Onin, then it must have been cultivated there but I have never heard of it being cultivated in New Guinea. When Warburg wrote his account of succedanea he saw material with immature male flowers, but for pala onin, he had large mature male flowers and immature fruit. The fact that the flowers were large, being mature, and the wrong information that the plant came from New Guinea, probably led him to describe it as a separate species, namely M. schefferi.

USES:
The nuts are quite aromatic and the tree was formerly cultivated to a small extent by the inhabitants of the Northern Moluccas, probably mostly for their own use. They made little profit for the trees did not produce any great quantity of fruit and the nuts are smaller than those of M. fragrans. The Dutch political administrators ordered all the trees to be cut down so as to keep the true nutmeg pure. Even if M. fragrans and succedanea did hybridize spontaneously in nature, the chance that succedanea would threaten the trade in the commercial product must have been remote. Such vandalism in exterminating an interesting and useful species is to be deplored, but fortunately H. J. Lam in 1926 found wild material of this species on Gunong Mala-Mala in Tidore, which goes to show that their diabolical acts did not altogether succeed.

This species is more than a robust edition of M. fragrans. The twigs are stouter, rougher, and have some pubescence at the apex, those of fragrans being glabrous. The leaves, though somewhat similar, are larger, broader and much more coriaceous and have slightly revolute margins. Their undersurface is covered with minute, dirty white or brownish white scales, but with age these tend to disappear and then the colour is brownish and more like that of fragrans. The inflorescence axis and pedicels are thicker than in fragrans. The male flowers are larger and of a different shape, being obtuse at the apex in bud and tomentulose outside.
The female flowers, too, are slightly larger and also less acute at the apex than those of *fragrans*. The stalk of the staminal column is pubescent and not glabrous. The fruit is rather similar, but smaller, and the seed is also smaller and more rounded in shape. Sometimes it is nearly sub-globose.

From *argentea* the present species also differs in its more coriaceous leaves, but in *argentea* the scales of the undersurface of the leaves are whiter and persist. Both have rough twigs, but those of *argentea* appear rougher as its lenticels are larger, raised and more numerous. The inflorescence axis is longer, but not so thick as that of *succedanea*; the pedicels are also not so thick, the flowers a trifle larger, more acute at the apex in bud and not tomentulose outside. The stalk of the staminal column is glabrous and not pubescent, while the fruit, too, seems to be without tomentum.

I am not able to distinguish between *succedanea* and the specimens with the broader leaves which Warburg called *speciosa*. One Leiden sheet of de Vriese's Batjan collection has broad and narrow leaves on the same specimen. A similar variable range in leaf width may sometimes be found in other collections of plants named *succedanea* and *speciosa*. Warburg did not see Atasrip's specimens from Ternate in Herb. Bogor. when he created *speciosa*. These are intermediate in width of leaf between the two extremes as are also my own specimens from the tree IVH 86 in Hort. Bogor. There was not a great amount of material available to him when he wrote his monograph, and he would therefore not have seen the range in leaf size that there now is. The material of *succedanea* that he saw had immature male flowers so that is probably one of the reasons why he created *schefferi* from specimens which had larger mature flowers. See note above under vernacular names. He included var. *brevifolia*, actually a *nomen nudum*, in typical *succedanea* and here I am inclined to agree.

The specimens are somewhat intermediate between *M. fragrans* and narrow-leaved forms of *succedanea*, but a trifle nearer to *succedanea*, so I have placed them with the latter. They could be large-leaved specimens of *fragrans* or even hybrids, but only experiments with living material and patience can settle such problems which are beyond the scope of this present monograph. Warburg created the name *speciosa* to cover the broad-leaved specimens because the name *M. radja* Miq. was a *mixtum compos- itum*. See Warburg, *Monogr. Myrist.* page 45 and *Die Muskatnuss*, page 367. See Teijsmann in *Natuurk. Tijdsch. Ned. Ind.* 23 (1861) 337 *Pala Radja*; see also Merrill, *Int. Rumph.* (1917) 230. The one part, the leaf specimen from Batjan (U) with unripe fruit was correct as *succedanea*. When in Batjan, Teijsmann met with a plant which he was told was called *Pala Radja*. The real Pala Radja as described by Rumphius was an abnormal fruit of *M. fragrans* with a very small nut. Teijsmann wrote about this *Pala Radja* and received some ripe fruits from the Sultan of Batjan which he planted in Bogor. The Sultan also gave him some unripe nuts
from the forest and these were sent to Leiden. De Vriese too, sent some ripe nuts without arils under the name of *Bitjoeli-bitjoeli* from Halmheira to Leiden. These, for some reason, got mixed with the nuts which Teijsmann thought were *Pala Radja* as well as with the leaf specimen and Miquel therefore described the material as *M. radja*. Some of them were probably those of *M. fragrans* and the others *M. succedanea*.

THE SERIES AND SPECIES OF SECTION II

10 SERIES FUSCAE

series *Fuscae* J. Sinclair, ser. nov.

Ramuli in partibus apicalibus 5 mm. crassi, generaliter tomentosi. *Folia* coriacea, saepe subbullata, modicae dimensionis, 16–32 cm. longa, 5–12 cm. lata, basi rotundata, emarginata vel subcordata, subitus squamulis et pilis fuscis vel flavidis 0.5–2 mm. longis induta (*M. brassii* squamulas argenteas tantum habet); nervi 22-jugati, utrinque distinctissimi, supra valde impressi, subitus elevati, a costa horizontaliter vel angulo maximo exeuntes, ad marginem valde et sensim curvati; nervi secundarii etiam prominentes; reticulationes scalariformes, numerosae, bene notatae, supra insculptae. *Flores masculi* pro genere magni, 7 mm. — 1.7 cm. longi, 2.8–5 mm. lati, ellipsoidei, oblongo-ellipsoidei vel fere tubuliformes, dense tomentosi vel lanosi, sessiles vel pedicelli floribus aequilongi; columna staminalis apiculata vel non, stipes quam antherae brevior, tenuior, basi tantum setaceus. *Fructus* 2–9 cm. longus, globosus, subglobo- sus vel ellipsoideus, tomentosus, lanosus vel tomentellus; stipes brevis, crassus vel nullus.

TYPE SPECIES: *M. fusca* MgF

Twigs mostly shortly tomentose and 5 mm. thick in the apical parts, glabrous in *brassii*, no lines present from petiole base to petiole base. *Leaves* coriaceus with slightly revolute margins, oblong or oblong-elliptic, medium size-class, 16–32 cm. long, average 24 cm. long and 5–12 cm. broad, average 8 cm, the lower surface covered with dark brown or yellowish hairs and scales, the hairs 0.5–2 mm. long, the hairs absent in *M. brassii* and in one of the vars of *chrysophylla* though abundant in the other var., the scales silvery-grey in *brassii*, the base rounded, emarginate or sub-cordate, the apex rounded, mostly bluntly acute, sometimes shortly apiculate; nerves numerous, average 22 pairs, very distinct on both surfaces, deeply impressed above, raised beneath, secondary nerves also present, both sets leaving the midrib at a wide angle and often horizontal towards the base, curving gradually from midrib to margin; reticulations scalariform, numerous and also very prominent, fainter in *M. brassii* and *sphaerosperma*, deeply impressed above (the leaves almost sub-bullate in *M. womersleyi* and *M. chrysophylla* var. *chrysophylla*); petiole stout, about 5 mm. thick. *Inflorescence axis* tomentose, stout, scar-covered, 5 mm. — 1.5 cm. long, simple. *Male flowers* large for the genus, 1–1.7 cm.
long and 4–5 mm. broad (smaller in *M. chrysophylla*, 7–8 mm. long and 2.8 mm. broad) ellipsoid or oblong-ellipsoid, rather blunt at both ends, nearly tubular in *chrysophylla*, split down ¼-way into the lobes, tomentose, often densely so with yellowish or dark brown hairs, so densely covered with hairs in *chrysophylla* and its var. that their shape is obscured; pedicels about as long as the flowers or the flowers sessile in *chrysophylla*; bracteole about half the size of the young flowers, very early deciduous; staminal column with an apiculus except in *chrysophylla*, the stalk shorter and thinner than the column and with bushy hairs at the base only. *Female flowers* slightly broader than the male, elongate also but swollen at the base. *Fruit* sessile or with a short thick stalk, tomentulose to lanose with the same colour of hairs as on the innovations, leaves and flowers, globose, sub-globose, or ellipsoid, not seen in *brassii*, 6–9 cm. long or 2–3 cm. only in *chrysophylla*; pericarp hard and thick, fragile and very thin in *chrysophylla*—5 species, *M. brassii*, *sphaerosperma*, *womersleyi*, *fusca*, and *chrysophylla* with its var. *entrecasteauxensis*.

This series is outstanding for the very distinct nerves and reticulations, the former leaving the midrib at a wide angle and curving gradually. Other features are the presence of scales and hairs on the leaves, the hairs often dense and long in contrast to those of other species in the genus, the rather large bluntly elliptic or oblong-elliptic male flowers also with often long tomentum and the great variation in the fruit, which is sessile or with a very short thick stalk. The series is nearest to series *Fatuae* on account of the scales and hairs. There may be an alliance with series *Tubiflorae* on account of the elongated perianth not quite so tubular, but also split down only a little way in both.

I have placed *M. brassii* here as it seems to fit in best in this series. It is unfortunately known from a single gathering without fruit. It differs from the other species in this series in not having hairs on the undersurface of the leaf. The flowers and staminal column have hairs. The scales are present on the leaves but they are silvery grey. However, the absence of hairs on the leaves does not mean that it should not be placed here for the var. *entrecasteauxensis* of *chrysophylla* also lacks the hairs on the undersurface of the leaf though they are plentiful on the flowers and fruits. It must be remembered that the intermediate specimens Saunders 57, mentioned on page 259 at once shows the connection between this variety and its species proper.


*quoad flores masculos tantum*—Fig. 22.

Tree 6 m. high. *Bark* characters unknown. *Twigs* glabrous, greyish brown, striate. *Leaves* coriaceous, ovate-oblong, drying dark brown above and silvery beneath with dark brown veins, apex bluntly acute, base broad and rounded; midrib broad and flat above, raised beneath; nerves 14–17 pairs, sunk above and raised beneath, curving gradually from midrib to margin in a wide
Fig. 22. *Myristica brassii* A. C. Smith.

 sweep, interarching faintly; reticulations fine, slightly prominent and sunk above, faint or absent beneath; length 20–25 cm.; breadth 10–12 cm.; petiole stout, blackish when dry, 1.8–2 cm. long. 

Male inflorescence a woody, 1cm. long, Knema-like tubercle with several flowers. Male flowers narrowly ellipsoid, 1.1–5 cm. long and 4–5 mm. broad, pale brown, adpressed-tomentulose becoming nearly glabrous, split down at the apex for a distance of 2 mm. into the small, oblong-deltoid, sub-acute perianth teeth; pedicels 7 mm.–1 cm. long and 2–2.5 mm. thick with an obtuse, semi-orbicular bracteole at the base of the perianth; staminal column 6–7 mm. long, a little shorter than the perianth and with a 0.5–1 mm. long, sterile apex; stalk pubescent at the base, as broad as the fertile part and nearly as long; anthers 7–10. Female flowers and fruit unknown.

NEW GUINEA DUTCH NORTH
NEW GUINEA: 15 km. south-west of Bernhard Camp, Idenburg River, Brass 12254 (BM, BRI, BO, L, LAE).

DISTRIBUTION: Known only from the above.

TYPE MATERIAL: Brass 12254 (A holotype, BM, BRI, BO, L, LAE).

A mountain species at 1,700 m. altitude. The description of the bark, female flowers and fruit given by A.C. Smith under this species in J. Arn. Arb. 22 (1941) 72 has to be excluded. It was taken from Brass & Versteegh 12547, wrongly identified by A.C. Smith as belonging to this species. I have identified it with M. sphaerosperma. The rusty-tomentose female flowers and fruit exactly agree with those of the latter species. This means that our present species, M. brassii, is still incompletely known as regards female flowers and fruit.

(30) Myristica sphaerosperma A.C. Smith in J. Arn. Arb. 22, 1 (1941) 71. — Fig. 23.

Tree 13 m. or more high. Bark dark brown, slightly fissured; sap red, abundant. Twigs dark brown, slightly rugose, glabrous except at the tomentulose, terminal bud. Leaves coriaceous, oblong or elliptic-oblong, broadest at the middle, drying dark brown above, silvery or cinnamon-brown beneath with minute scales which tend to be shed when older, apex acuminate, base rounded; midrib lying in a groove above, raised beneath; nerves 20–25 pairs, sunk above, prominent and brownish on the lower surface of the leaf, arising nearly horizontally from the midrib, curving gradually at a wide angle and anastomosing at the margins; reticulations rather faint on both surfaces; length 16–32 cm.; breadth 6–10.5 cm.; petiole stout, 1.7–2.5 cm. long. Male inflorescence a short, unbranched scar-covered tubercle. Male flowers oblong-ellipsoid and obtuse at both ends in bud, the same shape or slightly clavate when mature, dark brown-tomentose but not inflated or with such long hairs as in fusca. 1–1.1 cm. long and 3–4 mm. broad, split down ½-way into the lobes; pedicels 8 mm.–1 cm. long, slender, 1 mm. thick; bracteole 2 mm. long, half the size of their young flower-bud and early deciduous, its scar remaining in mature flowers at the base of the perianth; staminal column with a minute,
Fig. 23. Myristica sphaerosperma A. C. Smith.


sterile apiculus, its pubescent stalk \( \frac{1}{2} \) the size of the fertile part and slightly narrower, the hairs dark brown and confined to the base of the stalk. Female inflorescence a very short Knema-like, axillary tubercle with about 3 flowers. Female flowers ovoid, rusty-tomentose, 1 cm. long and 6 mm. broad at the base, split into three acute, spreading teeth near the apex, the remains of the minute bracteole at the base of the perianth; ovary ovoid, pale rusty-tomentose; pedicels 5 mm.–1 cm. long. Fruit solitary, spherical, 6 cm. or more in diameter, rusty-tomentulose with a hard, 3–4 mm. thick pericarp; stalk 1.5 cm. long and 5–7 mm. thick. Seed pale brown, 3–3.5 cm. in diam.; testa hard, 1 mm. thick.

**NEW GUINEA Vogelkop**

**(Dutch West New Guinea):** Mt. Krabo, Manokwari, Koster BW10780 (L).

**(Dutch North New Guinea):** 6 km. south-west of Bernhard Camp, Idenburg River, Brass & Versteegh 12547 (A, BM, BO, BRI, L, LAE); from Netar to coast, Cycloop Mts. Hollandia, bb25016 (A, BO, L).

**(Papua):** Central District:—Mt. Tafa, Brass 4174 (BRI, NY).

**(T.N.G.):** Morobe District:—Ogeramnang (Ogeramnang), Clemens 4527 (A); Yunzaing, Clemens Nos. 4074 (A) and 6433 (A, B, SING).

**Distribution:** New Guinea. Rare. A mountain plant of elevation 1150–2100 m.

**Type Material:** Brass 4174 (A holotype, BRI, NY).

*M. sphaerosperma* is nearest to *M. womersleyi* having fruits almost similar but with longer stalks. I do not know if the seed, like that of the latter, is aromatic or not. The leaves on the lower surface have much less tomentum and also their secondary veins and reticulations are not so distinct or so deeply impressed as in *womersleyi*. The two species are certainly rather close to each other although the leaves are different. It has been pointed out under *M. brassii* that Brass & Versteegh 12547 does not belong to that species but is clearly our present species *M. sphaerosperma*. Its flowers are much more densely tomentose than those of *brassii* which soon become glabrous.

**(31)** **Myristica womersleyi** J. Sinclair, sp. nov. — Fig. 24.

Species *M. sphaerospermae* aspectu frutuum et *M. chrysophyllae* var. *chrysophyllae* facie foliorum simili. A priore foliis bullatis valde reticulatis, subtus cum pilis ferrugineis tomentosis, fructibus breviter stipitatis differt; ab altera foliis apice obtusis vel obtuse acutis non apiculatis, basi rotundatis non emarginatis, pilis non stellatis recedit. In *M. fusca* folia etiam subsimilia sed fragiliora, basi subcordata, sunt.

Arbor 18–20 m. alta. Cortex atro-griseus, duriusculus tamen fragilis; latex rubro-brunneus. *Ramuli* in partibus apicalibus, gemma terminali elongata inclusa, ‘ferrugineo-tomentosi, 4 mm. crassi, in partibus vetustioribus atro-griseo-tomentosi, 7 mm. crassi, lenticellati. *Folia* rigide coriacea, supra glabra, leviter
Fig. 24. Myristica womersleyi J. Sinclair.
A, leafy twig. B, fruit. C, fruit with half of the pericarp removed to show the aril and seed. A–B from Womersley N.G.F. 11374 (SING holotype). C from the same (CANB) specimen in spirit.
bullata, in sicco modice brunnea, sub tus primum squamulis appressis pilisque simplicibus vel pauciramosis 2 mm. longis ferrugineo-tomentosa, deinde glauco-cinerea, minus hirsuta, oblonga, 18–20 cm. longa (probabiliter in foliis infimus longiora), 7.5–9 cm. lata; basi rotundata, apice obtusa vel obtuse acuta; costa supra plana, in sulco depressa, sub tus prominens; nervi 20–22-jugati, saepe cum nervo secundario brevi inter duos primarios posito, supra impressi, utrinque prominentes, obliqui, paralleli, maginibus distincte anastomosantes; reticulationes scalariformes utrinque distinctae; petioli 1–1.3 cm. longi, 5 mm. crassi. Flores masculi et feminei non visi. Fructus globosus vel subglobosus, 6–9 cm. in diam., pericarpium dense et breviter fusco-tomentellum, lignosum, 5 mm. crassum; stipes ut videtur 5 mm. longus (a ramulo separatus est) 5 mm. crassus. Arillus in segmenta multa angusta fenestratus. Semen intense aromaticum, subglobosum, 3.5–6 cm. in diam., testa lignosa, 2 mm. crassa.

Tree 18–20 m. high. Bark dark grey, rather hard and brittle; sap reddish brown. Twigs, including the elongate terminal bud rusty-tomentose, and 4 mm thick in the apical parts, dark greyish-tomentose, 7 mm. thick and lenticellate in the older parts Leaves rigidly coriaceous, glabrous, slightly bullate and medium brown above when dry, at first rusty-tomentose beneath with adpressed scales and simple or few-branched, 2 mm. long hairs, later glaucous-cinereous and less hairy, oblong, 18–20 cm. long (probably larger in the lowermost leaves), 7.5–9 cm. broad, rounded at the base and obtuse or bluntly acute at the apex; midri b flat and lying in a groove above, prominent beneath; nerves 20–22 pairs, often with a short secondary nerve between two main ones, sunk above, prominent on both surfaces, oblique, parallel, distinctly interarching at the margins; reticulations scalariform, distinct on both surfaces; peti oles 1–1.3 cm. long, 5 mm. thick. Male and female flowers not seen. Fruit globose or sub-globose, 6–9 cm. in diam., pericarp closely and shortiy dark brown tomentulose, woody, 5 mm. thick; stalk apparently 5 mm. long (it has been detached from the twig) and 5 mm. thick. Aril divided into many narrow segments. Seed intensely aromatic, sub-globose, 3.5–6 cm. in diam., testa woody, 2 mm. thick.

**NEW GUINEA**

**Eastern Highlands:**—Kini Creek, northeast slopes of Mt. Michael, Womersley N.G.F. 11374 (BM, CANB, K, L, LAE, SING holotype).

**DISTRIBUTION:** Known from the above single record. Altitude (6,500 feet) 2,000 m. Fruiting in September.

This is a remarkable species and a discovery of great importance among nutmegs. The seed is intensely aromatic, still retaining its spicy odour after being five years in the herbarium. In fact the aroma is as powerful, if not more so than that of *M. fragrans*, the nutmeg of commerce. Both the fruits and seeds are larger on the average than those of the common nutmeg. The fruit of the latter, however, can reach 9 cm. in diameter in the biggest specimens, this being the normal size for mature fruits of our new
species. Every effort should now be made to obtain seeds of womersleyi for trial plantings and cultivation experiments as it certainly promises to have or could have a future in the spice industry. It may be able to succeed in places where M. fragrans will not grow since it is a mountain species of altitude 6,500 feet. It should first of all be tried out in hill stations in New Guinea under the supervision of the Forestry Department and if successful, the trials could then be extended to such places as the Cameron Highlands in Malayia or the tea estates of Assam. It will probably require a moist climate but not a temperature in excess of 60°F. Flowering material is as yet unknown, but the species belongs to series Fuscae, coming nearest to M. sphaerosperma another mountain species with a very similar fruit but with quite different leaves. The leaves of M. womersleyi differ in being slightly bullate above with very distinct, deeply sunk nerves and conspicuous scalariform reticulations, the lower surface being covered with rusty, 2 mm. long hairs and adpressed scales. The petiole is shorter and stouter and the fruit-stalk is probably shorter also. Another species M. chrysophylla var. chrysophylla has almost identical leaves but quite a different fruit. Here the leaves differ from those of womersleyi in being apiculate or shortly and sharply acuminate at the apex and sub-cordate at the base. The rusty hairs on the lower surface of the leaf are mostly stellate and sometimes, in a very slight degree, shorter. Those of the new species are mostly simple or sparingly branched with short appendages. The leaves of M. fusca too, are somewhat similar but more fragile, often breaking in herbaria. They are sub-cordate at the base and the rusty tomentum tends to be very slightly shorter.


Tree 20–30 m. high. Bark black, scaly, sap light red. Twigs terete, densely covered with very short rusty-tomentum from the apex downwards for quite a distance (at least 20 cm.) medium brown in the glabrous parts, almost smooth with very few striations or markings. Leaves chartaceous (rather brittle when dry) oblong or sometimes oblong-ovate, drying rusty brown above and below, glabrous above except for the midrib, entirely covered with short rusty tomentum on the lower surface, apex acute, base rounded and sometimes emarginate or sub-cordate; midrib flat above, lying in a shallow groove, raised beneath; nerves 20–28 pairs, sunk above, prominent and raised beneath, oblique, parallel and closely spaced, interarching often in double loops at the margin; reticulations distinct above and below, scalariform; length 18–28 cm.; breadth 7–12 cm.; petiole 1–1.8 cm. long. Inflorescence a Knema-like, rusty-tomentose, scarred tubercle, 1 cm. long or the basal part smooth for about 4 mm. and then rough and scarred. Male flowers densely rusty-tomentose or lanose outside as are their pedicels. Yellow and sub-glabrous inside, narrowly ellipsoid or fusiform, 1.5–1.7 cm. long and 5 mm. broad, split down \( \frac{1}{6} - \frac{1}{4} \), the three apical free lobes very short, 2–3 mm. long, reflexed at anthesis,
Fig. 25. *Myristica fusca* Mg.f.

bracteole minute, at the base of the perianth; staminal column about 1 cm. long with about 8–10 anthers, the stalk 2 mm. long and densely setose with 2 mm. long hairs, the sterile apical portion acute, glabrous and 2 mm. long; pedicels 5 mm.–1 cm. long and 2 mm. thick. Female flowers broadly ovoid, 1 cm. long and 7 mm. broad, split ½-way down into the lobes, tomentose as in the male; ovary densely setose, ovoid-conical, nearly as long as the perianth, stigma sub-stipitate; pedicels 3 mm. long and 2 mm. thick. Fruit immature (the shape will undoubtedly alter) ellipsoid, 7 cm. long and 3.3 cm. broad, much shrunk, the breadth more in fresh specimens, probably 4 cm., densely rusty-tomentose; stalk 1 cm. long and 5–6 mm. thick. Seed oblong-ellipsoid, 3.5 cm. long and 1.8 cm. in diam., dark brown when dry.

NEW GUINEA

Dutch North
NEW GUINEA:


TYPE MATERIAL: Schlechter 16848. The holotype in Berlin was destroyed. There are still several excellent isotypes. See above.

A very distinct species, found at altitude 100–800 m. in primary forest. It is aptly named fusca from the dark brown colour of the tomentum on the innovations, undersurface of the leaves, inflorescence, flowers and fruit. Only two other species in this series have dark brown tomentum, namely sphaerosperma and womersleyi. It can be distinguished from both these by the longer hairs of its perianth, and by its ellipsoid fruit. From sphaerosperma it can be recognized by the much greater quantity of tomentum and from womersleyi by its brittle, chartaceous, non-coriaceous leaves which are not or scarcely sub-bullate and which have a sub-cordate base. The only possible species with which it might at first be confused when sterile are Horsfieldia hellwigi, var. pulverulenta and hairy forms of H. sylvestris, but the leaves of these are narrower, more acute and less reticulate above. The petiole of sylvestris is shorter, and there are as well, other minor differences.

(33) Myristica chrysophylla J. Sinclair, sp. nov. var. chrysophylla — Fig. 26.

Ab alteris speciebus ad seriem Fucae pertinentibus haec indumento molto pallidiore, floribus fructibusque dense lanosis pilis 3–5 mm. longis praeeditis differt. Ex affinitate M. womersleyi quae folia nonnihil simila habet, foliis apice apiculatis basi subcordatis, fructibus sessilibus minoribus recedit.

Arbor 7–21 m. alta, ramis horizontalibus. Cortex atro-brunneus nunc squamosus nunc abscidens; latex ruber. Ramuli in partibus apicalibus 4–6 mm. crassi, primum dense aureo-tomentosi cum pilis 2–3 mm. longis, deinde fusco-tomentosi, in partibus ulterioribus
Fig. 26. Myristica chrysophylla J. Sinclair var. chrysophylla.


Gardens’ Bulletin, Singapore — XXIII (1968)

Glabri, atro-grisei, fere leves vel striatuli. Folia chartacea vel subcoriacea, oblonga, supra in sicco modice brunnea, glabra, opaca vel subnita, subtus pilis 1–3 mm. longis et squamulis stellatis minutis tenuiter obsita, indumento eo primum chryseo deinde fuscescente, 16–30 cm. longa, vulgo 20 cm., 5–13 cm. lata, vulgo 8 cm., basi rotundata, subcordata, apice breviter acuminata vel apiculata; costa supra applanata, in sicco depressa; nervi 18–25-jugati, in parte basali follarum horizontales, in partibus ceteris generaliter angulo plusquam 45° orti, supra depressi, utrinque prominentes, marginibus valde anastomosantes; reticulationes scalariformes, plerumque utrinque distinctae; petiolus 1–1.2 cm. longus, 4–5 mm. crassus, tomentosus, glabrescens. Inflorescentia tomentosa, lignosa, tuberculiformis. Flores masculi per fasciculum plures, in alabastro oblongo-ovoidei, postea tubuliformes, 7–8 mm. longi, 2.8 mm. lati, sessiles, extus pallido-brunnei lanosi, intus cremei glabri, in lobos ½-fissi, lobi apice acuti et leviter reflexi; columna staminalis elongata, 6 mm. longa cum 10 antheris praedita, apiculus 0.5–1 mm. longus, stipites 2 mm. longus, setis pallido-brunneis 1.5 mm. longis tectus; bracteola lanosa 4 mm. longa. Flores feminei elongato-urceolati, 7 mm. longi, 3 mm. lati; ovarium 5 mm. longum, dense setosum; stigma anguste bilobatum. Fructus 1–4, conflerti, sessiles vel fere sessiles, subglobosi, 2–2.3 cm. in diam., sublanosi, pilis 3–5 mm. longis, chryseo-brunneis vel modice brunneis, simplicibus vel pauci et breviramosis induti; pericarpium maturum fragile. Arillus coccineus. Semen oblongo-ovoideum, in vivo grisum, in sicco pallido-brunnum, nitudum.

Tree 7–21 m. high with horizontal branches. Bark dark brown, finely scaly, later flaking slightly; sap red. Twigs 4–6 cm. thick in the apical parts, densely golden-tomentose with 2–3 mm. long hairs and darkening later, glabrous and blackish grey in the older parts further down and there almost smooth or finely striate. Leaves chartaceous or sub-coriaceous, oblong, glabrous, dull or slightly shining and medium brown above on drying, lower surface thinly covered with 1–3 mm. long hairs and minute stellate scales, this indumentum at first golden, later becoming a dark yellow or brownish yellow, the base rounded and sub-cordate, the apex shortly acuminate or apiculate; midrib flat and lying in a groove above; nerves 18–25 pairs, horizontal in the basal part of the leaf, usually arising at an angle of more than 45° in the other parts, sunk above, prominent on both surfaces, boldly arcing at the margins; reticulations scalariform, generally distinct above and below, length 16–30 cm. average 20 cm.; breadth 5–13 cm., average 8 cm.; petiole 1–1.2 cm. long, 4–5 mm. thick, tomentose, becoming glabrous later. Inflorescence a tomentose, woody tubercle. Male flowers several in the fascicle, oblong-ovoid in bud, later nearly tubular, 7–8 mm. long and 2.8 mm. broad, sessile, pale brown-lanose outside, cream-coloured and glabrous inside, split down ⅔-way into the lobes which are acute and reflexed at the apex; staminal column elongate, 6 mm. long with 10 anthers, the apiculus 0.5–1 mm. long, the stalk 2 mm. long or ⅓ of the whole column,
and covered with 1.5 mm. long, pale brown, setose hairs; bracteole lanose, 4 mm. long. Female flowers elongate-urceolate, 7 mm. long and 3 mm. broad; ovary 5 mm. long and densely setose with a narrow bi-lobed stigma. Fruit 1–4, sessile or nearly so, sub-globose, 2–2.3 cm. in diameter, sub-lanose, covered with 3–5 mm. long, golden brown or medium brown hairs which are simple or have a few short branches; pericarp of the ripe fruit fragile. Aril bright red. Seed oblong-ovoid, grey when fresh, pale brown and shining when dry.

**NEW GUINEA PAPUA:**

**Northern District:**—about half way between Patikiari and Gwaiaari Villages, Hoogland 3642 (A, BM, CANB, L, LAE); Kokoda, Carr 16228 (BM, CANB, K, L, SING).

**T.N.G. Morobe District:**—Quembung Mission, Clemens 2200 (A, B, SING); Busu Bridge Bridge near Lae, K. J. White N.G.F. 9546 (BO, CANB, K, L, SING); forest near Markham River, Lae, Henty N.G.F. 10548 (BM, CANB, K, L, SING); Red Hill area, Oomsis, K.J. White N.G.F. 10467 (CANB, K, L, SING); Red Hill, Wau Road, Womersley N.G.F. 3255 (A, BO, BRI, CANB, K, L, LAE); Oomsis, Womersley N.G.F. 9405 (CANB, K, L, SING).

**DISTRIBUTION:**

New Guinea, Morobe District and the adjacent Northern District. Sea Level to 370 m.

**TYPE MATERIAL:**

Hoogland 3642 (A, BM, CANB, L holotype, LAE).

**VERNACULAR NAMES.** *Andosusa; para* (Orokaiva language at Patikiari and neighbourhood).

*entrecasteauxensis* J. Sinclair, var. nov. — **Fig. 27.**

A typo folii paullo minoribus basi emarginatis (non subcordatis) subitus glabris, nervis paucioribus, reticulationibus minus distinctis, fructibus oblongo-ovoideis non subglobosis differt.

Arbor 15–20 m. alta, ramis horizontalibus. *Folia* supra in vivo atroviridia, in sicco nitida, modice brunnea, subitus glauca, in sicco etiam glauca vel flavido-brunnea, minute punctata, glabra vel fere glabra, vel (squamulis stellatis minutissimis sub microscopic tantum visibilibus), 17–22 cm. longa, vulgo 18 cm., 5.5–9 cm. lata, vulgo 7 cm., basi rotundata et emarginata vix subcordata; nervi 18-jugati. *Flores* ut in var. *chrysophylla. Fructus* oblongo-ovoideus, 2.5–3.3 cm. × 2 cm., modice bruneus, sublanosus.

Tree 15–20 m. high with horizontal branches. *Leaves* dark green above, drying glossy and medium brown, glaucous beneath, drying also glaucous or a yellowish brown, minutely punctate, glabrous or almost glabrous, or (with extremely minute stellate scales, visible only under the microscope) base rounded and emarginate, scarcely sub-cordate; nerves 18 pairs; length 17–22 cm., average 18 cm.; breadth 5.5–9 cm., average 7 cm. *Flowers* as in var. *chrysophylla. Fruit* oblong-ovoid, more elongate, 2.5–3.3 cm. × 2 cm., medium brown, sub-lanose.
Fig. 27. *Myristica chrysophylla* J. Sinclair var. *entrecasteauxensis* J. Sinclair.

NEW GUINEA D'ENTRECASTEAUX ISLANDS:

Fergusson Island:—Lamelele No. 1, Brass 25986 (K, L).

Normanby Island:—Waikaiuna, Brass Nos 25869 (A, CANB, K, L) and 25893 (A, CANB, K, L, LAE); Waikaiuna Bay, Sewa Bay, Womersley & E. Gray N.G.F. 8613 (A, BM, BO, BRI, CANB, K, L, NSW, SING).

DISTRIBUTION: As above. At or near sea-level.


Intermediate specimen


VERNACULAR NAMES: Iagisa (Onjob language at Naukwati); ruruswaen (Minufia language at Kabubu).

This is a common tree with a rather local distribution. At first I thought two species were involved, one with tomentose leaves and the other with glabrous. The flowers, however, are exactly the same in both and furthermore, they are sessile or almost so in both sexes. The fruit of the typical variety is sub-globose and of var. entrecasteauxensis oblong-ovoid. Fortunately an intermediate specimen, Saunders 57 from the Tufi sub-district, a locality also intermediate between the centres of distribution of the two respective varieties is available and it provides the most conclusive and convincing evidence that we are here dealing with only one species. In it the base of the leaf is rounded and emarginate but not sub-cordate being like that of the insular plant. The reticulations are invisible above, also as is the case in the insular plant, but beneath they are present, though faint and not so bold as in the tomentose variety. The lower surface of the leaf, however, is not glabrous. It is thinly covered with tomentum, though much shorter than in typical chrysophylla. Actually some of the island specimens appear to be absolutely glabrous on the undersurface of the leaf with the naked eye or with a hand-lens, yet under the low power of the microscope a few stellate scales may be seen. The fruit also tends to be intermediate in shape between the sub-globose ones of var. chrysophylla and the more elongated ones of var. entrecasteauxensis.

M. chrysophylla is distinguished from the other species of series Fuscae in having sessile flowers with a shorter and narrower perianth. (Those of womersleyi have not yet been collected.) The whole inflorescence is invested with a mass of pale yellow wool in which the flowers are hidden. One has to search for them. The indumentum of the twigs, leaves, flowers and fruits is also of this same colour, not the darker rusty brown shade of the other species. It may darken slightly in older leaves, but is absent, as has been stated from the leaves of the var. entrecasteauxensis. The
mature fruit is smaller and the pericarp thinner than that of the allied species (that of *M. brassii* is still unknown). In fact the pericarp is fragile, easily breaking up in dried specimens. The leaves of the typical variety are similar to those of *womersleyi* in several ways, especially in the sub-bullate appearance with deeply impressed nerves but differ in being chartaceous or less coriaceous with lighter tomentum. They are more sharply acute at the apex and sub-cordate at the base. It is unlikely that *M. chrysophylla* will be mistaken for *womersleyi* and no chance if fruit is present.

11. SERIES FATUAЕ


Twigs 3–4 mm. thick in the apical parts, stout in some vars of *fatua* eg. *affinis*, *morindiifolia* and *wenzelii*. Stoutest of all, 1 cm. thick in *M. villosa*, two faint lines present from petiole base to petiole base in some vars of *fatua* but often interrupted and never so distinct as the species of series Subalulatae, the apical parts glabrous (*koordersii* and *lepidota*), greyish brown puberulous to pubescent in the majority, pale tawny-villosel with 1–2 mm. long hairs in *villosa*, this pubescent area often followed by a shining, reddish brown portion, lenticellate in *lepidota* and in most vars of *fatua* and finally the older portions glabrous, dark grey and striate, blackish with very rough cracking bark in *villosa* (there is a lot of individual variation in these three portions in the vars of *fatua*, see key to vars). Leaves mostly chartaceous, sometimes coriaceous in the larger-leaved species, oblong-elliptic or elliptic, often widest at the middle, less often obovate, mostly medium size-class, 20–35 cm. long, average 30 cm. long and 5–8 cm. broad, but large size-class, 35–50 cm. long and 12–19 cm. broad in a few (*fatua* var. *affinis*, var. *morindiifolia* and var. *wenzelii*) and 9–14 cm. long, average 10 cm. long in *lepidota* the smallest (small size-class) in this series, base acute, sometimes slightly rounded, less often broadly rounded or sub-cordate, apex acute, less often shortly acuminate, lower surface covered with yellowish or cinnamon-brown powdery scales, less often yellowish white and rarely white scales (*koordersii*), the amount of this indumentum varying greatly in the vars of *fatua*, a moderate quantity present in the young leaves of most of the vars, but glabrous in var. *morobensis* and dense in vars *morindiifolia* and *magnifica*, long, simple, tawny-villosel hairs present as well in *M. villosa*, a shorter, floccose-furfuraceous indumentum of scales and scale-like dendroid (not simple) hairs present in var. *morindiifolia* and var. *quericarpa*; nerves 20 pars in the majority of the medium size-class species, 30 pairs in the large-leaved species and 10–12 pairs only in *lepidota,*
impressed and faint above, prominent beneath and interarching at the margins, oblique or often curving slightly and at times rather crooked, those in the basal part of the leaves sometimes arising at a wider angle, 60–90° to the midrib, close together and equidistant, secondary nerves present but never distinct or numerous; reticulations sometimes present but mostly obscured by the scales beneath; petiole closely and deeply inrolled towards the upper surface of the leaf, 1.5–2.5 cm. long in the majority, 2.5–4 cm. long in the longest and 1–1.5 cm. in lepidota, 2–3 mm. thick in the majority, 4–6 mm. thick in the longest and 1–2 mm. thick in lepidota. Inflorescence axis (2)–5 mm.–2 cm. long, simple or sometimes bifurcate in the larger-leaved species, tomentose. Male flowers ovoid-globrose to ellipsoid in bud, narrow-campanulate to campanulate when mature, tomentose outside, villose in villosa, 3 mm.–1 cm. long and split down from ¼–⅔-way into the acute, spreading or reflexed lobes; pedicels as long as or shorter than the flowers; staminal column usually with a sterile apex, the stalk shorter and narrower than the fertile part with hairs at its base. Female flowers urceolate to campanulate, with shorter pedicels than in the male, sessile in villosa; bracteole attached to apex of pedicel. Fruit very variable, oblong to sub-globrose, less often obovoid, peculiarly shaped in var. quercicarpa, discoid like an acorn, small to medium size-class, 2.5–7 cm. long, largest in var. magnifica, 7–10.5 cm. long, the tomentum also very variable, mostly rusty-tomentulose, sometimes densely tomentose when young, villose in villosa, the apex rounded but uncinate in villosa; stalk 4 mm.–1 cm. long, generally stout and short in proportion to the fruit, sessile or nearly so in villosa and in two vars of fatua, more slender in koordersii — 4 species, fatua (with 14 vars), koordersii, lepidota and villosa.

TYPE SPECIES: M. fatua Houtt.

Much of the minor details here, especially those of the fruit and indumentum, result from the great variation of M. fatua with its 14 varieties. The series itself is closest to Tenuiveniae and Fuscae with certain characters that tend to overlap in some species. From the former series it differs in the larger leaves with more indumentum beneath; the scales are usually yellow and less often a cinnamon brown, hairs being present in villosa and in some of the vars of fatua (absent in Tenuiveniae). The more numerous nerves are thicker, more prominent with more distinct interarching and tend to curve somewhat. In Tenuiveniae they are fine, slender, apt to fade in parts, and are always oblique. The male flowers, except for those of lepidota are larger. Their pedicels are as long as the flowers but only half as long in Tenuiveniae.

Series Fatuae differs from series Fuscae chiefly in the appearance of the leaves and in the shape of the flowers. The fruit is very variable in both series, there being plenty of characters to separate
individual species. The leaves are larger and never sub-bullate (due to numerous impressed reticulations) as in series Fuscae; their indumentum consists mostly of dendroid hairs as in some of the vars of fatua, whereas it is simple, longer and darker in colour in Fuscae. M. villosa is an exception. The perianth is more deeply split by the lobes while the fruit is rarely globose or sub-globose as is the case in series Fuscae. Other details will be found in the key.

(34) Myristica koordersii Warb. Monog. Myrist. (1897) 619; Koorders, Fl. van N.O. Celebes (1898) 572. — Fig. 28.

Tree 17–25 m. high with stilt-roots; sap deep red. Twigs 3–4 mm. thick near the apex, minutely rusty-puberulous on the terminal bud, glabrous below it, blackish or dark grey in the younger parts, lighter grey or brownish grey in the older parts, most parts slightly rough with longitudinal striations. Leaves chartaceous to coriaceous, narrowly elliptic to elliptic, drying medium brown to dark blackish brown or greenish brown above, glossy or dull, whitish beneath due to minute, closely adpressed scales, the lower nerves and midrib chocolate brown, standing out in contrast against the white background, apex acute. base cuneate; midrib flat and lying in a groove above, raised beneath; nerves 12–18 pairs, mostly 13 pairs, sometimes with an occasional shorter secondary nerve between a main pair, very fine and slender on both surfaces, best seen beneath, oblique, sometimes slightly crooked, interarching faintly at the margins; reticulations invisible; length 12–23 cm.; breadth 4–8 cm.; petiole 1.3–2 cm. long and 2.5–3 mm. broad. Male and female inflorescences a short, 5–7 mm. long, pubescent, woody tubercle with 3–5 flowers. Male flowers (immature) oblong or oblong-ellipsoid and obtuse at the apex in bud, 4–5 mm. long and 3 mm. broad, dark brown-tomentose outside, split down about ½-way into the lobes; staminal column 2.8 mm. long with an obtuse, 0.5 mm. long apiculus, anthers 10, stalk stout, glabrous or nearly so, about ½ the length of the whole column; pedicels slender, 5 mm. long, probably longer when mature; bracteole nearly as long as the flower and surrounding it on one side, obtuse at the apex, early deciduous. Female flowers 5 mm. long and 4 mm. broad, ovoid in bud, urceolate with reflexed lobes when mature, also split down ½-way by the lobes; ovary 2.5 mm. long, dark brown-strigose, stigma glabrous, rounded and obtuse like a duck’s bill; pedicels 5–6 mm. long. Fruit ellipsoid when young, later oblong and rounded at the apex with the remains of the stigma, 3.5–4.5 cm. long and 2.3–3.3 cm. broad, orange-brown-tomentulose, the tomentum dense and closely adhering to the pericarp, not furfuraceous or floccose; stalk 7 mm.–1 cm. long and 3–4 mm. broad. Aril dark red when dry. Seed reddish brown, ellipsoid, 2.8 cm. long and 1.5 cm. broad.
Fig. 28. *Myristica koordersii* Warb.

CELEBES
NORTH PENINSULAR:
The following five Minahassa:—Wian Complex north of Mt Klabat, Forman 381 (K); north slope of Mt Klabat, Forman 262 (BO, K, L, SING); Tondano, Manado, Koorders 18144 (BO); near Kajuwatu, Manado, Koorders 18128 (BO, K, L); Kakas, Manado, Koorders 18129 (BO, L).

CENTRAL CELEBES:
The following three Malili:—

SOUTH-WEST PENINSULA:
Palopo, Malenjong, bb24131 (A, BO, I SING); Todjambu, Kjellberg 2962 (BO,S); Pangkadjene, Teijsmann Nos 11722 (BO, SING); 11738 (BO, SING) and 12118 (BO); Baleh Angin, Teijsmann Nos. 12571 (BO, SING) and 12670 (BO); Malino above Makassar (Macassar, various spellings) Rant 472 (BO); Loka, Bonthain, Teijsmann 14063 (BO, SING).

SOUTH-EAST PENINSULA:
Rumbia, Elbert 3025 (L) male flowers.

MOLUCCAS HALMAHEIRA:
Gunong Sembilan, Pleyte 310 (BO, K, L).

BATJAN:
Waringin, bb23157 (BO, L, SING).

DISTRIBUTION:
Celebes widely distributed and Moluccas (Halmahera and Batjan). Altitude 200-1,100 m. Common on Gunong Sembilan.

TYPE MATERIAL:
Koorders Nos 18128 (BO, K, L); 18129 (BO, L) and 18144 (BO); Minahassa, three syntypes.

VERNACULAR NAMES:
Wande bokka (Tobela, Celebes); suka-suka (Batjan).

This species must go into series Fatuae. It is nearest to fatua being distinguished from fatua var. fatua by its smaller leaves and indument of white, closely adpressed scales on the undersurface of the leaf instead of the usual yellow ones of that species. The leaves are elliptic or narrowly elliptic, widest at the middle and have a cuneate base. The veins are finer and more slender, but stand out well on the lower surface against the white background. The fruit is smaller than in typical fatua and the short tomentum is never loose, furfuraceous or floccose. The male flowers (still not mature and seen only in Elbert 3025) are very similar to those of fatua, but are darker in colour on the outside. In fact all the members of the Fatuae series have very similar flowers. The female pedicels are rather long in proportion to the size of the flowers, 5–6 mm. long, and they will, like those of the male, probably lengthen still more.

**Synonym:** *M. microcarpa* Zipp. msc. nomen nudum. — **Fig. 29.**

Tall tree 22–35 m. high; sap red, not copious. *Bark* characters unknown. *Twigs* slender, 1–2 mm. thick at the apex, dark brown, finely striate and with several yellowish brown lenticels, glabrous except the dark brown, puberulous, elongate terminal bud. *Leaves* chartaceous, elliptic, elliptic-lanceolate or lanceolate, drying greyish brown above and covered with minute cinnamon-brown, less often silvery brown scales beneath, base acute, apex acuminate; midrib slender, lying in a groove above, raised beneath; nerves 10–12 pairs, slender, faint above but visible, oblique or curving slightly, rather close to each other; reticulations scalariform, faint or not visible on both surfaces; length 9–14 cm., average 10 cm.; breadth 3–4.5 cm. (small size-class); petiole 1–1.5 cm. long, slender, 1–2 mm. thick. *Male inflorescence* on a small, *Knema*-like woody tubercle, 2–3 mm. long and 2 mm. broad, with 3–5 flowers. *Male flowers* yellow, 3–5 mm. long and 2–2.5 mm. broad, oblong-cylindrical, slightly narrowed at the obtuse apex, densely rusty-tomentose as are the bracteoles and pedicels, membranous, split down ⅓-way at the apex by the obtuse lobes; staminal column narrowed abruptly towards the sterile apex, the fertile part 2.5 mm. long and as long as broad as the tomentose stalk; anthers 10; pedicels 2–3 mm. long; bracteole semi-orbicular, obtuse, attached to the base of the perianth. *Female inflorescence* as in the male, but the axis very short, 1mm. long. *Female flowers* 2–5, campanulate, split down ⅓-way by the acute reflexed teeth, 3 mm. long and 2.5 mm. broad, densely rusty-tomentose outside, glabrous inside; ovary rusty-tomentose, narrowed into a short, conical bi-lobed stigma; pedicels 2 mm. long, tomentose. *Fruit* mostly single, occasionally in pairs, obvoid, rounded at the apex, cinnamon-brown-tomentulose, 2.5–3 cm. long and 1–1.5 cm. broad, the pericarp very hard when dry, 1–2 mm. thick; stalk broad, giving the fruit an almost sessile appearance, 4–5 mm. long and 4–5 mm. thick. *Aril* red, the segments thin. *Seed* oblong, rounded at each end and slightly narrowed to the base, reddish brown, shining, slightly aromatic; cotyledons patelliform with wavy edges.
Fig. 29. *Myristica lepidota* Bl.

NEW GUINEA DUTCH SOUTH NEW GUINEA:

S.I., Zippelius s.n. (CAL, L, P, U) the CAL specimen numbered 36; the following Mimika:—Sg. Jera (Siera) Aet (Exped, Lundquist) 256 (BO, L) & 279 (BO, L); Siera, Oeta, bb32840 = Lundquist 121 (BO, K, L); Umar, Oeta, bb32819 = Lundquist 100 (BO, K, L); Najaja, Oeta, bb32836 = Lundquist 137 (A, BO, K, L).

ARU ISLANDS:

DISTRIBUTION:
Dutch South New Guinea and Aru Islands. Low elevation, sometimes at sea-level.

TYPE MATERIAL:
M. lepidota Bl., Zippelius s.n. coast of Dutch South New Guinea and neighbouring islands, without exact locality (CAL, L holotype, P, U) as M. microcarpa Zippel. Msc.

VERNACULAR NAMES:
Kaibita-bita; kapieta; molum (Aru Islands); maramea; mirawa and mireta: (Tarie at Mimika, New Guinea).

A tall tree with very small, insignificant flowers. There is an excellent illustration of it with ripe fruit in Blume’s Rumphia. The fruit, obovoid with a rather short, massive stalk, is never 6 cm. long as stated by Warburg. It will be seen that he has included some Forbes’s numbers of M. longipes among his material cited, so hence the reason for the big fruit and the statement that the plant is rather variable. M. lepidota is confined to a small area and is not variable at all. Markgraf also confused this species with longipes, including some Forbes and Ledermann numbers of longipes in his otherwise, authentic material and cited, as well, the synonyms resinosa and warburgii which I have disposed of under M. longipes. His appended description of the male flowers is also that of longipes.

M. lepidota, although belonging to series Fatuae, has resemblances to M. globosa, but differs from it chiefly in the presence of the cinnamon scales on the lower surfaces of the leaves and in the obovoid fruit with the short, rather massive stalk. The flowers are rather similar but are less flattened and more tomentose. They seem also to be slightly smaller, but are rather young in the available material of both species. The staminal column has an acute sterile apex which is apparently lacking in globosa. Among the minor features of difference is the presence of the numerous yellowish lenticels on the twigs in lepidota, giving then a slightly rougher appearance, the leaf tends more towards the elliptic series and less to the lanceolate; the apex is generally more acute and the acumen longer. Not a single collector has said a word about bark characters.

var. *fatua* — *Fig. 30.*

Tree 10–20 m. high with stilt-roots. *Bark* greyish brown, finely longitudinally striate; sap red. *Twigs* rather stout, 3 mm. usually 4 mm. thick, near the apex and up to 1 cm. wide in the oldest parts, dark reddish brown, smooth and shining in the younger parts, greyish brown-tomentulose at the extreme apex and for a distance of some 3–5 cm. downwards, soon glabrous, finely striate in the older parts often with numerous lenticels, lines from petiole base to petiole base not usually present but sometimes the younger parts show two incomplete, faint or indistinct ones near the apex. *Leaves* usually chartaceous, occasionally slightly coriaceous, dark green, glossy and glabrous above, drying a greenish or yellowish brown above, lower surface pale yellow, whitish yellow or occasionally white due to minute scales, these tending to become less or to get rubbed off with age, elliptic, elliptic-oblong, widest at the middle and from there equally and gradually narrowed towards both ends, the apex sharply acute or acuminate, the base mostly acute but also often rounded and then acute where the petiole joins the blade; midrib flat and lying in a groove above, 2–3 mm. broad at the base, raised beneath; nerves 20–25 pairs, sunk and sulcate above, raised beneath, oblique and parallel, interarching near the margins; reticulations absent; length (20)–25–35 cm., usually 30–35 cm. (large size-class); breadth 7–15 cm., average 12 cm.; petiole 1.5–2 cm. long and 4 mm. broad, deeply grooved when dry. *Male inflorescence* a *Knema*-like, woody, scarred protuberance, 5 mm.–1 cm. long, usually simple but occasionally 2–3-branched from or near the base. *Male flowers* coriaceous, 7–8 mm. long and 6 mm. broad, rusty-adpressed-tomentose outside, glabrous and cream coloured inside, ellipsoid to sub-globose in bud, narrowed slightly towards the apex but campanulate at anthesis and split down nearly half-way into the spreading, broadly ovate-triangular, reflexed lobes, their apices acute; staminal column with 10 anthers, and a minute obtuse apiculus, the fertile part 2–2½ times longer than the glabrous, furrowed stalk; pedicels slender, 6–8 mm. long, tomentose; bracteoles conspicuous, tomentose, narrow and carinate on the outer convex surface, glabrous and concave inside, acute at the apex, as long as the flower-bud and half as long as the flower but only half- or barely half-surrounding it on one side and situated at the apex of the pedicel. *Female flowers* rather similar to the male but more broadly campanulate or ovoid, 6 mm. long and 5 mm. broad, the lobes reflexed, the pedicels shorter and stouter, 5 mm. long and 2.5 mm. thick; ovary adpressed-tomentose with a very short, sessile, 2-lobed stigma. *Fruit* large, 5–7.5 cm. long and 3.5–4 cm. broad, oblong, rounded at both ends, shortly rusty-furfuraceous-tomentulose, the tomentum denser when young, the pericarp rather than and brittle when dry, tending to crack; stalk 1 cm. long and 5 mm. broad. *Aril* orange. *Seed* oblong, the testa shining and dark chocolate-brown outside.
Fig. 30. Myristica fatua Houtt. var. fatua.
PHILIPPINES BASILAN: Hutchison 3454 (K, US).
Prov. Cotabato.—Koronadal, Ramos & Edano 84981 (A).

MOLUCCAS HALMAHEIRA: W. Pitu, Beguin 2231 (BO); Kampong Goal. Pleyte 175 (BO, K, L, P, PNH, SING).

TERNATE
Reinwardt s.n. (L).

BATJAN:
de Vriese s.n. (L); Masurung, bb Nos 23138 (BO, L) and bb23139 (SING); Saoran, Domut, bb Nos 23183 (BO, L) & bb23201 (A, BO, L).

BURU:
Teijjsmann Nos. 1830 (U) and 1895 (BO, U); Teijjsmann and de Vriese s.n. (L, U); de Vriese s.n. (BO, CAL, L, NY).

CERAM:
East Ceram.—Wai Masiwang. Kornassi 990 (BO, L, SING, U), Artafela, bb25816 (BO, K, L, SING); Kiandarat. bb25849 (A, BO, L, SING).
West Ceram.—Kairatu, Gemba. Kuswata & Soepadmo Nos 14 (K, L, SING); 39 (L, SING); 57 (BM, K, L, SING); 71 (K, L, SING) and 125 (K, L, SING).

AMBON:
Binndendijk s.n. (BO, L, SING); Wai, bb25990 (A, BO, L) and Bewalda 6146 (BO, K, L, LAE, PNH, SING); slope of Gunong Salahutu. Wai. Kuswata and Soepadmo 272 (K, L, SING); G. Toena. Boerlage 281 (BO); Teijjsmann s.n. (BO, SING); Teijjsmann 5148 (BO, U); de Vriese s.n. (L); Hitu, Warburg 17646 (G Boiss., L, M); near Paso, de Wiljes-Hissink 127 (L).

BANDA:
Reinwardt s.n. (Herb. Blume) ex Banda, Cult. Hort. Bog (L, P, U); C. Smith 300 (BM) as M. tomentosa Thunb. and 2640 (BR) as M. macrophylla Roxb.; C. Smith s.n. (G & Prodr.) as M. macrophylla and C. Smith, date 1797 (CAL) as M. tomentosa Thunb.

CULTIVATED:
Hort. Bog., sine col. 49 (MEL); IVH 62 (US); IVH 62a (US); IVH 66 (L); IVH 66a (L); IVG 81 (US); IVG 91 (NY, US); IVG 91b (L); IVG 94 (US); Becarri, date 1876 (FI); Becarri FI Acc. Nos. 7669 (FI); 7670 (FI) & 7671 (FI) origin Ambon; Blume s.n. (L); Forbes 1156 (A, BM, CAL, K) near Ambon; Devill & Heide, Dec. 1921 (S); Koerniasih (IVH 66) 16 BO, K, L, P); Korthals s.n. (L); Reinwardt 1371 (L) & (67) (L) both as M. mascula; Reinwardt s.n. (L) as M. spadicea; Sinclair Nos. (IVG 91) 10023 (B, E, K, L, SING) and (IVG 96) 10024 (E, K, L, SING); Sutrisno (IVH 66) 119 (K, L, SING); Warburg 1741 (P) origin Ambon.

DISTRIBUTION:
Philippines (Basilan and Mindanao); Moluuccas (Halmahera, Ternate, Batjan, Buru, Ceram, Ambon and Banda).

VERNACULAR NAMES: Philippines:—lago (Bag): nyatnyat (Basilan). Moluccas:—ga: hai (Ceram); pala utan; palala; pala ala (Ambon); pala laki-laki, the modern spelling; pala fuker (Banda); mannetjes nooten (Dutch); nux myristica mas (classical names of Clusius and Rumphius).

USES: Very little used now. The wood has been used for posts in house-building (Rumphius). The nuts have been used medicinally for headaches and other sicknesses or (in the Malay Peninsula) pounded with senna as a purgative (Ridley). The fresh nut is faintly aromatic but loses its aroma on drying and storage.

From a glance at the geographical range and records, it will be seen that M. fatua sensu lato is the commonest species with the widest distribution in the genus Myristica. It is also the most polymorphic one with the greatest number of forms and varieties. Besides the typical var. fatua, thirteen other varieties are distinguished here. While M. fatua is, itself, easily recognized as a large-leaved section II species with a yellowish indumentum on the lower surface of the leaf, its further division into infra-specific taxa or units presents quite a formidable problem. With its wide distribution, especially in Eastern Malaysia, it seems to come very near to what might have been the basic or primitive type of nutmeg of section II. It also seems probable that many of the other species developed and evolved from a nutmeg of this kind along various evolutionary lines. M. fatua var. fatua was probably much more common in the Moluccas in pre-historic times or in the era when
primitive men lived by hunting and fishing, not still having reached the stage, when through sheer increase in numbers, they would have been forced to fell the forests and turn to agriculture. The forests on the coastal strips of the smallest islands would be the first to disappear and with them our present species, both in its typical form and possibly in other variations which do not exist today. Probably the islands between Ceram and the Eastern Sunda Group such as the South Eastern Islands, the South Western Islands, the Damar Islands, the Babar Islands and other small ones in the Banda Sea all had populations of *fatua*, especially ones with narrow leaves, lacking the yellow tomentum beneath. I mention this as *fatua* does have such glabrous forms in Ceram, these reappearing, but with a smaller fruit in the Lesser Sunda Islands, right along the chain from Damar to Wetar, Timor, Solor, Flores, Sumba and Sumbawa as the var. *spanogheana*. This variety is replaced in East Java by *M. teijsmannii* which resembles it in certain details, especially in the leaves. The student may experience difficulty in deciding whether some of the specimens from the Lesser Sunda Islands belong to this variety or to *M. teijsmannii*. (See notes under that species.) It may be that the one species gave rise to the other, but which way round will depend (see Introduction) in which direction the migration of section II *Myristica* species proceeded. We know that *M. fatua* has spurs of migration in various directions and if it is really a basic species, then it could have given rise to *M. teijsmannii* through the loss of the scales on the lower surface of the leaf. Some of the specimens of *M. fatua* var. *spanogheana* have already lost their scales while in others the indumentum is very thin.

*Myristica fatua* was first known from Banda and later from Ambon and is dealt with at length by Rumphius in his *Herb. Amboinense* 2 (1741) 24 under the name of *Nux myristica* mas and vernacular name *Pala Lacki-Lacki*. Rumphius, however, got the name *Nux myristica* mas from Clusius. There are a good many collections from Banda and Ambon as well as from trees cultivated in Hort. Bog. which originally came from these two places. These collections represent the typical var. *fatua* and they do not vary much. The typical is distinguished from the other varieties chiefly by its larger fruits, 5–7.5 cm. long and 3.5–4 cm. broad. The pericarp is brittle when dry, tending to break in herbaria and it is covered with a short, rusty-furfuraceous tomentum. Also the leaves are widest at the middle and from there taper off gradually to an acute base and apex and have yellow scales beneath. Both male and female flowers are campanulate at anthesis.

The specimens named *M. plumeriifolia* and *mindanaensis* from the Philippines, as far as I can see, are not different from var. *fatua* so I have included them as new synonyms. Except for the whitish lower surface of the leaves of *M. nivea*, also from the Philippines, there is no obvious difference, so I have merged it with var. *fatua* also. It must be remembered that the leaves of var. *fatua* may sometimes be white on the lower surface as well as yellow. I have
also included var. *maurocarpa* Miq. here since it seems that the fruit of var. *fatua* is itself normally quite large and that most of the smaller fruits that one may meet in herbaria are either immature or have shrunk on drying.

The differences between typical *fatua* and the other varieties are discussed in detail under each in turn but a few general remarks about some of them and their relationships are included here. As a rule, varieties which are further away from Banda and Ambon, the *locus classicus* of the typical, tend to be the most distinct. Thus var. *inutilis* from remote Samoa with its smaller leaves and fruits certainly differs sufficiently from var. *fatua* to be reckoned as a subspecies. So does var. *papuana* from New Guinea for that matter, but the differences between it and var. *inutilis* are not great. If var. *inutilis* were raised to a subspecies then var. *papuana* would be best considered as a variety of that subspecies. *M. fatua* var. *magnifica* from India would also seem to merit subspecific rank. Although its leaves are very similar to those of typical *fatua*, there are a number of differences in floral characters. The two varieties *morotaiensis* and *sangowoensis* are close to each other and some forms of *morotaiensis* show a near approach to var. *fatua*. No doubt these forms will hybridize with each other or with var. *fatua* making it difficult to decide where they ought to be placed. The large coriaceous-leaved form of var. *affinis* from Celebes with crooked veins and copious yellow indumentum is distinct enough as a variety but can it pass as a subspecies? Neither Koorders nor Miquel recognized the Celebes specimens as distinct from typical *fatua*. The thinner- and smaller-leaved forms of the same plant with less indumentum will show that var. *affinis* is not so very distinct after all from var. *fatua*, and Koorders and Miquel, after seeing them, probably thought that they were not worth distinguishing from typical *fatua*. Warburg, too, admits they are very close, but always cautious in decisions of this kind, does not unite them. Variety *wenzelii* from the Philippines, contrary to expectation, seems to be nearer to var. *affinis* than to the other Philippine species of Elmer and Merrill which I conclude are best sunk into var. *fatua*. The specimens from the Lesser Sunda Islands which I have designated as var. *spanogheana* seem to be slightly better as a variety than as a subspecies, though one could argue over this question, too. Variety *morindiifolia* from New Guinea with large leaves, rounded or cordate at the base, copious indumentum and large fruit is rather distinct. It is, if not actually, well on the way to being a subspecies, but has followed a line of evolution that has brought it nearer to var. *fatua* in general appearance than to var. *papuana*. The variety *subcordata* is less satisfactory, being more variable, and having characters somewhat intermediate between var. *papuana* and var. *morindiifolia*. In this complex var. *subcordata* may also be crossing with var. *papuana*.

Thus we see that all the variants from the typical form do not stand out and differ from it in equal proportion or degree of distinctness any more than they do from each other. One should neither be forced nor force oneself into trying to pigeon-hole all
the variants into unnatural groupings. There can be no definite rules as to how many varying characters are necessary for determining a variety or how many more will be required in establishing a subspecies. We are not dealing with exact mathematical progressions but rather with digressions, the \( n^{th} \) or \( n^{th}+1 \) term of which is governed by evolution. Thus, while certain variants such as \( inutilis \) or \( magnifica \) might be classed as subspecies on geographical grounds, the subspecies classification would not be satisfactory in dealing with others such as \( affinis \), \( sangowoensis \) and \( morotaiensis \), where, as has just been pointed out, the degree of variability is not so great or so clearly defined. It is not so much the number of varying characters that matters but the status of the taxa concerned. Some of the variants, especially the ones that differ less from \( fatua \) would look ridiculous if given the rank of subspecies. Perhaps a chromosome analysis would help. Since there is none, I prefer the simpler classification using varieties as the units of division, but have to admit that such a system hardly shows the relationship of these units in the best perspective. The ideal classification would be one with several subspecies and some of these subdivided into varieties, but to propose one now, in the absence of a proper chromosome count and other evidence, would only mean messing up the system of nomenclature.

var. \( affinis \) (Warb.) J. Sinclair. stat. nov.


Synonyms: \( M. fatua \) (non Houtt.) Auctores: Miq. Ann. Mus. Bot. Lugd.-Bat. 1, 2 (1864) 205 excl. var. \( macrocarpa \) Miq. 1.c. 205; Koorders, Fl. van N.O. Celebes (1898) 570 (see notes under var. \( fatua \) and below), \( M. celebica \) Gandoger in Bull. Soc. Bot. France 66 (1919) 225 in clavi. [non \( M. celebica \) Miq. (1865) = \( M. ellipitica \) var. \( celebica \) (Miq.) Sinclair] — syn. nov. — Fig. 31.

Twigs stout, 4–5 mm. thick near the apex, dull, greyish-brown-tomentulose or pubescent and striate in the apical parts and for a considerable distance down, also pubescent in quite old portions. Leaves coriaceous, less often thinly coriaceous, yellowish brown above when dry, often a dark blackish brown in coriaceous forms, lower surface with more copious indumentum than in var. \( fatua \), oblong-lanceolate or lanceolate, often broadest below the middle and gradually narrowed from there upwards to the acute or bluntly acute apex, base rounded or rounded and then sub-acute; midrib very stout and longitudinally striate beneath when dry, 5 mm. broad at the base, broader than in the typical; nerves (22)–26–30 pairs, oblique but often crooked, the angle of origin rather wide; length 27–40–(48) cm.; breadth 10–16 cm. Flowers as in var. \( fatua \), the stalk of the staminal column tomentose at the base. Fruit globose when young, later oblong, large, 6 cm. long and 3 cm. broad, but still not mature, densely yellowish-velvet, later tomentulose; stalk 1.3 cm. long.
Fig. 31. *Myristica fatua* Houtt. var. *affinis* (Warb.) J. Sinclair.

D, scales from the undersurface of a leaf. E, male inflorescences.
CELEBES S.L.:

NORTH PENINSULA:

Monado, Riedel 5823 (U); Teijsmann 3741 (BO, U); de Vriese s.n (K, L, S).

The remainder near Manado:

Dulamjo, Boalemo, bb13807 (BO); Popaja, Boalemo, bb15697 (BO, L); Lumpias, bb14538 (BO); Bambamate, Donggala, bb17057 (BO); Tangkilisan 2 = bb33116 (BO, K, L); Kajuwatu, Rakas, Koorders Nos 18125 (BO, L); 18126 (BO, L); 18131 (BO, L); 18138 (BO, L); & 18145 (BO, L); Paku-ure, Koorders Nos. 18141 (BO) & 18148 (BO, L); Pulah near Ratahan, Koorders 18142 (BO, L); Ratahan, Koorders 18151 (BO); Totok, Ratatotok near Ratahan, Koorders 18153 (BO) and near Ratahan, Koorders 19736 (BO, L); south slope of Gunong Manimporak, Lam 2438 (BO, L).

CENTRAL CELEBES:

Poso. Lape, bb29482 (A, BO, L, SING); Malili, Kawata (or Thawata), CEI/V250 (BO, L, SING).

SOUTH-WEST PENINSULA:

Pelenkahu, Teijsmann 30 (BO); Todjambu, Kjellberg 1736 (BO, S).

SOUTH-EAST PENINSULA:

Tolala, Kjellberg 2447 (BO, S); Preho, Lelewaoe, Kjellberg 2504 (BO, S).

PULAU MOENA:

Raha, Lamanoe, bb20757 (A, BO, L); Raha, Wasalangka, bb21130 (A, BO) and bb21330 (A, BO, L).

CULTIVATED:

Hort. Bog. IVG 82, Sinclair 10043 (A, B, E, K, L, M, NY, SING) the same tree probably as the Beccari FI Acc. Nos which now follow; Beccari, date 1876 = FI Acc. Nos 7668 (FI) & 7668a (FI); Sutrisno 125a (K, L, SING).

DISTRIBUTION:

Celebes.

TPPE MATERIAL:

Myristica affinis Warb., three syntypes:—


VERNACULAR NAMES:

Celebes:—daan; laka; lau; mararu (Manado); ogindolu (P. Moena).

This variety is best distinguished from typical var. fatua by the dull, tomentulose or pubescent twigs, the tomentum persisting for a long time even in the older portions, and by the larger and broader leaves with more veins and a more prominent midrib, striate when dry beneath and much broader, 5 mm. as against 2-3 mm. broad at the base of the leaf. The leaf itself is generally more coriaceous, though there are thin-leaved forms too; the apex is never sharply acute or acuminate and the base is less acute, usually rounded or rounded and then sub-acute. There is a tendency
for the upper surface of the leaf to be dull above on drying, but this character is not constant. In coriaceous forms it dries a dark blackish brown above. The indumentum is denser than in the typical form and the nerves have a tendency to be rather crooked. The fruit is nearly as large as in the typical form. Miquel and Koorders thought that the Celebes plant was the same as typical *M. fatua* Houtt. At least they did not make it a new variety of *fatua* but simply included it in the existing *M. fatua* Houtt.

**var. inutilis** (Richard ex A. Gray) J. Sinclair, stat. nov.


Tree 4–15 m. high, usually 7 m. *Bark* dark greyish brown. *Twigs* slender, 2.5–3 mm. thick for some distance down from the minutely puberulous apex, then reddish brown and slightly rough with numerous small lenticels, greyish brown and striate in the older parts. *Leaves* thinly chartaceous, dark glossy green above, drying a pale greyish brown or greenish brown, glossy or dull, the lower surface covered with minute, closely adpressed scales, pale yellowish brown or in the older leaves, becoming whitish brown, not rusty or medium brown, the nerves and midrib standing out a reddish brown in contrast, narrowly oblong or lanceolate, sometimes broadest at the middle, sometimes above the middle, base bluntly acute or rounded, apex acuminate; nerves 16–20 pairs, average 18 pairs, impressed and not very distinct above, fine and slender beneath curving slightly, sometimes rather crooked, the line of interarching at the margins fairly distinct; reticulations mostly invisible; length 13–22 cm., average 20 cm.; breadth 4–6 cm.; petiole 1.5–2.5 cm. long, rather slender, 2.5–3 mm. thick, channelled and the edges inrolled and close together when dry. *Male inflorescence* a 3–5 mm. long, rusty-tomentose, woody tubercle. *Male flowers* sub-umbellate, 8–12 in a cluster, thin in texture, obovoid in bud, narrowly clavate when mature, shortly rusty-tomentose outside, glabrous inside, 5–6 mm. long and 2.5 mm. broad, split down ⅓-way by the bluntly acute, reflexed lobes; staminal column 4–4.5 mm. long with 6–8 anthers and a sterile, acute, 0.2–0.5 mm. long apiculus. the stalk 2 mm. long, as long as or just slightly shorter than the fertile part, rusty-tomentose; bracteole ovate or rhomboid. 2 mm. long, rusty-tomentose like the perianth and pedicels, persisting until the flower-bud opens; pedicels 4 mm. long, slender, 0.5 mm. thick, longitudinally striate, often flattened.
Fig. 32. *Myristica fatua* Houtt. var. *inutilis* (Richard ex A. Gray) J. Sinclair.


Female flowers much fewer in the cluster, smaller, 4 mm. long and 2.5 mm. broad, urceolate with reflexed, triangular, acute lobes; ovary rusty-tomentose; pedicels 2 mm. long, slightly stouter than in the male. Fruit 1–4 in a cluster, oblong, obtuse at both ends, the apex sometimes with a minute apiculus in the centre, thin-walled, pale yellowish brown, minutely tomentulose, 3–3.6 cm. long and 1.6–2.3 cm. broad; stalk slender, 6 mm.–1 cm. long and 2–3 mm. thick. Aril red, reddish brown when dry. Seed oblong, shining, reddish brown, rounded at each end, 2.5 cm. long and 1.3 cm. broad.

**SAMOA s.l.**: Pickering, Cpt. Wilkes Exped. 1838–42 (A, K, P); Whitmees Nos 86 (K); 89 (K) & s.n. (A, BM).

**SAVAI'I**: Salailua, Christophersen & Hume 2612 (BO, K, UC); Taga. shore forest. Christophersen 2838 (K, L, P, UC); above Sili, Christophersen 3202 (A, BO, K); near Samalaeulu, Christophersen 3473 BO, K, P, UC).

**UPOLU**: Graeffe Nos 36 (HBG); 105 (HBG); 512 (HBG) and s.n. (A, BM, HBG) the A sheet is numbered 79 in pencil; Horne 10 (K) another sheet of the same number in K is hymargyraea var. hymargyraea: Horne date 1846 (BM); Mueller s.n. (BM) and Mueller 149 (BM) both as M. graeffii a msc. name; Vaiaberg, Rechinger Nos 1224 (BM) and 1491 (BM); Moa-moa Plantation, Eames 186 (A, L) the BO sheet of the same number is hymargyraea: Ululaloa, B.P.G. Hochreutiner 3436 (G, Z); top of Mafa Pass, McKee 2909 (K, L, NSW); Apolau, Reinecke 97 (BO, BRSL, E, G Boiss.); Vailele Kamin, Reinecke 103 (BO, BRSL, E, G Boiss., L).

**TUTUILA**: Ridge summits, Bryan 73 (P, UC); reservoir trail above Naval Station, Christophersen Nos 984 (P, UC) and 995 (P, UC); Pagopago, Meebold 21351 (BM, M); Fagasa trail, W. A. Setchell 67 (UC) and Cpt. Potts I (UC).

**TAU**: Back of Faleasao, Fitiuta trail, Garber 609 (K).

**JFU ISLAND**: Yuncker 9541 (K).

**DISTRIBUTION**: Samoa.

**TYPE MATERIAL**: Pickering, Cpt. Wilkes Exped. s.n (A holotype, K, NY, P, US) the NY and US sheets not seen. The holotype may be the US specimen. See notes under M. castaneifolia.

**VERNACULAR NAMES**: Atone (Tutuila); atogi (Upolu).

A common tree in Samoa from sea-level to 300 m., fruiting throughout the year. Warburg places it along with M. hymargyraea in series Inutiles. He says that it may only be a variety of that species. Christophersen also has had some difficulty at times in
distinguishing them. He says, in B.P. Bish. Mus. Bull. 128 (1935) 87, that Eames 186 and Christophersen 314 have the smaller, narrower leaves of M. inutilis and the sub-globose, dark brown, densely pubescent fruits characteristic of M. hypargyraea. The young leaves are glabrous, bringing the specimens closer to M. hypargyraea; but the seeds (314) are broader than originally described in this species, measuring 3 cm. by 2.6 cm. (original description 3.2 cm. by 2 cm.). I have seen Eames 186 which is a mixture. The A sheet (fruit) belongs to inutilis and the BO sheet to hypargyraea var. hypargyraea. Christophersen 314 is also M. hypargyraea var. hypargyraea.

I must, however, state that my difficulty has not been in distinguishing between these two species but between inutilis and fatua var. papuana, especially the rather variable material of the latter from the Solomons and the New Hebrides which both Guillaumin and A.C. Smith have named inutilis. I have excluded these specimens from inutilis which is, in my opinion, a tree entirely confined to Samoa. In fact inutilis is more closely related to fatua var. papuana than to M. hypargyraea and must go into series Fatuae. Also it is not anything more than another variety of fatua and should not rank as a species. M. fatua var. papuana in the Solomons is even more variable than it is in New Guinea, there being forms with broad leaves, narrow leaves, one with rather narrow coriaceous leaves described as M. procera, others like it with thin chartaceous leaves and finally one with smaller, narrower leaves. The fruits of the latter approach the form in the New Hebrides, having more slender fruit stalks than those of typical fatua var. papuana, but the leaves of the New Hebrides plant are fairly broad, more like those of typical fatua var. papuana. The fruits of all these specimens are of a darker brown colour than those of var. inutilis and so is the undersurface of their leaves. The variation of this variety in the Solomons is undoubtedly due to its separation in the various islands. The New Hebrides really form a continuation of the Solomon chain and it seems not unreasonable to find fatua var. papuana extending from the Solomons to these islands. Samoa is much more remote and lies well outside this group, some 20° of longitude further east. In fact Samoa is the eastern limit of the genus Myristica and we would scarcely expect to find fatua var. papuana extending so far east. M. fatua var. inutilis may, however, have arisen from it direct or through a common stock, the chief differences being the smaller, clavate-shaped flowers and the paler indumentum of the leaves and fruit in var. inutilis. These differences are best shown in tabular form. Also see notes under fatua var. papuana. M. hypargyraea is a different tree with stouter twigs, larger and broader leaves which have a white undersurface, a coriaceous, campanulate male flower, split down much further into the lobes, a differently shaped, stouter staminal column with a truncate apex and a sub-globose fruit, darker in colour.
### Differences between M. fatua var. inutilis and var. papuana

<table>
<thead>
<tr>
<th></th>
<th>M. fatua var. inutilis</th>
<th>M. fatua var. papuana</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twigs</td>
<td>Reddish brown, the two lines faint, occasionally present</td>
<td>Greyish brown, less shining, the two lines more distinct and more frequent</td>
</tr>
<tr>
<td>Leaves</td>
<td>Drying a pale greyish or greenish brown above and a pale yellow beneath, whitish in the older leaves, the veins reddish brown</td>
<td>Drying a darker brown above, pale yellowish but more often a rusty or medium brown beneath</td>
</tr>
<tr>
<td>colour:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>nerves:</td>
<td>16-20 pairs, average 18 pairs, some rather crooked</td>
<td>18-26 pairs, average 20 pairs, more oblique</td>
</tr>
<tr>
<td>size:</td>
<td>4-6 cm broad.</td>
<td>4-10 cm broad, more variable in shape</td>
</tr>
<tr>
<td>petiole:</td>
<td>1.5-2.5 cm long.</td>
<td>1-2 cm long</td>
</tr>
<tr>
<td>Flowers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>male:</td>
<td>Narrowly clavate, 5-6 mm long and 2.5 mm broad</td>
<td>Nearly tubular, larger, 6-9 mm long and 3 mm broad</td>
</tr>
<tr>
<td></td>
<td>Pedicels 4 mm long. Anthers 6-8.</td>
<td>Pedicels 6 mm — 1 cm long. Anthers 10.</td>
</tr>
<tr>
<td>female:</td>
<td>4 mm long and 2.5 mm broad.</td>
<td>5-6 mm long and 4 mm broad</td>
</tr>
<tr>
<td>Fruit</td>
<td>Oblong, 3.6 cm long and 1.6-2.3 cm broad, tomentum a pale yellow, very short, not furfuraceous; stalk slender, 6 mm — 1 cm long and 2-3 mm thick.</td>
<td>Oblong or obvoid, 3.3-4.5 cm long and 2-3 cm broad, tomentum rusty or medium brown, furfuraceous; stalk stouter, 5-7 mm long and 5 mm thick</td>
</tr>
</tbody>
</table>

**var. magnifica** (Beddome) J. Sinclair, **stat. nov.**


Tree 30 m. or more high with stilt-roots and often with buttresses, some of the roots from the base spreading along the ground and rising in loops above the surface. *Bark* purplish black smooth. *Twigs* 4-5 mm. thick at the apex, densely dark rusty-tomentose on the first 7 cm. from the apex downwards, then dark
Fig. 33. *Myristica fatua* Houtt. var. *magnifica* (Beddome) J. Sinclair.

A, leaf on left viewed from the undersurface, the one on the right from the upper. B, male inflorescences. C, male flower. D, staminal column. E, fruit with part of the pericarp removed to show aril and seed. F, young fruit. A from Boitdillon 730 (DD). B–E after King's plate 119. F from Bor 11441 (DD).
reddish brown, glabrous and shining, older greyish brown. *Leaves* coriaceous, oblong or oblong-elliptic, rather variable in shape, apex bluntly acute or acuminate, base rounded, dark glossy green on the upper surface, dark brown or olive green and retaining the gloss when dry, lower surface covered with densely packed, reddish-golden, stellate scales, these being shed with age; nerves 20–26 pairs, equidistant, oblique or curving slightly, interarching at the margins, sunk above, prominent beneath; reticulations invisible above, faintly visible and scalariform beneath; length 20–37–(60) cm.; breadth 10–12 cm.; petiole 2–2.5 cm. long and 5–6 mm. thick. *Male inflorescence* a 1 cm. long, simple or bifurcate woody tuberole. *Male flowers* 8–20 in a sub-umbellate cluster, coriaceous, ovoid-globose, densely rusty-tomentose outside, glabrous inside, 5 mm. long and 4 mm. broad, split down ⅓-way into the acute lobes; staminal column about 3 mm. long, shorter than the flower, the fertile portion with 8–10 anthers and obtuse with a minute apiculus at the apex, the stalk ⅓ the length of the anthers and with hairs on its basal portion; pedicels very short or absent, 2.5 mm. long; bracteole semi-orbicular, sericeous, acute at the apex. *Fruit* solitary or in pairs, oblong-ovoid, densely rustytomentose when young, becoming tomentulose when old, 7–10.5 cm. long and 5 cm. broad, pericarp fleshy, 4 mm. thick; stalk very short, about 5 mm. long. *Aril* orange-red. *Seed* 6 cm. long and 3 cm. broad, egg-shaped.

**PENINSULAR BOMBAY INDIA PRESIDENCY:**

**Kerala:**

**Travancore:**—South Travancore *Beddome 242* (K); Colatooorpolly, *Bourdillon Nos. 730* (CAL, DD, K) and *731* (CAL, K) and *Lawson Nos. 90a* (CAL); *90b* (CAL); *93* (CAL) and *Lawson, 26th Nov. 1893* (CAL, DD, K); on the Travancore Madras border in Travancore for the following three:—Courtallam Hills, *Beddome s.n. date 1873* (K); Tinnevelly Ghats, *Beddome Nos. 6725* (BM) and 6726 (BM).

**DISTRIBUTION:**

Peninsular India as above, also reported by Krishna Moorthy, *Ind. For.* (1960) 314 to be common in the valleys of the Shendurney, Kulathupuzha and Anchal Ranges of Travancore.

**TYPE MATERIAL:**

The type locality given by Beddome is South Travancore in the dense moist forests in the valleys at the foot of the Ghats round Mimoote near Colatooorpolly. He does not quote any of his own numbers. There is a specimen in K, *Beddome 242*, South Travancore, but the locality Colatooorpolly is not actually written on the sheet. All Beddome's specimens quoted in the present account may be taken as syntypes or authentic-material of this species.

**VERNACULAR NAMES:**

*Kottha panu* (Malabari).
ECOLOGY:

An immense, gregarious tree with looped "knee roots" which are very similar in appearance to those of the mangroves. K. Moorthy refers to this tree as the predominant species in the Myristica Swamp Association which fringes sluggish streams in the damp valleys at the foot of the Ghats. Also see notes on this association under *M. malabarica*. According to Beddome, one of the finest trees in S. India, flowering in February and fruiting in August.

After much consideration, and with profound reluctance I feel obliged to reduce this magnificent nutmeg of India to yet another variant of *M. fatua*. Like a great colonizer *M. fatua* has spread out in diverse directions from its centre of origin, settling and adapting itself to each new environment with the minimum of modifications. When compared with other variants of *fatua* such as *inutilis*, *papuana* and *morindiifolia*, *magnifica* does not seem to diverge in any greater degree of proportion from *fatua* than these others do. There is a striking similarity between the leaves of *magnifica* and those of typical var. *fatua*. In fact if someone were to place a few of the former side by side with those of var. *fatua* and to ask if they were the same without revealing the identity and locality of *magnifica*, then I should unsuspectingly say "surely they must be identical". If variants like *inutilis*, *papuana* and *morindiifolia* can be brought under the specific range of *M. fatua* surely also can *magnifica*. It has already been pointed out in the notes under var. *fatua* that, while *magnifica* is probably best considered as a subspecies, it is simpler at present in this interim, non-genetical classification to consider all the variants as varieties.

The following now are the chief differences between our present variety and the typical. In var. *magnifica* the male flowering pedicels are much shorter or absent — probably a good character. If they are immature, then all the better, for they may lengthen and then indicate a closer alliance with var. *fatua*. The flowers are smaller with a denser tomentum. They are ovoid-globose and not campanulate in shape. They are more numerous in the clusters. The fruit is larger, 7–10.5 cm. × 5 cm. The largest fruits I have seen in *fatua* var. *fatua* are those of Kuswata & Soepadmo 272 from Ambon and these measure 7.5 cm. × 4 cm. The presence of the looped "knee roots", noted by Krishna Moorthy, must surely have some value. They have not been seen in any other species of *Myristica* and are probably unique in the family. I wonder if they really belonged to a *Myristica*? Other genera in swamps can have such roots. The vast distance in geographical separation cannot be ignored. The minor distinctions are the stouter twigs with their denser and darker tomentum on the innovations, the more coriaceous leaves with stouter petioles and rounded base (other varieties of *fatua* such as var. *affinis* have equally coriaceous ones with stout petioles and similar base) and the denser, darker and slightly longer indumentum on the lower surface of the leaves.
This indumentum is nearest to that of fatua var. morindiifolia, and although more tightly packed, is not so long. It is of a more reddish tinge, consisting of stellate scales and not the dendroid hairs of var. morindiifolia which look like tiny moss plants with obtuse, imbricate leaves. Warburg excludes figures 4 and 5 in King’s plate depicting the aril, and thinks that they belong to that of M. malabarica. I cannot agree with him as the aril is so uniform as to be of little use in separating species of Myristica.

The true status of magnifica cannot be conclusively settled by alpha taxonomy in the herbarium. If a chromosome examination shows that the patterns are greatly out-of-step with those of the other varieties of fatua, then its rank might be raised. If it is a species, it is not one which differs ostentatiously from fatua.

var. morindiifolia (Bl.) J. Sinclair, stat. nov.


Synonym: M. cordifolia Zipp. Herb. (and one sheet M. cordiformis Zipp.) nom. nud. pro parte [altera pars = var. subcordata (Bl.) Miq.] non M. cordifolia Mart. ex A.DC. (1856) = Virola sebifera Aubl.; Zipp. ex Miq. Ann. Mus. Bot. Lugd.-Bat. 2, 1 (1865) 46 pro parte et pro syn. — Fig. 34.

Tree 12–25 m. high with horizontal branches and stilt-roots. Bark greyish black or brownish black; sap red, watery. Twigs ending in a large, elongate, 3.5 cm. long terminal bud and often with young folded leaves above or below the apical developing leaves, stout and rather similar to those of var. fatua, but covered with a ferrugineous-floccose tomentum on the innovations. shining and dark reddish brown underneath that indumentum, 4–5 mm. thick in the apical portions, lower down faintly striate and covered with lenticels. Leaves coriaceous, dark glossy green above, the lower surface glaucous, but covered with a yellowish, floccose-furfuraceous indumentum which tends to rub off when old, the upper surface drying a yellowish brown or medium brown, dull or slightly glossy in parts, oblong with nearly parallel sides or occasionally broadest above the middle, base rounded or subcordate, the apex acute or shortly acuminate; nerves numerous, 25–32 pairs or more, sunk and sulcate above, raised beneath, oblique or leaving the midrib at an angle of 60–70°, interarching in a double loop at the margins; length 24–46 cm., average about 32 cm. (large size-class) and breadth 9–19 cm., average 11 cm.; petiole 2–4 cm. long, average 3 cm. long, stout. Female flowers 5 mm. long and 5 mm. broad; pedicels 3 mm. long, stout. Fruit 5.5–6 cm. long and 3 cm. broad, about the size and shape of a hen’s egg, larger than in var. papuana but smaller than those of var. fatua, covered with a rusty-fur furaceous tomentum which is dense when young but tends to rub off with age; stalk 1 cm. long and 4 mm. thick.
Fig. 34. Myristica fatua Houtt. var. morindiifolia (Bl.) J. Sinclair.

NEW GUINEA

Vogelkop (Dutch West New Guinea):

Inanwaten, Muturi, Steenkool, bb32681 (BO, L); Ajamaroe, Schram BW6099 (L) somewhat approaching var. subcordata.

Dutch South New Guinea:

S.I., Zippelius s.n., three sheets in L numbered as follows:—903252—140 (L); 903255—9 (L) and 903255—10 (L); Sg. Aendua (Aindua) near Oeta and Mimika, (Exped. Lundquist 3) Aet 486 (A, BO, K, L) and Lundquist 193 = bb32912 (BO, L); Mimika (Siera) Jera, Oeta, Lundquist 113 = bb32832 (BO, K, L); Komor, Asmat Region, Naufje BW6614 (L).

T.N.G.

Eastern Highlands:—Gusap to Arona, Womersley N.G.F. 5103 (BRI, CANB, K, LAE); Mt. Woodfield, Markham-Arona Road, Womersley N.G.F. 6608 (BRI, L, LAE); Arai, Brass 31999 (K, L).

Morohe District:—Kikiepa Village, Wantoat Area, Womersley & Thorne N.G.F. 12625 (K).

New Britain:

Keravat, Floyd N.G.F. 6652 (A, BO, BRI, CANB, K, L, LAE); Warangoi Valley, Gazelle Peninsula, Womersley & Kazakoff N.G.F. 7070 (A, BRI, K, L, SING); Pulie River near Eliak Creek junction; south New Britain, K.J. White N.G.F. 10049 (CANB, K, L, SING); near Urin, south N.B., K.J. White N.G.F. 10035 (CANB, L, SING).

DISTRIBUTION:

Northern part of New Guinea. New Britain.

TYPE MATERIAL:

Myristica morindiifolia Bl. Zippelius s.n. (L) three sheets with the Leiden Acc. Nos. 903252—140; 903255—9 and 903255—10 = part of the cordifolia of Zipp. nomen nud., the remainder being var. subcordata. See notes below.

VERNACULAR NAMES:

Kosley (New Britain); mituru (Mimika); Osaar (Asmat); sapar (Maibrat).

Miquel at first recognized M. morindiifolia, but he later united it with subcordata under the circumscription M. fatua var. subcordata (Bl.) Miq. Warburg and Markgraf included it as a synonym under M. subcordata Bl. and both added the words “pro parte” after M. morindiifolia Bl. which they should have omitted. Warburg states that Blume’s M. morindiifolia was a mixtum compositum with two kinds of leaves and that the single leaf belongs to that of an unidentified myrmecophilous species and that the rest is subcordata. I have examined this sheet in Leiden under the L Acc. No. 903252—10 and it consists of two twigs showing young apical leaves as well as a large single detached leaf. This leaf is not at all that of any myrmecophilous species but is a good example of a well-developed adult leaf of fatua var. morindiifolia showing the yellow scales on the lower surface and the cordate base. Had Warburg seen specimens of the fine material of this var. from the Eastern Highlands or from New Britain with their large well-developed leaves he probably would not have made this mistake.
nor added the words "pro parte". On this above-mentioned sheet collected by Zippelius, there is in Miquel's handwriting "M. fatua var. subcordata f. glabrior and M. morindiifolia Blume". It also bears the number 172/6 in the handwriting of Zippelius, but I do not see Blume's writing on this sheet nor on any of the others. Miquel took this to be the type of Blume's morindiifolia, but there are two other sheets in Leiden collected by Zippelius named M. cordifolia and without a number. Miquel has written M. fatua var. subcordata on these. They are obviously all from the same gathering and agree perfectly with Blume's description of M. morindiifolia and should also be considered part of the type material as well as the other sheet 903252–10. I have used the Leiden accession numbers to designate them. (See under the heading Type Material as well as in my citation of specimens.) Blume did not quote any numbers under his morindiifolia but simply stated that it (that is the cordifolia of Zippelius) was without exact locality and came from New Guinea. The locality was probably somewhere in the Asmat region in Dutch South New Guinea.

The rest of the material of Zippelius's cordifolia is different and belongs to var. subcordata (Bl.) Miq. It also bears no number or exact locality except "in maritime woods, New Guinea", but I suspect it also came from the Asmat region as it matches quite well the recent material collected by Nautje at Asmat.

Variety morindiifolia is nearest to var. affinis which has similar large leaves but those of the former have more or less parallel sides and a sub-cordate or rounded base. The veins are less oblique and tend to leave the midrib at a wider angle. The larger leaves, with more numerous nerves and the long petioles should at once distinguish it from var. papuana.

The material from New Britain has a much denser indumentum on the lower surface of the leaf than that of Zippelius's type collection, but as the leaves become older the indumentum becomes much less dense. This can also be seen in some of the sheets from New Britain. Again bb32681 from the mainland of New Guinea is just as dense in indumentum as that of the N.B. material while the amount of indumentum on the specimens from the Eastern Highlands also varies with age. As I have pointed out before, (see under var. morotaenis) and especially as is the case with fatua var. fatua, the amount of tomentum cannot be taken as a distinguishing character or one on which to separate further these New Britain specimens or others on the mainland from the less glabrous forms.

var. morobensis J. Sinclair, var. nov. — Fig. 35.

 Haec arbor probabiliter varietas M. fatuae tantum est, affinis var. subcordatae et var. papuanae. A priore foliis basi acutis vel subrotundatis nec subcordatis; ab altera fructibus dense velutinis et ab ambabus squamulis pilisque foliorum carentibus differt. A M. chrysocarpa var. entreccasteuxense cui etiam subsimilis, foliis minoribus, basi non emarginatis, fructibus atro-brunneis discrepat.
Fig. 35. Myristica fatua Houtt. var. morobensis J. Sinclair.
Arbor magnitudinis incertae. Ranuli modice graciles, 3–4 mm. crassi, in partibus apicalibus ferrugineo-tomentelli, in partibus adultis atro-grisei, striatuli. Folia chartacea, utrinque glabra, costa subtus excepta, supra in sicco saepe nitida, utrinque modice brunnea, anguste oblonga vel anguste elliptica, interdum lanceolata, basi acuta vel subrotundata, apice acuminata, 12–21 cm. longa, 3.5–7 cm. lata, vulgo 4.5 cm., costa supra in sulco depressa, subtus elevata, glabra vel primum squamulis pilisque minutis induta, nervi c. 16-jugati, supra gracies subtus prominentes, valde curvati, a costa angulo 60–90° excurrentes, marginibus indistincte anastomosantes; reticulationes vix visibles, nonnunquam paucae supra obscure visae; petioli 8 mm.–1 cm. longi, 2 mm. crassi. Flores masculi et feminell non visi. Fructus fere sessilis, immaturus, sub-globosus, 1.5 cm. in diam., ferrugineo-velutinus cum pilis 1–2 mm. longis; stipes 3–5 mm. longus, 3–4 mm. crassus. Arillus in segmenta multa angusta divisus. Semen immaturum, oblongum, 7 mm. longum, 4 mm. latum.

Tree of uncertain height. Twigs moderately slender, 3–4 mm. thick, rusty-tomentulose in the apical parts, dark grey and finely striate in the adult parts. Leaves chartaceous, glabrous on both surfaces except the lower midrib, often shining above when dry, medium brown on both surfaces, narrowly oblong or narrow-elliptic, sometimes lanceolate, acute or slightly rounded at the base, acuminate at the apex, midrib sunk in a groove above, raised beneath, glabrous or at first covered with minute scales and hairs; nerves about 16 pairs, slender above, prominent beneath, curving widely, running out from the midrib at an angle of 60–90°, indistinctly interarching at the margins; reticulations scarcely visible, sometimes a few faintly seen above; length 12–21 cm.; breadth 3.5–7 cm., average 4.5 cm.; petiole 8 mm.–1 cm. long and 2 mm. thick. Male and female flowers not seen. Fruit nearly sessile, immature, sub-globose, 1.5 cm. in diam., densely rusty-velvety hairy with hairs 1–2 mm. long; stalk 3–5 mm. long and 3–4 mm. thick. Aril divided into many narrow segments. Seed immature, oblong, 7 mm. long and 4 mm. broad.


DISTRIBUTION: Morobe District, rain forest on mountain slopes. In fruit in January.

TYPE MATERIAL: Womersley N.G.F. 3142 (K holotype).

I am not sure of the exact status of this plant, known from a single gathering in fruit. It may be a variety of M. fatua or on the other hand, a distinct species. If further material should prove that this is so, then it may be raised to specific rank. As it is distinct, it seems best to give it some name. It differs from the other varieties of fatua in not having the lower surface of the leaf covered with minute scales. There are, however, scales and hairs on the lower midrib in the younger leaves. The fruit is densely covered with dark brown, rusty hairs resembling velvet or plush.
var. *morotaiensis* J. Sinclair, var. nov. — Fig. 36A.

A typo ramulis apice 2-costatis, glabris vel cum tomento sparsiore indutis, foliis brevioribus, obovatis, basi rotundatis, subtus squamulis fere carentibus differt.


A tree 10–12 m. high. *Twigs* with two lines or ridges at the apex, reddish brown, glabrous or with less tomentum than in the typical. *Leaves* thinly coriaceous or chartaceous, obovate or broadly obovate, broadest above the middle and from there gradually narrowed to a rounded base, apex rounded and then shortly acuminate or acute; nerves 22–30 pairs, average 26 pairs, oblique, parallel and close to each other; length 15–25 cm., rarely 30 or 35 cm.; breadth 7–11–(16) cm. *Flowers* as in var. *fatua*. *Fruit* immature, tomentulose, pale brown.

MOLUCCAS MOROTAI:

<table>
<thead>
<tr>
<th>Island</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Totodoku, Kostermans Nos. 697 (BO, K,</td>
<td>Pulau Kasiruta, Dinga bb16446 (BO, L).</td>
</tr>
<tr>
<td>L) and 771 (A, BO, K, L, LAE, PNH,</td>
<td></td>
</tr>
<tr>
<td>SING).</td>
<td></td>
</tr>
<tr>
<td>Batiyan:</td>
<td>Atasrip 48 (BO, L, SING).</td>
</tr>
<tr>
<td>Obi:</td>
<td></td>
</tr>
<tr>
<td>Sulailands:</td>
<td>P. Mangole, Dijko Sangatumba, van Hulstijn (Atje) 370 (BO, L, SING) somewhat intermediate, approaching var. <em>fatua</em>.</td>
</tr>
<tr>
<td>Buru:</td>
<td>Binnendijk s.n. (BO, L); Wafulahut, bb22844 (BO, L).</td>
</tr>
<tr>
<td>Ambon:</td>
<td>Binnendijk Nos. 17944 (BO) and 17990 (BO).</td>
</tr>
</tbody>
</table>

DISTRIBUTION: Moluccas.


In Morotai there are two varieties of *M. fatua*, this one and the coriaceous-leaved, mountain variety from Gunong Sangowo which I have named var. *sangowoensis*. Our present plant, var. *morotaiensis* is a lowland variety with much thinner leaves and very little tomentum on their lower surfaces. The main character which these two varieties have in common is the obovate leaf, gradually narrowed from above the middle to a rounded base. Also it is the most reliable non-variable character for separating var. *morotaiensis* from var. *fatua*. I do not think that the amount of scaly indumentum nor its colour matters greatly for that is so variable in *M. fatua* generally. The presence of the two ridges on the twigs also is only a secondary guide. It is true that they are more distinct in var. *morotaiensis* and that most specimens of *fatua* do not show them, yet there are forms of *fatua* var. *fatua* from
Fig. 36. *Myristica fatua* Houtt. var. *morotaiensis* J. Sinclair and var. *sangowoensis* J. Sinclair.

some of the southern islands of the Moluccas that have them. The other specimens quoted here under var. *morotaiensis* from P. Obi and Buru have broader, longer and thinner leaves with more veins and more tomentum than the Morotai specimens. I have included them here under var. *morotaiensis* because of their obovate leaves, rounded at the base. They show some approach to var. *fatua*, specially to some forms of it with a sparse indumentum of pale yellow scales from West Ceram collected by Kuswata and Soepadmo. These I cannot place in var. *morotaiensis* because the leaves are for the most part not obovate, but look exactly like typical var. *fatua* except that they have less scales. There are other typical specimens of var. *fatua* from East and West Ceram with abundant indumentum, again showing that one cannot depend on the indumentum for separation. Some of the southern Moluccan forms have narrow leaves like those of var. *spanogheana* from the Lesser Sunda Islands. It is fortunate that the recently collected West Ceram specimens with their thin indumentum turned up in time, because, if I had not seen them, I might not have noticed the connection between them and var. *fatua* on the one hand with its fairly dense coating of yellow scales and the nearly glabrous var. *morotaiensis* on the other. For a long time I was puzzled by this plant from Morotai (it was not in flower) and would have probably described it as a distinct species owing to its scarcity of tomentum, had I not seen these southern Ceram specimens. The fruit of var. *morotaiensis*, though immature, is smaller and less dense in tomentum than that of *fatua* var. *fatua*.


Tree 9-30 m., average 20 m. high with stilt-roots and 4-5 branches in a whorl. Bark dark greyish brown or greyish black, slightly rough with longitudinal striations and a few flakes when old; sap wine-red. Twigs more slender than in the typical, about 3 mm. thick at the apex and for some distance down, finely striate and greyish brown-tomentulose on the innovations, no smooth, glossy, reddish brown portions as in the type, dark greyish brown, striate and often slightly rough with lenticels in the older parts,
Fig. 37. *Myristica fatua* Houtt. var. *papuana* Mgfr.

the two lines occasionally present near the apex but faint. Leaves chartaceous, dark green and glossy above, drying a dark brown or usually darker and duller than in the typical, sometimes the gloss is retained, lower surface with a thin indumentum of yellow or rusty scales, lanceolate, oblanceolate or elliptic-lanceolate, often widest above the middle, base acute or less often rounded, apex acute or shortly acuminate; nerves 18–26 pairs, average 20 pairs, oblique; length 13–25 cm., rarely 30 cm., average 20 cm.; breadth 4–7–(10) cm., average 5 cm.; petiole 1–2 cm. long and 2–3 mm. thick, more slender than in the type, deeply grooved. Male inflorescence as in the type. Male flowers coriaceous and tomentose as in the typical but narrower, both in bud and when expanded, 6–9 mm. long and 3 mm. broad at the base, 4.5 mm. broad at the apex when fully open, the buds narrow, ellipsoid, but not quite tubular, narrowly campanulate with spreading or slightly reflexed, acute lobes when in full bloom, the perianth split down only \( \frac{1}{4} \)-way by the lobes, its undivided portion nearly tubular; staminal column 8 mm. long with 10 anthers and an acute, 0.5 mm. long sterile apiculus, the fertile portion, including the apiculus, 4.5 mm. long, the stalk only slightly shorter, 3.5 mm. long, its basal half densely adpressed-tomentose, the upper half glabrous and furrowed; pedicels 6 mm.–1 cm. long. Female flowers few in the cluster, 1–3 only, coriaceous, urceolate, 5–6 mm. long and 4 mm. broad, split \( \frac{1}{4} \)-way into the acute, spreading or reflexed lobes; ovary 3 mm. long and 2 mm. broad, minutely rusty-tomentulose, the stigmas glabrous with 2 obtuse lobes like a duck's gaping bill; pedicels shorter and stouter than in the male, 5 mm. long and 2 mm. broad. Fruit 1–3 in a cluster, smaller than in the type, 3.3–4.5 cm. long and 2–3 cm. broad, average 3.5 cm. long and 2.3 cm. broad. Oblong or slightly obovoid, rounded at both ends or slightly narrowed to the base, the pericarp hard but rather brittle, covered with short rusty-furfuraceous tomentum which tends to rub off; stalk 5–7 mm. long and 3–5 mm. broad. Aril red, fleshy, glossy when dry. Seed oblong, rounded at both ends with parallel sides, dark reddish brown and glossy when dry, 2.5 cm. long and 1.5 cm. broad.

**NEW Vogelkop GUINEA (Dutch West New Guinea):**

<table>
<thead>
<tr>
<th>Species</th>
<th>Location</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>S.l., Tuyama</td>
<td>Sorong near Kadamak, Pleyte 512 (A, BO, K, L, PNH, SING); Warsamson River, 25 km. east of Sorong, Schram BW2967 (L); Momi, Monokwari, Kostermans 262 = bb33461 (A, BO, K, L, PNH, SING); N. Oranshary, Brandes BW7288 (L); Jakati near Babo, MacCluer Gulf, (Exped. Lundquist) Act Nos. 142 (BO, L) and 147a (BO).</td>
<td></td>
</tr>
<tr>
<td>Dutch NORTH New Guinea</td>
<td>Nabire, Geelvink Bay. Kanehira and Hatusima 11636 (A, BO); Pionier Bivak, Mamberamo, bb33303 (BO); Oereb, ± 200 km. west of Hollandia. Schram BW9274 (L); Tami River, Hollandia, Schram BW 2801 (CANB, K, L); mouth of the Tami River, Versteegh BW Nos. 3802 (CANB, K, L) and 3810 (CANB, K, KEP, L, SING).</td>
<td></td>
</tr>
</tbody>
</table>

*Foot-note:* —RINR = Royal Institute for Natural Resources, Tokyo.
Dutch South New Guinea:


Papua:


Central District—Port Moresby, Captain Root s.n. (MEL); Dieni, Ononge Road, *Brass 3914 (A, BO, BRI, NY); Cocolands, *E. Gray *N.G.F. 7161 (A, BO, BRI, CANB, K, L, LAE, SING); Mori River, *McDonald *N.G.F. 8189 (K, L).


T.N.G.

Sepik District—Sepik, Ledermann 6727 (SING).

Madang District—Ramu Valley, 5 miles south-east of Faita airstrip, *Saunders 522 (L).

Morobe District—Late, *N.G.F. 926 (BRI, LAE).

New Ireland (Neu Mecklenburg):

Namatanai near Nabumai, *Peekel Nos. 241 (B burnt, not seen) and 400 (B burnt, not seen); Nusa, *Warburg 20722 (B burnt, not seen).

Admiralty Islands:

Manus Island, Loniu, (Mair) Hepplewaite *N.G.F. 550 (BRI, L, LAE).

Pulau Japan:


Numfoor:

Namber, *Koster BW Nos. 1016 (CANB, L) and 1061 (CANB, K, L, SING).

Salawati:

Kaloal, *Koster BW Nos. 1434 (BO, CANB, K, L); 1450 (CANB, K, L); 1458 (L) and 1485 (CANB, K, L).

Misool:

Waigama, *Teijmann s.n. (BO, SING).

Aru Islands:

P. Wokam (Vokan), Dosinamalaoe, *Beccari FI Acc. Nos. 7707 (FI) 7707A (FI) and 7707B (FI); *bb25263 (A, BO, K, L, P, SING) and *Buwalda 4918 (A, BO, K, L); *Warburg 20721 (B burnt, not seen).

Soulomons Bougainville Island:


Fauro:


Shortland Island:

Inland from Harapa Village, *Whitmore's collectors BSIP 5741 (L, SING).

Treasury Group:


Rob Roy Island:

Ridge top, *Whitmore's collectors BSIP 5354 (L, SING).

Wagina Island:

Ridge top, *Whitmore's collectors BSIP 5490 (L, LAE, SING).
Gardens' Bulletin, Singapore — XXIII (1968)

SANTA ISLAND:
ISLAND (YSABEL):
Tatamba, Brass 3434 (BM, BO, BRI, L) and Whitmore BSIP Nos. 2697 (L, LAE, SING); 2701 (L, LAE, SING) and 2735 (L, LAE) Maringe Lagoon, Mt. Sasari, Whitmore BSIP Nos. 2415 (L, LAE, SING) and 2439 (L, LAE, SING); Bogotu, Parega Village, Whitmore BSIP 2760 (L, LAE, SING).

NEW GUINEA:
GROUP:
Baga Island, Whitmore's collectors BSIP 3075 (L, SING); Kolombangara Island, Merusu Cove, Whitmore BSIP Nos. 1411 (L, LAE, SING) and 1429 (L, AE); New Georgia Island, Roviana Lagoon, river near Nusahope Village, Whitmore BSIP 1945 (L, LAE, SING); Rendova Island, north of Kenelo Plantation on first main ridge, Whitmore BSIP 1900 (L, LAE, SING); Vangunu Island between Vura Village and Gevala River, Whitmore BSIP 892 (L, LAE, SING); Gizo Island, Whitmore's collectors BSIP 5607 (L, LAE, SING); Banika Island, Stoddard 29 (A).

MALAITA:
Are Are District, west coast, Kiu, Lipaqueto BSIP Nos. 3420 (L, SING) & 3522 (L, SING).

GUADALCANAL:
Rere River, about three miles inland, Whitmore BSIP 3829 (L, SING).

SAN CRISTOBAL:
CANAL:
Star Harbour, Brass 3106 (A, BM, BO, BRI, L); Wairaha River, Whitmore BSIP 4214 (L, LAE, SING).

NEW HEBRIDES:
EPI ISLAND
Valley of the River Hibau, Nelson Bay, Aubert de la Rüe, 19th Nov. 1935 (A).

EFATE ISLAND:
Undine Bay, Kajewski 220 (A, K).

NGUNA ISLAND:

TANNA ISLAND:
Lenakel, Kajewski 44 (A).

ANEITYUM ISLAND:
Anelgaubat Bay, Kajewski 757 (UC).

CULTIVATED:
Hort. Bog. IVG 16, M. Jacobs, 6th March 1956 (BO, K, L, P, SING); Sinclair 10042 (BO, K, L, P, SING) and Sutrisno 122 (K, L, SING) all from the same tree.

DISTRIBUTION:
A wide distribution throughout New Guinea, including its surrounding islands, the Solomons and the New Hebrides.

TYPE MATERIAL:
VERNACULAR NAMES: New Guinea:— baa (Sko); bafak (Mooi); bepus (Hatam); betelohooi and bomsj or bomsy (Manikiong); hornuo (Totobu at Baramata); ibuundebrong (Kemtuk); laklakan (P. Wokam); madorapi Samber, Japen dialect); orsen (Berik); ramon (Waria); ransowan (Numfoor); sebehonggwa (Manikiong).

Solomons: ambu'ynor (New Georgia Group); e'ehara (New Georgia Group); kakala (Santa Isabel and New Georgia Group); kakala'a (New Georgia Group); kakala’a (New Georgia Group); kuku (Santa Isabel and New Georgia Group).

This variety differs from the typical in a number of characters and is certainly a good variety if not a subspecies. It is very variable with regard to leaf shape and texture, size of fruit and length and thickness of the fruiting pedicel. The forms and variants grade into each other in such a way that it is almost impossible to name them and to draw up a satisfactory key. The twigs are generally more slender and theomentum often extends down the twigs, completely covering the innovations. In this respect the twigs resemble those of var. affinis. The leaves are smaller both in length and breadth than those of the typical, though at times out-sizes occur. They generally dry a darker colour above and are often dull but not always. There is a tendency for them to be broadest above the middle, though again this is by no means the rule. The petiole is more slender. The flowers are narrower, both in bud and when expanded, but they may be just as long or even longer than those of the typical. They may be described as narrow-campanulate while those of var. fatua are broadly campanulate. The perianth is split down ¼-way by the lobes and below that the entire portion is nearly tubular but not quite. In the typical the split extends down ¼-way or more and the united portion is of a more triangular shape. The fruits are smaller and when young, their tomentum is less dense.

M. fatua var. papuana is even more variable in the Solomons than it is in New Guinea. There are forms with broad and also with narrower leaves than usual. Those with really broad leaves have been disposed of under var. platyphylla. Its flowers, however, are not really different from those of var. papuana. Those described by A.C. Smith were immature.

I have to reduce A.C. Smith’s M. procera from the Solomons to fatua var. papuana. Its rather long narrow leaves are coriaceous and it seemed at first that this form was worth retaining, but there are other very similar specimens with different degrees of leaf texture between thin and sub-coriaceous which at once show that procera is only var. papuana. Examination of the following two gatherings will make this clear. Kajewski 1587 has thin leaves while those of Brass 3106 are sub-coriaceous or intermediate in texture, being also long and narrow and coming near to those of procera. The most distinct form of the Solomons is Kajewski 2101 from Bougainville Island with smaller, very narrow leaves. Its fruit stalks are longer and thinner than those of typical fatua var.
papuana, being 3 mm. thick as against the 4–5 mm. thick stalks of the latter. There is a tendency for the fruiting pedicels of the Solomon Islands' material to be slightly thinner than those of var. papuana from New Guinea, but this is not absolutely constant as I have seen two collections from New Guinea with thin stalks also. This Bougainville Island gathering, Kajewski 2101, somewhat approaches the specimens of var. papuana from the New Hebrides in having thin fruiting pedicels, but the leaves of the latter are in no way different from those of many of the specimens from New Guinea. The specimens from the New Hebrides are best left as var. papuana and so also the Bougainville specimen. If many identical collections were to turn up from Bougainville with small leaves and thin fruiting pedicels, then I might consider describing them as a new form of var. papuana. I cannot do much with one or two gatherings, especially when the leaves are so variable and also when so many intermediate connecting forms exist and are liable to cross with each other. The two numbers Brass 3106 and Kajewski 1587 resembling procera, the narrow-leaved Bougainville Island plant Kajewski 2101 and the New Hebrides specimens have all been referred to as M. inutilis by A.C. Smith in J. Arn. Arb. 22 (1941) 74, but that plant, see my notes under inutilis, although very similar, is confined to Samoa.

M. finschii Warb. according to Markgraf, page 169, consists of loose fruit of M. fatua i.e. fatua var. papuana and a leafy twig of M. argentea. M. multinervia A.C. Smith is only var. papuana with longer leaves than usual. There are some specimens of var. papuana with slightly out-sized leaves but otherwise they are not different from the normal. I have seen the Beccari specimens of the type material of M. wallaceana and agree with Markgraf that they are the same as those of his var. papuana. I have not seen M. sericea which was destroyed in Berlin, but I accept Markgraf's decision that it is also synonymous since he had the material before him when he reduced it to a synonym of his own variety papuana. Also his description of it fits that of var. papuana.

var. platyphylla (A.C. Smith) J. Sinclair, stat. nov.

Tree 15–24 m. high with stilt-roots. Bark dark brown. Twigs sometimes faintly 2-angled, dark brown and glabrous except for the minutely puberulous innovations, 4–5 mm. thick at the apex and 5–6 mm. thick lower down. Leaves chartaceous, mostly obovate or oblong-obovate and widest above the middle, less often elliptic or oblong, drying greenish brown to medium brown above, lower surface thinly covered with yellowish or cinnamon scales, base narrowed and rounded, less often acute, apex acuminate or cuspidate; nerves 20–30 pairs, average 25 pairs, oblique; reticulations absent; length 20–35 cm., average 25 cm.; breadth 7–13 cm., average 10 cm.; petiole 2–3 cm. long and 3–3.5 mm. thick. Flowers as in var. papuana (those of the type immature). Fruit hard but brittle, pale brown, scurfy-tomentulose, correct shape difficult to
ascertain through shrinkage on drying, probably oblong-obovoid but described as ellipsoid, mature fruits 5–6.5 cm. long and 5 cm. in diam., apparently larger than those of var. papuana; stalk 8 mm.–1 cm. long and 3–5 mm. thick. *Aril* red. *Seed* oblong, 4 cm. long and 2.3 cm. broad.

**SOLOMONS BOUGAINVILLE ISLAND:**
Torokina, Mount Kamo, Kieta District, Volk & Robinson N.G.F. 599 (BRI, LAE) approaching var. papuana; Kugumaru, Buin, Kajewski 1916 (BM, BRI, G, L, SING).

**NEW GEORGIA GROUP:**
Kolombangara Island, Sandfly Harbour, Whitmore BSIP 1478 (L, LAE, SING); New Georgia Island, Viru River, Cowmeadow & Teona BSIP 2533 (L, LAE, SING).

**GUADALCANAL:**
Konga, 20 miles south-east of Honiara, Whitmore BSIP 736 (L, LAE, SING); Berande, Kajewski 2442 (A, BM, BO, BRI, G, L, NSW, P, SING); Tinomeat Trail between Toni and Tinahula Rivers, Whitmore BSIP 683 (L, LAE).

**SANTA CRUZ GROUP:**
Vanikoro Island, near Peou, Whitmore BSIP 1662 (L, LAE).

**DISTRIBUTION:**
Confined to the Solomons.

**TYPE MATERIAL:**

**VERNACULAR NAMES:**
Chigu (Bougainville); kakala (Kwara’ae New Georgia, Guadalcanal and Santa Cruz); toro-bagere (Guadalcanal).

**USES:**
The latex is used to check nasal haemorrhage in Guadalcanal.

*Myristica platyphylla* is certainly not very far removed from *fatua* var. papuana, but if one wants to distinguish taxonomically between the two, it can be done. The chief difference is best seen in the broader leaves of *platyphylla* which are also longer and have more veins, average 25 pairs as against 20 pairs in var. papuana. Their shape is mostly obovate or oblong-ovate and widest in the middle, but other shapes occur too. The texture, not always reliable, is usually just a bit thinner than that of var. papuana. The petioles and the twigs tend to be slightly stouter. What may be a good character is the apparently larger fruit with its larger seed. The shape unfortunately (see above) is not very obvious, but it does not seem to be very different from that of var. papuana. Many of the specimens of both in herbaria have immature fruits which shrink or get squashed on drying.

There are specimens of var. papuana in the Solomons which approach var. *platyphylla* and there is one in particular, *Volk* and Robinson N.G.F. 599 which has its leaves broader than those of var. papuana but not so broad as those of var. *platyphylla*. Its petioles, however, are like those of the latter. At first I thought that this specimen was only var. papuana with broader leaves than usual and this made me inclined to reduce *platyphylla* to var.
papuana. Now I feel that they are best kept as separate varieties and that the intermediate specimen should be classed with var. platyphylla and not with var. papuana. It has been already stated that var. papuana in the Solomons is rather variable (see under that var.) and that the small and narrow leaved forms of it also raise problems. My first task, however, is to draw attention to the forms and variants which stand out morphologically and taxonomically. If they cannot be named satisfactorily in the herbarium, they may be examined genetically later.

var. quercicarpa J. Sinclair, var. nov. — Fig. 38D, E & F.

Var. papuana forma atque magnitudine foliorum proxima a qua indumento dense floccoso, fructu disciformi, applanato distinguitur.

Arbor 37 m. alta; truncus 24 m. altus basi leviter canaliculatus. Cortex subniger, rugosus, fissuris verticalibus horizontalibusque tenuibus obtectus, eis transversis paucioribus minus distinctis. Ramuli hornotini graciles, 2–3 mm. crassi, fusco-tomentosi, annotini striatuli, cinerascentes, glabri. Folia chartacea, supra in sicco opaca, modice brunnea, subtus indumentum fulvo floccoso dense obtecta, basi cuneata vel leviter rotundata, apice breviter acuminata, supra medium saepè latissima, 15–18 cm. longa, 7 cm. lata; nervi c. 18-jugati, obliqui. Fructus 1.3–1.5 cm. longus, 1.8–2 cm. latus, aspero nauci quercus similis, disciformis, fuscus floccoso-tomentosus convexus, basi planatus, apice mucronatus: stipes 1.3 cm. longus, 3 mm. crassus. Semen oblongum, utrinque rotundatum, 2 cm. longum, 1.3 cm. latum, atro-brunneum, subnitidum.

Tree 37 m. high; bole 24 m. high and slightly channelled at the base. Bark blackish, rough, covered with fine vertical and horizontal fissures, the transverse ones fewer and less distinct. Twigs of this year’s growth slender, 2–3 mm. thick, dark yellowish brown-tomentose, those of last year finely striate, ash grey and glabrous. Leaves chartaceous, dull above when dry and of a medium brown colour, the lower surface densely covered with a dark yellowish brown floccose indumentum, obovate or oblong, the base cuneate or slightly rounded, the apex shortly acuminate, often broadest above the middle, lamina 15–18 cm. long and 7 cm. broad; nerves about 18 pairs, oblique; petiole 1.2 cm. long. Fruit 1.3–1.5 cm. long and 1.8–2 cm. broad, similar to an acorn in appearance, disc-shaped, dark yellow-brown with floccose tomentum, convex, flattened at the base and mucronate at the apex, stalk 1.3 cm. long and 3 mm. thick. Seed oblong, rounded at both ends, 2 cm. long and 1.3 cm. broad, dark brown and slightly shining.

NEW GUINEA PAPUA: Northern District:—Buna hinterland. 7 miles north-west of Embi Lakes, L.S. Smith N.G.F. 1270 (BRI. LAE, SING).

DISTRIBUTION: As above. A single collection so far. In rain forest at 92 m above sea-level.

TYPE MATERIAL: L.S. Smith N.G.F. 1270 (BRI holotype).

VERNACULAR NAMES: Hotei (Upper Waria).
Fig. 38. *Myristica fatua* Houtt. var. *subcordata* (Bl.) Miq. and var. *quercicarpa* J. Sinclair.

This is a curious entity with unique and striking acorn-like fruits. They are disc-shaped and flattened at the base, being broader than long. The remains of the style shows up as a macro at the convex centre of the disc. Unfortunately there are no specimens in flower, but this new variety seems to be near to var. *papuana*. Its leaves are similar in size and shape to those of var. *papuana*, but differ in having a dense covering of dirty yellow-brown, floccose indumentum beneath. It is placed here with varietal rank but may even be a distinct species. There is a possibility, but a more remote one, that it might be related to *M. markgraviana* in section I, series *Littorales*. This problem could easily be solved if flowers were available.

var. *sangowoensis* J. Sinclair, var. nov. — Fig. 36B & C.

A var. *morotaiensis* folii rigide coriaceis, subitus squamulis cinnamomeis tectis, fructibus saturate ferrugineo-cinnamomeis, pericarpio crassiore differt.

Arbor 15 m. alta. *Ramuli* crassi, lenticellati, teretes sine lineis vel costis. *Folia* rigide coriacea, obovata, supra olivaceo-brunnea, subitus squamulis cinnamomeis tecta, 17–26 cm. longa, 8–10 cm. lata, nervi 20–24-jugati. *Flores* non visi. *Fructus* oblongus vel globosus, 5 cm. longus et 4 cm. latus vel 4 cm. × 4 cm.; *pericarpium* lignosum, 1 cm. crassum, saturate ferrugineo-cinnamomeotomentellum.

Tree 15 m. high. *Twigs* stout, lenticellate, terete without lines or ridges from petiole base to petiole base. *Leaves* rigidly coriaceous. obovate, drying a greenish brown above and covered with cinnamon scales beneath, 17–26 cm. long and 8–10 cm. broad; nerves 20–24 pairs. *Flowers* not seen. *Fruit* oblong or globose. 5 cm. long and 4 cm. broad or 4 cm. × 4 cm.; *pericarp* hard and woody, 1 cm. thick, tomentulous and of a rich, rusty-cinnamon; stalk 5 mm. long.

MOLUCCAS *morotai*: Gunong Sangowo, Kostermans 1039 (A. BO, K. L, LAE, PNH, SING).

**DISTRIBUTION:** Morotai.

**TYPE MATERIAL:** Kostermans 1039 (K holotype).

A very coriaceous-leaved, mountain variety from 800 m. on Gunong Sangowo and stated by Kostermans to be common. The leaf is exactly of the same obovate shape as that of the lowland var. *morotaiensis* (see under that variety), but is covered with cinnamon scales beneath. The fruit also is of a similar but slightly more vivid cinnamon brown, while that of the lowland plant is pale brown with a thinner pericarp. The twigs lack the two ridges seen in var. *morotaiensis* or at least they are not present in the portions collected.

var. *spanogheana* (Miq.) J. Sinclair, stat. nov.


Tree 12–20 m. high with blackish bark. Twigs 3 mm. thick in the apical parts, 4–5 mm. thick lower down, greyish brown, longitudinally striate, a few lenticels present but no lines, glabrous except for some pubescence on the extreme apical parts. Leaves chartaceous, oblong or oblong-lanceolate, gradually narrowed from the middle to the apex, drying a glossy greenish brown above and yellowish to glaucous beneath, the indumentum very thin and deciduous, sometimes entirely absent in old leaves, apex acute to shortly acuminate, the base rounded or rounded and then shortly acute, slightly decurrent on to the petiole; nerves 22–28 pairs, close but equidistant, very oblique, arising at an angle of 35–45°, sunk above, fairly prominent beneath, secondary nerves often present; reticulations faint above but not always present, more distinct beneath when not obscured by the scales; length 20–42 cm.; breadth 5–10.5 cm.; petiole 1.5–3 cm. long and 3–4 mm. thick. Male flowers not seen. Female inflorescence a 7 mm.–1 cm. long woody tubercle. Female flowers rusty-tomentose outside, glabrous inside, ovoid in bud, nearly sessile, 5–6 mm. long and 4 mm. broad at the base; ovary conical, densely tomentose, 3 mm. long and 2 mm. broad, the bifid stigmatic lobes glabrous. Fruit densely and shortly rusty-tomentose, oblong, mostly rounded at the apex, sometimes slightly oblique, thick-walled, 2.3–3.5 cm. long and 1.5–2 cm. broad, nearly sessile on a 3 mm. long stalk. Aril red with numerous narrow segments. Seed reddish brown, oblong, 2.5 cm. long and 1.5 cm. broad.

**LESSE**
**SUNDA**
**ISLANDS:**

| Zollinger, 1106 (P); Ro Mts. Elbert 3809 (A, BO, CANB, G, K, L, PNH, S, SING); Mt Batulanthe, trail from Batudulang to summit, Kostermans 18113 (G, K, L, SING); Batudulang to Pusu, Kostermans 19075 (K, L), Singa, de Voogd 1617 (BO, L). |
| Waingapu, Iboet 105a (BO, SING); Kananggar, Iboet 519 (BO, L, U); Karita, Teijsmann s.n (BO); Tobundung, Teijsmann s.n. (BO). |
| Bao Feo, Endehe, bb8933 (BO); Ngada, Nderu, bb11396 (BO); Sita, Rensch 1414 (BO); Mt Kelimutu, de Voogd 1802 (BO, L). |
| Belodua, bb15972 (BO). |
| Kupang, Oratulu, bb12446 (BO); s.l., Spanoghe s.n (BO, CAL, K, L, S, U). |
| Kali M. Leraiten, north-west of Ilwaki, bb27204 (BO, K, SING). |
| Riedel s.n. (K). |

**DISTRIBUTION:** Lesser Sunda Islands as above.

*Foot-note:*—*M. sumbavana* is the original spelling.
Fig. 39. *Myristica fatua* Houtt. var. *spanogheana* (Miq.) J. Sinclair.

This variety differs from var. *fattua* chiefly in the much smaller fruit with denser tomentum and thicker pericarp. The fruit characters are very constant and reliable. It also differs in the shape of the leaves, these being more lanceolate and gradually narrowed from the middle to the apex; the indumentum, though variable, is less dense and often almost absent. The scales are usually yellow, but may be white also. The colour and density of the indumentum or lack of it bear no relation to the geographical distribution of this variety within the various islands.

It must be pointed out that *M. caesia* Zipp., a manuscript name for the specimens from Timor which Spanoghe identified with a query as "Myristica glauca? Bl." and published as "M. glauca? Bl." in *Linnaea* 15 (1841) 346 were later described by Miquel as *M. spanogheana*. I have now reduced *spanogheana* to *fattua* var. *spanogheana* but I inadvertently included *M. caesia* as a synonym of *Knema cinerea* when preparing my revision of *Knema*. I did not realize that Spanoghe was in doubt about the specimens really being *M. glauca* for in *Index Kewensis* there is no query. Blume's *M. glauca* is a synonym of *K. cinerea* and there is only one species of *Knema* which occurs in Timor namely *cinerea* var. *cinerea*. I had not at that stage examined all the *Myristica* species in full detail nor had I noticed the manuscript name *caesia* which is written on the Leiden type sheets of *M. spanogheana*. *M. caesia* should therefore be deleted from page 169 of my paper on *Knema* in *Gard. Bull. Sing.* 18 (1961) 169 as a synonym of *K. cinerea* var. *cinerea*.


Tree 12–21 m. high. Twigs more slender than in var. *morindi-folia*, of the same thickness as in var. *papuana* but glossy and dark reddish brown underneath their covering of indumentum. Leaves coriaceous, medium-brown and often (but not always) shining.
above when dry, ovate-oblong to broadly lanceolate, often broadest below the middle, base rounded and sub-cordate, apex acute or bluntly acute, the indumentum furfuraceous-floccose but less dense than in var. morindiifolia; midrib lying in a groove above; nerves about 26 pairs, parallel and close to each other, those in the lower third of the leaf leaving the midrib at an angle of 80–90°, those higher up towards the apex more oblique; length 15–20 cm.; breadth 7–9 cm.; petiole 7 mm.–1 cm. long. Male flowers rather young, 5–6 mm. long and 2.5 mm. broad, densely rusty-tomentose; stalk of staminal column pilose at its base; pedicels 3 mm. long. Female flowers campanulate, densely rusty-tomentose as in the male, 8 mm. long and 5 mm. broad; nearly sessile, pedicels 2 mm. long. Fruit oblong with a flat horizontal base, narrowed slightly towards the rounded or (when young) rather oblique apex, densely rusty-tomentose or when young almost velvety, 3.5–4 cm. long and 2–2.5 cm. broad, sessile or nearly sessile.

NEW GUINEA: VOGELKOP (DUTCH WEST NEW GUINEA): 15 km north of Ransiki, Kostermans 2842 (A, BO, K, L); Ransiki, Kostermans (Soehanda) 46 (A, BO, K, L); Putat, Mt Arfak, Beccari 913 (Fl).

(DUTCH NORTH NEW GUINEA): Rouffaer River, Drs van Leeuwen 9856 (A, BO, K, L, PNH).

(DUTCH SOUTH NEW GUINEA): S.1., Zippelius s.n (K,L, P. S. U) the Leiden sheets numbered as follows according to the L Acc. Nos:—903252–139 (L); 903255–3 (L); 903255–6 (L) and 908133–1170 (L); Erma, Asmat Region, Nautje BW6559 (A, L, PNH).

DISTRIBUTION: Northern part of New Guinea and according to Markgraf the Kei Islands (Warburg 20720 as M. wallaceana var. keyensis Warb.) but this specimen was destroyed in Berlin.

TYPE MATERIAL: Myristica subcordata Bl. Zippelius s.n (K, L, P, S, U) L includes the four Leiden sheets with the Leiden Acc. Nos:—903252–139; 903255–3; 903255–6 and 908133–1170 (L) = part of the cordifolia of Zipp. nomen nudum, the remainder being var. morindiifolia. M. wallaceana Warb. var. keyensis Warb. Warburg 20720 (B holotype, burnt). This was destroyed before I saw it but I accept Markgraf's treatment of it as a synonym of var. subcordata. He separated in from wallaceana proper to which both he and I agree is a synonym of his own var. papuana.

VERNACULAR NAMES: Bendoei (Ransiki); oser (Asmat).

This variety is nearer to var. papuana than to var. morindiifolia and more variable in leaf shape. It is not such a distinct or well-defined variety as morindiifolia. Perhaps it arose as the result of some degree of hybridization between the two. Variety subcordata can be recognized by the sub-cordate leaf, broadest in the basal section, giving the leaf an ovate-oblong appearance, the close
proximity of the nerves to each other and from the fact that they arise at right angles or almost so to the midrib in the basal part of the leaf. The upper surface of the leaf dries a yellowish or medium brown and often tends to be glossy. The midrib on the upper surface of the leaf lies in a furrow. The fruit is sessile or almost so and is more densely tomentose or velvety (especially when young) than that of the other varieties except var. morobensis where the tomentum is about the same in quantity.

Blume recognized two species M. subcordata Bl. and M. morindiifolia Bl. and he was aware that they were close to M. fatua. At first Miquel in 1858 also recognized Blume's two species as being distinct but later in 1865 he united them both under fatua var. subcordata (Bl.) Miq. Warburg and Markgraf followed him.

Blume had a rational conception of species and good judgment when dealing with closely related but yet distinct taxa and thus many of his species still stand good to this day. He was, in my opinion, certainly justified in separating Zippel's cordifolia into these two above entities which are close to M. fatua, but there was not enough material at that time for him to see that they were better classed as varieties of fatua rather than two closely related species. Perhaps if Warburg had seen the great mass of var. papuana that is now available as well as the fine material of var. morindiifolia from the Eastern Highlands and New Britain, he would not have been so emphatic about keeping M. subcordata distinct from fatua. I therefore follow Blume in maintaining subcordata and morindiifolia distinct as there are many differences between them, but I recognize them as varieties of fatua.

var. wenzelii (Merr.) J. Sinclair, stat. nov.

Basionym: Myristica wenzelii Merr. in Phil. J. Sc. C. Bot. 10, 4 (1915) 270 et En. Phil. Fl. Pl. 2 (1923) 180. — Fig. 40.

Tree 10–15 m. high. Twigs very stout, 7 mm. thick in the apical portions. Leaves long and narrow, broadest near the apex or well above the middle, the sides gradually narrowed to the rounded base, the blade slightly decurrent on to the petiole, the lower surface greyish or pale yellowish due to the minute scales; midrib very prominent, flat to convex above, smooth on both surfaces, convex and scarcely longitudinally striate beneath when dry, broad at the base (5 mm. broad); nerves oblique and parallel, more numerous and closer together than in the typical, 35 pairs or more, sometimes with a secondary one between two main ones; length 20–40 cm. long and 7–10 cm. broad in the broadest part, 3–4 cm. broad only near the base; petiole 1.5–3 cm. long, stout. Flowers as in the typical and the lower part of the stalk of the staminal column densely adpressed tomentose as in var. papuana. Fruit sub-globose to shortly oblong, densely rusty-tomentulose, 6 cm. long and 5 cm. broad, not still mature; sessile or with a very short, 2–3 mm. long and 1 cm. thick stalk.
Fig. 40. Myristica fatua Houtt. var. wenzelii (Merr.) J. Sinclair.

PHILIPPINES SAMAR: Mt Purog. Edaño 15449 (BM, L, PNH, SING); Catubig River, Ramos 24507 (K, US).

LEYTE: Masaganap near Jaro, Wenzel 1152 (A, BM, G).


DISTRIBUTION: Philippines as above, altitude 100-700 m.


Differs from the typical in the longer and narrower leaves, which are broadest near the apex, the sides gradually narrowed to the rounded, 3–4 cm. broad base, and in the more numerous and more closely spaced nerves. The smooth midrib is more prominent, scarcely or not striate when dry and broader at the base.


Tree 10–30 m., average 20 m. high, sometimes with stilt-roots. Bark dark reddish brown with blackish patches, rough and flaking profusely in thin pieces as in Knema hookeriana (not longitudinally furrowed as in the majority of Myristica species); sap red, copious. Twigs stout, 1 cm. thick at the apex, the innovations densely tomentose with pale cinnamon-brown, fine, adpressed, 1–2 mm. long hairs, the older portions blackish and greyish, very rough, the bark cracking irregularly. Leaves coriaceous, dark green and glossy above with paler or whitish midrib, drying a greyish green, the lower surface and petioles at first tomentose with cinnamon brown or greyish brown, fine, adpressed, 1–3 mm. long hairs, the hairs soon shedding to expose the coating of minute whitish scales which lies beneath them, oblong-elliptic, widest at the middle or sometimes above the middle, apex acute, base narrowed and then acute or bluntly acute, rarely rounded; midrib flat and lying in a groove above, raised beneath and longitudinally striate when dry; nerves 20–25–(32) pairs, oblique, equidistant, sometimes rather crooked, sunk above, prominent and raised beneath, the line of interarching distinct on both surfaces; reticulations sometimes visible above, fine, scalariform with fainter, irregular ones interwoven between the scalariform set, almost invisible beneath owing to the indumentum; length 24–36 cm.; average 30 cm.; breadth 8–11 cm.; petiole stout, tomentose at first, later glabrous, 1.5–2.5 cm. long and 5–6 mm. thick. Inflorescence axis a villose-tomentose, 1–2 cm. long, woody tubercle, few-flowered, the older ones sometimes bifurcate from near the base. Male flowers coriaceous,
Fig. 41. *Myristica villosa* Warb.

fragrant, 7 mm.–1 cm. long and 5 mm. broad, densely adpressed, pale brown villose-tomentose outside, cream inside, ovoid in bud, campanulate at anthesis with obliquely spreading ovate lobes, their apices acute and their bases originating ¾-way down the perianth; pedicels 4 mm. long, villose-tomentose; bracteole also villose-tomentose outside, closely adpressed to and half surrounding the lower half of the flower, 5 mm. long and 7 mm. broad, semi- orbicular, obtuse; staminal column 5.5–6 mm. long, obtuse at the apex with a minute apiculus, the fertile portion with 10–12 anthers and 4 times as long as the tomentose stalk. Female flowers few, 1–2, half hidden among the hairs of the inflorescence axis, sessile, broader than the male, about 8 mm. broad, and their lobes more reflexed; ovary densely villose, ovoid, stigma glabrous, 1.5 mm. long. Fruit ovoid, often slightly oblique or even somewhat uncinate at the apex, 4.5–6 cm. long and 3–3.5 cm. broad, densely pale brown or buff, velvety-tomentose with hairs 1–2 mm. long, sessile or on a very short, 5 mm. × 5 mm. stalk. Aril red. Seed 3.5–4.5 cm. long and 2 cm. broad.

**BORNEO SARAWAK**:

1st Division:—Matang, Beccari 1526 (FI, K); Semengoh F.R., Anderson SAR Nos 12571 (K, L, SAR, SING) and 12925 (K, L, SAR, SING) tree No 1313; Ghazalli SAR 13665 (A, K, L, SAN, SAR, SING) and Sinclair 10181 (A, E, K, L, SAR, SING); Sabal F.R., Gunong Gaharu, Nahar SAR 12677 (SAR).

2nd Division:—Simananggang, Sungei Kluah Anderson SAR 13280 (K, L, SAN, SAR, SING).

4th Division:—Melinau Gorge, Baram, Anderson SAR 4325 (A, K, L, SAN, SAR, SING); Meruong Plateau, Bintulu, Bruning SAR 8895 (SAR, SING); near Long Kapa, Mt Dulit, Ulu Tinjar, Richards 1190 (A, K, SING).

**BRUNEI**:

Andulau F.R., Ashton BRUN 5513 (K, KEP, L, SAR, SING) and Sinclair 10434 (E, K, L, SAR, SING); Bukit Puan, Ashton & Whitmore BRUN 634 (BO, K, KEP, L, SAR, SING); Bukit Teraja, Brunig SAR 1181 (K, SAR, SING).

**WEST BORNEO**:

Probably West Borneo but without exact locality, Teijjsman & de Vriese s.n (A, K, L); de Vriese s.n. (B burnt, BO, K, L, W burnt); Korthals s.n. (CAL, LY, S, U); Sentimo, Sambas, bb7094 (BO, L).

**SOUTH AND SOUTH-EAST BORNEO**:

Sampit region near Kuala Kuajan, Kostermans 8085 (A, BO, CANB, K, L, SING).

**EAST AND NORTH-EAST BORNEO**:

East Kutei, Sangkulirang, Palawan, bb11887 (BO); Pengadan, E. Kutei, bb12959 (BO, L); Tanjong Bangko region near mouth of Mahakam River, Kostermans 7012 (BO, K, L, PNH, SING); Loa Djanan, west of Samarinda, Kostermans 6438 (BO, K, L, PNH, SING); Balikpapan District, Sungei Wain, (Achmat, also spelling Achmad) bb Nos 34341 (BO, L); 34380 (BO, L) and 34410 (BO, L); Mentawir River region, Kostermans 10093 (K, L).
Gardens’ Bulletin, Singapore — XXIII (1968)

BRITISH NORTH BORNEO: S.I., Villamil 249bis (BO, K, P, SING, US); Ulu Surgei Salimpupon, Tawau, A. Bakar SAN 24984 (K, L, SING); mile 3, British Borneo Timber Co. Concession, Bukit Garam, Kinabatangan, Wood A4747 (KEP, L, SAN, SING); Sibulu River, Mengalong F.R., 31 miles S.S.W. of Sipitang, Wood SAN 152553 (K, KEP, L, SAN, SING); compartment 8, Sepilok F.R., Wood SAN 16550 (BO, KEP, L, SAN, SING); cpt 12, Sepilok F.R., Sinclair 8951 (SING) and cpt 13, Sinclair 8941 (A, B, E, K, L, M, P, SAN, SING); Surgei Sapi Camp, Beluran, Suah Tingguan SAN 37370 (L, SING); Beaufort Hill, G. Mikil SAN 30178 (L). Motley 166, also numbered 26 (K, MEL).

LABUAN: Pulau Nunukan:

PULAU NUNUKAN: bh26194 (A, BO, L); near British border on the east coast, Paymans Nos 15 (BO, L) and 33 (BO, K, L, SING) and Zainal Abidin 24 (BO, K, L).

DISTRIBUTION: Throughout Borneo.

TYPE MATERIAL: M. villosa Warb. Beccari 1526 (FI, K) Matang; de Vriese s.n. (B burnt, BO, K, L, W burnt) West Borneo, both syntypes. M. borneensis Gandoger, Korthals s.n. (CAL, LY holotype, S, U) probably West Borneo.

VERNACULAR NAMES: Gampusu (Dyak, Sebakung language, P. Nunukan).

Warburg has placed this species in series Fatuae, and while the resemblance to fatua in a number of characters is clear enough, yet there ought to be no difficulty in distinguishing the two. M. villosa is confined to Borneo whereas fatua does not occur there. The vegetative features alone will distinguish it from fatua. It differs in the dense indument of simple, adpressed, pale brown hairs which invest the lower surface of the leaf, the petioles, the young twigs, the flowers, the flowering pedicels, the inflorescence axis and even sometimes the upper midrib of the leaf. In fatua var. morindifolia there is an indumentum of erect, furfuraceous dendroid, scale-like hairs which resemble little moss plants, each beset with obtuse leaflets — see fig. 34, but these can never be confused with the simple hairs of villosa. The colour of the scales beneath, when the hairs are shed, is of a silvery white while those of fatua are usually yellow and rarely white. The petioles are stouter and the twigs much thicker at their apices. Their bark is blackish or greyish and has a much cracked surface not seen in fatua. The male pedicels of villosa are much shorter than those of fatua and the flowers more densely hairy. Similarly the fruit is much more densely hairy, approaching that of fatua var. subcordata, but theomentum of the latter is of a darker brown than the pale buff colour of villosa. The fruit of var. fatua is larger than that of villosa, but fruits of some of the other varieties of fatua are about the same size as in our present species. In the field, the blackish flaking bark, peeling off in thin portions like that of Knema hookeriana and its allies, is diagnostic. Most species of Myristica have either blackish or brownish, longitudinally furrowed bark.
12. SERIES TENUIVENIAE

series Tenuiveniae J. Sinclair, ser. nov.


Ramuli in partibus junioribus 3–6 mm. crassi, vulgo 4 mm., lineis ex petiolo ad petiolum carentibus. Folia chartacea vel tenuiter coriacea, modicae dimensionis vel parva, 8–22 cm., vulgo 15 cm. longa, 2.5–9 cm., vulgo 6 cm. lata, basi lata, rotundata, aliquando emarginata vel subcordata, subtus squamulis cinnamomeis tenuiter obtulta, costam inferiorem secundum pilis minutis raro obsita; nervi 15-jugati tenues, obliqui, supra saepe invisibles, subtus distinctiores, nervi secundarii inter primarios conspersi; reticulationes nullae; petiolum supra profunde involutus, brevis vel in "speciebus n. 41–43" pro rata longiusculus. Flores masculi (in quibusdam speciebus ignoti vel immaturi) (2)–4 mm. vel 8 mm.–1 cm. longi, dense ferrugineo-tomentosi, oblongi vel oblong-elliptoidei, in albastro ovoidei, utrinque obtusi, in lobos ½- fissi; pedicelli quam flores ½-longi; columna staminalis minute apiculata, stipes basi tantum setaceus. Flores feminine sessiles. Fructus generaliter parvus, 2.5–4 cm. longus (in M. archboldiana longior) oblongus, subglobosus vel obovoides, tomentellus vel (in M. buchneriana) tomentosus; stipes diversus, crassus brevis vel tenuiter elongatus.

TYPE SPECIES: M. tenuivenia J. Sinclair

Twigs 3–5 mm. thick in the apical parts, average 4 mm. but 5–6 mm. in archboldiana, no lines present from petiole base to petiole base, the innovations usually puberulous to tomentulose, the intervening portions striate, the older dark grey or blackish and sometimes rough with cracking bark. Leaves chartaceous to thinly coriaceous, lanceolate to oblong-lanceolate, less often oblong, sometimes (broad in proportion to length) broadly panduriform, medium size-class or bordering between small size-class and medium, small in smythiesii, in general 8–22 cm. long, average 15 cm. long and 2.5–9 cm. broad, average 6 cm. broad, base nearly always broad and rounded, sometimes emarginate or sub-cordate, apex acute, bluntly acute, less often shortly acuminate, lower surface thinly covered with cinnamon or rusty minute scales, these becoming ashy-brown when old, closely adpressed, sometimes slightly powdery, the indumentum in buchneriana rather variable, mostly very scant, the leaves often becoming glabrous and glaucous beneath, at times the indumentum denser and hairs present along the lower midrib; nerves average 15 pairs, oblique and very slender, close together, generally invisible to faint above, slightly more distinct beneath; secondary nerves present; reticulations not visible; petiole much inrolled towards the upper surface with a deep resulting groove, tending to be rather long in proportion to the lamina, 2–4 cm. long, but shorter, 6 mm.–1.3 cm. in smythiesii, beccarii and buchneriana, the latter being intermediate in length between these first two species and the remainder. Inflorescence
axis very short, pubescent, scar-covered. Male flowers (unfortunately not seen in several species and thus some helpful information about this series may be lacking) generally small, (2)-4 mm. or 8 mm.—1 cm. long, densely rusty-tomentose, ovoid, oblong, clavate or oblong-ellipsoid in bud, blunt at each end, split down \( \frac{1}{4} \)-way by the perianth lobes, the pedicels half the length of the flowers; bracteole early deciduous, half the length of the young flower; staminal column mostly young but the fertile part with a minute, sterile apiculus (always?), the stalk shorter and thinner with hairs probably confined to its basal portion. Female flowers densely rusty tomentose; sessile. Fruit generally small, 2.5—4 cm. long, with a thin pericarp, larger in archboldiana with a thicker pericarp, tomentum sparse and short, denser in buchneriana, oblong, sub-globose or obovoid; stalk generally short and thick, thin in pedicellata, longer in archboldiana.

Six species — *M. Smythiesii*, beccarii, buchneriana, pedicellata, tenuivenia and archboldiana.

The chief or outstanding features of this series are the thin, closely-spaced oblique veins, the presence of cinnamon or rusty scales in small quantity on the lower surface of the leaf, the broad, rounded leaf-base, the absence of reticulations, the rather long petioles and the small densely tomentose flowers. The fruit, more variable, will serve better for identifying the individual species. I have had great difficulty in knowing where to place *M. Buchneriana*. Finally it was decided to place it in this series. It stands in a position between the first two which are Bornean species and the remaining New Guinea ones. It is near to some of the members of series *Fatuae* but the longitudinally striate bark suggests series *Tenuiveniae*. The absence of stilt-roots (they are not required as the species grows on ridges) tends to rule it out of series *Fatuae*. The occasional presence of hairs suggests *Fatuae* but the numerous, slender, oblique veins and the structure of the flower are signs of series *Tenuiveniae*. The first two members, the Bornean species, are close to each other, the one being a more elegant edition of the other. When sterile they both closely resemble *M. Cinnamomea*, a section 1 species from which they may have arisen with the shortening of the inflorescence axis. A special key is added to separate these three species. The last three, all New Guinea species, are close to each other, especially in their leaves, those of *tenuivenia* and *archboldiana* being the most similar and differing little except in the base of the latter being slightly emarginate. A better knowledge of the male flowers in this series would be an advantage in determining its relations with other series, but it seems likely that it is an off-shoot of the *Fatuae* complex or of their ancestors.

(38) *Myristica Smythiesii* J. Sinclair, sp. nov. — *Fig. 42.*

*Myristica beccarii* in aspectu inflorescentiae atque florum proxima, sed ab ea nervis foliorum obscuris, stipite fructus tenuiore haec species differt. Folii *M. Cinnamomea* revocat a qua petioli brevioribus, inflorescentiis dissimilibus, fructibus multo minoribus discrepat.
Fig. 42. *Myristica smythiesii* J. Sinclair.

Arbor 9–18 m. alta, radicibus epigesis parvis nonnunquam praedita. Cortex griseo-fuscus, longitudinaliter striatus. Ramuli apice ferrugineo-tomentelli, infra apicem glabri, griseo-brunnei rugosi, in partibus inimisis excidentes. Folia subcoriacea, angusto-elliptica vel elliptico-lanceolata, supra atro-viridia, in sicco modice brunnea, subtus squamulis cinnamomeis vel cinereis obtecta, acuta, basi leviter rotundata vel acuta, 8–16 cm. longa, 2.5–6 cm. lata, petioli 8 mm.–1.3 cm. longi; nervi 12–14-jugati, gracillimi, supra leviter impressi, utrinque subobscuri vel visibles; reticulationes nullae. Inflorescentia 5 mm.–1 cm. longa, ut in Knema, lignosa, tuberculata (mascula leviter ramosa et longior). Flores masculi (immaturi) 2–3 mm. longi, dense ferrugineo-tomentosi; pedicellii 2 mm. longi; columna staminalis 1.5 mm. longa cum antheris 10–12 praedita; stipes sterilis brevissimus (fortasse deinde paullo longior). Flores feminœ non visi. Fructus ellipsoideus vel oblongus, pallido-ferrugineo-tomentellus, 2.5–3 cm. longus, 1.8–2 cm. latus, pericarpiu tenui; stipes brevis, 5–7 mm. longus, 3 mm. crassus. Semen (in sicco) rubro-brunneum, nitidum.

Tree 9–18 m. high, sometimes with small stilt-roots. Bark dark greyish brown, with fine striations. Twigs rusty-tomentulose and 2–3 mm. thick at the apex, lower down glabrous, greyish brown and rough, flaking slightly in the lowermost parts. Leaves subcoriaceous, narrowly elliptic or elliptic-lanceolate, dark green and glossy above, drying a medium brown, dull and covered with minute, cinnamon or ash-coloured scales beneath, apex acute, base mostly rounded, acute in the apical leaves; nerves 12–14 pairs, very fine, sunk above, faint or scarcely visible on both surfaces; reticulations not present; length 8–16 cm.; breadth 2.5–6 cm.; petiole 8 mm.–1.3 cm. long and 2.5–3 mm. thick. Inflorescence a rusty-tomentose, Knema-like woody tubercle, 5 mm.–1 cm. long (slightly branched and longer in the male). Male flowers (immature) ovoid in bud, densely rusty-tomentose, 2–3 mm. long on a 2 mm. long pedicel, anthers 10–12 on a 1.5 mm. long column, its basal sterile portion very small (perhaps it may elongate later). Female flowers not seen. Fruit oblong or slightly ellipsoid, thin-walled, pale rusty-tomentulose, 2.5–3 cm. long and 1.8–2 cm. broad; stalk 5–7 mm. long and 3 mm. thick. Aril red. Seed reddish brown and shining when dry.

BORNEO SARAWAK:

BRUNEI:

4th Division:—Miri, F. G. Browne 70 (SAR, SING); Lambir Hills Forest Reserve, Miri, Dan b. Haji Bakar SAR 4366 (A, K, L, SAN, SAR, SING).

Sungei Rampayoh, Ashton BRUN 30 (K, KEP, L, SING); Sungei Belait at Kuala Ingei, Ashton BRUN 189 (BO, K, KEP, L, SAR, SING); Badas Ashton, Smythies & Wood SAN 17440 (K, KEP, L, SING); Andulau F.R., Ashton BRUN 5511 (K, L, SAR, SING).

DISTRIBUTION:

Confined to Brunei and a small area of Sarawak adjoining it.
TYPE MATERIAL:  

Ashton, Smythies & Wood SAN 17440 (K, KEP, L, SING holotype). This number is also deposited in A, BO and BRI but I have not see their duplicates.

A tree of primary forest on loam or on mixed peat-swamp overlying clay. I, myself, on first examination, confused it with both beccarii and cinnamomea. The leaves of all three have cinnamon-coloured scales beneath. Those of the present species can be distinguished from those of cinnamomea by their shorter petioles and from those of beccarii by their much fainter or almost obscure nerves. They are also less coriaceous than those of beccarii and are acute or rounded at the base, never emarginate, as is sometimes the case in beccarii. Those of cinnamomea nearly always have an acute base. The inflorescence in both beccarii and the present species is of the Knema-like type, a short, woody axillary tubercle but the flattened branched axis-type is present in cinnamomea. The flowers of the first two are very similar, densely tomentose, while those of cinnamomea are tomentulose. Unfortunately I have seen very poor, immature flowering material of the first two and can make no more statements. The fruit also is like that of beccarii except that the stalk is not quite so stout. Thus the species is more closely allied to beccarii than to cinnamomea, a section I species.

(39) Myristica beccarii Warb. Monog. Myrist. (1897) 518 t. 14 f. 1–3; Merr. En. Born. J. Str. Br. R. As. Soc. special number (1921) 269. — Fig. 43.

Tree 15–25 m. high, often with a few stilt-roots. Bark brownish black, longitudinally striate. Twigs rough, 4–5 mm. thick in the apical parts, the bark cracking in the older blackish parts, rusty-tomentose on the apical bud and on the striate innovations. Leaves coriaceous, lanceolate or oblong-lanceolate, dark green and glossy above when fresh, dull when dry, lower surface dull and covered with minute cinnamon or greyish brown scales, apex acute, base mostly rounded or less often emarginate; nerves 11–18 pairs, sunk above, and slightly raised beneath, indistinctly arching at the margins; reticulations invisible; length 9–22 cm.; breadth 5–9 cm.; petiole short, 6 mm.–1 cm. long and 3–4.5 mm. thick. Inflorescence axis a 5 mm. long, Knema-like woody tubercle with very immature, sessile, densely rusty-hairy flower buds (the males as yet only 2 mm. long and almost covered on one side by the subtending bracteole); staminal column 1.75 mm. long, also very immature and as yet with no sterile basal portion; anthers about 6–7. Female flowers sessile, tomentose as in the male, 5 mm. long and 3 mm. broad, the perianth apices recurved. Fruit single, oblong or slightly ellipsoid, rusty-tomentulose, thin-walled, 2.5–3 cm. long and 1.5–2 cm. broad, almost sessile on a stout, 3–5 mm. long and 5 mm. thick stalk. Aril red, finely laciniate to the base. Seed shining, medium brown, 1.5 cm. long and 1 cm. broad.
Fig. 43. Myristica beccarii Warb.

BORNEO SARAWAK:

1st Division:—Kuching, Beccari 247 (FI, G, K, M, P); Matang, Beccari 2053 (FI); Semengoh Forest Reserve, Kuching, Sinclair 10299 (A, B, E, K, L, NY, SAR, SING); Sabal Forest Reserve, Serian, Nahar SAR 12705 (K, L, SAR, SING); Gunong Gaharu, Serian, Sinclair 10245 (A, E, FI, K, L, M, SAR, SING).

South and South-East Borneo:

East and North-East Borneo:

British North Borneo:

Pulau Nunukan:

DISTRIBUTION:

Endemic in Borneo.

TYPE MATERIAL:

Beccari Nos. 247 and 2053 syntypes.

An endemic Bornean tree of lowland primary forest, chiefly in Sarawak. The leaves resemble those of *M. cinnamomea*, but the nerves are more distinct, the base rounded and sometimes emarginate, and the petioles shorter. The leaves recall also those of *M. Smythiesii*, another species with cinnamon scales beneath, but in beccarii they are more coriaceous with more distinct nerves. The fruit is like that of *lepidota* but larger. It also recalls that of *M. Smythiesii*, but has a stouter stalk.


Tree 10-20 m. high with horizontal branches. Dark dark brown or greyish brown, vertically fissured; sap red. Twigs slender, 3 mm. thick and rusty-tomentulose in the young parts, glabrous, finely striate and greyish brown in the older parts. Leaves chartaceous, glabrous and drying a medium or pale brown above, glabrous and glaucous beneath or sometimes sparingly covered with some very minute yellow scales and in two cases (see notes) with hairs as well, lanceolate or occasionally ovate-lanceolate, base cuneate or rounded, apex acute; midrib lying in a groove above, raised beneath and when young slightly scaly-furfuraceous; nerves 12-18 pairs, sunk and open above, thin on both surfaces, oblique, those in the basal part (of the lamina) often horizontal; reticulations invisible; length 14-21 cm.; breadth 4.5-8 cm., average 6 cm.; petiole 1-1.5 cm. long and 2-3 mm. thick. Male inflorescence a 5-8 mm. long wooden tubercle, simple or at times bifurcate. Male flowers several, subumbellate, coriaceous, clavate or obovoid in bud, adpressed-rusty-tomentose outside, 8 mm.—1 cm. long and
Fig. 44. *Myristica buchneriana* Warb.

4–5 mm. broad, split down ⅓-way at the apex into the acute lobes; staminal column 6 mm. long with 10 anthers, the sterile apiculus obtuse, 0.75 mm. long, the stalk 2 mm. long, its base adpressed-setose; bracteole sub-orbicular, early deciduous; pedicels 4–5 mm. long and 2 mm. thick. Female flowers 1–2 per pedicel, ovoid, densely rusty-tomentose, 8 mm. long and 5 mm. broad; pedicels 5 mm. long, stouter than in the male. Fruit 1–3, ellipsoid or sometimes obvoid, shortly and densely rusty-tomentose, 4 cm. long and 1.8–2 cm. broad, the base gradually narrowed into the stalk; stalk stout, 1 cm. long and 6 mm. thick. Aril red with narrow divisions. Seed ellipsoid, 2.5 cm. long and 1.2 cm. broad.

**NEW GUINEA**

**Dutch North New Guinea:**

- Holtekang, Hollandia, *Brouwer BW834* (CANB, K, L) and *Schram BW1542* (CANB, L).

**PAPUA:**


**T.N.G.:**


**DISTRIBUTION:**

East side of New Guinea from Dutch North N.G. to Mandated Territory (Sepik, Madang and Morobe Districts).

**TYPE MATERIAL:**

*Warburg s.n.* in the original publication and later, in his monograph, numbered 20714 (B holotype burnt, G. Boiss.) mouth of Butaueng River, Finschhafen, N. Guinea, date April 1889.

**VERNACULAR NAMES:**

- *Estumol*; *ilis* (Jal, Madang); *gaa gola* (Hollandia); *kwolung* (Angoram); *madut* (Sempi, Madang); *nggwambih* (Maprik); *ngumur* (Kaigorin); *san* (Bembi).

It was, with extreme good fortune, that I found in Herb. Boissier, Geneva in 1963 an isotype of this species, the holotype of which was destroyed at Berlin. In the original publication Warburg states that the type came from Butaueng near Finschhafen. Here he does
not give it a number. Neither does he give any of the other Myristicaceae mentioned in this paper numbers whether collected by himself or by others. In his monograph it is numbered Warburg 20714, mouth of the Butaueng River, Finschhafen. The specimen according to the label was collected by him in April 1889. The Geneva specimen must have been distributed before he gave it a number, but M. buchneriana Warburg appears on the sheet in his own handwriting with the locality and date. There is, in addition, a seedling grown in Java mounted on the same sheet. The isotype is an exact match of the numerous, subsequent material which has accumulated in herbaria, even down to the reddish, rather dense tomentum of the male flowers. Not all of the specimens quoted by Markgraf in his two publications are M. buchneriana. The Brass specimens belong to M. insipida and the Ledermann ones to M. lancifolia var. lancifolia. I do not know if Schlechter 16226 is correct since it was destroyed in Berlin. In herbaria M. buchneriana is often confused with insipida.

M. buchneriana is a tree of ridge tops and grows at an altitude of 300–1,300 m. Most of the collections are fruiting specimens. It is easily distinguished from the members of its own series by the much thinner indument of scales on the lower surface of the leaves, these often disappearing later. One collection, Brass 28894 shows an indumentum of very short hairs as well as scales, but again both these tend to disappear in adult leaves. Hairs have not been seen on the leaves in the other species. The tomentum on the fruit is longer and denser than that of the other species. The petioles are shorter than those of the other New Guinea members, a character which M. buchneriana shares with the two Bornean allies.

There is a resemblance to M. fatua var. papuana but our present species can be recognized from the longer, more reddish tomentum on its flowers, pedicels and fruits, the latter having a harder and thicker pericarp, the base of which is gradually attenuate into the stalk and not abruptly so as in var. papuana. Forms of var. papuana with shorter and broader leaves than usual look very similar but they have more veins and a much denser covering of scales beneath than in M. buchneriana. Finally the twigs are not rough like those of var. papuana.

(41) Myristica pedicellata J. Sinclair, sp. nov. — Fig. 45.

Species probabiliter affinis M. smithii praecipue propter folia fructusque aliquidum similes sed petiolis et pedicellis fructiferis mucho longioribus inter alia facile distinguitur.

Arbor 30m. alta, radicibus brevibus epigaesis suffulta. Cortex griseo-brunneus, absidens. Ramuli in partibus apicalibus 3–4 mm. crassi, longitudinaliter striati, fuscì, minute puberuli, in partibus adultis atro-brunnei, lenticellati, magis rogosi. Folia chartacea, supra modice brunnea, subtus squamulis minutiis nitidis appressis cinnamomeis tecta (folia adulta cinerascentia) anguste oblonga vel lanceolata cum marginibus fere parallelis, basi rotundata, apice
Fig. 45. *Myristica pedicellata* J. Sinclair.

A, leafy twig with fruit. B, fruit. A from *Pullen* 944 (L holotype). B from the same (CANB isotype).
breviter acuminata; costa supra in sulco depressa, subtus elevata; nervi 20–25-jugati, supra subdepressi, utrinque gracillimi, tenuissimi in partibus subevanidi, inter se approximati, obliqui, paralleli; reticulationes nullae; 13–20 cm. longa, 4–6 cm. lata; petioli 2–2.5 cm. longi, 2–2.5 mm. crassi. Inflorescentia (sect. 2) lignosa, 3–5 mm. longa. Flores masculi et feminei non visi. Fructus 1–2, oblongus raro subglobosus, 2 cm. longus, 1.5 cm. latus, utrinque obtusus, stigmate persistente, pericarpium minute ferrugineo-vel cinnamomeo-tomentellum, tenue, 1 mm. crassum, lignosum; stipes 1.5–1.8 cm. longus, 2 mm. crassus tantum.

Tree 30 m. high with short stilt-roots. Bark greyish brown, flaking. Twigs 3–4 mm. thick, longitudinally striate, dark brown and minutely puberulous in the apical parts, blackish brown, lenticellate and rougher in the adult parts. Leaves chartaceous, medium brown above, covered beneath with shining, adpressed, minute cinnamon scales, the adult leaves turning ashy grey, narrowly oblong or lanceolate with the margins nearly parallel, rounded at the base, shortly acuminate at the apex; midrib lying in a groove above, raised beneath; nerves 20–25 pairs, slightly depressed above, very slender and thin on both surfaces, almost vanishing in parts, close to each other, oblique, parallel; reticulations absent; length 13–20 cm.; breadth 4–6 cm.; petiole 2–2.5 cm. long and 2–2.5 mm. thick. Inflorescence (section 2) woody, 3–5 mm. long. Male and female flowers not seen. Fruit 1–2, oblong or sometimes sub-globose, 2 cm. long and 1.5 cm. broad, obtuse at both ends, the stigma persisting, the pericarp minutely rusty or cinnamon-tomentulose, thin, 1 mm. thick, woody; stalk 1.5–1.8 cm. long, slender, 2 mm. thick only.

NEW GUINEA T.N.G. Madang District:—South-east of Aioame Patrol Post, east side of Tiganant's Creek on track to Apenam. Pullen 944 (A, BM, BRI, CANB, L holotype, LAE, MEL, US) only the A, BM, CANB and L duplicates seen by me.

DISTRIBUTION: Single record, altitude 350 ft. (about 107 m) in Pomeia-Celtis forest, river terrace.

VERNACULAR NAME: Ieldumuk (Jal).

The spot characters of this species are the minute cinnamon scales on the lower surface of the leaves, their long petioles and the long and slender stalked, rather small, oblong, rusty-tomentulose fruits. Unfortunately male and female flowers are as yet unknown. It is unique among the Myristica species with small fruits except M. tubiflora on account of its longer, slender fruiting-pedicels. It seems to be very near to M. smythiesii especially in the leaves with their faint slender venation and scales and in the almost similar fruit but differs from it in the longer petioles and the long, slender fruiting-pedicels. M. archboldiana has somewhat similar leaves but they are slightly emarginate at the base and the fruit is very much larger and on a thicker pedicel.
Species affinis *M. archboldianae* et *M. pedicellatae*. A priore fructibus oblongis vel subglobosis minoribus; ab altera fructibus majoribus, stipitis crassioribus, multo brevioribus differt.

Arbor 10–25 m. alta. *Ramulis* 4–5 mm. crassi, longitudinaliter striatulis, apice et paullo infra ferrugineo-puberulis, mox glabri, nigro-brunnei. *Folia* chartacea, supra glabra, in sicco nita, flavo vel nigro-brunnea, subts primum minute ferrugineo-squamulosa, dein pallido-grisea, glabrascentia, oblonga vel panduriformia, saepe supra medium latissima, basi rotundata in petiolum leviter decurrentia, apice obtuse acuta, 10–20 cm. longa, vulgo 15 cm., 4–7 cm. lata, vulgo 5 cm.; nervi 16–20-jugati, supra immersi, subts levier elevati, utrinque tenues, inter se approximati, obliqui vel subarciuti; reticulationes invisibles; petioli 2–2.5–(3) cm. longi, 2 mm. crassi. *Flores masculi* non visi. *Inflorescentia feminina* lignosa, brevissima, 2–3 mm. longa. *Flores feminii* coriacei, dense conferti, sessiles vel cum pedicellis 1 mm. longis, 2 mm. crassis praediti, late urceolati, extus ferrugineo-tomentosi, 4–5 mm. longi, 3 mm. lati, in lobos 4–(1)-partiti. lobi ipsi ultimo reflexi, apice obtusiusculi; ovarium ovoideum vel lateraliter planatum, dense ferrugineo-tomentosum, stigma bilobatum crassum glabrum. *Fructus* 1–2 ferrugineo-subtomentellum denu m in partibus fere glabrescens oblongus, ovoideo-oblongus (subglobosus), lignosus, 3,5–4 cm. longus, 2.6–4 cm. latus; stipes (pedunculo incluso) 5–8 mm. longus, pedicellus ipse 4–5 mm. longus, 5 mm. crassus. *Arillus* ruber, segmentis coriaceis. *Semen* badium, nitudum.

Tree 10–25 m. high. *Twigs* 4–5 mm. thick, finely longitudinally striate, rusty-puberulous at the apex and a little bit below, soon glabrous, blackish brown. *Leaves* chartaceous, glabrous above, shining when dry, yellowish or blackish-brown, at first minutely rusty-squamulose, later pale grey, becoming glabrous, oblong or panduriform and often widest above the middle, base rounded and slightly decurrent on to the petiole, apex obtusely acute, 10–20 cm. long, average 15 cm., 4–7 cm. broad, average 5 cm.; nerves 16–20 pairs, sunk above, slightly raised beneath, slender on both surfaces, close to each other, oblique or slightly curving; reticulations invisible; petiole 2–2.5–(3) cm. long. 2 mm. thick. *Male flowers* not seen. *Female inflorescence* woody, very short, 2–3 mm. long. *Female flowers* coriaceous, densely clustered, sessile or on a 1 mm. long and 2 mm. thick pedicel, broadly urceolate, rusty-tomentose outside, 4–5 mm. long and 3 mm. broad, split down 4–(1)-way by the lobes, the latter ultimately reflexed and somewhat obtuse at the apex; ovary ovoid or laterally flattened, densely rusty-tomentose, stigma bi-lobed, thick, glabrous. *Fruit* 1–2, rusty sub-tomentulous, becoming nearly glabrous in parts, oblong, ovoid-oblong (or sub-globose, see notes) woody, 3.5–4 cm. long and 2.6–4 cm. broad; stalk (including the peduncle) 5–8 mm. long, the pedicel itself 4–5 mm. long and 5 mm. thick. *Aril* red with coriaceous segments. *Seed* chestnut-brown, shining.
Fig. 46. Myristica tenuivenia J. Sinclair.
NEW GUINEA LOUISIAD
ARCHI-
PELAGO: Misima Island, Quartz Mountain, Brass 27638 (A, BO, K, L); Rossel Island, Jinju, Brass 28528 (A, BO, K, L).

DISTRIBUTION: Louisiade Archipelago. Rain forest at low elevations.

TYPE MATERIAL: Brass 27638 (A, BO, K holotype, L).

This species seems to be near M. archboldiana, pedicellata and snythiesii on account of the cinnamon or rusty scales on the lower surface of the leaves. In fact the leaves of archboldiana are so similar that they can only be distinguished by their slightly emarginate base while those of pedicellata tend to have more strictly parallel sides, being oblong in shape. The fruits of archboldiana are much larger while the smaller fruits of pedicellata have longer, thinner pedicles. I am putting the Rossel Island plant, Brass 28528 with tenuivenia, but the fruit is larger, 3.5–4 cm. in diameter, globose or sub-globose in shape and lighter in colour than the oblong fruits of tenuivenia which are immature and measure 3.8–4 cm. long and 2.6–2.8 cm. in diameter. Those of the Rossel Island plant have been slit laterally to assist them in drying and the resulting globose shape may not be altogether natural. The true shape may be more oblong as in the type. The leaves have dried a paler colour above but otherwise they are the same. The Rossel Island plant may be a variety but I cannot be certain from a single gathering so I include it with the type until more material becomes available.

(43) Myristica archboldiana A.C. Smith in J. Arn. Arb. 22, 1 (1941) 73. — Fig. 47.

Tree up to 30 m. high with straight bole and pale brown, lenticellate bark. Twigs 5–6 mm. thick, glabrous, slightly angled and purplish at the apex, blackish there when dry, dark grey or blackish grey lower down, rough and longitudinally striate with slightly fissured bark. Leaves chartaceous or thinly coriaceous, glabrous above and drying greyish brown, rusty brown to ashy grey beneath due to minute adpressed scales (not powdery), elliptic-oblong, base rounded and emarginate or slightly sub-cordate, apex cuspitate or shortly acuminate; midrib flat, narrow and lying in a groove above, raised beneath; nerves 17–20 pairs, oblique, close together, sunk above, slightly raised beneath, fine and slender on both surfaces; reticulations absent; length 13–15 cm.; breadth 6.5–7 cm.; petiole 2.5–4 cm. long (long in proportion to the leaves) and rather slender, 2 mm. thick. Male and female flowers unknown. Fruit obovoid, 7 cm. long and 4 cm. broad, narrowed towards the base, rounded and broadly obtuse at the apex, rusty-tomentulose, pericarp 8 mm.–1.2 cm. thick but will become thinner later as fruit is still immature; peduncle 2.5 cm. long and 5 mm. thick; pedicel short, 3 mm. long. Seed ellipsoid, 2.5 cm. long.

NEW GUINEA PAPUA: Western District:—Palmer River, 2 miles below junction with Black River, Brass 6982 (A, BM, BO, BRI, L, LAE).

DISTRIBUTION: Known from the above only.

TYPE MATERIAL: Brass 6982 (A holotype).
Fig. 47. *Myristica archboldiana* A. C. Smith.

The outstanding features are the large, thick-walled, obovate fruits, the long-petioled leaves, emarginate at the base, rusty to ashy grey beneath and their slender, oblique venation. The nearest relatives appear to be *M. pedicellata* and *M. tenuivenia*. See also under these species.

### 13. SERIES TUBIFLORAE


Twigs generally slender at the apex, 1–2 mm. or 2–3 mm. thick and in two species, *cucullata* and *flosculosa*, of medium thickness, 3–4 mm., glabrous, mostly reddish brown and nearly smooth in the youngest parts, sometimes two-angled, but with faint or very fine striations, greyish and 4–6 mm. thick in the older portions. Leaves chartaceous to thinly coriaceous, more coriaceous in *cucullata* and *flosculosa*, small to medium size-class (the smallest in the genus in *fimnipes*, guadalcanalensis and some forms of tubiflora, slightly larger in *flosculosa* and *cucullata*, average about 15 cm. long and the largest 23 cm. long, the smallest 4 cm. long, mostly elliptic, occasionally oblong, the base acute, the apex acute or acuminate, the lower surface sparsely covered with minute adpressed whitish or rarely yellowish scales when young, the scales never lax or powdery, the same species may be with or without the scales; nerves 8–23 pairs, average 15 pairs, much curved or arcuate and leaving the midrib at a wide angle, occasionally slightly oblique, slender but generally distinct; secondary nerves always present, shorter but never numerous or conspicuous except in *M. cucullata*. Inflorescence a woody tubercle with or without a smooth basal portion, but mostly the smooth part well developed especially in *longipes*, the main axis or peduncle slender, simple or bifurcate, the forks forming an acute angle, well seen in *longipes* and *crassipes* (*M. tubiflora* has both types). Male flowers tubular, the perianth 8 mm. to 1 cm. or 1.5 cm long, split down ¹⁄₆–¹⁄₂ into the lobes; bracteole always some distance down on the pedicel below the base of the perianth and in this respect this series differs from all others in *Myristica*: staminal column with a good development of the apiculus, the fertile part mostly broader and longer than the pubescent or less often glabrous stalk. Female flowers also elongate or urceolate, smaller and fewer. Fruit unique in this series because of its narrow-ellipsoid, or fusiform shape, acute at both ends, often with a pseudo-stalk, less often oblong or narrowly oblong, the stalk, 1–2 mm. thick or very stout, 4–7 mm. thick, the tomentum very fine and short, light to dark brown, often glabrous, becoming glabrous, generally smooth, minutely tuberculate in *crassipes*. 11 species—*M. ensifolia*, gracilipes, cylindrocarpa, tubiflora, longipes, cornutiflora, crassipes, firmipes, *guadalcanalensis*, flosculosa and cucullata.

**TYPE SPECIES:** *M. tubiflora* Bl.

*Foot-note:*—Since this paper went to press *M. guadalcanalensis* has turned out to be *M. insipida*, which belongs to Series Cimiciferae.
The majority are small trees averaging 15 m. high but *ensifolia* is a shrublet 1.5 m. high only, while *firmipes* and *guadalcanalensis* are tall trees reaching 34 m.; half of them are mountain species ascending to 2,000 m., often on ridge crests, and the rest lowland while one species *M. cylindrocarpa* occurs in lowland forest subject to seasonal inundation. Another species, *M. firmipes* has still-roots. The species in this series are all closely allied and should not be difficult to name. Many of them have not been described before and unfortunately some of them are not yet known in flower. Therefore, because of this, the key has been based mostly on fruit and some of my suggestions on their relations may not be correct owing to the lack of male flowers. We have much more yet to learn about this very interesting and uniform series, perhaps more uniform than all the other series, but one with some unique diagnostic characters not found in the other series. Among such characters at once apparent are the tubular flowers, the ellipsoid fruit, acute at both ends with slender peduncles and pedicles, the small elliptic leaves and above all the presence of the bracteole well below the base of the flowers. Series *Tubiflorae* with several mountain species is probably nearest to series *Subulalatae*, and probably arose from it or from the same basic stock. One species *M. crassipes* on the other hand, may have been partly derived from the series *Fatuae*, the fruit similar in shape with a thick stalk, the presence of two lines on the twigs with some tomentum on the apical regions of the twigs and the yellowish scales on the lower surface of the leaves all suggest such an alliance. Series *Tubiflorae* may have arisen from series *Fragrantes*. The inflorescence axis has the same dichotomous pattern of branching as well as an unbranch-ed pattern, seen in both. There is a greater development of the scar-bearing portion in series *Tubiflorae*. The small elliptic leaves are very similar in both series.

(44) *Myristica ensifolia* J. Sinclair, sp. nov. — Fig. 48.

Species ad seriem *Tubiflorae* pertinens quae, non tantum ab omnibus speciebus in hac gege sed etiam ab omnibus *Myristicis*, foliis angustissimis (angustis pro longitudine comparatis) distinguenda. *Fructus* ut in *M. tubiflora*, in forma subsimilis sed minor.

Arbor parva, 1.5 m. alta, gracilis. *Ramuli* novelli tantum visi, graciles, 2 mm. crassi, glabri, nisi apicem puberulum versus, rubro-brunnei, leves, nitidi, 2-angulati. *Folia* chartacea, glabra, supra in sicco sordida, virido-vel griseo-brunnea, subuts pallidiora, squamulis albidis paucissimis in foliis juvenilibus tantum, angustissime elliptica vel ensiformia, cum marginibus undulatus fere parallelis, basi acuta, apice acuta vel acuminata, 17–22 cm. longa. 2–3 cm. lata; costa supra in sulco depressa, subuts prominens; nervi 18–20-jugati, apicem versus evanidi, supra depressi, subuts magis distincti, late curvati, intra margines anastomosantes; reticulations invisibles; petioli 8 mm.–1 cm. longi, 2 mm. crassi.
Fig. 48. *Myristica ensifolia* J. Sinclair.
Flores masculi et feminei non visi. Fructus solitarius, anguste ellipticus vel fusiformis, 4.5 cm. longus, 1.3 cm. latus, pallido-brunneus, tomentellus, apice mucronatus, basi in pseudo-pedem 1 cm. longum attenuatus; pericarpium tenue; stipites gracilis, basi 2 mm. crassus, sursum probabiliter 1.5 mm. crassus et probabiliter saltem 1 cm. longus (in feliciter stipes fractus est).

Small tree, 1.5 m. high, slender. Young twigs only seen, slender, 2 mm. thick, glabrous except the puberulous apex, reddish brown, smooth, shining, 2-angled. Leaves chartaceous, glabrous, dull and greenish or greyish brown above when dry, paler beneath with a very few minute whitish scales in young leaves only, very narrow-elliptic or ensiform with the margins undulate and nearly parallel, base acute, apex acute or acuminate, midrib sunk in a furrow above, prominent beneath; nerves 18-20 pairs, vanishing towards the apex, depressed above, more distinct beneath, curving widely and forming loops within the margins; reticulations invisible; length 17-22 cm.; breadth 2-3 cm., narrow in proportion to the length; petiole 8 mm.-1 cm. long and 2 mm. thick. Male and female flowers not seen. Fruit solitary, narrow-elliptic or fusiform, 4.5 cm. long and 1.3 cm. broad, pale brown, tomentulose, mucronate at the apex, narrowed at the base into a 1 cm. long pseudo-stalk, pericarp thin; stalk slender. 2 mm. thick at the base, probably 1.5 mm. thick higher up and probably 1 cm. long (unfortunately the stalk is broken).

NEW GUINEA PAPUA: Western District:—Fly River, 528 mile camp, Brass 6857 (A holotype).

DISTRIBUTION:
No other records. Ridge forest undergrowth, Altitude 80 m. In fruit in May.

A dwarf species belonging to series Tubiflorae but differing from the rest of the members in the long, narrow leaves, narrow in proportion to their length. In fact the leaves are also narrower than those of any other Myristica species on a breadth to length basis and they recall somewhat those of Knema ruja. The fruit is nearest to that of M. tubiflora in shape but is smaller in size than the average tubiflora fruit. Unfortunately the fruiting pedicel is broken so its exact length is not known. It is probably short.

(45) Myristica gracilipes J. Sinclair, sp. nov. — Fig. 49.

Species affinis M. cylindrocarpace a qua foliis obovatis, apice acuminatis, pedicellis fructiferis longioribus, fructibus basi in pseudo-pedem attenuatis distinguished. Species dueae ipsae propter stipites fructiferos tenues in subdivisionem seriei Tubiflorae ponendae. Subdivisio altera huius gregis stipes crassos habet.

Arbor 6 m. alta. Ramuli novelli glabri, rubro-brunnei. 3 mm. crassi, adulti griseo-brunnei, crassiores, rugulosi Folia chartacea vel tenuiter coriacea, glabra, supra saturate brunnea (non nigro-brunnea), subtus pallidiora, hic illic squamulis minutis albidis appressis parce praedita (probabiliter primum eis dense tecta) deinde fere calva, anguste oblongo-obovata, basi rotundata vel obtusa acuta, apice breviter acuminata, 14-20 cm. longa, 4.5-6 cm. lata; costa supra plana, in sulco depressa, nervi 12-16-jugati,
Fig. 49. Myristica gracilipes J. Sinclair.
Leafy twig with fruit from Kanehira & Hatusima 12277 (BO isotype).
interdum cum nervo secundario inter duos primarios jacentem, a costa late curvati vel oblique ascendentes praeipue prope margines; reticulationes supra invisibles, subitas distinctae et laxe conspersae; petioli 1–1.5 cm. longi, 3–4 mm. crassi tumidiusculi. *Flores masculi et feminæ* non visi. *Fructus* solitarius (an semper?), pallido-brunneus, tomentellus, oblongus, 2.5–3 cm. longus, 1.5 cm. latus, pericarpio tenui, apice rotundatus, mucronatus, basi rotundatus et in pseudo-pedem 5–7 mm. longum attenuatus, pedunculus brevissimus, 2–3 mm. longus, pubescens; pedicellus insignis, gracilis, 2.7–3.5 cm. longus 1–1.5 mm. crassus, glaber, cicatrice bracteolae 5 mm.–1 cm. infra apicem notatus.

Tree 6 m. high. Young twigs glabrous, reddish brown, 3 mm. thick, the old ones greyish brown, thicker, slightly rough. Leaves chartaceous or thinly coriaceous, glabrous, dark brown above (not blackish brown) lower surface paler, thinly provided here and there with some minute, whitish, adpressed scales (probably at first densely coated with these), later almost bare of them, narrowly oblong-obovate, base rounded or obtusely acute, apex shortly and sharply acuminate; midrib flat and sunk in a groove above: nerves 12–16 pairs, sometimes with a secondary nerve between two main ones, curving widely from the midrib or obliquely ascending, especially near the margins; reticulations invisible above, fairly distinct beneath and laxly scattered around; length 14–20 cm.: breadth 4.5–6 cm.; petiole 1–1.5 cm. long, 3–4 mm. thick, somewhat swollen. Male and female flowers not seen. Fruit solitary (always?), pale brown tomentulose, oblong, 2.5–3 cm. long and 1.5 cm. broad with a thin pericarp, rounded and mucronate at the apex, rounded and narrowed at the base into a 5–7 mm. long pseudo-stalk; peduncle very short, 2–3 mm. long, pubescent, pedicel remarkable, slender, 2.7–3.5 cm. long and 1.5–1.5 mm. thick, glabrous, marked 5 mm.–1 cm. below the apex with the scar of the bracteole.

**NEW GUINEA DUTCH NORTH NEW GUINEA:*** Dalman, 45 km inland from Nabire, *Kanëhira & Hatusima* 12277 (A, BO).

**SOUTHERN HIGHLANDS:*—Mubi River-Lake Kutubu Divide near Tage, Schodde 2291 (L, LAE).

**DISTRIBUTION:** The above two records. Rain forest, 500–923 m altitude, the type fruiting March, the other specimen September.

**TYPE MATERIAL:** *Kanëhira & Hatusima* 12277 (A holotype, BO).

A small tree with small size-class leaves and a small oblong fruit. The leaves look like those of other small-leaved species such as *lancefolia* and *globosa* but it is at once evident from the fruit that it belongs to series *Tubiflorae* and is nearest to *M. tubiflora* and *cylindrocarpa*, especially to the latter. It differs from the latter in having a pseudo-stalk to the fruit, while the genuine stalk is longer than that of *cylindrocarpa*. The remains of the bracteole can be seen 5 mm.–1 cm. below the apex of the pedicel. Series *Tubiflorae* could be divided into two subseries, one with a thick fruit-stalk and the other with a thin one. Here it is very thin like that of both *cylindrocarpa* and *tubiflora*, being only 1–1.5 mm. thick.
Such a thin remarkable structure must have a very efficient, compact conducting system as well as a rigid mechanical tissue all laid down in a small area of stalk. This type of fruiting pedicel is seen also in such species of *Horsfieldia* as *schlechteri*, *subtilis* and *crux-militensis*, and is a good aid to identification. The leaves of the type are a darker brown than those of *Myristica cylindrocarpa*, being rounded at the base and more acuminate at the apex. Also they are widest above the middle, being more obovate in shape and the veins slightly more oblique. Unfortunately no flowers have as yet been seen.

(46) *Myristica cylindrocarpa* J. Sinclair, sp. nov. — Fig. 50.

Species in seriem *Tubiflora* ponenda et *M. tubiflora* affinis a qua foliis paullo crassioribus, supra in sicco nitidis, subitus albidosquamulosus cum nervis rubro-bruneis, fructibus cylindricis (non ellipsoides nec fusiformibus) differt.

Arbor vel frutex 6 m. alta. *Ramuli* novelli glabri, 2-angulati, rubro-brunei, 2–3 mm. crassi, adulti grisei, 4–5 mm. crassi, teretes, rugulosi. *Folia* chartacea, glabra, supra in sicco pallido-viridobrunnea, nitidula, subitus squamulis appressis albidis deterabilibus tecta, tarde calva, pallido-brunnea, elliptica vel anguste elliptica, utrinque acuta, marginibus incrassata, 10–13 cm. longa, 3–6 cm. lata; costa supra in sulco depressa, utrinque rubro-brunnea; nervi 10–15-jugati, supra depressi, subitus prominentes, rubro-brunei, valde arcuati, marginibus anastomosantes; reticulationes supra laxae, scalariformes, subitus invisibles; petioli 7 mm.–1 cm. longi, 1.5–2 mm. crassi. *Flores* masculi femineaque non visi. *Fructus* solitarius vel vulgo binis aut quaternis dispositus, pallido-bruneus, minute tomentellus, cylindricus apice mucronatus, 2.5–2.8 cm. longus, 8 mm.–1 cm. in diam., pericarpio 1 mm. crasso tantum, pedunculus 7 mm.–1.2 cm. longus tenuis, 2 mm. crassus, apice levis vel pauci-cicatricosus; pedicellus 5–7 mm. longus tenuissimus, 1 mm. in diam., cicatrice bracteolae delapsae 1–2 mm. infra apicem notatus. *Arillus* ruber in segmenta primaria quattor divisus. *Semen* oblongo-cylindricum, atro-brunneum, nitidum, 2 cm. longum, 8 mm. latum.

Tree or shrub 6 m. high. Young twigs glabrous, 2-angled, reddish brown, 2–3 mm. thick, the old ones greyish, 4–5 mm. thick, terete, slightly rough. Leaves chartaceous, glabrous, drying pale greenish brown and slightly glossy above, lower surface covered with minute, adpressed, whitish scales which tend to be cast off, later slowly becoming free of them and pale brown, elliptic or narrowly elliptic, acute at both ends; midrib lying in a groove above, reddish brown beneath; nerves 10–15 pairs, depressed above, prominent beneath, reddish brown, curving boldly and interlacing at the thickened margins; reticulations lax and scalariform above, invisible beneath; length 10–13 cm.; breadth 3–6 cm.; petiole 7 mm.–1 cm. long and 1.5–2 mm. thick. Male and female flowers not seen. Fruit solitary, usually in pairs but also four together, pale brown, minutely tomentulate, cylindrical, mucronate at the apex, 2.5–2.8 cm. long, 8 mm.–1 cm. broad, the pericarp 1 mm.
Fig. 50. *Myristica cylindrocarpa* J. Sinclair.

thick only, the peduncle 7 mm–1.2 cm. long, thin, 2 mm. thick, smooth at the apex or with a few scars, the pedicel 5–7 mm. long, very thin, 1 mm. in diam., marked with the scar of the fallen bracteole 1–2 mm. below the apex. Aril red, divided into 4 main segments. Seed oblong-cylindrical, dark brown, shining, 2 cm. long and 8 mm. broad.

NEW GUINEA PAPUA: Central District:—about 1 mile north-west of Maipa Village, Kairuku sub-district, Darbyshire 929 (L. LAE).

T.N.G.: Madang District:—Pondoma Village, Josephstaal, K. J. White N.G.F. 10288 (CANB, K, L, SING); Lower Ramu-Atitau Area near Samarikan, Guam River, Robbins 1567 (CANB).

DISTRIBUTION: New Guinea, Madang District. Fruit September. In low-lying forests subject to seasonal inundation.

TYPE MATERIAL: K.J. White N.G.F. 10288 (CANB, K holotype, L, SING).

Another species of series Tubiflorae belonging to that division of it with the thin, slender, fruiting pedicels and peduncles. It is nearest to M. tubiflora but the leaves are slightly thicker and larger with minute, whitish scales and reddish brown nerves and midrib beneath. The upper surface is somewhat glossy when dry, not dull like that of tubiflora. The upper midrib, too, is usually reddish brown but not the nerves on the upper surface. While the leaves in tubiflora are generally small, there are in that species ones just as big as those of our new species. The fruit is never so big as that of tubiflora, being cylindrical in shape and not drawn-out at both ends, and having no pseudo-stalk.


Tree or shrub 3–20 m. high with slender, spreading branches. Bark greyish brown, finely longitudinally fissured; sap red. Twigs greyish brown, finely longitudinally striate, glabrous, very slender and often only 1 mm. thick near the apex, 3 mm. thick lower down; terminal bud almost filiform. 0.4 mm. thick, greyish puberulous, actue at the apex. Leaves chartaceous, glabrous, elliptic or elliptic-lanceolate, dark glossy green above and drying a dull, pale greyish green, glaucous beneath and drying a medium brown or grey, the nerves more or less the same colour as the lower surface or a little darker, apex acuminate, base acute, less often slightly rounded and then acute; nerves 8–15 pairs, average 10, slender, impressed above, raised beneath, leaving the midrib in bold curves at an angle of 70–85°, close together but equidistant; reticulations very faint or absent, but may sometimes be seen with a lens, forming a weak scalariform series; length 6–15 cm., average 10 cm.
Fig. 51. *Myristica tubiflora* Bl.

breadth 2–6 cm., average 4 cm. (small size-class); petiole 8 mm.–1.5 cm. long, slender, 1–1.5–(2) mm. thick. Male inflorescence short, slender, mostly simple, occasionally bifurcate, the main smooth portion 1 mm.–1.5 cm. long and 0.5–0.7 mm. thick depending on age, or sometimes absent altogether, the scar-covered portion generally shorter though sometimes even longer than the main part, but never very much thicker, 1 mm. up to 1.2 cm. long and 1–1.2 mm. thick. Male flowers few at a time, tubular, cream-coloured, glabrous to minutely puberulous, blunt to somewhat acute at the apex in bud, 8 mm.–1.2 cm. long and 1.5–2–(2.5) mm. broad, split down 1/5-way by the very small, rather blunt perianth lobes; staminal portion slender, bracteole acute, coloured, 2 mm.–1.5–2 mm., much shorter or slightly less than the fertile part but narrower, anthers 10; pedicels 8 mm.–1 cm. long, filiform, 0.2–0.3 mm. thick; bracteole minute, obtuse, amplexicaul, median on the pedicel or some distance below the base of the perianth (the original position is at the base of the perianth in very young flower-buds). Female inflorescence simple, the main part up to 5 mm. long. Female flowers bottle-shaped, 8 mm. long and 3 mm. broad at the base, the neck tapering into the three, obliquely spreading or horizontal perianth lobes which are 1/5 the length of the tube; ovary dark brown-tomentose, fusiform; pedicel longer than in the male, 5 mm.–4 cm. long. Fruit pendulous, orange, soon glabrous, narrowly ellipsoid or fusiform, rostrate or sub-rostrate at the apex, 4–7 cm. long and 1.3–2.5 cm. broad, narrowed at the base into a pseudo-stalk, the pericarp thin but hard and much wrinkled when dry; stalk generally long and filiform but varying much from 5 mm.–2.5 cm. long, these measurements including those of pedicel and peduncle combined. 2 mm. thick with the bracteole or part of it persisting at some distance below the base of the fruit as in the male and with a small collar where the pseudo-stalk joins the pedicel. Aril bright red, fimbriate at the apex, but mostly covering the seed except for two equidistant slits down to the base on each side, aromatic as is the seed. Seed oblong-ellipsoid, blunt at each end, pale brown.

NEW GUINEA VOGELKOP (DUTCH WEST NEW GUINEA):

Kambu Kepper. Atasrip 709 also numbered 3 (BO, L, SING); Sausapor, Sorong. Versteegh BW 3974 (K, L); Steenkool, road to Temboeni, van Royen 3457 (K, L); Inanwatan, Tisa, Steenkool, hh32650 = Lundquist 31 (BO, L); Momi, Manokwari. Kostermans Nos 146 = hh33369 (BO, K, L); 263 hh33462 (BO, K, L, SING); 289 = hh33481 (BO, K, L) & 2666 (A, BO, L); Warnapi, north of Ransiki, Kostermans Nos 47a (BO, L); 2665 (BO) & 2665a (K, L); Warsui near Ransiki, Kostermans 2667 (A, BO, K, L); Ransiki, Kostermans 47 (A, K, L); Oransbari, Schram BW 1896 (BR, CANB, K, KEP, L); Anggi Giti Lake, Arfak, Kostermans 2440 (BO, L); Lobo (Lowo) Zippelius s.n. (CAL, L, P); Skendi north of Teminabuan, Versteegh BW7475 (L).
Dutch North New Guinea: Van Rees Mts, Drs v. Leeuwen 9217 (A. BO, K, L); Meerlakte Motor Bivac, Rouffer River, Drs v. Leeuwen 11115 (BO, L); Holtekang, Hollandia, Schram BW/1503 (BR, CANB, L) & Versteegh BW/39 (BO, CANB, L); Berap, Hollandia, bb28934 (A, BO, K, L, SING); Tami, Giellerup 274 (BO, K, L, U).

Dutch South New Guinea: Noord River, Sabang Camp, von Römer 304 (L) & Branderhorst 329 (BO, K, L, U); Oeta, Aet 182 (BO, K, L); Sg. Aendoea, near Oeta, Aet 485 (A, BO, K, L); Mimika, Lundquist 228 = bb32947 (BO, L); behind Bivouac Island, Pulle 53 (A, BO, K, L).

Papua: Northern District:—Mt. Scratchley, Giulianetti, date 1896 (K); Kakoda, Carr 16167 (BM, CANB, L, SING); Lala River, Carr 15800 (A, BM, K, L, SING); Isuarava, Carr Nos 15501 (A, BM, CANB, K, L, SING); 16086 (BM, CANB, K, L, SING); 16087 (BM, CANB, K, L, SING); near Saga Village, Yodda Valley, Hoogland 3935 (A, BM, CANB, K, L, LAE, VS) & about 1 km north of Pitoki Village, Hoogland Nos 3971 (A, BM, CANB, K, L, LAE), & 3972 (A, BM, CANB, K, L, LAE, VS).

Gulf District:—Kikori sub-district, Seribi River, near Middletown, Floyd, Gray & Middletown N.G.F. 8079 (A, BRI, CANB, K, L, LAE, SING); Vailala River, Ihu, Brass 940 (A, BRI, K, P).

T.N.G.: Sl. Schlechter 17795 (K).

Sepik District:—Ledermann 9810 (L); Hunsteinspitz Quellenlager, Ledermann 8372 (SING).


Pulau Japen: Serui, bb30671 (A. BO, L, SING).

DISTRIBUTION: New Guinea, more plentiful in the west than the east, ascending from sea-level to 1,538 m in damp forests.

TYPE MATERIAL: M. tubiflora Bl., (Lowo) Lobo, Zippelius s.n. (CAL, L holotype, P).

VERNACULAR NAMES: Aposi (Yense); bengemun (Ransiki); bomsi or bonsi the commonest name (Manokwari); hamana (Orokaiva language at Mumuni); kamare (Oeta); maru-maru (Kiwai); medak (Mooi); sanggit (Tehid).

This species might easily be confused with fragrans if sterile for the leaves have a striking and close resemblance to those of the commercial nutmeg. I, myself, was even puzzled when at the beginning of my studies, I first saw some of the sterile material collected by Kostermans from the Manokwari Region. Also at that time, I was not yet well-acquainted with M. tubiflora, for I had seen little material of it. I began to wonder if the Manokwari plant could be a wild form of fragrans and a first record for New Guinea. Dr. Kostermans who was present at the time, assured me that it was not fragrans and that the leaves and twigs were not
aromatic. It will be noticed that the nerves on the lower surface of the leaf in _fragrans_ dry a reddish brown, and the contrast between their colour and that of the background of the leaf is striking. In _tubiflora_ there is no such sharp contrast, the nerves are either of the same colour as the matrix of surrounding tissue or are slightly darker. The number, 8–15 pairs in _tubiflora_ as against 8–11 pairs in _fragrans_ may help. There are excellent coloured plates of both species in Blume’s Rumphia.

Apart from the leaf similarity, _M. tubiflora_ is not closely related to _fragrans_. In fact, it is a very distinct plant in a distinct series. Its similarities, suggesting a close relationship with _longipes_, are well seen in the type of inflorescence, the tubular flowers, the migration of the bracteole from the original and normal position at the base of the perianth to one at some little distance below the base or even as far down as the middle of the pedicel (a unique diagnostic character seen only in the _Tubiflorae_) and in the peculiar, spindle-shaped or ellipsoid fruit which is beaked at the apex, has a pseudo-stalk and collar at the base and is borne on a long, rather slender stalk. The following differences between the two species are to be noted:— _M. tubiflora_ is not confined to mountains like _longipes_. In fact there are more records from lowland forest than from high altitudes. The leaves are thinner in texture and less variable in shape. They are elliptic or elliptic-lanceolate but not obovate or panduriform. The inflorescence is usually simple and rarely bifurcate. Its scar-covered part may be long or very short, but not so thick as that of _M. longipes_. The flowering pedicels are much thinner and those of the female often very much longer. They are exceptionally long in _Hoogland 3971_, reaching 4–5 cm. The perianth is thinner in texture and not so broad. The fruit is pendulous and not erect. It is nearly always solitary since the inflorescence axis is not or rarely bifurcate. There will consequently be no knee-joint and bend on the fruiting stalk as in _longipes_. The pericarp is wrinkled and not smooth when dry since it is much thinner. The thicker pericarp of _longipes_ will resist shrinkage and wrinkling on drying. The mature pericarp is glabrous and not tomentose. The stalk as pointed out above, is usually long and slender in both species, but the fruit may sometimes be nearly sessile in _tubiflora_, thus baffling the beginner.

(48) **Myristica longipes** Warb. Monog. Myrist. (1897) 535;

Tree 6–20 m. high. _Bark_ dark-brown or almost black, flaking in thin, irregular pieces when old; _sap_ yellowish red. _Twigs_ slender, 2 mm. thick near the apex and 4 mm. lower down, glabrous, finely striate, greyish brown, often with darker intervals here and there...
Fig. 52. *Myristica longipes* Warb.

Leaves rather variable in texture, shape and distinctness of nerves, coriaceous or mostly thinly coriaceous, sometimes chartaceous, elliptic-lanceolate, ovate-elliptic, obovate-elliptic or panduriform, widest at the middle and then often abruptly narrowing just below the middle, the margins very slightly recurved beneath in the more coriaceous ones, glabrous, medium green above and greyish green below, drying a dark brown above and medium brown below, apex shortly acuminate or bluntly acute, base acute, rounded or rounded and then acute; midrib raised above and below; nerves 10-16 pairs, fine and slender, oblique or curving slightly, sunk above or sometimes scarcely visible, raised or not beneath; reticulations mostly invisible, but sometimes seen above in the more coriaceous leaves where they are sunk and never very numerous; length 6-15 cm., average 11 cm.; breadth 3.5-6 cm., average 4.5 cm.; petiole slender, 1-1.5 cm. long and 2-3 mm. thick. Male inflorescence a slender, 5 mm.-3.5 cm. long main axis, lengthening with age, bifurcate at the apex, the branches shorter and covered with numerous scars of fallen flowers or sometimes in early stages the main axis a 3-5 mm. long, simple woody tubercle; pedicels slender, 5-6 mm. long and 0.5-0.7 mm. thick. Male flowers coriaceous, tubular, cream-coloured, puberulous outside, glabrous inside, the perianth 1 cm. long and 2-3.5 mm. broad, split down about 1/5-way into the small, 1 mm. long, deltoid, sub-acute or obtuse lobes; bracteole narrow, sheath-like, 4 mm. long with an obtuse apex, only present in the very youngest flowers, i.e. those up to 7 mm. long, its position in the early stages at the base of the perianth, then caducous and visible as a scar or a fragment 1-3 mm. below the base of the perianth; staminal column with a 3.2-4 mm. long, adpressed-pubescent stalk, the fertile portion 3.4-6 mm. long with 6-8 anthers, as broad as the stalk at their junction, but tapering to a slender needle-like or subulate, 1.4 mm. long sterile apiculus. Female inflorescence bifurcate as in the male, but the main part shorter, 5 mm. long, yet lengthening to 1 cm. long in fruit. Female flowers flask-shaped, 7 mm. long, tapering into a short, narrow, 1.5-3-(4) mm. long neck above the swollen portion, the swollen portion 3 mm. broad, the minute, obtuse perianth lobes divericate but not reflexed; ovary 6 mm. long and 2 mm. broad, conform to the shape of the perianth, dark brown, adpressed-tomentose; pedicels 8 mm. long, lengthening to 1.5 cm. in very young fruit; bracteole also very early caducous, its remains 1-3 mm. below the base of the perianth. Fruit single or in pairs, orange when ripe, medium brown when dry, tomentulose, becoming glabrous with age, spindle-shaped, mucronate at the apex, 3.5-4-(5) cm. long and 1.5-2.3 cm. broad, narrowed at the base into a 7 mm. pseudo-stalk: stalk consisting of the main branch of the inflorescence axis, now 1 cm. long and the 1.7-2.3 cm. long pedicel which is thickened at the apex to form a narrow, collar-like ring or minute cupular-receptacle to which the pseudo-stalk is attached. Aril red, even when dry, very thin, the segments narrow, rather few and widely spaced, exposing the seed. Seed ellipsoid with obtuse ends, pale brown, 3 cm. long and 1.7 cm. broad.
NEW GUINEA

DUTCH NORTH

NEW GUINEA:

Bernhard Camp, Idenburg River. _Brass & Versteegh_ 13573 (BM, BO, BRI, L, LAE); 15 km south-west of Bernhard Camp. _Brass & Versteegh_ 11925 (A, BM, BRI, L) and _Brass Nos_ 12147 (A, BM, BO, BRI, L) and _Brass Nos_ 12147 (A, BM, BO, BRI, K, L, LAE) & 12173 (BM, BO, BRI, L, LAE); 6 km south-west of Bernhard Camp, _Brass & Versteegh Nos_ 12574 (A, BM, BO, BRI, L, LAE) and 12597 A, BM, BO, BRI, L, LAE) these two may be crossing with _eucullata._

PAPUA:

Milne Bay District:—north slopes of Mt. Davman, Maneau Range, _Brass_ 23241 (A, L, LAE).

Central District:—Sogerí Region. _Forbes_ _Nos_ 242 (BM, CAL, K, L, P); 396 (A, BM, CAL. E. Fl. G, K, L, MEL. P, PNH, SING, US); 592 (BM, CAL) & 647 (BM, CAL. E. Fl. K, L, P); Koi Taki. _Carr Nos_ 12707 (BM, CANB, K, L, NY, SING) & 12870 (BM, CANB, K, L, SING); Boridi, _Carr Nos_ 13122 (A, BM, CANB, K, L, SING); 13238 (A, BM, CANB, K, L, SING); 13239 (A, BM, CANB, K, L, SING); 13384 (A, BM, CANB, K, L, SING); 13394 (A, BM, K, L, SING); 13395 (A, BM, K, L, SING); 13524 (BM, CANB, K, L, SING); 14391 (BM, CANB, K, L, SING); 14403 (A, BM, K, L, SING) & 14609 (BM, K, L, SING).

Southern Highlands:—above Kiburu, Mendi Valley, Schodde 1390 (L, LAE).

T.N.G.:

Senik District:—Ledermann Nos. 10244 (L); 10249 (L) and 9828 (L).


Morobe District:—Sattelberg. _Biro_ 21 (BP); _Clemens Nos_ 1015 (A, L) & 1717 A, B, L, SING); Ogeramnang. _Clemens_ 4836 (A); Bulolo. _K. J. White N.G.F._ 10149 (K, L, SING).

DISTRIBUTION:

New Guinea, on mountain slopes, altitude 460–2,000 m (1,500–6,500 ft).

TYPE MATERIAL:

_M. longipes_ Warb. Mt Yule, Central District. _MacGregor_ s.n. (B holotype burnt). I have not yet chosen a neotype for _longipes_ as it should be quite easy to collect new material from near the summit of Mt Yule, the original "locus classicus" and make that the neotype. _M. pachyphyllo_ A.C. Smith. Bernhard Camp. _Brass_ 12173 (A holotype, BM, BO, BRI, L, LAE). _M. resinosa_ Warb. Hort. Bog. cult., ex Dutch New Guinea, north-west coast. _Teijsmann_, date 1878 (B holotype burnt). _M. warburgii_ K. Schum., Sattelberg. _Biro_ 21 (B holotype burnt, BP).
A New Guinea species from mountain slopes with certain distinctive features which should help in recognizing it. Notable among these is the unusual spindle-shaped or elongate-ellipsoidal fruit with a beak at the apex and a pseudo-stalk and collar at the base. The stalk is long and slender, consisting of the basal peduncle or main axis of the inflorescence and joined to this is the actual pedicel, forming a portion of the fork of the inflorescence. Sometimes both branches of the inflorescence are present and we get a letter Y-shaped structure with two fruits. If only one fruit has developed or if the other is broken off, the whole fruit-stalk has then the appearance of a long single bent one with a kink or knee below the middle. The leaves are 6–15 cm. long, average 11 cm., that is, they are small as far as the genus *Myristica* may be divided on basis of size-class of leaves. There are several species in New Guinea with small leaves like those of *longipes*. Among such are *globosa* and *lepidota* and in the Moluccas *M. fragrans*. The majority of *Myristica* species on this comparative basis have much larger leaves, 15–30 cm. in length, while the largest are 30–50 cm. long. This classification of "large" and "small-leaved" species might seem useful in a key when dealing with sterile material, but unfortunately the matter is not so simple as that. Often large-leaved species may have a few small leaves, say 10–15 cm. long, present among the normally large ones and conversely with the small-leaved species, when they may have leaves of a size in excess of the standard laid down for division in a classification or key. One is often tempted to use this system in a key, but it can be disastrously misleading.

Other salient features are the fine, slender nerves, sometimes rather indistinct beneath, the raised midrib on the upper surface of the leaves, the tubular flowers, the presence of the bracteole or rather the remains of it on the pedicel a short distance below the adult perianth and not at the actual base of the flower except in developing flower-buds, and the bifurcate inflorescence with a rather short main axis. When very young, the stalk or peduncle of the main axis is extremely short and flowering can even take place at that stage before the axis lengthens to its normal size or before the two lateral branches or the usual pedicel-scars are in evidence. In such cases one should easily recognize the inflorescence as belonging to section 2. When the main axis lengthens and especially in young fruit, then one will really see just how appropriate the name *longipes* is for this species. Though related to *M. fragrans* in having a slender bifurcate inflorescence, this species appears to be nearest to *M. tubiflora*. This is exemplified to a slight degree in the leaves, but much more so in the tubular perianth with the final position of the bracteole also some distance below it and not at its actual base, the somewhat similar, ellipsoidal fruit with a long, thin stalk and in the slender inflorescence axis with the numerous pedicel-scars. For other similarities and differences see under *M. tubiflora*.
Markgraf in Bot. Jahrb. 67 (1935) 611 places M. resinosa and warburgii, Berlin types which are now destroyed, as synonyms of lepidota. Apart from some of the specimens which he quotes there as lepidota and which are correctly identified as lepidota, many of the numbers quoted, especially the Forbes and Ledermann numbers, belong to longipes. The description of the male flowers appended there is also that of longipes. In fact his general idea of lepidota does not represent that species, but is based on specimens which are mostly longipes. It is very likely then that these two synonyms represent longipes and not lepidota. In fact the original descriptions of them agree fairly well with that of longipes. I have now seen Biro 21, isotype of M. warburgii on loan from Budapest (BP) and it is in fact longipes.

M. resinosa Warb. was based on Teijsmann s.n. cultivated in Hort. Bog. and brought from the north-west coast of Dutch New Guinea by Teijsmann. This was destroyed at Berlin. I have failed to find any trace of a duplicate sheet in Bogor. The Berlin sheet according to Warburg is also M. succedanea (non Blume) Scheffer, pro parte. See Scheffer in Ann. Jard. BtZg 1 (1876) 46. Here I have followed Warburg since Markgraf, as pointed out above, partly mixed up lepidota with longipes, putting this specimen as a synonym of lepidota. Also Warburg’s description answers best to that of longipes. The leaves are whitish on the undersurface, and the fruit-stalk only 2.5 mm. thick, so the plant is unlikely to be lepidota. I disagree, however, with Warburg as regards his view on Scheffer’s full conception of M. succedanea, page 46. According to Warburg M. succedanea (non Bl.) Scheffer, as he puts it, consists of two parts (1) M. resinosa as stated above which I have reduced to longipes and (2) the specimen with the rather variable leaves which Warburg thought was different from the true succedanea and which he named M. schefferi Warb. Markgraf placed M. schefferi and M. succedanea “ex Scheffer” i.e. the same material, as a synonym of M. fatua var. papuana. I have seen this material and in my opinion it is not different from the true succedanea Reinw. ex Bl. Scheffer was therefore not so far wrong after all in his conception of M. succedanea Bl., part of the material he refers to being correct as M. succedanea Bl., the other part which he did not distinguish being M. resinosa Warb., now put by me in longipes.

(49) Myristica cornutiflora J. Sinclair. sp. nov. — Figs 53 & 54.

A M. longipede cui proxima haec species ramulis adultis griseis, pallidioribus, profundiis striatis, foliis latioribus, in sicco plerumque pallidioribus, nervis subitus prominentioribus, inflorescentia mascula longiore et melius evoluta cum floribus subulatis (non tubuliformibus) magis numerosis et paullo longioribus, floribus femineis majoribus basi tumidioribus, fructibus medio latioribus non utrinque angustatis differt.

Arbor 5-12 m. alta. Truncus basi anteridibus tabularibus 50 cm. longis, 75 cm. latis praeditus. Cortex griseus, minutefissuratus, squamulosus. Ramuli in partibus apicalibus 2-4 mm. crassi, glabri, nigro-brunnei, verticaliter striati, in partibus adultis
Fig. 53. *Myristica cornutiflora* J. Sinclair.

Fig. 54. Myristica cornutiflora J. Sinclair.

pallid-grisei. *Folia* chartacea vel tenuiter coriacea, supra in sicco virido-brunnea hic nigrigantia, illic pallidiuscula, subitus pallidobrunnea, omnino glabra, elliptica, interdum oblongo-elliptica, utrinque acuta vel obtuse acuta, marginibus incassata et leviter revoluta, 8–24 cm. vulgo 15 cm. longa, 6–10 cm. vulgo 7 cm. lata; costa supra in sulco depressa, subitus elevata; nervi 16–18-jugati, multo arcuati, supra impressi, subitus prominentes, nervi secundarii inter primarii conspersi; reticulationes supra visae, subitus invisibiles; petiolus 1.5–2.6 cm. longus, 2–3 mm. crassus. *Inflorescentia mascula* pendens, 3–6 cm. longa, axis levis, 1.5–3.5 cm. longus, 1.5–2.5 mm. latus, apice bifurcatus, ramuli cicatricosi. *Flores masculi* per fasciculum 5–8, turbinato-subulati vel corniculati, tumidi, 1–1.5 cm. longi, 2–3.5 mm. lati, rubro-brunnei in sicco, minime appressi-puberuli, mox glabri, apice valde et brevissim e 3-angulati et in lobos ovatos 1–1.5 mm. longos 4/5-fissi: pedicelli graciles, 3 mm.–1.8 cm. longi, vix 1 mm. crassi; bracteola-citissime decidua, non visa, cica trix eius semi-orticularis, diu apice pedicelli manens, denique per auctum floris 1–3 mm. infra basin perianthii descendens; columna staminalis 6–8 mm. longa, tenuis, sine apiculo sterili vel cum eo vix tandem emergente, stipes pubescens parti fertili equilongus. *Inflorescentia feminea* 2–3.5 cm. longa, cymosa cum 2–3 floribus tantum. *Flores fenemiei* glabri, ampulliformes, 8 mm.–1 cm. longi, basi tumidi, 3–4 mm. lati, apicem versus attenuati, 1.5–2 mm. lati; ovarium 7 mm. longum, 3 mm. latum, tomentellum, utrinque angustatum; pedicelli 7 mm.–1 cm. longi, 1 mm. crassi. *Fructus* solitarius vel in paribus dispositus, glaber, in sicco lignosus, late ellipsoides vel aliquantum subglobosus, 3–4.5 cm. longus, 2–2.5 cm. latus, basi in pseudopedem 5 mm. longum productus, apice in iuventute mucronatus; stipes 2 mm. crassus cum pedunculo 7 mm.–1.5 cm. longo et pedicellis 1–1.5 cm. longis. *Semen* elongaturn, pallidum, 2.5 cm. longum, 7 mm. latum.

Tree 5–12 m. high. *Trunk* with buttresses 50 cm. long and 75 cm. wide. *Bark* grey, finely fissured and with small scales. *Twigs* 2–4 mm. thick, glabrous, blackish brown and vertically striate in the apical parts, pale grey in the adult parts. *Leaves* chartaceous or thinly coriaceous, greenish brown above when dry, blackish in some parts and somewhat pale in others, pale brown beneath, quite glabrous, elliptic or sometimes oblong-elliptic, acute or obtusely acute at both ends, thickened and slightly revolute at the margins, 8–24 cm. long, average 15 cm., 6–10 cm. broad, average 7 cm.; midrib lying in a groove above, raised beneath; nerves 16–18 pairs, much curved, impressed above, prominent beneath; secondary nerves present among the primary; reticulations visible above but not beneath; petiol 1.5–2.6 cm. long and 2–3 mm. thick. *Male inflorescence* drooping, 3–6 cm. long, the main axis smooth, 1.5–3.5 cm. long and 1.5–2.5 mm. broad, divided into two equal scar-covered branches at the apex. *Male flowers* 5–8 in the cluster, conical-subulate or horn-shaped, swollen, 1–1.5 cm. long and 2–3.5 mm. broad, reddish brown when dry, minutely adpressed-puberulous, soon glabrous, strongly but very
shortly 3-angled at the apex where they are split down \( \frac{1}{6} \)-way into the ovate, 1–1.5 mm. long lobes; pedicels slender, 3 mm.–1.8 cm. long and scarcely 1 mm. thick; bracteole very soon deciduous, not seen, its scar semi-orbicular, remaining for a long time at the apex of the pedicel and finally through growth of the flower descending 1–3 mm. below the base of the perianth; staminal column 6–8 mm. long, slender, without a sterile apiculus or with it scarcely as yet emerging, the stalk pubescent, equalling the fertile part. Female inflorescence 2–3.5 cm. long, cymose with 2–3 flowers only. Female flowers glabrous, ampulliform, 8 mm.–1 cm. long, swollen and 3–4 mm. broad at the base, narrowed towards the apex and there 1.5–2 mm. broad: ovary 7 mm. long and 3 mm. broad, tomentulose, narrowed towards both ends; pedicels 7 mm.–1 cm. long and 1 mm. thick. Fruit solitary or in pairs, glabrous, woody when dry, broadly ellipsoid or somewhat sub-globose, 3–4.5 cm. long and 2–2.5 cm. broad, produced into a 5 mm. long pseudo-stalk at the base, mucronate at the apex when young; stalk 2 mm. thick with the peduncle 7 mm.–1.5 cm. long and the pedicels 1–1.5 cm. long. Seed elongate, pale, 2.5 cm. long and 7 mm. broad.

NEW GUINEA

DUTCH SOUTH

NEW GUINEA:

Subdivision Moejoe:—Jibi. 5 km north from Ninati, Kalkman BW6413 (G, L, LAE); Opka, about 10 km north-east from Ninati, Kalkman BW6460 (L, LAE).

PAPUA:

Southern Highlands:—near Tage. Lake Kutubu, Schodde 2260 (L, LAE); Lake Kutubu on ridge behind Government Station, Gray N.G.F. 8142 (A, BO, BRI, CANB, K, LAE).

T.N.G.:

Sepik District—Ledermann 8730 (SING); April River, Ledermann 9728 (L).

DISTRIBUTION:

New Guinea as above. Stated to be common at 50 m altitude in secondary forest at Jibi. The Tage material was obtained at 2,700 ft. or 830 m.

TYPE MATERIAL:

Kalkman BW6413 (G, L holotype, LAE).

VERNACULAR NAMES:

Badumnsusoga (Kutubu language); mong (Moejoe language).

This species is nearest to *M. longipes* and differs from it chiefly in the larger flowers (the male non-tubular), the fruit broader at the middle and very much less attenuate at both ends and in the more prominent veins of the leaves. Besides these three major differences there is also a number of minor ones. The twigs are more deeply striate with their older portions often a lighter colour. The leaves tend to be broader and have thicker margins; their colour on drying is slightly different, there being light and dark greyish patches above with an occasional suggestion of a greenish tinge while the lower surface is paler and parchment-like. The male flowers are more numerous in the cluster than those of *longipes*. They are nearly mature but not quite as the pollen sacs have not yet dehisced nor has any apiculus appeared on the staminal column. I do not think that the apiculus is lacking since the rather large one in *longipes* is late in developing and
does not protrude until the anthers begin to shed their pollen. The female flowers are more swollen at the base than those of \textit{longipes}. The apex of the fruit when young is slightly produced into a mucro but this tends to disappear with age while the basal pseudo-stalk is smaller in all proportions.

Care should be taken not to mistake \textit{M. cornutiflora} for a species in series \textit{Ellipticae} because of certain deceptive similarities such as the flowers of both sexes being 3-angled at the apex in bud, the cymose inflorescence and the fruit in pairs on slender pedicels. I, myself, at first thought this species to be allied to \textit{M. garciniifolia} because of these characters, and more especially because the bracteole scars were at the base of the male perianth in the type, \textit{Kalkman BW6413}. But since the male flowers there are not quite mature, the bracteole scars will eventually move or be pulled down into a position 1–3 mm. below the base of the flower as in the male flowers of \textit{Ledermann 9728} and in the female flowers of \textit{Kalkman BW6460}. In \textit{M. longipes} the phase of retraction of the bracteole scar appears to be of much shorter duration; the bracteole there is either seen at the base of the very young flower or as a scar 1–3 mm. below the base of older flowers.

(50) \textit{Myristica crassipes} Warb. in Schum. et Lauterbach, Fl. Deutsch. Schutzgeb. i.d. Südssee (1900) 326; Markgraf in Bot. Jahrb. 67, 2 (1935) 162. — \textbf{Fig. 55}.

Tree 7–27 m. high. Twigs 3 mm. thick at the apex, and 4 mm. thick for a considerable distance down, minutely puberulous, brownish, finely striate, slightly rough with a few lenticels in the older parts, slightly angled or with 2 faint lines in some of the internodes. Leaves chartaceous, glabrous and drying medium or dark brown above, greyish yellow or whitish yellow to glaucous beneath due to very minute, closely adpressed scales, the nerves and midrib brownish, lanceolate to narrowly lanceolate, less often elliptic, occasionally broadest above the middle, base acute or bluntly acute, at times slightly rounded, apex shortly acuminate; midrib flat and lying in a groove above, raised beneath; nerves 14–20 pairs, mostly 18, close together, leaving the midrib at a wide angle, often 90°, curving gradually and interarching near the margins, depressed above, fine on both surfaces; reticulations faint on both surfaces, often indistinct; length (small size-class) 10–15 cm.; breadth 3.5–5 cm.; petiole 1 cm. long and 2–2.5 mm. thick. Male inflorescence a short, \textit{Knema}-like axis with numerous scars, mostly simple, but sometimes bifurcate or trifurcate, 5 mm.–2.5 cm. long. Male flowers coriaceous, tubular, 8–9 mm. long and 2.5–3 mm. broad, rusty-tomentulose outside, split down \( \frac{1}{6} \)-way at the apex into the short, obtuse lobes; staminal column 7 mm. long, without an apiculate apex, the pubescent stalk about as long as the 8 anthers of the fertile part; bracteole 1 mm. long, obtuse at the apex and situated 1–2 mm. below the base of the perianth; pedicels 5–7 mm. long. Female flowers not seen. Fruit single, rusty-tomentulose, rugulose, broadly ellipsoid or oblong-ellipsoid, slightly gibbous with an acute, oblique apex
Fig. 55. *Myristica erassipes* Warb.
and slightly acute base, 4 cm. long and 3 cm. broad with a very hard, woody, 5-8 mm. thick pericarp: peduncle short, 5 mm. long; pedicel 5 mm.-1 cm. long, both stout and woody, 7 mm. thick.

NEW GUINEA PAPUA:

Northern District:—Isuarava, Carr Nos. 15509 (A, BM, CANB, K, L, SING) and 16091 (BM, CANB, K, L, SING).

Central District:—Schraderberg. Ledermann Nos 11769 (B burnt, not seen) and 12026 (B burnt, not seen).

Western Highlands:—near Wahgi River at Kup, Mini sub-district, Robbins 1135 (CANB).

Morobe District:—Finschhafen, Sattelberg, Bamler 50 (B burnt, BRSL); Patep Creek, Wau Road, Womersley N.G.F. 13447 (L).

DISTRIBUTION:

As above. A mountain species, altitude 700-1,385 m.

TYPE MATERIAL:

Bamler 50 (B holotype burnt, BRSL) not 51 as quoted by Warburg.

I place this species with *M. longipes* and *tubiflora* in series *Tubiflorae*. There is a similarity in the leaves, the tubular flowers with the bracteole 1-2 mm. below the base of the perianth and in the fruit. The flowers are nearest to those of *longipes*. The fruit differs from that of both in being less elongate at the base and apex, the pseudo-stalk shorter, the pericarp harder, thicker and sometimes minutely warted and the real stalk much stouter and thicker. The leaves are rather similar also to those of *M. floseculosa* but smaller with more crowded nerves. For other differences see under that species.

(51) *Myristica firmipes* J. Sinclair, sp. nov. — Fig. 56.

Species in seriem *Tubiflorae* ponenda et *M. crassipedi* affinis a qua foliis multo minoribus, fructibus majoribus, levibus (non rugulosis) differt.

Arbor excelsa, radicibus epigaeis praedita, Cortex brunneus. *Ramuli* glabri, graciles, juvenes 1-2 mm. crassi, rubro-brunnei, adulti 3-4 mm. crassi, grisei, rugulosi. *Folia* chartacea vel tenuiter coriacea, supra virido-brunnea vel olivacea, subtus pallido-brunnea, in partibus squamulis minutis albidis parce induta, anguste elliptica, utrinque acuta, 4-8 cm. longa, 1.5-2.5 cm. lata (pro genere parva); costa supra in sulco depressa, subtus elevata; nervi 8-14-jugati, supra impressi, subtus prominuli, apicem versus fere obsoleti, a costa usque ad margines valde arcuati; reticulationes paucissimae, obscurae, sub lente tantum visae; petioli graciles, 1-1.3 cm. longi, 1.5 mm. crassi. *Inflorescentia* (sectio 2) lingosa, 5 mm. longa. *Flores masculi* et *feminei* non visi. *Fructus* minute ferrugineo-tomentellus, ellipsoides vel obovoideo-ellipsoides, inaequilateralis, 5.5-6 cm. longus, 3.3 cm. latus (nondum maturus), basi in pseudo-stipitem angustatus, apice obliquus, pericarpium crassum, lignosum, linea suturalis prominens; *stipes* 1-1.5 cm. longus, 7 mm. crassus.
Fig. 56. *Myristica firmipes* J. Sinclair.

A, leafy twig with fruit. B, fruit. C, young fruit, one half of pericarp removed to show aril and seed. A from *Brass* 7181 (BO isotype). B the same (LAE holotype). C the same (BRI isotype).
Tall canopy tree with stilt-roots. *Bark* brown. *Twigs* glabrous, slender, the young ones 1–2 mm. thick, reddish brown, the older ones 3–4 mm. thick, grey, slightly rough. *Leaves* chartaceous or thinly coriaceous, greenish brown or olivaceous above, pale brown and thinly covered beneath in parts with minute whitish scales, narrowly elliptic, acute at both ends; midrib lying in a groove above, raised beneath; nerves 8–14 pairs, impressed above, slightly prominent beneath but almost obsolete towards the apex, curving boldly from the midrib to the margins; reticulations very few and obscure, visible only with a lens; length 4–8 cm.; breadth 1.5–2.5 cm. (the smallest in the genus); petiole slender, 1–1.3 cm. long and 1–1.5 mm. thick. *Inflorescence* (section 2) woody, 5 mm. long. *Male* and *female* flowers not seen, *Fruit* minutely rustymamentulose, ellipsoid or obovoid-ellipsoid, unequal-sided, 5.5–6 cm. long and 3.3 cm. broad (not yet mature), narrowed into a pseudo-stalk at the base, oblique at the apex, the pericarp thick and woody, the line of dehiscence prominent; stalk 1–1.5 cm. long and 7 mm. thick.

**NEW GUINEA PAPUA:**

**Western District:**—Palmer River. 2 miles below junction with Black River, Brass 7181 (BM, BO, BRI, L, LAE).

**DISTRIBUTION:**
The above record only, in fruit in July. Forests of higher ridge crests at 100 m altitude.

**TYPE MATERIAL:**
Brass 7181 (BM, BO, BRI, L, LAE holotype).

The spot characters are the small leaves and the large, thick-walled, unequal-sided fruit with its oblique apex, thick stalk and a pseudo-stalk. Such a fruit will at once place it in series *Tubiflorae* where the bracteole is a short distance below the base of the perianth. The fruit of this new species is similar to that of *crassipes* and *longipes* but slightly larger. Unfortunately the flowers are as yet unknown, but they will probably be of a similar tubular shape like the other members of this montane group.

(52) *Myristica guadalcanalensis* J. Sinclair, sp. nov.


I have deleted the Latin description of this species so that the name *M. guadalcanalensis* will not be valid. Since this paper went to the press, better material of it was sent in by T. C. Whitmore’s collectors for naming and from this I saw that it was only *M. insipida* R.Br. and not a new species. It will be noted that Walker & C. T. White 36, the proposed type of *guadalcanalensis* was in female flower and fruit. When preparing my description of *insipida* no female flowers were then available to me, otherwise I might have seen that the two were the same. The recent specimens are also from Guadalcanal, namely *F. Kere* BSIP 4987 and 5003.
Fig. 57. *Myristica guadalcanalensis* J. Sinclair.

Tall tree 34 m. high, the bole bare up to 16 m. Bark nearly black, finely longitudinally fissured; sap copious, deep red. Twigs slender, 1–3 mm. thick, glabrous, finely striate vertically, usually blackish grey but yellowish in parts, especially towards the apex. Leaves numerous, chartaceous, glabrous, yellowish brown, paler beneath, narrowly elliptic with an occasional falcate one, acute at both ends, thickened but scarcely revolute at the margins; nerves 10–15 pairs, average 12 pairs, often with a short secondary nerve here and there, slightly depressed above, very fine on both surfaces, indistinct or vanishing at the margins and apex, deeply and irregularly curved; reticulations not at all distinct above, invisible beneath; length 6–12 cm., average 9 cm.; breadth 2–4 cm., average 2.5 cm. (small size-class); petiole slender, 1–1.5 cm. long and 1–1.3 mm. thick. Male flowers not seen. Female flowers 1–4, arising from woody, 1–3 mm. long pustules: perianth ellipsoid in bud, urceolate and split down ½-way with acute, reflexed lobes at flowering, minutely adpressed-puberulous, 4 mm. long and 2.5–2.75 mm. broad; pedicels 2.5–3 mm. long, 0.75 mm. thick; bracteole 1 mm. long and situated 1 mm. below the apex of the pedicel. Fruit ellipsoid, attenuate and acute at both ends, at first rusty-tomentulose, later glabrous, 5 cm. long and 2.5 cm. broad, pericarp 1–2 mm. thick; stalk 8 mm–1 cm. long, 3.5 mm. thick. Aril bright orange. Seed oblong-elliptic, 3 cm. long and 1.3 cm. broad.


DISTRIBUTION: This single record in riverine rain forest in female flower and fruit in August.

VERNACULAR NAME: Ainniu.

This species would seem to belong to series Tubiflorae firstly on account of the bracteole being situated a little below the base of the perianth and secondly because of the ellipsoid fruit, very similar to that of longipes. It is slightly smaller with a thinner stalk and pericarp than that of firmipes, but more attenuate and not oblique at the apex. The leaves of both, small size-class, are rather similar, those of the Solomon species being thinner without whitish scales beneath and the nerves less distinct but generally more (1–2 extra) in number. This is the first record of a series Tubiflorae species outside New Guinea.

(53) Myristica flosculosa J. Sinclair, sp. nov. — Figs 58–59.

Species M. crassipedi proxima a qua foliis majoribus, nervis inter se distantioribus, floribus masculis paullulo tenuioribus, pedicellis brevioribus atque gracilioribus, fructibus oblongo-ovoideis (non gibbosis) apice rotundatis, stipitibus tenuioribus differt.

Arbor 6–15 m. alta. Cortex griseo-brunneus, per longitudinalin leviter fissus; latex rubro-brunneus. Ramuli glabri, 3–4 mm. crassi, partes juveniles 2-angulatae, 10–20 cm. longae, leves, rubro-brunneae, partes adultae griseo-brunneae, striatulae. Folia
Fig. 58. Myristica flosculosa J. Sinclair.

Sinclair squamulosa oblongo-elliptica supra mediocria, impressi, in brunneaimmersa, glabri, apice in flavi, patentes ovarium elongato-ovoideum, Flores masculi tubiformes pallidoflavi, 8 mm.—1 cm. longi, 2 mm. lati, minute tomentelli vel fere glabri, apice in alabastro obtusi vel ad anthesin in lobulos late patentes vel reflexos ¼-fissi; lobuli apicibus incrassati, obtuse acuti; columna staminalis anguste cylindrica, 9 mm. longa ex ore perianthii c. 1 mm. exserta; pars fertilis antheris 7—8 praedita, breviter apiculata (apiculo 0.3—0.5 mm. longo) quam stipes duplo longior sed eum aequilata; stipes sparsim pubescens vel basi tantum pilis appressis obtectus; pedicelli gracies 5 mm. longi; bracteola c. 1 mm. longa, 1 mm. infra basim perianthii affixa. Flores feminei 1—3, vulgo 2, ex tuberculo brevi orti; perianthium elongato-ovoideum, minute tomentellum, 5—6 mm. longum, paullo supra basim 3—3.5 mm. latum, apice ut in masculis ¼-partitum; ovarium ferrugineo-tomentosum in stigmata attenuatum; pedicelli 6—8 mm. longi, medio minute bracteolati. Fructus solitarius vel binis, oblongo-ovoideus; infra basim truncatum in brevem pseudo-pedem, 3—4 mm. longum productus, apice rotundatus et minute apiculatus, ferrugineo-tomentellus, 3 cm. longus, pseudo-pede incluso, 2.3 cm. in diam., pericarpium lignosum, 2 mm. crassum; stipes 1 cm. longus, 4 mm. crassus.

Tree 15 m. high. Bark greyish brown with shallow, longitudinal fissures; sap reddish brown. Twigs glabrous, 3—4 mm. thick, the young parts 2-angled, 10—20 cm. long, smooth and reddish brown, the old parts greyish brown and finely striate. Leaves medium size-class, coriaceous, glabrous, dark green above, pale brown or becoming yellowish brown when dry, the lower surface cinerose or pale yellowish with minute scales except the reddish brown midrib and nerves, broadly elliptic, oblong-elliptic or elliptic-lanceolate, obtusely acute at the base and drawn out at the apex into a short blunt acumen: midrib flat and lying in a groove above, convex and raised beneath; nerves 15—20 pairs, sunk above, prominent beneath, leaving the midrib at an angle of 70—90°, curving with deep arches at first, then gradually ascending; reticulations invisible above, fine, scalariform and often indistinct beneath; length 11—23 cm., average 17 cm.; breadth 4—9 cm., average 7 cm.; petiole 1—1.5 cm. long and 3 mm. thick. Male inflorescence as in Knema, a woody, scar-covered, 5 mm. long tubercle with 4—5 flowers at the apex,
Fig. 59. *Myristica flosculosa* J. Sinclair.

Male flowers tubular, pale yellow, 8 mm.—1 cm. long and 2 mm. broad, minutely tomentulose or almost glabrous, obtuse at the apex in bud or split down ⅔-way by the small, spreading or reflexed lobes when the buds unfold, lobes thickened and obtusely acute at their apices; staminal column narrowly cylindrical, 9 mm. long, projecting about 1 mm. out of the mouth of the perianth, the fertile part with 7—8 anthers, shortly apiculate (the apiculus 0.3—0.5 mm. long) twice as long as the stalk but equalling it in breadth, the latter sparsely pubescent or covered with adpressed hairs at the base only; pedicels slender, 5 mm. long; bracteole about 1 mm. long and attached to the pedicel about 1 mm. below the base of the perianth. Female flowers 1—3, usually 2 arising from a short tubercle; perianth elongate-ovoid, minutely tomentulose, 5—6 mm. long and 3—3.5 mm. broad a little above the base, split down ⅔-way at the apex as in the male; ovary rusty-tomentose, attenuate into the stigmas; pedicels 6—8 mm. long with a minute bracteole at the middle. Fruit solitary or in pairs, oblong-ovoid, produced into a 3—4 mm. long pseudo-stalk below the truncate base, rounded and then minutely apiculate at the apex, rusty-tomentulose, 3 cm. long, including the pseudo-stalk, 2.3 cm. broad, pericarp woody, 2 mm. thick; stalk stout, 1 cm. long and 4 mm. thick.

NEW GUINEA Papua:  
Northern District:—Isuarava, Carr Nos. 15549 (BM, CANB, G, K, L, SING) and 15550 (A, BM, CANB, K, L, SING); Divinikoari Hill, about 3 km south of Divinikoari Village, Hoogland 3717 (A, BM, BO, CANB, K, L, LAE, US).
Milne Bay District:—about 2 miles south of Binigura, Baniara sub-district, foothills of Maneau Range, Saunders 175 (A, BM, CANB, L).

DISTRIBUTION:  
South-east Papua. In lowland rain forest up to 1,538 m (5,000 ft) in the hills. Flowering Aug.—Sept., fruiting Feb.

TYPE MATERIAL:  
Hoogland 3717 (L holotype).

VERNACULAR NAMES:  
Kearara (Onjob language at Naukwate); masureb (Minufia language at Kabulu); para (Orokaiva language at Mumni).

The outstanding features of this species are the dark reddish brown twigs, smooth and faintly 2-angled for a considerable distance downwards before they become greyish and striate, the pale brownish colour of the leaves (medium size-class) on the upper surface when dry, the deep curves of their veins, the graceful, tubular, minutely tomentulose to almost glabrous male flowers and their long staminal column and the oblong-ovoid fruit with broad base, very short pseudo-stalk and collar, rounded apex and fairly stout stalk.
M. flosculosa another member of series Tubiflorae is nearest to crassipes, especially in the leaves which also have about the same number of veins. In crassipes the leaves are smaller, however, and the veins are closer to each other. The fruit differs in being rounded at the apex. It is not gibbous like that of crassipes and the stalk, although stout, is not so thick. Carr’s specimens from the higher elevation (5,000 ft.) have slightly smaller leaves than the lowland specimens of flosculosa. They are slightly more yellowish on the lower surface also, but otherwise I can see no specific differences.

(54) Myristica cucullata Markgraf in Bot. Jahrb. 67, 2 (1935) 166. — Fig. 60.

Tree 6–25 m. high. Bark dark grey to nearly black, flaking slightly longitudinally; sap-wood pale straw, heart-wood pale brown; sap red. Twigs glabrous, dark grey or blackish grey, often slightly shining, smooth or finely longitudinally striate with a few scattered lenticels, 3–4 mm. thick in the younger parts, stouter ones up to 6 mm. thick sometimes present. Leaves varying in texture, slightly coriaceous to rigidly coriaceous, the margins slightly revolute, dark green and glossy above, drying dark to pale yellowish brown or (in the thinner leaves) blackish brown, the lower surface greyish or whitish grey due to very minute scales sunk in the tissue of the leaf (not powdery or loose), rarely a few yellowish scales present, oblong or oblong-elliptic, the sides tending to be parallel, base bluntly acute or rounded, the apex also bluntly acute or obtuse; midrib smooth, flat or slightly convex and lying in a groove above, 2–3 mm. broad at the base and 1 mm. broad higher up; nerves 16–23 pairs, average 20, often with a shorter, secondary one between a main pair, close together, nearly parallel or curving slightly, arising at an angle of about 60–80° from the midrib, slender on both surfaces, sunk, above, level with the lower surface, rarely raised, their brown colour beneath contrasting with the paler background; reticulations not always visible, fine, faint and scalariform on both surfaces when present; length 15–23 cm.; breadth 4–7–(9) cm.; petiole 1.5 cm. long and 2–4 mm. thick, drying black. Inflorescence a short woody tubercle or later a main axis, 8 mm.–1 cm. long with two divaricate branches of about the same length, male 3–5 flowered, female 1–3 flowered. Male flowers (those seen rather poor and immature) light brown adpressed-tomentulose outside, cream inside, oblong-ovoid and slightly 3-haired at the apex in bud, elongate later, (5)–8 mm.–1 cm. long and 3–6 mm. broad, split down about ½-way into the perianth lobes which are broadly ovate and bluntly acute at the apex; staminal column 5 mm. long with 8–10 anthers and an acute, 0.75 mm. long sterile apiculus, stalk glabrous, 2.5 mm. long, as long as the fertile part and its apiculus; bracteole triangular, sheathing, at first entirely enclosing the young flower except for
Fig. 60. *Myristica cucullata* Mgfr.

a narrow portion at its margins, later its scar 1–3 mm. below the base of the perianth and 5 mm. below in fruit; pedicels 6–7 mm. long, slender. Female flowers 1–3, flask-shaped, suddenly narrowed above the 4 mm. broad base, 7 mm. long and split down ¼-way at the apex into the reflexed teeth; ovary rusty-tomentulose: pedicel 6 mm. long, angled, stouter than in the male. Fruit single, 3–6 cm. long and 2–3.5 cm. broad, narrowly oblong, obtuse at the apex or slightly narrowed, often appearing acute in herbaria since it readily splits into two halves when dry, at first minutely rusty-tomentulose, glabrous and shining when old, pericarp hard, 5–7 mm. thick; stalk 1–1.5 cm. long and 4 mm. thick. Aril red. Seed oblong or narrowly oblong-ovoid, dark brown and glossy when dry, 3.5 cm. long and 1.8 cm. broad.

NEW GUINEA DUTCH NORTH

New Guinea:

Sidoarsi Mts, Iwawgiin BW9041 (L), Mt Moasets, south-west of Samli, Hollandia, Karstel BW Nos. 5321 (L) & 5324 (L); Bernhard Camp, Idenburg River, 6 km south-west of the above, Brass & Versteegh 12312 (A, BM, BO, BRI, L); 8 km south-west of the above, Brass 12738 (A, BO) and 4 km south-west of the above, Brass & Versteegh 13523 (BM, BO, BRI, L, LAE) some of the duplicates of these three numbers may have Brass only as the collector.

DUTCH SOUTH NEW GUINEA:

S.I., von Römer 1063a (BO); Wissel Lakes Region, biv. 16-17, alt. 1380-1600 m, Eyma 4283 (BO, L); Doglia, north of Kebo, Wissel Lakes, Vink & Schram BW8792 (L).

PAPUA:

Central District:—Tapini sub-district. Woitape Area, McVeagh N.G.F. 10750 (SING).

T.N.G.:

Sepik District:—Etappenberg, Ledermann 9110 (L); Lordberg, Ledermann 10131 (L).


Morobe District:—Sattelberg Area the following Clemens Nos:— Ogermann, Clemens Nos 4764 (A); 4971 (A); 5153 (A, BRI) & 5475 (A, B, SING); Sambangi, Clemens Nos. 7810a (A, B, L, SING) & 7810b (B); Sananzing, Clemens 9312 (A, B, L, SING); Wau-Salamaau Road, near Skindewai, Womersley & Millar N.G.F. 8444 (A, BRI, K).

DISTRIBUTION:

The mountains of the east coast of New Guinea, altitude 560-2,030 m from Hollandia to Morobe and one record in Dutch South New Guinea.

TYPE MATERIAL:

Ledermann 10131 (B holotype, burnt, L); Ledermann 9110 (L paratype).

VERNACULAR NAMES:

Betelohoi (Manikiong language); gudua (Woitape Area); kame (Kapauke language, Wissel Lakes); namperaro (Aiyura); navbakara (Kwerba language at Mt Moasets); sigari (Kamano); soeroem (Mt Moasets, probably Kwerba).
A mountain species which I have placed in series *Tubiflorae*. It has affinities with *longipes*, both having somewhat similar leaves with fine slender nerves and reticulations. The nerves are, however, more numerous in *cucullata* and the margins of the leaves tend to be more parallel. The flowers are less tubular and the fruit is broader at the middle, rounded and not attenuate towards both ends and on a shorter and thicker stalk. Dichotomy can be present but the axis grows slowly and is shorter with usually only one fruit reaching maturity. The name *cucullata* refers to the shape of the bracteoles which almost entirely cover the young flowers; they drop off early and their scars may be seen 1–3 mm. below the base of the older flowers. There are certain specimens of *longipes* from the Idenburg River in which the fruit approaches that of *cucullata*, being less elongate than that of typical *longipes*. Is it possible that these two species hybridize?

In *cucullata* there is considerable variability in the texture and breadth of the leaves. The veins are usually fine and not raised on the lower surface; numerous secondary ones are also present. The specimens from the Idenburg River have broader and more coriaceous leaves with thicker petioles and twigs than the rest of the material but otherwise they are the same. A. C. Smith has also named them *cucullata*. Material from Dutch South New Guinea (including the Wissel Lakes) differs slightly in having the veins more prominent and slightly raised on the lower surface. The specimens of *Womersley N.G.F. 3393* from the Eastern Highlands have rather slender twigs but their BO duplicate has thicker twigs and broader leaves more like those of the typical. If infra-specific taxa ought to be recognized here, I am not prepared to define any major ones on the variability of leaves alone, remembering the parallel instances of this kind seen in species like *iners* and even *longipes*. What may be of significance in deciding subordinate taxonomic limits is the fact that the flowers of the Wissel Lakes and Morobe District specimens are considerably smaller than those of the type from the Sepik District or of those from the Sidoarsi Mountains. It seems that the specimens with the largest leaves tend to have the largest flowers but how far this is true is not known since material from some of the important areas lacks flowers. The selection of flowering material on the whole is poor, inadequate and mostly immature. We do not yet know what the flowers of the Idenburg specimens are like nor in which category to place specimens like *N.G.F. 3393* from the Central District, which have both large and small leaves on the same tree. Some of the large-leaved specimens from Hollandia are said to be from young trees.
14. SERIES CIMICIFERAE


Twigs slender, 1–3 mm. thick and reddish brown in the apical portions, glabrous except the minutely puberulous terminal bud, greyish and longitudinally striate in the older portions. Leaves mostly chartaceous, sometimes thinly coriaceous, drying various shades, pale grey, yellowish brown to medium brown or slightly blackish above, pale brown, yellowish brown or sometimes glaucous beneath in globosa, mostly elliptic or elliptic-lanceolate, the base mostly acute, the apex acute, bluntly acute, less often acuminate, small size-class (those of concinna among the smallest in the genus) 5–20 cm. long, average 12 cm.; 1–7.5 cm. broad, average 4 cm.; nerves 10–18 pairs, average 14 pairs, slender, much curved, leaving the midrib at a wide angle, distinct except in concinna, secondary nerves absent: reticulations mostly absent, some faint ones seen with a lens on the lower surface; petiole slender, 8 mm.–1.5 cm. long and 1–2 mm. thick. Inflorescence a short unbranched, 2–5 mm. long woody tubercle with dense clusters of ellipsoid or oblong-ellipsoid flowers (fewer in the clusters in globosa). Male perianth pale yellowish-tomentulose to tomentose, 4–6 mm. long and 1.2–3 mm. broad, split down ½-way at the apex into the non-reflexed lobes; pedicels variable, as long as the flowers, 5–6 mm. long and filiform in globosa to shorter, 0.5–3 mm. long and 1 mm. thick in the other two; bracteole minute, situated at the apex of the pedicel and at the base of the perianth; staminal column without a sterile apiculus, the stalk tomentose or tomentose at the base only, narrower than the fertile part and about half as long. Female flowers (in globosa) urceolate, 6 mm. long and 4 mm. broad; pedicels 5–7 mm. long, stouter than in the male (not seen in the other two species). Fruit 1.5–3.5 cm. long and 1–2.5 cm. broad, pale brown or yellowish brown, globose, sub-globose, less often oblong or ellipsoid, without a central apiculus except when very young, glabrous or soon becoming glabrous, the pericarp thin and liable to break in herbaria; stalk 3–7 mm., average 5 mm. long and 1–3 mm. thick — 3 species, M. concinna, globosa and insipida.

TYPE SPECIES: (M. cimicifera R.Br.) = insipida R. Br.

The outstanding features of this series are the small thin, mostly elliptic leaves with widely curving nerves, the absence of secondary nerves and the paucity of reticulations, the slender glabrous twigs, the small ellipsoid male flowers with long or short pedicels, the absence of the sterile apiculus to the column and the small globose to oblong fruits with a thin pericarp.
Two of the species, insipida and globosa are very common, and have a wide distribution while concinna is very rare. The wide distribution of insipida even to Northern Australia may be due to the fact that it is a species of the costal dunes. The fruits of all three are small and could easily be distributed by birds, especially those of M. globosa. M. concinna probably evolved from globosa later and has had less time to spread very far. At least it seems to be nearer to globosa in general appearance as well as in other details, but rather strange to say it has the short male pedicels of insipida and its male flowers too are closer to those of insipida. I should have expected that the length of the pedicels, a rather minor character, would have, in this small series, been long like those of globosa. In fact, I was surprised to find this variation of the pedicels in an otherwise uniform series.

This series through M. globosa seems to come nearest to series Subalulatae. In many ways M. globosa is like a miniature M. subalulata. The shape of the flowers, the long pedicels, the appearance of the leaves and fruit are similar, though all on a smaller scale. The twigs, however, lack the two lines from petiole base to petiole base, the fruit has a central micro only when young and the apiculus of the staminal column is absent or poorly developed in comparison with that of the Subalulatae.

At one time before the Master Key to the series was prepared, I thought that series Cimiciferae was near to series Laurifoliae and was about to unite the two. Series Cimiciferae differs from the last-mentioned in its ellipsoid or oblong-ellipsoid male flowers, those of the latter being ovoid or sub-globose. The leaves also are much larger in Laurifoliae, but they are of less importance. Probably I ought to have placed insipida in series Laurifoliae, and then concinna with short pedicels would have to go there too. On the other hand globosa might have been placed in series Subalulatae. It probably does not matter very much as the last few series in section II i.e. those without the yellow powdery scales on the lower surface of the leaves (excluding the Tubiflorae) are all rather similar, differing only in minor characters. Grouping in relation to certain sets of similar characters will produce one arrangement and a different arrangement is possible by a grouping which depends on other combinations of related characters. Once again, series are but minor divisions and differences between them are not spectacular.

Attention has been drawn to the fact that sterile specimens of globosa might be confused with sterile ones of fragrans since the leaves are in some ways similar. See notes under the description of M. globosa for details.

Gardens’ Bulletin, Singapore — XXIII (1968)


Tree 6–20 m. high with straight bole and horizontal branches. *Bark* dark brown to almost black, longitudinally striate, flaking in rectangular portions when old; sap pink. *Twigs* glabrous except the terminal bud, finely longitudinally striate, yellowish or reddish brown when young, greyish brown when old, somewhat slender, 3 mm. thick at the apex and 4–5 mm. thick lower down. *Leaves* chartaceous to slightly coriaceous, glabrous, medium to dark green and glossy above when fresh, paler and dull or slightly glaucous with yellowish green midrib beneath, drying a pale greenish brown and glossy or dull above, and a pale yellowish brown beneath, variable in shape, mostly narrowly elliptic but also lanceolate, elliptic-lanceolate or oblant-lanceolate on the same tree and even in the same specimen, base acute or less often rounded, apex bluntly acute or obtuse, occasionally acute; midrib lying in a groove above; nerves 10–15 pairs, closely or distantly spaced, slender, sunk above, slightly prominent beneath, curving gradually from midrib to margin; reticulations
Fig. 61. *Myristica insipida* R. Br.

very faint on both surfaces when the texture of the leaf is thick, mostly absent in thin leaves; length 10–20 cm.; breadth 2.5–7.5 cm., average 5 cm. (often large and small ones on the same specimen); petiole 1–1.5 cm. long and 2 mm. thick. Male inflorescence Knema-like with a dense cluster of up to 10 flowers arising from the apex of each 2–5 mm. long, woody tubercle. Male flowers coriaceous, oblong or narrowly ellipsoid, obtuse at the apex in bud, densely pale brown-tomentose outside, cream-coloured and glabrous inside, 5–6 mm. long and 3 mm. broad, split down \(\frac{1}{4}-\frac{3}{4}\)-way into the deltoid, acute perianth teeth; pedicels tomentose, slightly shorter than the perianth, 2–3 mm. long; bracteole semi-orbicular, half-embracing the perianth on one side, tomentose outside, glabrous inside, closely adpressed to the base of the perianth, 1.5 mm. long and 2.5 mm. broad; staminal column 4–5 mm. long, the fertile part 3 mm. long with 8–10 anthers, cylindrical and rounded at the apex with or without a sterile apiculus, the stalk 1.5–2 mm. long, half to nearly as long as the fertile part, and slightly narrower than it, striate, thinly hairy at the base with 1 mm. long, whitish hairs. Female flowers not seen. Fruit oblong, rounded at the apex, only slightly narrowed at the base above the stalk, pale brown and sparsely covered with 0.5–1 mm. long, dendroid hairs, these breaking and appearing short when old, the pericarp thin and wrinkled on drying, 2.5–3.5 cm. long and 1.5–1.8 cm. broad; stalk short, 5 mm. long and 3 mm. thick. Aril red. Seed oblong, rounded at both ends, pale yellowish brown, shining, 1.8 cm. long and 1.3 cm. broad.


ISLANDS

TIMOR LAUT: Forbes 3368 (A, BM, CAL, K, SING); Riedel (per Dr. Meyer) June 1884 (K); Mejano Das, bb24416 (A, BO, K, L, SING); Adaut, Pulau Selaru, J.v.B. Waalkes 3143 (K, L, P, SING).

NEW GUINEA

DUTCH SOUTH NEW GUINEA: Ginu, Okaba, Branderhorst 11 BO, K, L, U; Merauke, Branderhorst 294 (BO, K, L, U) and Koch 708 (BO, L).

PAPUA: Milne Bay District—Barawara, W. McGregor 12 (MEL). Central District—Rubologo Creek, Brown River Road, Port Moresby, E. Gray N.G.F. 8085 (A, BM, BO, BRI, CANB, K, L, NSW, SING); Rubologo Creek, Mt Lawes Timber Reserve, Jackson N.G.F. 4521 (A, BO, BRI, CANB, K, L, LAE, SING); Yule Island, C.T. White 734 (BRI); Toulon Island, Lister Turner, Nov. 1930 (BM, BRI); Kalo, Brass 510 (A, BRI, K, P); Mori River Bras 1633 (A, BRI, K, P).

WESTERN District—Mabadian. Brass 6505 (A, BM, BO, BRI, L, LAE); Daru Island, Brass 6430 (A, BM, BO BRI, K, L); Lower Fly River, east bank, opposite Sturt Island, Brass 8122 (A, BM, BO, BRI, L, LAE).

ISLETS IN TORRES STRAIT: Thursday Island, Jaheri, date 16th May 1901 (BO).
AUSTRALIA

Western Australia:

Swan River, *Lieut King* s.n. (BR, G); York Island, Brunswick Bay, *Herb. Hooker* (J. Smith) s.n. (CAL; K) & *Cunningham* 288 (BM, K).

Northern Territory:

Port Darwin, *R. Brown* 25 (G, Boiss., P) and s.n. (BM) probably the same collection: *Holtze 6151* (Z); Darwin, *Hill 432* (NSW); Holtze’s Jungle near Darwin, *M.R. Jacobs 9* (NSW); Port Essington, *Armstrong 580* (K); Yirrkala, Arnhem Land, *Specht Nos 841* (K, L, LAE, NSW) and *841b* (K, L, LAE, NSW); Groot Eglandt, *Specht 666* (K, L) and Tindale *N.S.W. Acc. No. 43136* (NSW); Chasm Island, *R. Grown 2312* (BM).

Queensland:

Carpentaria, *R. Brown 3012* (E, K); Cape York, *Thozet, date 1870* (G); Albany Island, *Hill 80* (K); Cooktown, Mt Cook, *Warburg 19500* (B, burnt); Daintree River, *Kajewski 1392* (BM, E, K, P, SING); Mossman River Gorge, *Brass 2134* (K, P); Mawbrag River, *Brass 1987* (K, P); Fitzroy Islands, Endeavour River, *Lieut. King* s.n. (G & Prodr., K) and Banks & Solander, *date 1770* (BM; K); Fitzroy Islands, *Cunningham 312* (BM, K) & s.n. (G & Prodr.); Bellenden-Ker, *C.T. White 1284* (NSW); Gadgarrah River, Atherton, *Kajewski Nos 1007* (K, P, UC) and *1168* (E, K, P); Innisfail, *Michael 5 = N.S.W Acc. No 43139* (NSW); Rockingham Bay, *R. Brown s.n.* (BO, P) and *Dallachy (Herb. v. Müller)* s.n. (FI, K, NSW) and *Wilhelmi s.n.* (B, burnt); Sandy Cape, Port Bowen, *McGillivray 102* (BM, NSW); Sarina, *C.E. Hubbard & Winders 6510* (K); Bayfield just north of Keppel Bay, *C.T. White 8140* (BM).

Cultivated:

Hort. Bog., *IVG24, Sinclair 10027* (A, B, BM, E, K, L, NY, SING); *IVG24 from same tree, Sutrisno 124* (A, BO, L, SING) the BO duplicate has a portion of *lancifolia* var. *montana* mounted on the sheet.

DISTRIBUTION:

Lesser Sunda Islands (P. Babar and Timor Laut), Coast of New Guinea, especially on the southern shores, the coast of Queensland down to latitude 23°N (the southern limit of the genus *Myristica*), Northern Territory and that portion of the Western Australian coast opposite Timor Laut. The locality of Lt. King’s specimen from the Swan River, Western Australia must be an error. Domin suggests that the label has got mixed up with that of some other plant and interchanged.

TYPE MATERIAL:

A tree of the coastal sand dune forest; often on the shores of small islands, but never very far inland. Warburg's contention that *cimicifera*, a Solander's manuscript name, (Warburg, page 501) was in use before the name *insipida*, cannot stand under Article 57 of the Code. Bentham was the first to unite these two species and the right to choose one of them for all time remains with him. Blake follows Bentham in reducing *cimicifera* to a synonym of *insipida* and also points out Warburg's mistake in nomenclature [Austr. J. Botany 2 (1954) 124]. Warburg using *cimicifera* as the starting point, regarded *insipida* as a variety of it. He describes yet another variety, namely *acutifolia* Warb. under it, but creates a new species, *M. muelleri*, to dispose of three other specimens which he says are near to *cimicifera*.

There is some variation in the shape, size and texture of the leaf in *M. insipida*. Large and small leaves with an acute or rounded base, the veins close together or distantly spaced, are frequent, not only on the same tree, but even in the same specimen. The general colour of the upper surface of the leaf is dark green and glossy when fresh and pale yellowish brown or olive-green when dry, the gloss often being retained. Small leaves, especially if the veins beneath have a reddish tinge, resemble the leaves of *M. globosa*. Markgraf mistook Ledermann 7799 (*M. globosa*) and cited it with *M. macgregorii* Warb., another synonym of *insipida*. Since *insipida* is distributed over a fairly wide area, some variation, especially in leaf characters, is expected, but such variants in leaf form are not confined to any one distinct area. Since they are, as pointed out above, to be seen in the same specimen, I find then quite useless in separating the various varieties given by Warburg. I cannot even maintain his *M. muelleri*, mentioned above, separate from *insipida*. Whether the fertile part of the staminal column ends in an apiculus or not seems immaterial. I have examined many flowers of the New Guinea material of *insipida* and find that an apiculus may or may not be present even in the same specimen. I also find that long or short hairs on the fruit will not separate *muelleri* and *cimicifera* as is stated by Warburg nor will it, in fact, separate any of the other so-called species or varieties. The hairs are very brittle and break off at their ends when old, becoming shorter. This can be seen on wrinkled fruits in...
herbarium specimens. The fruit shrinks on drying and the hairs at the bottom of depressions formed by the wrinkles are often protected and remain unbroken. Extra protection is afforded to such fruits when wrapped in paper and kept in packets on the sheet.

_M. insipida_ is nearest to _globosa_ which is a taller tree, usually confined to inland situations. The following are the chief differences between the two. The leaves of _insipida_ are slightly larger and dry a paler colour. The apex is generally obtuse and the veins fewer. The flowers (male) are paler and more numerous in the clusters. They have thicker but shorter pedicels, these also being shorter than their own perianths. The fruit is larger and more oblong (not globose or sub-globose) and the stalks slightly shorter than those of _globosa_.

(56) _Myristica concinna_ J. Sinclair, sp. nov. — Fig. 62.

Species valde affinis _M. globosa_ a qua foliis angustioribus, floribus subcyllindricis angustioribus, subsessilibus vel pedicellis floriferis brevioribus, fructibus minoribus ellipsoides differt.

Arbor elegans, 8–15 m. alta. _Cortex_ atro-brunneus, per longitudinem leviter fissus, lenticellis ferrugineis pustulosus sparse obtectus, intus stramineo-brunneus; _latex_ ruber. _Ramuli_ glabri, striolati, prope apicem et pro 6–12 cm. deorsum gracillimi, 1–2 mm. tantum crassi, rubro-brunnei, inferne 3–4 mm. crassi, griseo-brunnei. _Folia_ chartacea, anguste elliptica, supra in sicco pallido-griseo-brunnea, nitida vel opaca, subtus paullo pallidiora, costa inferiore rubro-brunnea eminente, basi acuta, apice acuta vel acuminata, 5–11 cm. longa, 1–3 cm. lata, vulgo 2.5 cm.: nervi 12–15-jugati, tenuissimi, supra generaliter invisibles, subtus haud prominentes, hic illic subocculiti vel evanescentes, a costa angulo 70–90° abuntes, sursum gradatim curvati et prope marginem arcuati; petioli 1 cm. longi, tenuissimi, 1 mm. crassi. _Inflorescencia mascula_ ut in _Knema_, tuberculiformis, lignosa et cicatricosa, 2–3 mm. longa, 2 mm. lata. _Flores masculi_ flavi (in sicco modice brunnei) conferti, membranacei, subcyllindrici vel tubuliformes, basi tumidiusculi, appresso-tomentelli, 4–5 mm. longi, 1–2 mm. lati, vulgo 1.75 mm., apice in lobos notatos obtusos 1/5–1/2-fissi; pedicelli breves, 0.5–2 mm. longi, vulgo 1 mm., bracteola semiorbicularis vel deltoida, apice obtusa, ad basin perianthii affixa; columna staminalis angusto-cylindrica, 3.5–4 mm. longa, in apicum minutum acutum sterilem terminata, antherae 8, stipites appresso-setosus, 1.2–2 mm. longus, partem fertilem in longitudine aequans vel 1/2-brevior, in diam. quam ea palulo angustior. _Flores feminei_ nondum visi. _Fructus_ 1.8–2 cm. longus, 1–1.2 cm. latus, ellipsoides, pallido-brunneus vel flavido-brunneus, tenuiter lepidoto-furfuraceus, indumento deterptis, mox glabrescens; pericarpium in sicco vel in maturitate tenuis, 0.5–1 mm. crassum; stipites 3–5 mm. longus, tenuiss, 1–2 mm. crassus. _Arillus_ ruber, usque ad basim in segmenta plu minusve 4 tenuia fenestratu. _Semen_ pallido-brunneum, oblongum, utrinque rotundatum, carpellum implens.
Fig. 62. *Myristica concinna* J. Sinclair.

A graceful tree, 8–15 m. high. Bark dark brown, slightly longitudinally fissured and sparsely covered with rusty, pustular lenticels, inner bark straw-brown; sap red. Twigs glabrous and finely striate, reddish brown and very slender from the apex downwards for a distance of 6–12 cm. (only 1–2 mm. thick), lower down 3–4 mm. thick and greyish brown. Leaves chartaceous, narrowly elliptic, drying a pale greyish brown and glossy or dull on the upper surface, a little paler still on the lower with the reddish brown midrib standing out in contrast, base acute, apex acute or acuminate: nerves 12–15 pairs, very slender, generally invisible above, not at all prominent on the lower surface, half-hidden or vanishing here and there, leaving the midrib at an angle of 70–90°, curving gradually upwards and arching near the margins; length 5–11 cm.; breadth 1–3 cm., average 2.5 cm.; petiole very slender, 1 cm. long and 1 mm. thick. Male inflorescence as in *Knema*, tuberculate, woody, 2–3 mm. long and 2 mm. broad and covered with scars. Male flowers yellow (medium brown when dry) clustered together, membranaceous, sub-cylindrical, but somewhat swollen at the base, adpressed-tomentulose, 4–5 mm. long, 1–2 mm. broad, average 1.75 mm. broad, split down 1/5–½-way at the apex into the minute, obtuse lobes; pedicels short, 0.5–2 mm. long, average 1 mm.; bracteole semi-orbicular or deltoid, obtuse at the apex, attached to the base of the perianth; staminal column narrow-cylindrical, 3.5–4 mm. long, ending in a minute, acute, sterile apex, anthers 8, stalk adpressed-setose, 1.2–2 mm. long, equal to the fertile part in length or half the length of it and a little narrower than it in diameter. Female flowers not yet seen. Fruit 1.8–2 cm. long, and 1–1.2 cm. broad, ellipsoid or oblong, pale brown or yellowish brown, thinly scaly-furfuraceous, soon becoming glabrous, the indumentum tending to rub off; pericarp thin when dry or in ripe fruit, 0.5–1 mm. thick; stalk 3–5 mm. long, slender, 1–2 mm. thick. Aril red, fenestrate to the base into about 4 thin segments. Seed pale brown, oblong, rounded at both ends, filling the carpel.

**NEW GUINEA Papua:**

Northern District:—about 1 km north-west of Anonda Airstrip along the Girua River, Hoogland 3773 (A, BM, BO, CANB, G, K, L, LAE, US); along the Musa River near Guruguru Village, Tufi sub-district, Hoogland 4215 (A, BM, CANB, K, L, LAE, US); about 3 miles from Aku on track to Kuruaku, Tufi sub-district, Saunders 28 (A, BM, CANB, K, L, LAE).

**DISTRIBUTION:**

Papua. Dense rain forest. Altitude low, 5–25 m.

**TYPE MATERIAL:**

Saunders 28 (A, BM, CANB, K holotype, L, LAE).

**VERNACULAR NAMES:**

Etsupat (Onjob language at Naukwate, Tufi sub-district); inene (Orokaiva language at Mumuni, Girua River); ruswaen (Minufia language at Kububu, Tufi sub-district).
An elegant tree with leaves narrower and fruits smaller than those of any other *Myristica* species. Although a near neighbour of *globosa*, it differs in certain important characters which would seem to indicate a distinct specific rank rather than a varietal alliance. If it is only a variety, then why does it stand so wide apart from the other close variants that make up *globosa*? If it originated in the distant past from *globosa* or from some common stock, then it has gone a long way beyond the realms of varietal rank. It has, in my opinion, at least reached the border-line of specific demarcation with enough qualifications to pass as a new species. Although it has made the grade without impressive distinctions, it is more than an incipient species, the incipient and "dead end" stages down this highway of evolution have, no doubt, perished without a fossil record.

The chief diagnostic features separating it from *globosa* are as follows:— the narrower leaves, the narrowest in the genus, the narrower male flowers, almost tubular except for their slightly swollen bases, the shorter male flowering-pedicels, 0.5–2 mm. long, and the smaller fruit, ellipsoid and not globose in shape with thinner walls when dry or ripe, scarcely thicker than the shell of a duck’s egg and finally, though not always their slightly paler colour. It will sometimes be noticed that the pericarp is quite glossy or polished in parts where the scurfy indumentum has been rubbed off. The faintness of the venation of the leaves, another notable feature, will not distinguish *concinna* from *globosa*, as the latter may have both faint and distinct nerves, depending on the texture of the leaf. I have noted in the herbarium specimens that the pedicels are short even in mature flowers that have opened at the apex, displaying their erect perianth lobes with the staminal column protruding a very short distance beyond the lobes. The anthers here have already dehisced, revealing their yellow pollen. The unopened flower-buds (much more numerous than the mature flowers) have, at this stage, shorter pedicels than similar flower buds of *globosa* in the same stage of growth. Finally, the shortness of the pedicels, if constant, will go a long way in supporting the view that *M. concinna* is a distinct species and not a variety of *M. globosa*.


*This is the corrected spelling in the index to Warb. Monog. Myrist. page 665. The original spelling Warb. page 541 is *M. baeuerlenii* Warb.*
Sinclair — Myristica


Tree 8–35 m. high, average 18 m. with horizontal branches and cylindrical crown. Bark mostly dark brown, but also pale or medium brown, slightly longitudinally striate, flaking in small thin rectangular pieces; sap watery, red, copious. Twigs slender, 1–2 mm. thick in the apical parts, 3–4 mm. lower down, finely striate, reddish brown, becoming greyish brown in the old parts, glabrous except the slender, elongate, minutely puberulous terminal bud. Leaves slightly variable in shape, texture and colour on drying, mostly chartaceous, sometimes thinly coriaceous, mostly elliptic, also narrowly lanceolate, lanceolate, elliptic-lanceolate, narrowly elliptic or less often oblanceolate, generally dark glossy green above and glaucous or greyish beneath when fresh, but also from pale to dark green above on the same tree, drying a dull greyish or rusty brown above or sometimes blackish brown in thin leaves, lower surface generally a paler brown with a greyish shade, the nerves beneath very often a reddish brown or darker than the surrounding tissue, apex shortly and bluntly acuminate to acute, base acute; midrib sunk above and slightly prominent beneath; nerves 13–18 pairs, average 15, slender but distinct, close to each other, sunk above, faintly or not raised beneath, curving gradually from the midrib at a wide angle (often 90°); reticulations faint above or absent, faint and lax below, best seen with a lens; length (small size-class) 8–17 cm., average 12 cm.; breadth 3–5.5 cm., average 4 cm.; petiole slender, 8 mm.–1.5 cm. long, 1.5–2 mm. thick. Male inflorescence a short, 2–5 mm. long, Knema-like, woody, axillary tubercle with numerous flowers. Male flowers yellow or pale yellow, tomentulose to puberulous outside, ellipsoid and obtuse in bud, membranous, 5 mm. long and 3 mm. broad, split down ¼-way by the small obtuse lobes; pedicels 5–6 mm. long, filiform, 0.3–0.5 mm. thick, tomentulose; bracteole ovate, thin, tomentulose outside, obtuse at the apex, arising from the base of the perianth and closely applied to it; staminal column elongate, cylindrical, the fertile part 3 mm. long, with 10 anthers extending right up to the obtuse apex, stalk 1 mm. long, densely tomentose to glabrous, slightly narrower than the fertile part. Female inflorescence as in the male, but with 1–3 flowers only. Female perianth urceolate, ovoid in bud and narrowed to an obtuse apex, 6 mm. long and 4 mm. broad, coriaceous; pedicels 5–7 mm. long, stouter than in the male; ovary dark rusty brown-tomentose, ovoid and elongated above the middle, 4 mm. long, stigma with 2 flat obtuse lobes. Fruit single or in pairs, globose, sub-globose or less often slightly oblong, orange, minutely pale greyish or rusty brown-tomentulose, the tomentum longer when young but tending
Fig. 63. *Myristica globosa* Warb.
to become shorter and less when old, thin-walled, shrinking or wrinkled when dry, varying in size, 1.5–2.5 cm. in diam.; stalk 5–7 mm. long and 3 mm. thick. Aril red with thin lacinations. Seed aromatic, dark brown, shining, filling the carpel.

MOLUCCAS MOROTAI: G. Sangowo, Kostermans Nos. 7887 (BO, K, L, PNH, SING) & 7889 (BO, K, L, LAE, PNH, SING).

TERNAY: Beccari FL Acc. Nos. 7756 (FI); 7756b (FI) and 7756c (FI).

P. OBI: Laiuwai, bb23777 (BO, L, PNH, SING).

CERAM: Kampung Kiandarat, G. Kilka, Buwalda Nos. 5597 (K, L) & 5641 (A, K, L) and bb25843 (A, BO, K, L, SING).

NEW GUINEA VOGELKOP: Sorong (Soron), Beccari 96 (FI) 2 sheets, also numbered FL Acc. Nos. 7657 (FI) & 7657a (FI); Warsamson River, ± 25 km. east of Sorong, Iwanggin BW5713 (K, L, SING) & Schram BW2984 (K, L); Steenkool, Road to Temboeni, km. 1.5, opposite police barracks, v. Royen 3579 (CANB, K, L); Wersar, about 6 km. south of Teminabuan, Schram BW6065 (L); Soeroeremi, Mangold BW2334 (KEP).

DUTCH: Berap (Nimbruran) Hollandia, bb28987 (A, BO, K, L, SING); south of Sentani-Meern between Sekoli & Sairum, Hollandia, Kalkman BW3776 (L) and Schram BW9374 (L); mouth of the Tami River, Versteegh BW3818 (CANB, K, KEP, L, SING); Pioneer Bivak, Mamberamo, bb31230 (BO, L).

PAPUA: S.1., N.G.F. 331 (BRI).

Northern District:—Dobodura Area, N.G.F. 2037 (BRI, LAE, SING); Tufi sub-district, about 1 km. east of Aku, Hoogland 4393 (A, BM, BO, CANB, G, K, L, LAE, US); Lala Valley, Carr 15861 (BM, CANB, G, K, L, SING).


Central District:—Sogeri, Barrett N.G.F. 4168 (A, BO, BRI, K, L, LAE, SING) & Forbes 212 (BM, CAL); Brown River, E. Gray & Coppack N.G.F. 7152 (A, BM, BO, BRI, CANB, K, L, LAE, NSW, SING); Diani, Ononge Road, Brass 3946 (A, BO, BRI, K, NY, US); Koitaki, Carr Nos. 12890 (A, BM, CANB, K, L, SING) & 12899 (BM, CANB, K, L, SING); Boridi, Carr Nos. 13265 (A, BM, CANB, K, L, SING); 14325 (A, BM, CANB, K, L) & 14901 (A, BM, CANB, K, L, SING); Runa Falls, Carr 12374 (A, BM, CANB, K, L, NY, SING); s.l., Chalmers 5 (MEL); South Cape, Chalmers 10 (MEL).

Western District:—Strictland River, Bäuerlen 1 (MEL).

Gardens’ Bulletin, Singapore — XXIII (1968)

LOUISIAD: Sudest Island, Tagula Island, Mt Riu, Brass Nos 27813 (A, L) and 27918 (A, CANB, K, L); Rossel Island, Aobaleti, Brass 28302 (A, BO, K, L).


T.N.G.: Sepik District: — April River. Ledermann Nos 7799 (SING); 8779 (SING); 8819 (SING) & 12333a (L); Timbomori. Womersley N.G.F. 3708 (A, BM, BO, BRI, CANB, K, L, LAE, NSW).

Madang District: — near Utu Village, southern foothills of Adelbert Range, about 30 km inland, Hoogland 4938 (A, BM, CANB, K, L, LAE, US); Ramu Valley, Rodatz & Klink (Tappenbeck) 70 (BRSL); Ramu Valley, about 5 miles south-east of Faita airstrip, Saunders Nos 219 (CANB, L, LAE); 244 (CANB, L); 335 (A, BM, CANB, K, L, US); 431 (CANB, L); 456 (A, BM, CANB, G, K, L, US); 510 (CANB, L, LAE); 514 (CANB, L, LAE) & 516 (CANB, L); Sakula Valley, Lower Ramu-Atitau Area. Pullen 1173 (BM, CANB, L).

Morobe District: — Highlands-Gusap Road near Water-rice, Robbins 1010 (BM, CANB, L); Kjabbit, Markham Valley, Clemens 10479 (A); Markham River, Henty N.G.F. 10546 (CANB, K, L, SING); rain forest, edge of Botanic Gardens, L. K. White N.G.F. Nos 9671 (BO, CANB, K, L, SING) & 9697 (CANB, K, L, SING) & A.N. Millar N.G.F. 9781 (CANB, K, L, SING); Oomsis near L., Henty N.G.F. 10673 (CANB, K, L, SING); Red Hill Area. Oomsis K. J. White N.G.F. 10476 (CANB, K, L, SING); Oomsis, Brass 29239 (K, L, LAE) & Womersley N.G.F. 9403 (BM, BO, CANB, K, L, NSW, SING); Yalu, Womersley N.G.F. Nos 3190 (A, BRI, CANB, K, L, LAE) & 3238 (BO, BRI, CANB, L, LAE); Yalu, east side of Munim Water. Austr. For. Survey Co. N.G.F. 270 (BRI, LAE); Umboi Island, K. J. White N.G.F. 9647 (CANB, K, L).

NEW BRITAIN: Near Wasissi Village, Talasea sub-district, K. J. White N.G.F. 10939 (CANB, K, L, SING); Mora Mora-Rikau Road, Talasea sub-district, K. J. White N.G.F. 10865 (BM, CANB, K, L); Galillo Village, near Cape Hoskins, West Nakanai, Floyd N.G.F. 6433 (A BM, BRI, CANB, K, L, LAE, NSW, FNH); Lodi River. Mait N.G.F. 1835 (BRI, LAE); the following three Gazelle Peninsula: — Keravat, Floyd N.G.F. 3450 (A, BO, BRI, CANB, K, L, LAE); Vudal Divide, Keravat, Womersley N.G.F. 7931 (A, BM, BO, BRI, CANB, K, L, NSW, SING); Warangoi Valley, Womersley & Kazakov N.G.F. 7069 (A, BM BO, BRI, CANB, K, L, NSW, SING).

PULAU JAPEN: Serui, Mariattu, bb Nos 30458 (BO, L) & 30459 (A, SING); Serui bb Nos 30768 (A, BO, L, SING) & 30833 (A, BO, L, SING).

MIOS: bb Nos 30960 (BO, L) & 30971 (A, BO, L, SING).
Sinclair — Myristica

Salawati: Kaloul, Koster BW1445 (CANB, L).

SOLOMONS BOUGAINVILLE:

Island: Tonolei harbour, Whitmore BSIP 4160 (L, LAE, SING).

CHOISEUL:

Island: Near Ruruwai, Whitmore BSIP 3967 L, LAE, SING).

WAGINA:

Island: Ridge top, Whitmore’s collectors BSIP 5496 (L).

NEW GEORGIA GROUP:

Island: Baga Island, Whitmore’s collectors BSIP 2880 (L, LAE, SING); New Georgia Island, Vim River, Cowmeadow & Teona BSIP 2542 (L, LAE, SING); Rendova Island, north of Kenelo Plantation, Whitmore BSIP 1901 (L, SING).

RUSSEL ISLANDS:

Island: Banika Island, Stoddard 10 (A).

MALAITA:


GUADALCANAL:

Island: Uulolo, Mt Tatuve, Kajewski 2552 (A, Mt Austen, near Honiara, Whitmore BSIP 769 (L, LAE, SING).

SAN CRISTOBAL:

Island: S.I., Comins 121 (K); Magoha River, Brass 2744 (A, BM, BO, BRSL).

Moluccas (Morotai, Ternate, P. Obi, Ceram) New Guinea (except Dutch South New Guinea), New Britain and the Solomons. Lowland forest from sea level to 1,230m.

TYPE MATERIAL:

M. globosa Warb., Forbes 212 (BM, CAL) Soger and Chalmers 10 (B burnt, MEL) South Cape. M. baueerlenii Warb., Bäuerlen 1 (B holotype burnt, MEL). M. chalmersii Warb., Chalmers 5 (B holotype burnt, MEL). M. montanoides Warb. Beccari Fl Acc. Nos 7756 (Fl); 7756a (Fl); 7756b (Fl) & 7756c (Fl). M. schumannianna Warb., Rodatz & Klink (Tappenberg); 70 (B holotype burnt, BRSL). M. salomonensis Warb., Comins 121 (K holotype). M. tristis Warb., Beccari 96 (Fl) 2 sheets.

VERNACULAR NAMES:

New Guinea:—Hokkol; saksak (Amele); san (Bembi); geseopasop; gisingas; mobo; rok (Bilia); kwardzim (Bogia); mansindor (Bosneh, P. Japen); djakwin; dzidzit; gaigihab; pasif (Dumpu); gadiun; gamuka; gonugula (Faita); uti (Jal, Lower Ramu); babijag (Karoor); kekere; orokali (Kemik); medak (Moob language near Sorong); fer (Utu). New Britain:—La gegeesi (Galilo Village). Solomons:—Aiba’asa (Guadalcanal); aiba’asi (New Georgia Island); mansi-mansi (Guadalcanal); pai-passi (Malaita); tolou (San Cristobal).

All the scientific names except the last are of the same date. I have chosen M. globosa for the name of the plant as the epithet globosa aptly describes the fruit. Being a common tree with a wide distribution, this species shows some slight variation mostly in respect of the leaves, while the fruit varies somewhat in size. Most of the material collected is in fruit, flowering specimens seem to have received less attention. M. chalmersii,
globosa (I can see no difference between the first two), salomonensis and the material from New Britain have fruit of the same size. The specimens with the smallest fruits are from Morobe District. Those of montanoides tend to have a slightly oblong fruit, but otherwise they are the same. M. baeuereii has the leaves somewhat thinner than the others and is typical of Morobe specimens. The leaves of the material from New Britain nearly always have the nerves on the lower surface of the leaf distinctly reddish-brown when dry. Material from other regions may not always show the red colour so clearly. I have united all these so-called species as they grade into each other with every stage of intermediates and not one of them is really worth even varietal rank. At most, they are forms or sub-forms and I am unable to draw up any satisfactory key to separate them. Markgraf reduced M. schumanniana to globosa and chalmersii to tristis. He did not include salomonensis nor montanoides, but then he was not concerned with these as they were outside his area.

The leaves of globosa show some similarity with those of fragrans and are of the same size-class. In fragrans, however, they are more sharply acuminate or acute at the apex, more glossy above, more elliptic and broader at the middle, with fewer nerves (8–11 pairs) and these are more prominent and raised on the lower surface. M. globosa has already been compared with lepidota in the notes after that species.

15. SERIES SUBALULATAE


Twigs 3 mm.—1 cm. thick at the apex with two lines running down from petiole base to petiole base (the lines faint in undulatifolia), often thinly winged in subalulata, ant swellings and deformations also present in this species. Leaves chartaceous, coriaceous in specimens from mountains, large to medium size-class, 20–40 cm. long and 7–15 cm. broad, average 10 cm. broad in subalulata, smaller, 15–26–(32) cm. long and 3.5–8 cm. broad in the other two, oblong, the base rounded or acute, less often sub-cordate or cordate, the apex acute or rounded and shortly acuminate, drying medium brown above, or darker in sulcata, the lower surface paler brown, or in undulatifolia and mountain specimens of subalulata whitish with minute but never powdery scales; nerves 15–30 pairs, average 22 pairs, impressed above, distinct beneath, much curving and leaving the midrib at a wide angle; secondary nerves absent or rare. Inflorescence stout, very typical of section 2, the basal smooth portion absent. Male flowers elongate and ellipsoid or narrowly oblong, pale tomentulose to tomentose outside (often darker in subalulata), 3–5 mm. long and 2 mm. broad, much longer, 1–1.5 cm. long in subalulata, not split down very far into the non-reflexed lobes; pedicels 4–7 mm. long, 1–1.5 cm. long in subalulata, equal to or longer than the flowers in the same inflorescence; staminal column
distinct in having a well-developed, acute sterile apiculus, longer than in the other series (1.5–2 mm. long in subalulata), the stalk shorter than the fertile portion and slightly thinner, pubescent or glabrous. Female flowers more ovoid or urceolate, smaller than in the male. Fruit dark or light brown, minutely tomentulose becoming glabrous, sub-globose, ovoid or shortly oblong, rather small, 1.6–4 cm. long and 1.3–3.5 cm. broad and often with an apiculus, especially when young; stalk 3 mm.–1.2 cm. long and 3–7 mm. thick. 3 species — M. subalulata, sulcata and undulatifolia confined to the Kai Islands (Moluccas) and New Guinea.

**TYPE SPECIES:** M. subalulata Miq.

The outstanding features are: — the presence of the two lines on the twigs, the ant swellings in subalulata, the large leaves, the distinct, much curved primary veins, the absence of conspicuous secondary veins, the ellipsoid male flowers not split down very far into the non-reflexed lobes, the well-developed, acute, sterile apiculus to the staminal column and the small rather similar fruits. The nearest related series is series Cimiciferae and the similarities can be seen best through comparison with M. globosa in that series and M. subalulata in the present. M. globosa has similar leaves but on a very much reduced scale, the curving of the nerves being identical. Also its ellipsoid flowers with long pedicels are comparable with the larger similar ones of subalulata while the shorter pedicels of concinna and insipida are comparable to the shorter ones of sulcata and undulatifolia in the present series. Other parallels can be found in the fruit. A less striking relation is that of series Tubiflorae to the present one, both again having the curved veins. Here the two species through which the bonds of relationship at once stand out are M. undulatifolia and M. flosculosa. Look at the staminal column of both in the illustrations figs 67 and 58. They are identical, both having hairs only at the base of the column. The fruit, usually narrowly ellipsoid in series Tubiflorae, passes on to a more oblong shape in the latter half of this series, approaching that seen in undulatifolia. Now look at the fruit of cucullata with its reduced stalk and the resemblance is complete. The two faint lines on the twigs of undulatifolia can also be compared with the faint ones on flosculosa or better still the more prominent ones of subalulata with those of flosculosa.


Small tree 3–10 m. high, the bole 5–10 cm. diam. with short, drooping horizontal branches. Bark smooth or in old trees finely longitudinally striate, greyish brown, dark brown or brown mottled with green, inner bark pale brown; wood white, turning brown when cut due to the pink sap. Twigs glabrous except for the puberulous, 1–3 cm. long, narrow-elongate, acute terminal bud, stout. 5 mm.–1 cm. thick, occasionally sparsely lenticellate, myrmecophilous with hollow, swollen, ant-inhabited deformities, reddish brown, smooth and often shining in such parts, the older non-myrmecophilous parts generally solid, greyish brown, rough or striate, the apical parts quadrate, smooth and also solid, two lines or often two narrow wings running from leaf base to leaf base, one on each side, the lines present throughout the length of the twig but becoming modified into wings in the swollen parts. Leaves rather variable, mostly chartaceous, often coriaceous in specimens from mountain habitats, glabrous, medium to dark green and glossy above when fresh, medium brown when dry, pale or whitish beneath with very minute scales, the latter moulded and firmly set into the tissues of the leaf, not rubbing
Fig. 64. *Myristica subalulata* Miq

Fig. 65. Myristica subalulata Miq.

off easily, lamina oblong with nearly parallel sides or broadening out above the middle or panduriform and obovate, the base generally acute in small leaves, mostly rounded or only occasionally cordate in large ones, the apex broad, rounded and then acute or less often shortly acuminate; midrib sunk in a groove above, reddish brown beneath when dry; nerves 20–30 pairs, average 25 pairs, sunk above, prominent and reddish brown beneath, equidistant, oblique or often leaving the midrib at a more or less steep angle, curving and ascending gradually and anastomosing near the margins in distinct loops; reticulations invisible or sometimes a few, faint scalariform ones seen beneath; length (size-class large) 20–40 cm., average 30 cm.; breadth 7–15 cm., average 10 cm.; petiole 7 mm.–2 cm. long, fairly stout, 3 mm. thick. Male inflorescence of Knema-like, scarred, large woody tubercles, generally 5 mm. long and 5 mm. broad, or occasionally reaching up to 2 cm. long when very old. Male flowers numerous, variable in size with age, the largest mature ones 1–1.5 cm. long, average 1.3 cm. long and 3–5 mm. broad, coriaceous, rusty-tomentulose outside, cream-coloured inside, narrowly ellipsoid-cylindrical, narrowed towards the slightly acute apex in bud, the lobes more or less erect during anthesis, bluntly acute at the apex, very small, 2 mm. long and about $1/7 \frac{1}{3}$ the length of the whole perianth; staminal column elongate-cylindrical, 9 mm.–1.1 cm. long, the fertile part with 10–12 anthers and as broad as the stalk and drawn out at the apex into a 1.5–2 mm. long apiculus, stalk glabrous, 2–3 mm. long, about $\frac{1}{3}$ the length of the fertile part: bracteole broadly triangular, acute at the apex, 2–4 mm. long, early deciduous, leaving a prominent, half-ring-like scar at the apex of the pedicel where it was attached: pedicels 1–1.5 cm. long, slender, sometimes longitudinally striate when dry. Female inflorescence as in the male but shorter and with fewer flowers. Female flowers coriaceous, ovoid, narrowed towards the apex, 7–9 mm. long and 5–6 mm. broad, split down $\frac{1}{3}$-way by the obtuse teeth; ovary 4–5 mm. long, adpressed-rustytomentose, narrowed into the bi-lobed stigma, the lobes narrow and touching each other or slightly reflexed; pedicels short and thick, 2–3 mm. long and 2–3 mm. broad. Fruit nearly sessile, solitary or 2 or 3 together, orange when ripe, dark to medium brown when dry, minutely tomentulose, sub-globose to slightly longer than broad, 1.6–2.8 cm. long and 1.3–2 cm. broad, minutely apiculate at the apex, the apiculus sharp, 2 mm. long and 1 mm. broad, the pericarp thin-walled but hard when dry; stalk 3 mm. long and 3 mm. thick. Aril red with fine, slender laciniations. Seed oblong, rounded at each end, 2 cm. long and 1.3 cm. broad, medium brown, slightly rough and dull.
Gardens’ Bulletin, Singapore — XXIII (1968)

MOLUCCAS KAI ISLANDS:

Juhiri 85 (713) (BO, L, SING) and 91 (712) (BO, L).

NEW GUINEA: VOGELKOP

(DUTCH WEST
NEW GUINEA:

S.1., Lesson s.n. (P); Remoe, Sorong, Pleyte 483 (A, BO, K, L, PNH, SING); road to Klamono, Sorong, v. Royen 3017 (CANB, K, L); road from Steenkool to Temboeni, km 8, v. Royen 3475 (CANB, K, L); Kapaor, Becceari 70 (FI); Ramoi, Becceari 403 (FI); Kambu Kepper. Atastrap 4 (BO, L); Tuvama Nos. 767 (RINR); and 1185 (RINR); Bostuin, Tafelberg, Manokwari, Kalkman Nos. BW3509 (CANB, L, SING) and BW3696 (K, L); Momi, sub-district Manokwari. Kostermans Nos. 209 (A, BO, K, L) and 162 = bb33384 (A, BO, K, L); Sidei, + 50 km west of Manokwari, v.d. Sijde BW5557 (L); Andai, Teijssmann 7584 (BO, C, K, L, MEL); Koto, Anggi, Arfak, E. Mayr 227 (BO): Tisa near Babo, Act 3 (A, BO, K, L); S. McCluer, Moetoeri near Babo, Act 16 (A, BO, K, L); Skendi, north of Teminanbuan, C. Versteegh BW7454 (L); Adi Island, Fak-fak, C. Versteegh BW7579 (L); Triton Bay, M. le Guillou, date 1838–40 (P); Etna-bi, Koch Nos. 19 (BO, L) and 20 (BO, L); Napan District, Akama, Itjiri & Niimura 435 (TNS) and Wati, Itjiri & Niimura 660 (TNS).

DUTCH NORTH
NEW GUINEA:

Dalman, Nabire, Kanehiria & Hotausia Nos. 12091 (A) and 12223 also numbered 11691 (A, BO, RINR); Mamberamo, Feuilletaut de Bruyn 149 (BO); Albarros Bivak, Mamberamo, Drs v. Leeuwen Nos. 9085 (A, K, L); 11297 (BO, L); 11330 (A, BO, K, L) and 11402 (BO): Mamberamo River near Scholte Island. Versteegh BW25 (CANB, L); Otkin River, Drs v. Leeuwen 11403 (BO, K, L): van Rees Mts. Drs v. Leeuwen 9181 (BO, K, L); van Gelder River, van Rees Mts. Drs v. Leeuwen 9306 (A, BO, K, L); Rouffer River, Drs v. Leeuwen Nos. 9844 (A, BO, K, L, PNH, SING) and 9845 (BO); Bernard Bivak, Meller Drs Nos. 614 (BO, K, L) and 631 (A, BO, K, L); 4 km south-west of Bernard Bivak, Idenburg River, Brass 13706 (A, BM, BO, BRI, L, LAE); Gunong Mesan. Hollandia, bh30596 (A, BO, L, SING); Humbolt Bay, Holland’a, Gielleriap 183 (BO, K, L, U); Arso, Gielleriap 644 (BO, K, L).

DUTCH SOUTH
NEW GUINEA:

S.1., von Römer Nos. 96 (L); 260 (L) and 1063 (L): Pulle Nos. 7 (A, BO, K, L) and 17 (BO, K, L): G.M. Versteeg Nos. 1758 (BO, K, L, U) and 1786 (BO, K, L, U); Zippelius s.n. (CAL, K, L, U); Canoe Camp, Mt. Carstensz, Kloss, June 1913 (BM, K, SING); Nassau Mts, Drs v. Leeuwen 10651 (A, BO, K, L); Butopare, Kokonao, Mimika, Warrint BW5156 (L): Noord River, G.M. Versteeg 1367 (BO, L); Utuambawe near Zwaluw. Biak, Branderhorst 435 (BO, K, L, U): Perameles Forest, Pulle 508 (BO, L); Kloof Bivak, Pulle 1232 (BO, K, L); 1 km east of junction of Bon and Minam Rivers. Mt. Antares, Star Mts., Kalkman 4368 (L).
Papua:


**Central District:**—S.1., probably Central District, *Chalmers 6* (MEL); Vaimuru, Vanapa River, *McDonald N.G.F. 8161* (BM, BO, CANB, K, L, NSW, SING); Obree Range, *Sayer 2* (MEL); between Owen Stanley Range and the South Coast, *Burke s.n.* (K, L); Koitaki, *Carr 12597* (BM, CANB, K, L, SING); Boridi, *Carr Nos. 13267* (A, BM, CANB, K, L, SING); 13348 (BM, CANB, K, L, SING) and 14302 (BM, CANB, K, L, SING); Sogeri Region, *Forbes 404* (BM, CAL, E, FL, K, L, MEL, P); Berg Meroka, Sogeri Region, South Cape, *Forbes 916* (BM, E, FI, K, L, P); Sogeri and Javararie, C. T. *White 386* (BRI).


**Southern Highlands:**—near Tage, Lake Kutubu, *Schodde 2187* (L, LAE); near Moro, Lake Kutubu, *Schodde 2420* (L, LAE).

**Western District:**—Palmer River, 2 miles below junction of Black River, *Brass Nos 7273* (A, BRI, L) & 7274 (A, BO, BRI, L); Fly River, *d’Albertis 3* (MEL) and *d’Albertis date 1877 = FL Acc. No. 7746* (Fl).

T.N.G.:

**Sepik District:**—*Ledermann 12802a* (L); April River, *Ledermann 9712* (B burnt) male plant and male flowers determined by Markgraf as *M. costata*; August River, *Womersley N.G.F. 3804* (A, BO, BRI, CANB, K, L, LAE, SING).


**Western Highlands:**—near Wankl Village, 5 km. south-east of Mt Hagen Station, *Hoogland & Pullen Nos 5831* (BM, BO, CANB, K, L, US) & 5850 (BM, CANB, G, K, L); Nebelyer limestone divide, Mt Hagen sub-district, *Robbins 474* (CANB); Mt Kum near Mt Hagen, *Ross N.G.F. 9609* (L); Nondugl, *Womersley N.G.F. 4333* (A, BRI, K, L, LAE); ½ mile south of Kiliga, Mt Oga, *Saunders 707* (CANB, L).
Eastern Highlands:—Okapa. Henty N.G.F. Nos 10622 (CANB, K, L) and 10623 (SING) & K. J. White N.G.F. 9577 (BO, CANB, K, L, SING); Aiyura, L.S. Smith N.G.F. 1040 (BRI, LAE); Kainantu-Ramu Divide, Robbins 976 (CANB, L).

Morobe District:—Sattelberg, Bamler 2 (BRSL); Biro Nos 61 (BP) & 209 (BP); Clemens Nos 178 (A, B, L); 300 (L); 426 (L) & 2186 (B, SING); Hellwig 247 (B burnt) holotype of M. costata; Nyman 424 (UPS) quoted by Markgraf as 724; Warburg 20704 (L, M); Lambanga near Sattelberg, Clemens 7783 (A, B); Kulung-tufu, Sattelberg, Clemens 6650 (B, SING); Ogerammanent (Ogeramman), Clemens 5440a (A, B, SING); Boana, Clemens Nos 8219 (A, B); 8245a (A, B, SING) & 41310 (A); Middle Bumi River, Weinland, June 1890 (BO, BRSL, CAL, L, M, S, SING, US); Wan Area, Lec, N.G.F. 2504 (LAE); near Salt Springs, McAdam 230 (BRI, LAE); near Skindeiwai, Womersley & Millar N.G.F. 8442 (A, BO, BRI, K, L, SING); Bulowat East, 2nd Australian Forest Survey Co. N.G.F. 2504 (BRI, LAE); Bulolo Valley, the remainder:—Brass 29146 (K, L); Floyd & Havel N.G.F. 7446 (A, BM, BO, BRI, CANB, K, L, LAE, NSW, SING); Womersley & Brass N.G.F. 11018 (CANB, L, SING); Womersley & Gray N.G.F. 4075 (A, BO, BRI, CANB, K, L, LAE, SING).

D'ENTRECASTEAUX ISLANDS: Fergusson Island, mountains between Agamoia and Ailulauai, Brass 27129 (A, L).


MISOL: Pleyte 1099 (BO, K, L).

ARU ISLANDS: Giaubu-lengan (Vokan) Wokam, Beccari Fl Acc. Nos 7742 (Fl) & 7745 (Fl).


DISTRIBUTION: A common species widely distributed throughout New Guinea and the Aru and D'entrecasteaux Islands. Also in Ulu Island but seems to be absent from New Britain. In the Moluccas it is found only in the Kai Islands.

Sinclair — Myristica

syntype; the two other syntypes of *M. heterophylla* K. Schum., namely *Hollrung Nos* 648 and 701 are *M. hollrungii*, see under that species for details. *M. macrophylla* Zipp., *nomen nudum*, *Zippelius* s.n. (L) cult. Hart. Bog. *M. myrmecophila* Becc., *Beccari Nos* 70 (FI) Kapaor; 403 (FI) Ramol; *FI Acc. Nos* 7742 (FI) and 7745 (FI) Aru Islands, syntypes. *M. velutina* Mgj, *Ledermann 11175* (B holotype, burnt, not seen) Sepik District; *Ledermann 12802a* (L) Sepik District, the only existing paratype, all other paratypes cited by Markgraf [see Bot. Jahrb. 67, 2 (1935) 165] have been destroyed.

VERNACULAR NAMES: Aigarap (Chimbu, Masul); keep: kip; marra-kip (Hagen sub-district, Togoba); kobbugmongond (Wahgi, Minj); koijon (Tehid); mansfoor (Biak); mate-mate (Amele, Lower Ramu, Madang Distr.); on-a (Jal, Lower Ramu-Atitau area); para (Orokaiva language at Mumuni); piprim (Hollandia, Moeries dialect); sugwiti (Manikong language at Momi); wennoh (Argoeni language); woriasti (Tisa near Babo).

A common species with a wide distribution and hence some variation in leaf form, though not so much as might be expected. It does not seem to be very particular about habitat and soil requirements as it occurs from sea level to montane forest at 2,215 m. (7,200 feet)It has been found in secondary forest and disturbed areas as well as in primary. It is usually present in the drier areas in lowland forest, but has been obtained from swampy forest too. Tolerant of a wide pH range, it thrives on limestone as well as on acid soils. It is often associated with *Pometia* in the lowlands and *Nothofagus* in the Highlands.

*M. subalulata* is distinct from all other members of the family in being an ant-plant and the special morphological modifications that have been evolved as a result of the myrmecophilous habit are well-known and useful diagnostic characters. Such portions of the twigs that are inhabited by ants are hollow and often swollen or variously deformed. The swellings seem to be absent from the extreme apical portions as well as from the older, solid, striate parts. The two lateral lines which run down from petiole base to petiole base (also found in certain species of *Horsfieldia*) are very distinct in the myrmecophilous parts where they form thin wings on each side of the twig. *M. hollrungii* and *sulcata* also have the lines but lack the wings and the swollen portions and are not inhabited by ants.

The other salient or useful diagnostic features may be mentioned in turn. The large leaves are acute, rounded or less often cordate at the base. They are usually chartaceous in lowland and coriaceous in mountain plants. I do not, however, recognize Warburg’s unpublished varieties *impressa* and *subcordata*, nor have I found it necessary to create any other infra-specific taxa based on leaf characters. It seems that Warburg must have, on later consideration, thought it best to abandon his idea of
publishing these here-mentioned varieties. The lower surface of
the leaf is of a pale colour and often silvery white. It is usually
silvery white and more scaly in mountain plants. I am unable
to separate M. velutina Markgraf, a mountain plant with smaller
leaves and no ant-swellings from M. subalulata. The type and
all paratypes except one in Leiden have been destroyed. This
remaining paratype is not a good specimen, but there are several
other similar sheets from the mountains collected by Clemens
as well as others by the Forest Department at Lae. These help
greatly to solve the problem. They have similar, small leaves
with a silvery undersurface and although the ant-swellings on
the twigs seem to be fewer in such mountain plants, some of
the specimens do show them. It seems that such portions without
them are mostly the younger or apical parts of the twigs and
that the portions showing them have just not been collected.
On the other hand it may be that they have not been invaded
yet by ants or that the ants which prefer them are absent in
the district. Ants cannot always be present. The flower structure,
including the staminal column, is exactly the same as in the
typical. Sleumer and van Royen have also recently collected this
same mountain form, but again I have included it in the typical
since it is difficult to draw any exact line of demarcation between
it and other coriaceous-leaved specimens of subalulata which
have a white undersurface to the leaves and which grade into
the mountain forms with change of altitude. The following sheets
of these here-mentioned collectors arrived rather late to be
included conveniently with the rest in the appropriate place of
citation and so they are mentioned now: — Cycloop Mountains,
Sleumer and van Royen Nos 5972 (K, L) and 6005 (K, L).

The flower of subalulata varies in size, but it is certain that
many of the smaller flowers on herbarium sheets are immature.
I have taken my description and measurements from the largest
flowers available. The staminal column is very distinct in its
long drawn-out sterile apiculus and in its general narrow-elongate
appearance. The sub-globose fruit will be recognized by its short,
sharp, apical mucro.

The existing isotype material of M. bialata is poor and scrappy,
but I feel that it is closer to M. subalulata than to hollrungii,
although the geographical distribution might suggest the latter.
One should try to go again to the type locality in Ulu Island
and see which of these two species really occurs there. M. bialata
is an older name than hollrungii and if the two should prove
similar, then the well-known name of the latter would unfortunately
have to be dropped. The undersurface of the leaf in the type
material of bialata is more like that of subalulata and further
the stalk of the staminal column is glabrous as in that species
and not pubescent as in hollrungii. Warburg states that it is
very close to subalulata but then he was always reluctant to
make any reduction and would name every species he came
across, even if it were a seed out of the stomach of a paradise-
bird. His own specimens were usually short, scrappy portions.
It is unfortunate that both the type of M. costata Warb. and the Ledermann number Ledermann 9712 with male flowers which Markgraf subsequently added, were both destroyed at Berlin. Warburg states that the plant is near to subalulata but that there are no hollow portions present in the twigs. It was so named costata because of the four to six ridges or wings present on the twigs, but such a freak has never turned up again. I have written to Dr. Markgraf explaining how close costata is to subalulata and that I am prepared to consider them the same. He has now reviewed the position and is of the opinion that I should unite the two. He mentions that the type specimen was extremely swollen and looked strange (he saw it before it was destroyed) and also remarks about Warburg’s habit of naming all specimens and his hesitation in making reductions. He says that the only real difference between Ledermann 9712 and subalulata was its shorter perianth, but I have found out, as stated earlier that very few of the perianths observed in herbarium sheets are really mature. A good point in favour of the reduction is that the stalk of the staminal column of the Ledermann specimen is glabrous like those of subalulata and it really seems that this is a constant character here.

It must be pointed out that M. heterophylla K. Schumann in Schumann et Hollrung, Fl. Kais-Wilh.-Land (1889) 45 consists of three syntypes, only one of which is M. subalulata. The other two are M. hollrungii. These are:— (1) Hollrung 178, Kalueng, Finschhafen = M. subalulata. (2) Hollrung 648, Lower August River = M. hollrungii. (3) Hollrung 701, Second August Station = M. hollrungii. Schumann also added the synonym M. spanogheana (non Miq.) K. Schum. to his citation of literature but this synonym has to be excluded as it is M. schleintzii and not heterophylla or spanogheana of Miq. M. heterophylla K. Schumann was later emended by Warburg in his monograph, page 489 when he excluded from it both Hollrung 178 and 701, leaving only Hollrung 648. He added another specimen namely Lauterbach 1107 in his citation, this specimen also being M. hollrungii. Although Warburg thought that M. heterophylla K. Schumann emend. Warb. was now a good species, it is really only M. hollrungii. In spite of all this, emended or not, M. heterophylla is a later homonym of M. heterophylla Fernandez-Villar (1880).

Bower’s reference in the Proc. Phil. Soc. Glasgow 18 (1889) 323 to Myristica myrmecophilh Beccari wrongly appeared as Myristica myrmecophila Bower in the 2nd List of Addenda et Emendanda to Index Kewensis, 1st Suppl. 1886-1895 (1906) 509. This is a pure compiler’s error and hence also a nomen nudum. I have excluded it from the citation of literature. Bower’s paper is entitled “On Humboldtia laurifolia, Vahl, as a Myrmekophilous Plant” (Humboldtia is a small genus of the Leguminosae). It is clear that Bower’s attention had been drawn to myrmecophilous plants by Beccari’s then recently published papers on this subject in Malesia (1884-5), and Bower’s reference to Myristica
myrmecophila is clearly to Beccari's species, and has nothing to do with anything in Ceylon as stated in Index Kewensis. Here is a transcript of the paragraph in which the reference occurs:

"Of the myrmekophilous plants cited by Beccari, that most nearly corresponding to Humboldtia is Clerodendron fistulosum, a new species, here also the internodes are swollen, and hollowed, and inhabited by ants, which gain access to the interior of the slit-like holes, two of which are situated, one on either side, at the upper end of each internode. Beccari is of opinion that both the swollen form of the internodes and the first origin of the holes have become inherited characters of the species, as an adaptation to the requirement of the protecting ants. Somewhat similar slit-like holes are to be found in Myristica myrmecophila, also a new species. The form of the orifice in this case also would suggest that the initiative in their formation is taken by the plant".

I am indebted to Mr. Airy Shaw of the Kew Herbarium for sending me a copy of the above transcript, the original publication not being available in the library of the Botanic Gardens, Singapore.


Synonym: M. anceps Warb. Monog. Myrist. (1897) 528 — Fig. 66.

Tall tree 12-43 m. high, average 25 m. with horizontal branches and sometimes with buttresses. Bark generally greyish brown, but also medium to dark brown, smooth when young, slightly longitudinally fissured and flaking when old, thick, brittle, inner bark reddish brown: sap reddish brown, not copious. Twigs glabrous, sharply 2-angled with two lines running down from petiole base to petiole base, one on each side of the twig, young parts dark reddish brown or blackish brown, nearly smooth and about 3 mm. thick, the older greyish brown, longitudinally striate and stouter, 5-6 mm. thick. Leaves thinly coriaceous, glabrous, dark green and glossy above, medium green and slightly glossy beneath with a yellowish green lower midrib, greyish brown or blackish brown above when dry, retaining their gloss, lower surface only slightly paler with the nerves often reddish brown, the lamina elliptic or oblong-elliptic, sometimes panduriform, widest at the middle, acute or rounded at the base, rounded and then shortly and acutely acuminate at the apex, the acumen 1 cm. long; nerves 15-20 pairs, sunk above, prominent beneath, equidistant and almost horizontal when they leave the midrib, curving in bold, wide arches and anastomosing at the margins, the marginal loops best seen on the lower surface; reticulations faint or invisible, scalariform when present; length 14-22-32 cm., average 19 cm.; breadth 6-8 cm.: petiole 1.5-2.5 cm. long, rigid, 3 mm. thick. Male inflorescence with rather small, 3-5 mm. long, scar-covered tubercles, each bearing a cluster of flowers. Male flowers fragrant, 4-5 mm. long and 2 mm. broad, cylindrical
Fig. 66. *Myristica sulcata* Warb.

or slightly clavate, obliquely inserted on the pedicel, densely light to medium brown tomentose, obtuse at the apex in bud, split down ½-way by the obtuse or obtusely acute, erect teeth: staminal column 3.5 mm. long with 7–10 anthers and ending in a minute, obtuse apiculus, stalk adpressed-tomentose, as long and as broad as the fertile part; pedicels slender, tomentose, arcuate, 5–7 mm. long; bracteole at the apex of the pedicel, about 2 mm. long and early deciduous. Female flowers fewer in the cluster, 3 mm. long and 3 mm. broad at the base, ovoid or urceolate with patent teeth; ovary ovoid, light brown adpressed-tomentose, stigma with two glabrous, divaricate, cylindrical lobes; pedicels 3–4 mm. long. Fruit sub-globose, 3.8–4 cm. long and 3–3.5 cm. broad with a very hard, 2–3 mm. thick pericarp, light or medium brown tomentulose at first, becoming nearly glabrous when old; stalk 1 cm. long and 5 mm. thick. Aril red with numerous, narrow laciniations. Seed 2.5 cm. long and 2 cm. broad, dark brown, shining.

NEW GUINEA

Vogelkop

(DUTCH WEST NEW GUINEA): Plateau north of River Pami, + 8 km
north-west of Manokwari. Koster BW4348 (L); Dessa, Momi, Manokwari. bb.33494 = Kostermans 306 (BO, K, L); Sidei near Manokwari, Iwanggin BW5775 (L) and Schram BW1721 (CANB, KEP, L); Oransbari, Ransiki, Brouwer BW Nos. 2537 (L) and 2629 (CANB, L); Koster BW1124 (CANB, K, KEP, L) and Schram BW1876 (CANB, L); Prafi, Manikiong, Schram BW523 (L); Andai, Becarri 681 (FL).

DUTCH NORTH NEW GUINEA:

Papua: Sekoli Plain, Division Hollandia, Iwanggin BW9184 (L) and Noesi BW8137 (L).


Milne Bay District:—north slopes of Mt. Dayman, Maneau Range, Brass 23293 (A, K, L, LAE).

Central District:—Mori River. McDonald N.G.F. 8191 (BM, K, L, SING).

T.N.G.: Madang District:—Ramu Valley about 5 miles south-east of Faita airstrip. Saunders Nos. 207 (CANB, L); 257 (CANB, L); 275 (CANB, L, LAE); 369 (CANB, L, LAE); 388 (CANB, L) and 412 (CANB, L, LAE).

Morobe District:—Quembung. Clemens 2152 (A, B, SING).

CULTIVATED:

Hort. Bog. sub 1VH28. Sinclair 10038 (A, B, E, K, L, NY, SING); Sutrinos 69 (BM, G, K, KEP, L, P, SING) and Rastini 222 (K, L, SING) all from the same tree.

DISTRIBUTION: Vogelkop, Dutch North N.G., Papua and Mandated Territory.
I have not seen the type of this species which was one of those destroyed, but I follow Markgraf who was the last monographer to see it. He says that *M. anceps* is not different and reduces it to a synonym of the present species. The specimens I quote here all match *anceps* and agree well with Warburg’s description of *sulcata*. The leaves in many cases dry a dark brown on both surfaces so any specimens not of this shade should be checked carefully. Besides the colour of the leaves on drying, the chief diagnostic features of this species are the presence of two lines on the twigs, the wide curves of the equidistant veins which leave the midrib at an angle of 70–90°, the small tomentose flowers, obliquely attached to the longer, slender, aruncate pedicels and the large, sub-globose fruit which has a hard pericarp and becomes almost glabrous when old.

*M. sulcata* is like a large edition of *M. globosa*, but differs from it in the presence of the two lines on the twigs. It resembles *M. subalulata* which also has two lines on the twigs, but can be distinguished from the latter by the absence of both the myrmecophilous inflations and the wing-like extensions of the lines. The rather similar leaves are generally smaller so their size and their more arched veins ought to distinguish them from those of *subalulata*. I must admit that there might be some difficulty in distinguishing the younger, sterile apical portions of twigs of *subalulata* which have similar small leaves and which show the two lines, but which do not yet have the inflations or wings. Perhaps the colour of the leaves on drying might then help in identification. Those of *subalulata* are usually paler beneath but not necessarily so above. Other differences between the two species are the much smaller flowers of *sulcata* with denser tomentum and often aruncate pedicels, the shorter staminal column, with a shorter, less elongate sterile apiculus and finally the larger fruit without a central micro. *M. sulcata* is also related to *hollrungii*. For differences see under that species.

There are two collections of *Brass* from Goodenough Island which may be *sulcata* but they are not very typical. I have not been able to identify them with certainty. They may represent a species near to *sulcata*, but I should like to see more material. The flowers are very similar to those of *sulcata*, having exactly the same tomentum, but the apiculus of the staminal column is lacking. The specimens are *Brass* 24706 (A, K, L, LAE) and *Brass* 24772 (A, K, L).
(60) *Myristica undulatifolia* J. Sinclair, sp. nov. — Fig. 67.

Species affinis *M. sulcatae* a qua lineis vel angulis duobus ramorum minus distinctis, foliis angustioribus subitus argenteo-cinnamomeis, fructibus oblongis (non subglobosis), stipitibus crassioribus differt.

Arbor 6–25 m. alta, truncus rectus, nudus usque ad 20 m. altus, superne ramificatus. *Cortex* atro-fuscus, leviter fissuratus, in senectute paullo abscindens. *Ramuli* in partibus junioribus nigro-brunnei, 3–4 mm. crassi, obscure 2-angulati, in partibus senioribus nigro-grisei, rugulosi cum lenticellis postsuberos, corticati, gemma terminali minute griseo-puberula elongata excepta, omnino glabri. *Folia* chartacea vel tenuiter coriacea supra modice viridia, subitus propter squamulas appressas argenteo-cinnamomea, supra in sicco modice brunnea, secus costam atque hic illic rubro-maculata vel in foliis veteribus atro-brunnea, concoloria, angusto-oblonga cum marginibus fere parallelis undulatis revolutis et interdum parce et minute spinoso-denticulatis, vulgo integris, basi acuta vel rotundata, apice acuta vel breviter acuminata; 15–26 cm. longa; 3.5–7 cm. lata vulgo 5.5 cm. lata; costa supra in sulco depressa, subtus elevata; nervi 18–28-jugati, vulgo 22 paria, supra depressi, subtus ± eminentes, late et irregulariter curvati, prope margines anastomosantes; reticulationes scaliformes haud conspicueae; petioli 2–2.5 cm. longi, 2.5 mm. crassi. *Inflorescentia mascula* brevissima, 3–5 mm. longa, tomentosa, lignosa, tuberculiformis, floribus apice subumbellatim confrondis. *Flores masculi* (nondum maturi) coriacei, anguste oblongi, vel breviter tubuliformes, apicem obtusum versus angustati, 5 mm. longi, 2 mm. lati, extus pallido-brunnei, tomentosi, in lobos ½-partiti: columna staminalis in apicem sterilem argutum, 0.5 mm. longum terminata, antheris 10 praeda, pars fertilis 1.5 mm. longa, stipes 1.5 mm. longus, basi minute pubescens; pedicelli 4–5 mm. longi, graciles, tomentosi; bracteolae ovatae acutae vel acuminatae quam flores ½-brevisiores. *Flores feminine* urceolati, 4 mm. longi et 4 mm. lati; pedicelli 2 mm. longi. *Fructus* 1–2, pallido-brunneus, primum minute tomentellus demum fere glabrescens, immaturus ellipsoideus, maturus oblongus, 3.5 cm. longus, 2.5 cm. latus, apice mucronatus, pericarpium 5 mm. crassum cum linea suturali prominenti; stipes 7 mm.–1.2 cm. longus, 7 mm. crassus.

Tree 6–25 m. high, the bole straight and bare up to 20 m. high, the branches at the apex. *Bark* dark brown, slightly fissured, flaking somewhat when old. *Twigs* blackish brown, faintly 2-angled and 3–4 mm. thick in the younger parts, dark grey and slightly rough with pubicular lenticels in the older parts, glabrous throughout except on the minutely greyish, puberulous, elongate terminal bud. *Leaves* chartaceous or thinly coriaceous, medium green above, silvery cinnamon beneath due to very small adpressed scales, drying a medium brown above, blotched with red here and there or along the midrib, dark brown and of one colour in old leaves, narrowly oblong with the margins nearly parallel, undulate, revolute and at times sparingly and minutely spinose-denticulate, mostly entire, base acute or rounded,
Fig. 67. *Myristica undulatifolia* J. Sinclair.

apex acute or shortly acuminate, midrib sunk in a groove above, raised beneath; nerves 18–28 pairs, average 22 pairs, sunk above, more or less prominent beneath, curving widely and rather crooked, anastomosing at the margins; reticulations scalariform and not at all conspicuous; 15–26 cm. long and 3.5–7 cm. broad, average 5.5 cm.; petioles 2–2.5 cm. long and 2.5 mm. thick. Male inflorescence very short, 3–5 mm. long, tomentose, woody, tubercular with the flowers clustered in sub-umbellate fashion at the apex. Male flowers (not yet mature) coriaceous, narrowly oblong or shortly tubular, narrowed towards an obtuse apex, 5 mm. long and 2 mm. broad, pale brown-tomentose outside and split down ½-way into the lobes; staminal column with 10 anthers and ending in a sharp, sterile, 0.5 mm. long apex, the fertile part 1.5 mm. long, the stalk 1.5 mm. long, minutely pubescent at the base; pedicels 4–5 mm. long, slender, tomentose; bracteoles ovate, acute or acuminate, situated at the base of the perianth and ⅛ as long as the flowers. Female flowers urceolate, 4 mm. long and 4 mm. broad; pedicels 2 mm. long. Fruit 1–2, pale brown, at first minutely tomentulose, finally becoming almost glabrous, the immature ellipsoid, the mature oblong, 3.5 cm. long and 2.5 cm. broad, mucronate at the apex, the pericarp 5 mm. thick with a prominent line of dehiscence: stalk 7 mm.–1.2 cm. long and 7 mm. thick.

NEW GUINEA

DUTCH SOUTH NEW GUINEA: Awemko, + 55 km north of Mindiptana; subdivision Moejoe; Kalkman BW6491 (L).

PAPUA:

Central District:—Koitaki, Carr 11917 (A, BM, CANB, K, L, SING); Kokoda Trail, about 5 miles north of Sogeri, Schodde 2886 (L, LAE, SING).

Gulf District:—Aird Hills, behind bark factory, Kikori sub-district, Floyd & Gray N.G.F. 7173 (A, BM, BO, BRI, CANB, K, L, LAE, NSW, SING).

DISTRIBUTION:

New Guinea, four records. Forest on lower slopes of hills.

TYPE MATERIAL:

Floyd and Gray N.G.F. 7173 (K holotype).

VERNACULAR NAMES:

Krikket (Mandobo language at Awemko); mong (Moejoe).

This species seems to be nearest to M. sulcata, especially in the flowers which look almost the same and have the same pale brown tomentum. The pedicels are slightly shorter. The two lines or angles on the twigs are fainter than in sulcata and are often interrupted or not visible in some portions of the twigs, particularly in the older. They may be missed altogether as they sometimes are in hollrunghi, another species with which this one may be confused. The leaves, with petioles of about the same length (i.e. as in sulcata) are narrower with more nerves, having parallel sides and a thin investment of closely adpressed, silvery or cinnamon scales beneath. In this respect they are more like those of subalulata which often have a similar silvery tinge beneath with the sides parallel or not. The staminal column, like that of all three above-mentioned species, has a sharp
apiculus, but the hairs are confined to the basal part of the stalk. The young fruits are like those of *subalulata* while the mature ones resemble those of *hollrungii*. The stalk is thicker than that of all three. The colour of the upper surface of the dried leaf seems to be rather variable. In the type there are blottches of red here and there and especially along the midrib. If this feature is at all constant then it would be useful in diagnosis. The leaves of *Carr 11917* are dark brown and glossy above and do not show such colourations. This is probably because they are older and more coriaceous. Yet I fear that the colouration is purely accidental. The white scales on their lower surface have mostly disappeared. The margins of the leaves are slightly undulate and curiously in *Kalkman 6491* there are a few very short, 1 mm. long, spiny teeth. This may be natural or more likely due to inrolling on drying, the margin being thicker in some parts, especially in the undulations. If this character is usual it would also be a good diagnostic one for there are no other examples of denticulate leaves in the *Myristicaceae*.

16. SERIES HETEROPHYLLAE


Twigs moderately stout, 3–4 mm. thick in the apical parts, 7 mm.–1 cm. thick lower down in the oldest, the youngest parts dark reddish brown, the oldest greyish and striate, lenticels usually present, two distinct lines present from petiole base to petiole base in *hollrungii*. Leaves chartaceous to thinly coriaceous, drying pale brown or yellowish brown above, paler beneath or whitish, the nerves the same colour in *hollrungii* and darker in the other two, reddish brown in *hypargyraea*, dark brown in *kajewskii* if the upper surface of the leaf is dark, but reddish brown if the leaf above is paler, oblong mostly in shape but more variable in the vars of *hypargyraea*, being also oblong-lanceolate, oblanceolate or obovate (var. *insularis*), medium to large size-class, 20–35 cm. long and 5–13 cm. broad, average 7–9 cm. broad, but also very variable in size especially in the vars of *hypargyraea*, reaching 40 cm. long in its var. *gillespieana* and 15 cm. broad in var. *insularis*, base mostly rounded but often sub-cordate, apex rounded and then acute or bluntly acute, less often shortly acuminate; nerves prominent beneath, straight, oblique, equidistant and parallel, interarching distinctly at the margins, mostly 16–22 pairs but with 18–30 pairs, average 22 pairs in var. *gillespieana*; secondary nerves and reticulations present in *kajewskii* and in *hypargyraea* var. *insularis*, less distinct
or absent in the others; petiole 1.8–2 cm. long in *hollrungii*, noticeably longer and up to 5 cm. long in the others, especially in *kajewskii*. Male inflorescence (not seen in *kajewskii*) 5 mm.–4 cm. long, stout, with or without a smooth basal portion, the later, if present, usually well developed, 2–3 scar-covered branches sometimes present, the scars rather distant in *hypargyraea*. Male flowers ovoid to sub-globose or in bud sometimes obovoid but never elongate or ellipsoid, their apices obtuse and not acute in bud, pale brown, glabrous to tomentose. 5–6 mm. long and 4–6 mm. broad, split down 1⁄3-way into the non-reflexed lobes; pedicels 5–7 mm. long, slender, flattened; staminal column with an apiculus in *hollrungii*, the apiculus absent in the others, stalk densely pubescent in *hollrungii*, mostly glabrous in the others or with a few hairs at its base; bracteole as large as the flower buds. Female flowers smaller, 3–5 mm. long, also deeply lobed, the pedicels shorter and stouter, 2.5–3 mm. thick. Fruit glabrous to tomentulose, oblong-ovoid to globose or sub-globose, the pericarp smooth and thin in *hollrungii*, very hard and thick in the others with some warts, medium size-class, 3–3.5 cm. long and 2–2.7 cm. in diam., much larger in *kajewskii* and var. *gillespieana*, 6–8.5 cm. long; stalk short, very stout in *hollrungii* and *kajewskii*, more slender and up to 2 cm. long in *hypargyraea*. 3 species — *M. hollrungii*, *kajewskii* and *hypargyraea* with its four vars — var. *hypargyraea*, var. *gillespieana*, var. *guillauminiana* and var. *insularis*.

**TYPE SPECIES:**  
= *M. hollrungii* Warb.

The chief features of this series are the large or medium-sized, oblong leaves with a rounded base and straight venation, the ovoid or sub-globose medium-sized male flowers obtuse at the apex in bud, the pedicels about the same length or slightly longer, the perianth of both sexes split down 1⁄4 and not reflected and the glabrous or tomentulose sub-globose fruit. In this series Warburg places *M. hollrungii* and *M. heterophylla* K. Schum. emend. Warb. The latter emended is really only *M. hollrungii*. See notes on *heterophylla* under both *subalulata* and *hollrungii*.

The three species form a natural series with *M. kajewskii* intermediate between *hollrungii* and *hypargyraea*. Their relations are also strictly in keeping with their geographical distribution. From the key and descriptions it would appear that *kajewskii* is actually closer to *hypargyraea* than to *hollrungii*. At least the last two have more characters in common with each other than with *hollrungii*. The disjunct insular distribution of *M. hypargyraea* in a number of islands widely cut off by sea has given rise to no less than four distinct varieties and these have all been considered at one time or other as distinct species. In comparison *M. hollrungii* has as wide a distribution, probably covering a greater area of land, but it is not variable. Its distribution is of course continuous and not interrupted by wide stretches of water so hence its uniformity.
The series shows affinities with the preceding one Subalulatae through *M. hollrungii*. This species has often been confused with *M. subalulata* when sterile due to the fact that both have the two lines present on the twigs and that the leaves of both are rather similar but differ in the more curved veins of the latter. The male flowers, however, are rather different from those of *subalulata* which have an acute apex and will expand later into an ellipsoid perianth, not split so far down by the perianth lobes. This is the best reason for not placing *hollrungii* in series Subalulatae. The long peltioles of *kajewskii* suggest an alliance with series Castaneifoliæ. There is, however, a closer alliance with series Teijsmanniae, the leaves and flowers all a similar shape but reduced in size and darker in colour on drying in the latter.


A medium to tall tree, 6–36 m high, average 24 m with pyramidal crown, slender bole, horizontal whorled branches and stilt-roots. *Bark* dark greyish brown, finely vertically fissured and flaking; wood straw-coloured, darkening when cut, soft with large pores; sap red, copious. *Twigs* glabresc., varying from 3–4 mm thick near the apex to 7 mm–1 cm lower down, smooth and reddish brown to dark brown in the younger parts, greyish brown and striate with a few lenticels in the older parts, 2 lines present from petiole base to petiole base, usually visible throughout the length of the twig. *Leaves* thinly coriaceous, glabrous, medium green above, pale or glaucous beneath with yellowish green veins, drying a pale or yellowish brown above, paler still beneath except the sometimes slightly darker nerves, oblong or less often oblong-lanceolate, the base rounded, sometimes cordate, the apex acute or acuminate; nerves 16–22 pairs, oblique, parallel, equidistant, level with the upper surface or in thicker leaves slightly depressed and sulcate, thin but prominent beneath; reticulations mostly invisible; length 20–35 cm, average 27 cm; breadth 5–13 cm,
Fig. 68. *Myristica hollrungii* Warb.

Fig. 69. Myristica hollrungii Warb.

average 9 cm (large or medium size-class); petiole 1.5–2 cm long and 3–4 mm thick. Male inflorescence a simple or 2–5–branched, woody, scar-covered tubercle, 1 cm long and 5 mm broad, occasionally up to 3 cm long, the smooth basal part, if present, 3–5 mm long only. Male flowers coriaceous, sub-globose or ovoid-globose, obtuse at the apex, 5 mm long and 4 mm broad, pale brown-tomentulose to minutely puberulous or nearly glabrous outside, pale yellow when fresh and white and glabrous inside, split down \( \frac{1}{2} \)way into the erect lobes, staminal column about 4 mm long, the fertile portion 2.5–3 times as long as the densely pubescent stalk and broader with a rather flattened apiculus and 10 anthers; bracteole at the base of the perianth, ovate-ornicular, obtuse, half as long and half as broad as the flower; pedicels slender, 6 mm long. Female flowers as in the male but on a shorter, 2–3 mm long and thicker, 3 mm broad pedicel; ovary broadly ovoid, tomentose. Fruit oblong or oblong-ovoid, rounded or slightly narrowed at the apex, the central apiculus more evident in young fruits, the pericarp wall rather hard, orange and with some minute scurf when ripe, soon becoming glabrous, drying a pale to medium brown, 3–3.5 cm long and 2–2.8 cm broad; stalk 5 mm long and 4 mm thick. Aril orange. Seed 2.2 cm long and 1.3 cm broad.

NEW GUINEA

VOGELKOP

(DUTCH WEST NEW GUINEA):

S.1., Tuayama 1013 (RINR).

Manokwari area:—Sidei, about 65 km west of Manokwari, Koster BW6820 (K, KEP, L, SING) and Iwangan BW5742 (L); valley of the Lower Pami River, about 5 km north of Manokwari, Koster BW Nos 4370 (L) and 4371 (L); Manokwari, Nielsen 901 (C): Roose Kolonisatie, Manokwari, bb15904 (BO, L); Andai, Beecari 669 (FI); Afrai, Mangold BW2221 (L); Warnapi, 15 km north of Ransiki, Kostermans 2664 (A, BO, K, L, PNH, SING).

Ransiki Onderaf:—Oransbari. Lasschuit BW4512 (L) and Mangold BW2150 (CANB, L); Mios (Meos) Waar Island, Koster BW Nos 1220 (BO, CANB, K, L, SING) and 1305 (CANB, K, L); Wandos Waar, Mios Waar, Versteegh BW3864 (K, L).

Nappan District:—Waobe, Y. Satake & T. Niimura 800 (TNS).

DUTCH NORTH NEW GUINEA:

Sieber, Nabire, Kanehira & Hatusima 12670 (A, BO, RINR); Mamberamo River, near Scholte Island, Versteegh BW18 (BO, CANB, K, L, PNH); Takar, Sarmi, Mangold BW2276 (L); Obefareh, Boe River, Sarmi, Karstel BW5339 (L); mouth of Tami River, Hollandia. Schram BW1996 (BR, CANB, K, L); Hollandia, Tami/Holtekang, Brouwer BW839 (L); Holtekang, Brouwer BW862 (L); Janim Besar, south-west of Sentani Meer, Hollandia, Kalkman BW3791 (L); Memo, Schram BW Nos 2756 (CANB, L) and 2795 (CANB, L); Roufer River, Meer-vlakte Motor Bivak, Drs v. Leeuwen Nos 11088 (A, BO, K, L) and 11102 (A, BO, K, L, SING); Bernard Bivak, bb25679 (A, BO, K, L, SING).
Dutch South New Guinea:

Carstensz, Kloss Nov. 1912 (K); Erma, Asmat, Bouman BW3225 (DD, K, KEP, L) and Nautjie BW6381 (L); Digul River near Kueh, Versteegh BW4847 (L); v.d. Willigen River, Drs. v. Leeuwen 9700 (A, BO, K, L); Merauke River, Jaheri, 25th March 1901 (BO); Merauke River, east bank of Merau River, south of Senajo, v. Royen 4670 (CANB, K, KEP, L, SING) not 4570.

Papua:

Northern District:—Gona Road, 2 miles south of Gona Mission, Edwards N.G. F. 10726 (K, L).

Central District:—Lower Mori River, Brass 1552 (A, BRI, K, P).

Western District:—Fly River, d'Albertis 9 (FI, MEL) the FI material is also numbered FI Acc. Nos. 7655 & 7655a; Lower Fly River opposite Sturt Island, Brass 8008 (A, BM, BO, BRI, K, L, LAE); Wuroi, Oriomo River, Brass Nos. 5765 (A, BO, BRI, NY, US) and 5766 (BO, BRI, NY); Jackson N.G.F. 2737 (A, BO, BRI, CANB, K, L, LAE, SING) and E. Gray & K. J. White N.G.F. 10418 (CANB, K, L, SING).

T.N.G.:

S.I., Lauterbach (2) 638 (K, BRSL) quoted as 2638 by Markgraf but on the label 638.

Sepik District:—Ledermann Nos. 6852 (SING) and 7888 (SING); Wewak-Angoram Area, inland from Balam Village on the But-Kauk road, Pullen 1339 (BM, CANB, L); Lower August River, Hollrung 648 (BO); Second Augusta Station, Hollrung 701 (BO, K, MEL); Sepik River, Herre 309 (BO, NY) and 330 (NY); Sepik River near Mount Meander, Womersley N.G.F. 3774 (A, BRI, CANB, K, L, LAE, NSW) and Sepik River near Yesan, Womersley N.G.F. 3755 (A, BRI, CANB, LAE); Yellow River near Sepik, Womersley N.G.F. 3889 (A, BO, BRI, K, L, LAE, SING); Yellow River Hills, Womersley N.G.F. 3931 (A, BO, BRI, K, L, LAE, SING); Karosomeri River, Womersley N.G.F. 3687 (BO, BRI, CANB, K, L, LAE).

Madang District:—Astrolabe Bay, Lauterbach Nos. 1107 (BRSL) and 1188 (BRSL); Ramu River, Rodatz & Klink (Tappenbeck) Nos. 3 (BRSL, L) and 33 (BRSL); Lower Ramu-Atitau Area, 4 mile west of Aiome airstrip, Saunders 921 (CANB, L) and Mirap, Saunders 965 (BM, CANB, L); Atemble, Robbins 1347 (CANB); Josephtaal, K. J. White N.G.F. 10251 (CANB, K, L, SING).
Gardens' Bulletin, Singapore — XXIII (1968)


New Britain: Talasea sub-district:—at the old village of Miluputu on Mt Mataleoich. K.J. White N.G.F. 10943 (CANB, K, L, SING) and south-west of Rikau Village. K.J. White N.G.F. 10810 (CANB, SING).

New Britain District:—Nantambu. Open Bay, Mair N.G.F. 1877 (BRI, LAE).

DISTRIBUTION:

New Britain and throughout New Guinea in the lowlands by river banks, and mangrove, rarely ascending (see notes below).

TYPE MATERIAL:

M. hollrungii Warb., Hollrung 701 (B burnt, BO, K, MEL) Second Augusta Station; Beccari 669 (FI) Andai: Lauterbach 1188 (B burnt, BRSL) Astrolabe Bay, three syntypes given by Warburg in his monograph but since he emended M. heterophylla K. Schum. with its three Hollrung numbers and selected one of them as M. hollrungii then this one Hollrung 701 could be taken more strictly as the type of M. hollrungii. M. albertisii Warb., d'Albertis 9 (B holotype burnt, FI, MEL) Fly River. M. eurycarpa Warb., Rodatz & Kiltik (Tappob- beck) 317 (B holotype burnt, BRSL) Ramu River. M. heterophylla K. Schum. Two of the three syntypes quoted by Schum. are M. hollrungii; these are Hollrung 648 (B burnt, BO) Lower August River and Hollrung 701 (B burnt, BO, K, MEL) Second Augusta Station. The third syntype is not hollrungii but subalulata, namely Hollrung 178 (B burnt) Kalueng, Finschhafen. M. heterophylla K. Schum. emend. Warb. in Monog. Myrist. pages 489 and 490. The type is strictly Hollrung 648 but he has also added Lauterbach 1107 (B burnt, BRSL) Astrolabe Bay.

VERNACULAR NAMES:

Mangrove Nutmeg (English). New Guinea languages:— estumoh (Jal at Madang); guma (Maprik at Sepik); iboom or ibuumkwarapsane (Kemtuk); kiea (Awju); lamanaru Talasea, New Britain; mate-mate (Amele); menalara (Mori River, southeast Papua); nit (Kebar); sebong-gwa; sebehongwa (Mios Waar Island); segwchi (Manikiong); sumtar (Amber-baken); tantar (Itik and Mander); war-gdo (Wein); watan (Berik).
A tall tree with stilt-roots in mangrove and wet places along river banks, subject to inundation. It is one of the commonest wild nutmegs in New Guinea and it may be confused in herbaria with the equally common *M. subalulata*, especially if the latter is sterile. It is a taller tree than *subalulata*, being 6–36 m high as against 3–10 m in the latter, which has no stilt-roots and usually grows in drier ground. Occasionally it ascends to 923 m (3,000 ft) in which case the leaves tend to be slightly narrower and the stilt-roots reduced in size or absent, *e.g.* Gray 4071 and White 10118. I have not given such specimens any varietal name as there are intermediates, the leaves of which tend to become smaller with increase of altitude, and anyway, the variation from the typical lowland tree is very slight. The ant-swellings, so characteristic of the twigs in *subalulata* are absent as well as the wings, but both species have the two lines extending from petiole base to petiole base. *M. sulcata* has these lines too, but then its leaves are darker when dry. It is because of the pale colour of the rather similar leaves (on drying) that *hollrungii* and *subalulata* are so often confused in herbaria. Those of *hollrungii*, however, tend to be on the average, smaller with fewer, more oblique and less deeply arched veins than those of *subalulata*, the base rounded or cordate, seldom acute. The texture of the leaf in both is similar except in the mountain forms of *subalulata* where it is naturally more coriaceous. The male flower of *hollrungii* is smaller and sub-globose in shape, not elliptic-cylindrical, more deeply lobed at the apex and with a much shorter staminal column and sterile apiculus. Its sterile stalk is densely pubescent, not glabrous, and the flowering pedicels are only half as long as those of *subalulata*. The glabrous fruit is larger and more oblong with a less prominent central apiculus. When young it is much more similar to that of *subalulata*, then being more sub-globose with a distinct central beak. In fact, in the early stages that of *M. sulcata* is similar also. It is about the same size as that of *hollrungii* when mature, but retains its sub-globose shape and lacks the central apiculus. All three are orange, becoming glabrous. For differences between *hollrungii* and *kajewskii* see the notes under the latter. *M. heterophylla* K. Schumann is a *mixtum compositum* with three syntypes. It was later emended by Warburg. For a full explanation see notes above in the Type Material of *hollrungii* and again in the notes after *subalulata*. Markgraf makes *M. albertisii* Warb. a synonym of *M. bialata* Warb. which he keeps up. Warburg states that it is nearest to *hollrungii*. I find that it is not different either. I have put it as a synonym of *hollrungii*.

It is difficult to decide whether to place *hollrungii* in series *Subalulatae* or in series *Heterophyllae*. It will be seen from the above comparison that *hollrungii* and *subalulata* have various points of resemblance. In fact *hollrungii* is the species which connects the present series with the *Subalulatae*. I would have put *hollrungii* with *subalulata*, only the male flowers are quite different, their shape being sub-globose and acute at the apex in bud like those
of series *Heterophyllae*, not elongate, tubular or acute at the apex as in *subalulata*. Less important is that the staminal column and straight veins are also more in keeping with what is found in the other members of the *Heterophyllae*. Once again it is the general rule in a uniform genus like *Myristica* to find and expect to find species which connect one series to others. Warburg like myself has not put *M. hollrungii* with *M. subalulata*, but then his series *Heterophyllae* is uniform consisting only of *hollrungii* and *heterophylla*, the latter really only *hollrungii*. Series *Heterophyllae* sensu *mihi* would be more uniform if *hollrungii* were removed from it as the two remaining species *kaijewskii* and *hypargyreae* are closer, both morphologically and geographically. If *hollrungii* has to be separated from these two species and if they continue to exist as a series then a new series, namely *Hypargyreae* will have to be created for them.


**Synonym**: *M. cerifera* A. C. Smith in J. Arn. Arb. 22, 1 (1941) 77—**syn. nov.—**Fig. 70.

Medium to large tree, 10-25 m high with stilt-roots. *Bark* reddish brown, rough with longitudinal cracks and flaking in crinkly, paper-thin flakes; sap red. *Twigs* stout, 3-8 mm thick, depending on the distance down from the apex, glabrous, striate, dark bluish brown or less often medium brown in the younger parts, rough and greyish in the older. Leaves chartaceous or coriaceous, glabrous, dark glossy green above, glaucous or whitish beneath, drying a pale brown above (as in *M. hollrungii*), pale or cinereous beneath with darker veins, oblong, rounded at the base, acute or bluntly acute at the apex; midrib prominent on both surfaces, becoming longitudinally striate on the lower surface when dry and there 3-4 mm broad near the base; nerves 18-25 pairs, oblique, equidistant, faint above, level with the surface or slightly sulcate, raised beneath; reticulations invisible above, a fine scalariform set beneath interwoven with a fainter network; length 17-35 cm; breadth 6-12 cm (large to medium size-class); petiole 2-5 cm long, often drying black, stout, 3-4 mm thick. *Male flowers* unknown. *Female*, the remains present on a *Knema*-like woody tubercle, the perianth thickly coriaceous, 6-7 mm long and 5-6 mm broad, tomentulose, the lobes 3 mm long and 3 mm broad, acute at the apex, ovary densely brown-tomentose, striate, stigma deeply bilobed; bracteole 3 mm long and 7 mm broad, obtuse; pedicels very short. *Fruit* single or in pairs, large, 7-8.5 cm long and 5.5-7.5 cm broad, broadly oblong to nearly sub-globose, sometimes with a few warts, pale brown-tomentulose, the pericarp hard and woody, 5-8 mm-(1 cm) thick; stalk 5 mm-2 cm long, very stout, 1 cm thick. *Seed* oblong, rounded at the apex, slightly rounded at the base, 4 cm long and 2 cm broad, hard, medium brown, glossy and having a spicy fragrance.

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*Foot-note:* *See Addenda, page 512.*
Fig. 70. Myristica kajewskii A. C. Smith.

Gardens’ Bulletin, Singapore — XXIII (1968)

SOLOMONS

Bougainville Island: Kupei Gold Field, Kajewski 1736 (A, BM, BO, BRI, G, P); Kugumaru, Buin, Kajewski 1827 (A, BM, BO, BRI, G, L); Lake Luralu, Koniguru, Buin, Kajewski 2068 (A, BM, BO, BRI, G, L, P); Siuai, Waterhouse 166 (K); Tonolei harbour, Whitmore BSIP 4148 (L, LAE, SING).

Fauro: Kariki. Whitmore’s collectors BSIP 5698 (L, LAE, SING).

Shortland Island: Inland from Harapa Village, Whitmore’s collectors BSIP 5737 (L, SING).

Choiseul Island: Inland from Liliu Village, Whitmore’s collectors BSIP 3559 (L, LAE, SING); Solovae Inlet, 1 mile south of Choiseul Bay Whitmore’s collectors BSIP 5685 (L, LAE, SING); ultrabasic outcrop, Ruravi, Whitmore BSIP 2981 (L, LAE, SING).

Santa Island: Garona, a few miles west of Maringe Lagoon, Whitmore BSIP 2484 (L, LAE, SING).

New Georgia Group: Gizo Island, Whitmore’s collectors BSIP 5601 (L, LAE, SING); Kolomangara Island, Kape harbour, Womersley & Whitmore BSIP 805 L, LAE, SING); Le River, New Georgia Island. Walker & C. T. White 198 (BRI, K); Baga Island, Whitmore BSIP 1373 (LAE, SING).

Malaita: Are Are District, Kiu, Lipaquito BSIP 3545 (L, LAE).


San Cristobal: Wairaha River, Whitmore BSIP 4251 (L, LAE, SING).

Distribution: Solomons.


Vernacular Names: Hig-ham-bure (Guadalcanal); kakola New Georgia; kuku (New Georgia and Santa Isabel); mu; or-wu-pekira; voraga (Bougainville).

Uses: The bark is macerated and the liquid drunk to check haemorrhages.

A common tree in lowland rain forest from 150–1,200 m altitude. M. cerifera is not really different so I reduce it to a synonym of our present species. M. kajewskii is also close to hollrungii but differs as follows:—The two lines on the twigs of the latter do not seem to be present. The leaves are generally more coriaceous but not always. The midrib is stouter and the petiole longer, sometimes up to 5 cm, but usually 3 cm long. The undersurface tends to be whiter with more distinct reticulations. The most important difference lies in the much larger fruit with a thicker woody pericarp and a stouter stalk. It is most unfortunate that male flowers are lacking in kajewskii for they might have told us more about the exact position of this species since it is also close to hypargyraea.
It may be and it is my own opinion that *M. kajewskii* is but yet only another variety of the widely distributed and variable *M. hypargyraea* which has spread from Fiji east to the other island groups. A glance at key no. 16 will show that the characters for separating the two are not very satisfactory. All are minor ones except the large fruit and even that character is shared by the var. *gillespieana* of *hypargyraea*, the variety which is nearest to *kajewskii* both morphologically and geographically. In fact, sterile material of both is sometimes indistinguishable. Yet, in the absence of male flowers, I am unable to confirm whether *M. kajewskii* is distinct or not and can make no reduction at present. I had hoped that Whitmore's recent collection would have provided the much awaited solution, but unfortunately there were no flowering specimens among the several sheets collected by him.


var. hypargyraea—Fig. 71.

Tree 10–20 m high. Twigs glabrous, the young parts moderately slender in the typical Samoan plant, average about 4 mm thick but becoming thicker in the older parts, greyish brown, finely striate, numerous small lenticels present. *Leaves* chartaceous, glabrous, dark green above; drying a greenish metallic grey, often slightly shining, greyish white beneath with reddish brown midrib and nerves, the whiteness due to very minute, non-powdery, waxy scales sunk in the tissue, oblong or oblong-lanceolate, base rounded or less often bluntly acute, apex acute; nerves 16–21 pairs, average 19 pairs, raised or slightly impressed above, fairly prominent beneath, straight or at times slightly crooked, the line of inter-arching at the margins prominent; reticulations indistinct or invisible: length 14–34 cm, average 23 cm; breadth 5–11.5 cm, average 7 cm; petiole deeply channelled and closely inrolled, 2–3 cm long and 2.5–3.5 mm thick. *Male inflorescence* 1–4 cm long, simple or mostly bifurcate, section 2 type but both the smooth

*Foot-note:—See Addenda, page 511.
Fig. 71. Myristica hypargyraea A. Gray var. hypargyraea.

basal part and the floriferous part elongating, the latter rusty-tomentose and with a few scars. **Male flowers** coriaceous, rusty or yellowish brown tomentose, ovoid-globose in bud and angled at the apex, completely covered by the bracteole on one side, subcampanulate at anthesis and split down to below the middle or ⅔-way by the broadly ovate lobes, 5–6 mm long and 6 mm broad; staminal column 5 mm long, the fertile part 3 mm long and 1.5–2 mm broad with 10 anthers and truncate on the top without an apiculus, the stalk narrower, 2 mm long, glabrous or with a few hairs at its very base; bracteole about ½ as long as the mature flower, broadly ovate or semi-orbicular; pedicels slender, 5–7 mm long and 1–1.5 mm broad, flattened and longitudinally striate. **Female flowers** also deeply lobed, 5 mm long, the ovary globose, densely rusty-tomentose; pedicels 5 mm long and 2–2.5 mm thick. **Fruit** sub-globose or slightly longer than broad with a minute apiculus, 3.2–3.5 cm long and 2.5–2.7 cm broad, dark brown-tomentulose, rather like that of a *Knema*, minutely warted, the line of dehiscence rather prominent, the pericarp thin but hard and woody, 2 mm thick; stalk slender, 3–4 mm thick, the peduncular part 1.2 cm long and the pedicel 1 cm long. **Aril** red with many fine lacinations. **Seed** with a dark brown, hard, glossy testa when dry, the embryo (after Warburg) crateriform with wavy margins.

**SAMOA S.L.:**

Graeffe s.n. (BM); Horne Nos. 10 (A, K) a second sheet of No. 10 in K is *fatua* var. *inutilis*; 29 (K); Powell 204 (K); Vaupe1 300 (K, M, NSW); Whitmee Nos. 87 (K); 88 (K); 90 (K); 101 (K) and s.n., date 1876-77 (A, BM, C, CGE, E, SING); Pickering, Cpt. Wilkes Exped. s.n. (A, K, NY, P, US) the Tonga specimen = var. *gillespieana* is also mounted on the A sheet. The NY and US specimens not seen by me.

**SAVAI:**

Graeffe 211 (HBG); near Samalaelu, Christophersen & Hume 2486 (BO) and Christophersen No. 3474a (UC) and 3474b (K); above Sili, Christophersen 3203 (K, L, P, UC).

**UPOLU:**

Graeffe Nos. 2 (HBG); 66 (HBG); 66a (HBG) and s.n. (HBG); Malololelei, Christophersen Nos. 150 (K, P, UC) and 314 (K, P, UC); Moa-moa Plantations, Eames 186 (BO, K) the A and L sheets of this number are *fatua* var. *inutilis*; top of Mafa Pass, McKee 2876 (K, L); Apolau, Reinecke 133 (BM, BO, BRSL, E, G & Boiss., K, L, Z); Laulii River Region, Reinecke 248 (E, G Boiss.).

**TUTUILA:**

S.L., Reinecke 445 (E, G Boiss.); Pago-pago, Garber 928 (BO); reservoir trail above Pago-pago, Yuncker 9419 (A); near summit of Vatia Pass on Vatia side, Setchell 342 (UC).

**DISTRIBUTION:**

Samoa.
TYPE MATERIAL: \( \text{Pickering, Cpt. Wilkes Exped. s.n. (A, K, NY, P, US) Samoa. The A sheet has the Tonga specimen of } M. \text{ hypargyraea (which I have now separated as the var. gillespieana) also mounted on it. I have not seen the NY and US sheets. The holotype according to A.C. Smith, Bull. Torr. Bot. Club 1.c. 403 is the A sheet but I think it may be the US sheet. For reason see under } M. \text{ castaneifolia, section Type Material. The lectotype of } M. \text{ hypargyraea var. hypargyraea should be taken as the Samoan specimen on the US sheet since the material was distributed by the Smithsonian Institution.} \)

VERNACULAR NAMES: \( \text{Atone (Savaii, Upolu); atone-ulu (Tutuila).} \)

var. gillespieana (A. C. Smith) J. Sinclair, \textit{stat. nov.}


Tree 8–30 m high, average 15 m with branches more or less horizontal. \textit{Twigs} stouter than in the typical, 6 mm thick in the younger parts and 8 mm–1 cm thick in the older, blackish or purplish brown and smooth in the younger parts, rougher and greyish brown in the older. \textit{Leaves} more coriaceous than in the preceding, oblong with nearly parallel sides, sometimes oblong-ovate, base rounded and often emarginate or sub-cordate, apex acute or bluntly acute; nerves 18–30 pairs, average 22 pairs; reticulations usually absent but sometimes a few faint, scalariform ones in the younger leaves; sizes rather variable, often larger than in the typical, 20–40 cm long, average 23 cm; 7–14 cm broad, average 9 cm; petiole 2–4 cm long. \textit{Flowers} as in the typical. \textit{Fruit} obovoid-ellipsoid when young, 3–5 cm long and 2.6–3 broad, later globose, sub-globose and less elongate when mature, 6 cm in diam., generally with paler tomentum; stalk much stouter than in the typical, 1–1.5 cm long and 8 mm–1 cm thick.
Fig. 72. *Myristica hypargyraea* A. Gray var. *gillespieana* (A. C. Smith) J. Sinclair.

FIJI S.L.:
Gillespie 4648 (A); probably Nawang-gambena, B. E. Parham 1295 (A).

Vanua Levu:

Vanua Mbalavu:
Malatta, A.C. Smith 1457 (A, BO, K, UC) on limestone.

Koro:

Viti Levu:
Mba, vicinity of Nalotawa, eastern base of Mt. Evans Range, A.C. Smith 4445 (A, K) small leaves; Mbua, southern portion of Seatovo Range, A.C. Smith 1537 (A, BO, K, P, UC) small leaves.

Moturiki:
Storek 866 (A, BM, G & Boiss., K) the BM sheet has in addition a leaf of M. castaneifolia.

Tonga Tongatapu
(Tongatabu):
Pickering, Capt. Wilkes’ Exped. s.n. (A, K, P) the A sheet also has the Samoan specimen of M. hypargyraea var. hypargyraea mounted on it. Graefe 68 (HBG); Langi, Mua, Setchell & Parks 15275 (A, K, UC); Vahe and Ha’ake Districts, Setchell & Parks 15432 (G, K, NSW, UC); van Dieman’s Point, Setchell & Parks 15505 (UC): towards lagoon near Fatai, Hürlimann 56 (Z); Hufangalupe near Vaini Village, Yuncker 15064 (A, BM).

‘Eua Island:
Lister, date 1889–90 (K); Parks 16160 (A, BM, C, K, UC); on terrace south Vaingana River, Hürlimann No. 279 (Z) and 280 (Z); trail to summit of eastern ridge, Yuncker 15385 (BM).

Kao Island:
Yuncker 15968 (BM).

Distribution:
Fiji and Tonga.

Type Material:

Vernacular Names:
Katone or kotone (Tonga); male (Fiji).

Uses:
Stem for making banana shooks, the aril for ornaments.

var. *guillauminiana* (A. C. Smith) J. Sinclair, stat. nov.


Synonym: Myristica sp. Guillaumin in J. Arn. Arb. 13, 2 (1932) 83.—Fig. 73.

Foot-note:—* See Addenda, page 425.
Fig. 73. *Myristica hypargyraea* A. Gray var. *guillauminiana* (A. C. Smith) J. Sinclair.

Leafy twig with fruit from *Kajawski 422* (BRI isotype).
Tree 25 m high *Twigs* young parts only present, dark brown, glabrous except the terminal bud, fairly slender, 4 mm thick. *Leaves* thinly chartaceous to almost membranous, drying a pale greyish brown above, whitish beneath, oblong or obovate; nerves 15–18 pairs; length 22 cm; breadth 8 cm; petiole slender, 2–3.5 cm long and 2 mm thick. *Flowers* not seen. *Fruit* globose to sub-globose, 3–4.5 cm long and 3–4 cm broad, very similar to those of the typical, the tomentum lighter in colour; the warts nearly absent, the apex minutely apiculate; stalk much shorter and slightly thicker, the peduncle 3 mm long, the pedicel 3 mm long and 5–6 mm thick.

**BANKS GROUP (near NEW HEBRIDES):** Vanua Lava Island, *Kajewski* 422 (A holotype, BRI, K, NY) the NY sheet not seen by me.

**DISTRIBUTION:** Banks Group, known from this single collection, but a common tree there at sea level.

**var. insularis** (Kanehira) J. Sinclair, *stat. nov.*


Large tree 10–30 m high. *Twigs* glabrous except the rusty-pubescent terminal bud and short innovations, fairly stout, 3–5 mm thick in the apical parts, 5–6 mm thick in the older, medium brown and longitudinally striate, greyish brown with coarser striations and a few lenticels lower down. *Leaves* mostly chartaceous, sometimes thinly coriaceous, drying a pale or less often medium brown above and waxy white or cinereous beneath due to very closely adpressed (not lax) minute scales, the lower midrib and nerves standing out a medium or reddish brown, obovate or broadly obovate, broadest above the middle and from there narrowed to the rounded or mostly sub-cordate base, rounded at the apex and then obtuse or bluntly apiculate; nerves 17–22 pairs, rarely a secondary one arising between two main ones, sunk above, prominent and raised beneath, oblique and more or less parallel; reticulations invisible above, visible beneath only in thin leaves, scalariform; length 25–38 cm; breadth 10–15 cm (4–8 cm broad at the base) but short leaves, 15 cm long and 7.5 cm broad sometimes present at the apex or on fruiting twigs; petiole 1.5–3.5 cm long, fairly stout, 3–4.5 mm thick. *Male inflorescence* as in the typical (only one seen by me) a striate, rusty-pubescent, slender main axis, 2–3.5 cm long, probably also shorter or nearly absent, dividing at its apex into two thick, scar-covered, 1 cm long branches, the flowers crowded at their apices. *Male*
Fig. 74. *Myristica hypargyraea* A. Gray var. *insularis* (Kanehira) J. Sinclair.

flowers as in the typical, rusty-tomentose outside, glabrous and
cream-coloured inside, campanulate, 5–6 mm long and 6 mm broad
 stil immature) ovoid-globose in bud with an obtuse apex; stalk
of staminal column glabrous except for a few hairs at its base,
fertile part twice as long as the stalk and ending in a minute
obtuse or truncate, sterile apiculus; pedicels slender, 5–7 mm
long. Fruit oblong, rounded at the apex with a short mucro,
4–4.5 cm long and 2.8 cm in diam., rusty-brown-tomentulose, the
pericarp hard and thick, sometimes verruculose, the line of
dehiscence prominent; stalk 5 mm–1.5 cm long and 5 mm thick.

CAROLINES PALAU:
ISLANDS: Babelthup Island (Baobeltoab):—
Galdok, Kanehira & Hatusima 5009 (A,
NY not seen); Ngathpang, T. Tuyama,
16th Aug. 1939 (TI).
Urukthapel Island:— Todai-yama,
Kanehira 1865 (K, NY not seen, P, TNS);
ditto, T. Tuyama, 9th Aug. 1939 (TI,
TOFO).

PONAPE: s.l., Kanehira Nos. 1512 (NY not seen);
1529 (P) and 1545 (K, NY not seen, US
not seen); G. Koidzumi, Jan. 1915 (TI);
Riesenbg 57 (BISH); Takamatsu 1023
(BISH). Mt. Seletterah, Glassman 2729
(BISH) male flowers; Takalide, Hosokawa
5522 (BISH); Palikir, Kanehira 727 (A
not seen, BISH, NY not seen, TI);
Sankaku-yama, Kanehira 763 (NY not
seen, TNS); Anapeng-pa, Takamatsu 713
(BISH).

DISTRIBUTION: Confined to the Carolines (Palau Islands
and Ponape).

TYPE MATERIAL: Kanehira 1865 (FU holotype not seen,
K, NY not seen, P, TNS).

VERNACULAR NAME: Ka'ara or kararah.

Myristica hypargyraea is a rather variable species since it is
spread over different areas isolated by seas. The type of M.
hypargyraea A. Gray consists of specimens from two localities,
namely Samoa and Tonga, both collected by Pickering during the
U.S. Expedition of Captain Wilkes, Duplicates were distributed by
the Smithsonian Institution, Washington. Actually on the A sheet
the specimens from these two localities are mounted side by side.
I have not seen the US herbarium material. In Gray's original
publication of M. hypargyraea it is apparent that he based his
description of it on male and fruiting specimens from Samoa and
that the account of the only female flowers he saw was from
Tongatabu (Tonga) specimens which also had young "forming"
fruits present in their inflorescences. Since the greater part of his
description was therefore taken from the Samoan material, I pro-
pose to designate the Samoan material as M. hypargyraea var.
hypargyraea. I have excluded and called the Tonga material which
is slightly different M. hypargyraea var. gillespieana since the
name gillespieana is available and can be used. Thus we have
M. hypargyraea var. gillespieana confined to Tonga and Fiji and
var. hypargyraea to Samoa.
The variety *gillespieana* differs from the typical in its much thicker fruiting pedicels, 8 mm–1 cm thick as against 3–4 mm in the typical. The young fruit is more elongate and more attenuate at the base into the stalk. Mature fruits become more or less sub-globose like the typical, but they are larger, being 6 cm in diameter and not warted. The colour of tomentum on the pericarp is often paler but this is not a reliable character. There are other minor differences such as the stouter twigs and the larger, more coriaceous leaves, often sub-cordate at the base and with more nerves. The size of the leaves is not always reliable, however, as they vary a good deal in their dimensions and small ones may be present which do not differ much from those of the typical. Some of these small-leaved specimens have been incorrectly named *M. castaneifolia*, but I have placed them under *hypargyraea* var. *gillespieana* with the inscription “small leaves” after the specimens cited. Also see notes under *castaneifolia*. Thus it can be seen that the differences between var. *gillespieana* and var. *hypargyraea* are not very striking and certainly not sufficient for *gillespieana* to remain as a separate species. It is not surprising, therefore, that Asa Gray considered them (the Tonga and Samoa specimens) to be but one species for there are sterile specimens which are sometimes indistinguishable.

*M. guillauminiana* A. C. Smith is no more than another variety of *hypargyraea* and probably arose as the result of isolation in the Banks Islands. The leaves are thinner and sometimes obovate, while the fruit-stalk is shorter and a little thicker, but not so thick as in var. *gillespieana*. The fruit is globose or sub-globose, very like that of the typical, but the warts are faint or nearly absent. It is not possible to say much more about it, since it was described from a single gathering.

*M. hypargyraea* var. *insularis* is said to be common in the Palau Islands. It differs from the other varieties in the leaves being obovate or broadly obovate, rounded or mostly sub-cordate at the base and the mature fruit oblong. The leaves of var. *guillauminiana* are sometimes obovate but thinner in texture. The fruit of var. *insularis* is often slightly warted and in this respect it resembles that of var. *hypargyraea* but its stalk (i.e. *insularis*) is shorter and a little thicker but not so thick as that of var. *gillespieana*. The flowers are more or less similar. Most of the specimens I have seen from the Carolines are named *M. hypargyraea* and not *insularis* and I cannot see that they are anything very different in spite of their great separation by distance and by sea. I fail to agree with Kanehira and A. C. Smith that they represent a different species and the most I can do is to make them a variety on account of the broad obovate leaves and the oblong fruits. Markgraf who examined them recognizes both *insularis* and *hypargyraea* in the Carolines. Fosberg has also named some of the sheets *hypargyraea*. The hairs on the perianth are, as A. C. Smith states, transversely fusiform, with the apical cell often elongate. In fact they consist of a small basal one with several others placed on top of it in an imbricate fashion and each larger than the preceding. If there are only two cells the resulting form
is a star with four rays. This type is not infrequent among the others but the majority have more than four rays and are probably older than the four-rayed ones. Those of var. gillespieana have mostly stellate hairs while those of var. hypargyraea have simple, one-celled or separate ones mixed with a few stellate ones. They all look the same under a lens when magnified 8 or 10 times and they are essentially all derived from one kind of hair with the same yellow pigment. One cannot make such trifling characters the basis for specific delimitation. The majority of foresters would ignore such minute details.

M. hypargyraea var. hypargyraea has been confused in herbaria with the other Samoan tree Myristica fatua var. inutilis as their leaves are rather similar at times. I, personally, have not experienced any difficulties here and there should be no trouble in recognizing them when male flowers are present. For more details see under M. fatua var. inutilis. It has already been pointed out that hypargyraea has been wrongly identified with castaneifolia at times. It is near to castaneifolia especially in its flowers but the floriferous part of its male inflorescence axis is more elongate, the scars of fallen flowers being fewer and more distant from each other. It can be distinguished from castaneifolia by the general absence of numerous secondary nerves on its leaves.

17. SERIES TEIJSMANNIAE


Twigs glabrous except the terminal bud, medium to dark brown or reddish brown, longitudinally striate, moderately slender, 3–5 mm thick or in one species 5–7 mm thick in the apical parts. Leaves chartaceous to stoutly coriaceous, glabrous, silvery beneath in M. andamanica when young, rhombic, elliptic-oblong, elliptic-lanceolate or ob lanceolate, acute at both ends, large to medium size-class, 12–40 cm long, average 26 cm long and 4–12 cm broad, average 7 cm; nerves 12–22 pairs, average 17 pairs, oblique and nearly parallel, straight or curving slightly, a few secondary nerves present but these short and never conspicuous or numerous; reticulations faint or absent. Male inflorescence axis generally stout in the reproductive part, with or without a straight smooth portion. Male flowers ovoid or sub-globose, less often oblong, 4–8 mm long and 3–5 mm broad; pedicels 6–7 mm long; bracteole early deciduous. Fruit glabrous or tomentulose, ovoid or sub-globose; 2.8–6.5 cm long and 3–4.5 cm in diam. Species 3 —— M. andamanica, crassa and teijsmannii.

TYPE SPECIES: M. teijsmannii Miq.
Very close to series Laurifoliae differing only in minor characters such as larger leaves, stouter twigs, veins more oblique and not curving even if they arise from the midrib at a wide angle, flowers larger, fruit more globose, not oblong. Both have the perianth slightly 3-angled at the apex. There is more development of the apiculus in the staminal column and the stalk is glabrous or less hairy. The apiculus may be present or absent in teijsmannii so this character may not have much significance.


A handsome tree 7-12 m high with horizontal branches and stilt-roots. Bark blackish; sap blood red. Twigs glabrous except the rather slender, elongate, pubescent terminal bud, medium to dark brown, longitudinally striate, 3-5 mm thick depending on the distance down from the apex. Leaves chartaceous to thinly coriaceous, seldom rigidly coriaceous except in the oldest leaves, glabrous, dark green and glossy above, pale greenish brown and often glossy when dry, lower surface covered with minute, silvery scales when young, the scales disappearing and the colour pale green or when dry medium brown, elliptic, broadly elliptic, oblong-elliptic or nearly rhombic, widest at the middle and from there tapering gradually to both ends, base acute, less often rounded but if so, then bluntly acute where it joins the petiole, apex acute or shortly acuminate; nerves 12-22 pairs, average 18, equidistant, oblique, nearly parallel, impressed above, raised beneath; reticulations scalariform, faint on both surfaces, dimensions variable, usually about 20-24 cm long and 9-12 cm broad but small ones 13 cm long and 4.5 cm broad and out-sizes up to 35 cm long and 14 cm broad; petiole 2-3.5 cm long and 3-4 mm thick. Male inflorescence a woody tubercle, 5 mm — 1 cm long, covered with scars to the base or often with a smooth basal portion 2-3 mm long, simple or sometimes shortly bifurcate with the branches 2-3 mm long. Male flowers many in the cluster, rusty-tomentulose outside, cream-coloured inside, oblong but in bud sub-globose to oblong and obtuse at the apex, coriaceous, (4) — 5 mm long and 3 mm broad, split down 1/4-way at the apex by the obtusely acute, erect or later slightly reflexed perianth lobes; staminal column about 3.5 mm long, the fertile part cylindrical with (6) — 8-10 anthers, obtuse at the apex with or without a blunt sterile apiculus, slightly broader than the stalk and 2-3 times longer; stalk nearly glabrous or with some minute hairs; bracteole tomentulose, semi-ombicular, surrounding the lower half of the flower.
Fig. 75. Myristica andamanica Hk. f. and M. crassa King.

on one side, acute, obtuse or 3-lobed at the apex; pedicels slender,
slightly longer than the flowers, 6–7 mm long. Female flowers not
seen. Fruit broadly ovoid like a peach or a large hen’s egg or
sometimes oblong, narrowed to the obtuse apex or not, glabrous,
5–6.5 cm long and 3–3.5 cm broad; stalk 1 cm long and 3–4 mm
thick. Seed shining, ovoid, 4–5 cm long and 2–2.5 cm broad.

ANDAMANS:  S.I., Carter 178 (CAL); King’s collector,
date 1884 (BM, CAL, G, K).
Middle Andaman:—Long Island, Parkinson
669 (CAL, DD, K) and Mt. Barrington,
Parkinson 636 (CAL, DD); Claudius
Range, Middle Andaman, Parkinson
1170 (CAL, DD); Porlob Island, Kirat
Ram 3777 (DD).
South Andaman:—S.I. Kurz 265 (CAL);
Port Blair, King’s collector 186 (CAL,
FI); Hobodaypur, King’s collector, 6th
September, 1890 (CAL, K); North Bay,
King’s collector, 12th September, 1891
(CAL, P); Mt. Harriet, Kurz, 2nd Feb-
uary, 1875 (BO, CAL, K, L); Corbyn’s
Cove, King’s collector, 13th February,
1892 (BM, CAL); Anikhet Hill Jungle,
King’s collector, 5th March, 1893 (CAL,
K).

NICOBARS:  S.I., Didrichsen 3688 (C).

DISTRIBUTION:  The Andamans and Nicobars. Not un-
common on evergreen hills in the
Andamans. It should be looked for in
the forests of Tenasserim and the islands
of the Mergui Archipelago.

TYPE MATERIAL:  M. andamanica Hk.f. The collection
of Kurz and King’s collector from the
Andamans. No holotype chosen by
Hooker f.

VERNACULAR NAMES:  Jaiphal (Andamans).

ECOLOGY:  Flowers July-August. Fruits December-
February.

It is obvious that Warburg did not notice the similarity of
M. andamanica and crassa since he placed andamanica in series
Malabaricae near to malabarica (probably at Hooker’s suggestion,
see Fl. Br. India 5 page 103) and crassa in series Castaneifoliae.
I have noted the following differences between the two:— In
M. andamanica the twigs are more slender and the leaves not so
coriaceous. They are always broader at the middle and from
there taper to the acute base and apex. At times they may be
almost rhombic. Those of crassa are narrower, more e’longated
and usually have the sides nearly parallel. If at all they are broad,
then the broad portion is above the middle, near the apex. The
undersurface is at first covered with minute silvery scales in
andamanica. These seem to be lacking in crassa. In andamanica
the male flowers are slightly smaller and rusty-tomentulose in
contrast to the glabrous or nearly glabrous ones of crassa. Female
flowers of andamanica are lacking, but they are probably not
different from the female of crassa. The fruit is usually of the
same shape, but it sometimes tends to be oblong in andamanica.
(65) *Myristica teijsmannii* Miq. Fl. Ind. Bat. 1(2), 1 (1858)

**Synonym:** *M. hyposticta* Miq. Fl. Ind. Bat 1(2), 1 (1858) 55; Koorders et Valeton, Bijdr. Booms. 4 (1896) 178. —— *Fig 76.*

Tree 12–15 m high with some stilt-roots. *Bark* with a few flakes but no ridges or furrows; sap red, copious. Twigs reddish brown, glabrous except the rusty-puberulous terminal bud and young apical parts, finely longitudinally striate, the portions of the current year's growth rather slender, 2.5–4 mm thick, those of previous years 4–6 mm thick, slightly darker and often with a greyish tinge. *Leaves* chartaceous and rather fragile, medium green and glossy above, glaucous beneath with a greenish yellow midrib, drying a greenish brown above and greyish or pale brown beneath, sometimes with a yellowish tinge, oblong-lanceolate, lanceolate or mostly oblanceolate, often broadest just above the middle and narrowed to an acute base, apex obtuse or shortly and bluntly apiculate; midrib flat and lying in a groove above, raised and reddish brown; nerves 14–18 pairs, often with a secondary one between two main ones, impressed above, raised beneath and rather slender, also drying reddish brown, semi-patent or curving slightly with crooked ones here and there; reticulations invisible; length 12–26 cm, average 20 cm; breadth 4–7–(10) cm; petiole 1.5–2 cm long, slender, 1.5–2.5 mm thick, reddish brown, inrolled and deeply channelled. *Inflorescence axis,* the male a short woody tubercle, 4 mm long and simple (section II type) or elongating up to 1 cm and then dividing by simple dichotomy into a central flower and two very short, 2 mm long lateral axes bearing 6–10 flowers, the basal portion of the axis smooth, flattened and with the appearance of a very short section I or an incipient section I type, the female much shorter, 2–3 mm long, but its basal portion also smooth, 1–3-flowered. *Male flowers* ovoid, 7–8 mm long and 4–5 mm broad, dark brown and shortly adpressed-tomentose outside, cream and glabrous inside, obtuse at the apex in bud, split down ¼-½-way into the lobes; staminal column about 5 mm long with 10–12 anthers, the stalk 2 mm long, rusty adpressed-pubescent, broad at the base, the fertile portion 3 mm long, rather obtuse or flat at the apex with a very short sterile portion or with most of the anthers ending at the apex; pedicels 6 mm long or about as long as the flowers, often slightly curving inwards, the apical portion slightly broader than the rest; bracteole amplexicaul, almost enclosing the young flowers, 6–7 mm long and ¼ shorter in length than the mature flower, broadly ovate, acute, obtuse or emarginate at the apex. *Female flowers* very stoutly coriaceous, 7–8 mm long, 5–6 mm broad and 1 mm thick, urceolate, the
Fig. 76. *Myristica teijsmannii* Miq.

lobes patent or reflexed; ovary 4 mm in diam., dark brown-tomentose, the stigmas glabrous and obtuse like a duck's bill; pedicels 3–5 mm long, stout, 2.5–3 mm thick. Fruit often 2 together, globose or sub-globose, dark brown-tomentulose, 4 cm in diam., pericarp hard, 5 mm thick; stalk 5–7 mm long and 5 mm thick. Aril red. Seed conform to the carpel.

JAVA Mid JAVA:

Baron Bay, Djojkia, Burger 2155 (BO, SING).

EAST JAVA:

S.1., Horsfield 196 (CAL); Teijsmann 21616 (BM); Teijsmann & de Vriese s.n. (L); de Vries s.n. (L). The following in Kediri:—Gadungan Pare, Koorders Nos. 13594 (BO, CAL, K, L, P); 22738 (BO, CAL, K, L) & 22794 (BO, K, L); Gunong Parang, Kediri, Koorders Nos. 13596 (BO, CAL, P); 22854 (BO, CAL, K, L) & 23051 (BO, L); Patjitan, Horsfield s.n. (BM, CGE, K, U); Gunong Wilis, Backer Nos. 11487 (BO) & 11571 (BO, K, L, SING); Lörzing 961 (BO); Koorders 38776 (BO) & Warburg s.n. (C, Fl, G, Boiss., L, P); West of Prigi, Backer 11826 (BO, L, SING); Sumbing, Teijsmann s.n. (BO, K, U, W) and Hasskarl (15) (L) probably same collection; Mt. Kawi, Warburg, date 23rd April, 1898 (G Boiss., M); Malang, Pagersari, Ja 2694 (A, BO, L); Ngandjuk, Ja 3069 (L). The following three Pasuruan:—Bantar, Backer 30445 (BO, SING); Tangkil S. Range, Koorders Nos. 23394 (BO, L) & 23612 (BO).

CULTIVATED:

Hort. Bog. Beccari Fl Acc. No. 7654 (Fl); Forman 34 (IVG78) (BO, K, L, SING) the K sheet numbered 34, the others dated 14th February, 1956 are probably from the same gathering; Sinclair Nos. 10025 (IVG78) (E, K, SING) & 10026 (IVG78a) (B, E, SING); s. coll. IVG78a (NY, US); Teijsmann (Herb. Hasskarl) s.n. (L, P); Warburg s.n. (L).

DISTRIBUTION:

East Java, altitude 100–1,000 m. One record from Mid Java.

TYPE MATERIAL:


VERNACULAR NAMES:

Durenan; kalakalu; pala djawa; rah (E. Java); kosar (Sundanese).

Warburg placed this species in a series of the same name and I have now to add two others, namely M. andamanica and crassa. All three are closely related and might even be considered three subspecies or three varieties. I had originally intended to make crassa a variety of andamanica with teijsmannii as a separate species but this hardly makes sense as the differences between the three are not disproportionate. I admit that this is a border-line case and that the grounds for separating or uniting them as
varieties or subspecies of one unit are about fifty-fifty. The geographical distribution favours a separation since the distribution of *teijsmannii* is discontinuous and terminates in East Java. A separation is further aided by the fact that there is a curious apparent similarity that is in reality deceptive between *M. teijsmannii* and *M. fatua* var. *spanogheana*. It may be that *fatua* through variants like var. *spanogheana* with very little indumentum on the lower surface of the leaves gave rise to the glabrous *teijsmannii*. If the latter is related to *fatua* then this suggests that it is a species rather distinct from *andamanica*. *M. fatua* var. *spanogheana* ends in Sumbawa but we might have expected a further extension of it to Lombok and *teijsmannii* on to Bali as it will be recalled that *Kneoa cinerea* var. *sumatrana* ended in Bali and was replaced by its var. *cinerea* in Lombok, the Wallace Line passing between these two islands. The eastward spread of *M. guatterifolia* similarly terminated in Bali.

Apart from the absence of the indumentum, *teijsmannii* can always be distinguished from *fatua* var. *spanogheana* by its narrower leaf-base with the veins not crowded at the very base, the fewer and less oblique veins, the perinath not split down so far by the lobes and the more globose fruit with less indumentum. The male inflorescence axis in *fatua* var. *spanogheana* and also in the other varieties of *fatua* is usually without a smooth basal portion. In *teijsmannii* the basal portion is often smooth and may elongate up to 1 cm long. It may then divide once into a very short fork, each arm being only 2 mm long. It seems here that there is some reversion to the section I type of axis. We could also argue that the section I species of western Malesia in giving rise to section II with the shortening of the inflorescence axis did not always complete this process. It was not so well perfected in this species as in *fatua*. If the evolution proceeded in this direction, *teijsmannii* occurring at the barriers of western and eastern Malesia would have evolved before *fatua* and might even have given rise to *fatua* var. *spanogheana*. If the evolution proceeded from east to west with *fatua* as the basic species then it may have given rise to var. *spanogheana* as mentioned at the beginning, and this in turn led on to *teijsmannii* again at stepping stones to western Malesia. The tendency for the inflorescence axis to lengthen was incipient in *teijsmannii* but became more pronounced in the other species of western Malesia except those of section II.

*M. teijsmannii* differs from *crassa* chiefly in having more slender twigs and petioles, much thinner leaves which are not so broad at the middle and more gradually narrowed to the base, the nerves thinner and less distinct above, the inflorescence axis more elongate and not so stout, flowers darker brown and more densely tomentose (not glabrous) and fruit also with more tomentum. The differences between the three allies are best illustrated in tabular form.
<table>
<thead>
<tr>
<th>Twigs (young parts up to 10 cm down from the apex)</th>
<th>M. andamanica</th>
<th>M. crassa</th>
<th>M. teijsmannii</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slender, 3 mm thick, reddish brown.</td>
<td>Stout, 5–7 mm thick, blackish brown.</td>
<td>Slender, 3 mm thick, reddish brown.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Usually rhombic, widest at the middle.</td>
<td>Elliptic-oblong to oblong-lanceolate or oblanceolate usually with parallel sides.</td>
<td>Usually oblanceolate and gradually narrowed to the base.</td>
<td></td>
</tr>
<tr>
<td>Base acute.</td>
<td>Base bluntly acute or rounded.</td>
<td>Base acute.</td>
<td></td>
</tr>
<tr>
<td>White scales present beneath when young.</td>
<td>No scales, glaucous beneath.</td>
<td>No scales, glaucous beneath.</td>
<td></td>
</tr>
<tr>
<td>Length 20–24–(35) cm.</td>
<td>Length 18–40 cm.</td>
<td>Length 12–26 cm.</td>
<td></td>
</tr>
<tr>
<td>Breadth 9–12 cm (small ones 13 cm × 4.5 cm).</td>
<td>Breadth 5–12 cm.</td>
<td>Breadth 4–7 cm.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Petioles.</th>
<th>3 mm thick.</th>
<th>4 mm thick.</th>
<th>1.5–2.5 mm thick.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smooth basal part if present slightly elongate, 3–5 mm long, rather slender.</td>
<td>Smooth basal part 2–3–(5) mm, shorter but very stout.</td>
<td>Smooth basal part elongate up to 1 cm, slender.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Male flowers.</th>
<th>Rusty-tomentulose 5 mm × 3 mm.</th>
<th>Glabrous or nearly so, 4–7 mm × 3 mm.</th>
<th>Rusty-tomentose, tomentum darker than in the other two, 7–8 mm × 4–5 mm.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bracteole.</td>
<td>2.5 mm long.</td>
<td>2 mm long, early deciduous.</td>
<td>6–7 mm long.</td>
</tr>
<tr>
<td>Fruit.</td>
<td>Broadly ovoid to oblong, glabrous, 5–6.5 cm × 3–3.5 cm.</td>
<td>Ovoid-globose, minutely puberulous, becoming glabrous, 2.5–4.5 cm in diam.</td>
<td>Subglobose to globose, 4 cm in diam., darker brown, tomentulose.</td>
</tr>
</tbody>
</table>


Leaves often with nearly parallel sides, sometimes oblanceolate and broadest above the middle. The lobes of the female flowers are reflexed at the apex, but those of the male generally not.

The anthers are 6–10 in number and not 12–18 as stated by King, Warburg and myself.

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>SUMATRA INDRAGIRI:</td>
<td>RIouw and Ond., Kuantan District, Sungei Rambei, <em>bb23470</em> (BO, L).</td>
<td></td>
</tr>
<tr>
<td>PALEMBANG:</td>
<td>Kubestrekken, <em>Buurman van Vreden 139</em> (BO) and <em>Endert 222</em> (BO); Banjusin and Kubestrekken, <em>Grashoff 958</em> (BO).</td>
<td></td>
</tr>
<tr>
<td>DISTRIBUTION:</td>
<td>Sumatra, Siam and the Malay Peninsula. Does not occur in Borneo.</td>
<td></td>
</tr>
<tr>
<td>VERNACULAR NAME:</td>
<td><em>Prao Ledong</em> (Siam).</td>
<td></td>
</tr>
</tbody>
</table>

### 18. SERIES LAURIFOLIAE


**Synonym:** series *Suaves* (*Suavis*) Warb. Monog. Myrist. (1897) 377 *quoad* *M. cumingii* Warb. *tantum.*

Twigs 2–4 mm thick, reddish brown and nearly smooth in the apical parts, 4–6 mm thick, greyish brown and longitudinally striate in the older parts. *Leaves* chartaceous to coriaceous, medium to small size-class, length 9–30 cm, average 19 cm; breadth 3–10 cm, average 6.5 cm; drying a greenish or greyish brown above, often glossy with dark patches, paler brown or with some whitish scales beneath (these scales not lax and powdery as in the *Fatua-complex*) the lamina elliptic, elliptic-lanceolate, oblong-lanceolate
or rarely oblanceolate, broadest at the middle, the base mostly acute, less often rounded, the apex acute, less often acuminate; nerves 10–18 pairs in the one species and 13–30 pairs in the other, curving widely and rather crooked, secondary nerves present; reticulations faint beneath in the one species and more distinct, forming a fine lax network in the other; petiole 1.5–3 cm long, average 2 cm long and 2–4 mm thick, deeply grooved. *Male inflorescence* often with a short smooth part below the scar-covered part, the latter often with short knarled branchlets and prominent scars (dactyloid). *Male flowers* numerous in dense umbels, small, 4–5 mm long and 2.5–3.5 mm broad, ovoid or less often obovoid, obtuse at the apex in bud, split down 1/2–1/2-way by the non-reflexed lobes, tomentulose in the one species and densely tomentose in the other; pedicels 3–5 mm long, slender; bracteole semi-orbicular, 2.2 mm long and 1.5 mm broad, persisting for sometime; staminal column with an acute or obtuse sterile apiculus, the stalk in *ceylanica* nearly glabrous or with very few hairs, and 1/2 the length of the fertile part, in *dactyloides* tomentose and as long as the fertile part. *Female flowers* urceolate with reflexed sub-acute lobes. *Fruit* 4.5–6.5 cm long and 2.2–3.5 cm broad, oblong or oblong-ovoid, rounded at both ends when mature, rusty-tomentulose becoming glabrous; stalk 5 mm — 1 cm long and 5 mm thick —— 2 species *M. ceylanica* and *dactyloides*.

**TYPE SPECIES:**

[M. laurifolia Hk.f. et Th.] = *M. dactyloides* Gaertner.

A small series related to series *Teijsmanniae* and differing from it only in minor characters. These have been already discussed under that series while its relationship with series *Cimiciferae* has also been mentioned under series *Cimiciferae*. There is also some affinity with series *Castaneifoliae* in some minor characters. These series at the end of section II with the glabrous leaves are all near to each other and perhaps somewhat artificial. They all overlap in certain characters and this lack of gaps is probably a good sign and will help to show how the one evolved from the other without missing links. This may not please the tidy-minded who like pigeon-holes for here they will be in difficulties if they try to “force” species into series unnaturally. Here they will realize that in some respects the classification of the Myristicaceae is not as easy as ABC. However, series *Castaneifoliae* differs from the present series chiefly in having fainter, straight and more oblique nerves, the reticulations absent, the petiole longer in proportion to the size of the lamina, the flowers slightly larger, less often the same size, and the fruit more ellipsoid and not oblong.

The two species of the present series are very close to each other and the differences between them are mentioned in the notes after each. *M. ceylanica* occurs in Ceylon where it is rare, and strange to say in the Philippines where it has a wide distribution. *M. dactyloides* is commoner in Ceylon than *ceylanica*. It is also found in South India. Both species require protection and might easily disappear if the forests are cut down.


**Pre-Linnaean Literature:** nux moschata majoris seu macis arbor, Camello in Ray, Hist. Pl. 3 App. (1704) 58 vide supra. Nux moschata majoris seu macis arbor Indis Dooghan, Dunghan vel Gonogono, Camello l.c. 58.

**var. ceylanica** — **Fig. 77.**

Tree 6–20 m. high with bushy, elongate crown and lax branches. Bark nearly smooth, flaking slightly when old, brown, inner bark thick, reddish brown; wood white; sap red. Twigs, the youngest parts slender, pale reddish brown, 2–3 mm. thick, nearly smooth or longitudinally striate, the older moderately slender, 3–4 mm. thick, slightly rougher, darker reddish brown, the oldest 4–5 mm. thick and greyish brown. Leaves glabrous, chartaceous, occasionally thinly coriaceous, elliptic-oblong, elliptic or elliptic-lanceolate, generally broadest at the middle, dark green and glossy above, much paler beneath with a yellowish-green midrib, drying various shades, generally a greenish brown above with dark brown patches and often glossy, light to dark brown beneath, base acute or cuneate, seldom rounded, or if so then acute where it joins the
Fig. 77. Myristica ceylanica A. DC. var. ceylanica.
petiole, apex acuminate or acute; midrib sunk and lying in a groove above, prominent but thin beneath, often longitudinally striae on drying; nerves 10-18 pairs, sometimes with a short secondary nerve between a main pair, leaving the midrib at an acute angle (about 45°). The general pattern oblique, but often rather crooked or curving irregularly, slender but distinct on both surfaces, impressed above; reticulations faint or absent, a few scalariform ones often seen beneath; length 9-20 cm., average 16 cm.; breadth 3-9 cm., average 6 cm.; petiole slender, rather long, 1.5-2.5 cm., average 2 cm. long and 2 mm., occasionally 3 mm. thick, deeply grooved. Male inflorescence a 5 mm.-2 cm. long, *Knema*-like, woody tubercle, covered with pedicel scars, sometimes with 2-3 very short branches, the tubercular part often with a 2-3 mm. long, smooth main axis at its very base. Male flowers numerous, crowded, sub-coriaceous, minutely rusty-adpressed-tomentulose outside, cream coloured and glabrous inside, ovoid, slightly narrowed to the 3-angled, somewhat obtuse apex, split down ⅓-⅓-way by the erect lobes which are obtuse or bluntly acute at the apex, 4-5 mm. long and 3-3.5 mm. broad; pedicels 3-5 mm. long, slender; bracteole semi-orbicular, embracing the flower on one side, obtuse at the apex, tomentulose, 2.2 mm. long and 1.5 mm. broad; staminal column with 7-10, average 8 anthers, fertile part 2.5 mm. long, ending in a 0.5 mm. long, acute or obtuse sterile apiculus, stalk 1 mm. long, a third to slightly less than half the length of the fertile part, but of about the same breadth, nearly glabrous or with a few very short hairs. Female inflorescence shorter than the male, 2.5 mm. long. Female flowers much fewer than in the male, 1-3 only on each tubercle, 5 mm. long, urceolate with reflexed, sub-acute lobes; ovary 2 mm. long and 2 mm. broad at the base, dark brown-tomentose, the stigma bi-lobed, glabrous, resembling a duck’s bill; pedicels 2 mm. long. Fruit oblong (ellipsoid when young) 4.5-6.5 cm. long and 2.2-3.5 cm. broad, average 5 cm. long and 3 cm. broad when dry, minutely rusty-tomentulose, rounded at both ends; pericarp 3 mm. thick; stalk 5 mm.–1 cm. long and 5 mm. thick. Aril red, much fimbriated with narrow segments. Seed oblong, dark brown, shining.

CEYLON

S.l., (probably Walker) Herb. Hooker 749 (K); ‘Herb. Hance, Thwaites 5473 (P); Trimen, July 1890 (CAL); Walker 1087 (E, K); Wight Nos. 871 (E) and 872 (E).

Central Province:—Palleseama, Dambulla, Alexander, Oct. 1890 (PDA); Naula on road to Elahera, Alexander, date 1888 (PDA); Matale, Madulkelle, Worthington 1989 (BM); Uma-oya, Thwaites C.P. 2923 (A, BM, BO, BR, CAL, CGE, DD, Fl, G, Boiss. & Prodr., K, P, PDA); Uma-oya, s. coll., July 1890 (PDA).

S.I., Merritt 8585 (US).

PHILIPPINES

Mindoro:—Puerto Galera, Ramós 46373 (A, BM, BO, K, NY, P, UC, US) and José Vera Santos 5329 (L); Badok, Naujan, Celestino & Castro 1995 (A, BO, BR, L, PNH, SING, UC); Pinamalayan, Ramos Nos. 40814 (A, BO,
P, US, W); 40867 (A, BO, BRI); 40909 (DD, K, MEL, UC) & 40910 (A, BO, K, L, P, US); Cauayan, Bongabong River, Merrill 80 (P); Merrill Nos. 3663 (NY) & 3698 (K, NY); Mt Yagaw, eastern slope, M.D. Sulit & Conklin 17645 (L, PNH).

LUZON:
Pro. Cagayan:—Curran 17202 (US).
Pro. Quezon:—Tayabas, Bawan 24935 (A, K, NY, US); Malbog, Tayabas, Oro 30702 (NY, SING); Mt Binuang, Tayabas, Ramos & Edano 28865 (A, BM, K, P, US); Alabat Island, Ramos & Edano Nos. 48050 (NY, UC); 48194 (B, NY, P, SING, UC) & 48388 (UC).
Pro. Albay:—Cuming 903 (BM, K); Mt. Malinao, Edano 34497 (BM, BRI, K, L, PNH, SING); Tivi, Vidal 854 (K).

SIBUYAN:

TICAO:
Rosenbluth 12523 (US).

SAMAR:
Catubig River, Ramos 24147 (A, NY, US) and Sablaya 8 (A, K); Laquilacon, McGregor 43717 (UC).

LEYTE:

BILIRAN:
Mt. Suiro, M.D. Sulit 21548 (L, PNH).

NEGROS:
Pro. Negros Occidental:—Masias, Sareno & Torrille 30131 (UC); Iglamgam, Dias 29890 (NY, UC).
MINDANAO: S.1., Ahern 363 (BO).


Prov. Davao:—Mati, Ramos & Edano 49001 (B, BM, BR, NY, P, SING, UC).


Prov. Zamboanga del Sur:—San Ramon, Hallier 4699 (NY).

DISTRIBUTION:

Ceylon in the drier forests, rare. Philippines, widely distributed in lowland forest, ascending to 830 m., common.

TYPE MATERIAL:

VERNACULAR NAMES: Malaboda or malabodde (Ceylon, Sinhalese) also used for the other Ceylon species M. daetlyoides. Philippines:— Bantolinau (Mbo.); duguan (Bik., C. Bis., P. Bis., Tag.); imos (Mbo.); kalau (C. Bis.); malabakau (C. Bis); malatalang (Tag.); uguau (Bik.). Formerly used for house construction in rural areas in the Philippines like so many other kinds of wood. Nearly all rural houses are made of wood so hence the great shortage of forests and trees to-day. More recently houses are being made of brick or other more costly materials as a result of injudicious forest felling while native trees are confined to ridges or inaccessible places. According to M.D. Sulit, the bark is boiled in the Philippines and the decoction drunk to prevent the spitting blood.

var. cagayanensis (Merrill) J. Sinclair, stat. nov.


Tree 8 m high. Twigs dark reddish or purplish brown, 3–4 mm thick near the apex and 5–6 mm thick lower down, much stouter than in the typical. Leaves smaller and much more coriaceus, 9–18 cm long, average 13 cm and 4–6 cm broad, average 5 cm; nerves more deeply impressed above and more prominent and thicker on both surfaces; nearly parallel or curving slightly; petioles 2–3 cm long, stouter, 3–3.5 mm thick. Flowers and fruit as in the typical.

FORMOSA MAINLAND: Hengchun, Hsiuan Keng, date 1950 (US) not seen by me.

BOTEL TOBAGO OR LANYU ISLANDS: Botel Tobago, also called Lanyu, Kotosho Island or Hung-tou-yn, Sasaki s.n. date 1912 (TI); Kawakami & Sasaki, date 1912 (TI); Mt. Satuji, Tyosyun Sata 1260 (Z).

LUTAO ISLAND: Kawakami & G. Nakahara, date 1905–06 (TI).

PHILIPPINES BATANES ISLANDS: Batan Island. Ramos Nos. 80422 (K, NY, SING) & 80600 (K, NY).

BABUYAN ISLANDS: Camiguin Island. Fenix 4105 (G, PHN. SING, US) and Balatubat, Camiguin Island, Edito 79290 (BO, NY, SING).
I have realized early in my studies on the genus *Myristica* the close resemblance between *M. cumingii* and the Ceylon *M. ceylanica*. On examining the male flowers from the type of the latter, I find that they are, in all characters even down to the last details of the staminal column, in no way different from those of *cumingii*. I now have to unite these two species as I am unable to separate them in a key. Neither King nor Warburg have suggested any alliance. The latter, when examining *ceylanica*, saw a single gathering only, namely the type. *M. ceylanica* seems to be rare in Ceylon, at least it has not been frequently or recently collected. It is found in drier areas than those of its common, related, Ceylon neighbour *M. dactyloides* Gaertn. (*laurifolia*). In the Philippines it is common and widely distributed. *M. dactyloides* is very similar to *ceylanica*, but has more coriaceous leaves, thicker twigs and more densely tomentose flowers (see notes under that species). There is, in the Annonaceae, a parallel instance where a member, *Anaxagorea luzonica*, like *M. ceylanica*, common in the Philippines, misses the Malay Peninsula, but is also found in Ceylon. It was formerly known under the name of *A. ceylanica*, but has now been reduced to *luzonica*. This distributional pattern would suggest that *M. ceylanica* is a very old species.

Blume states that Camello’s *nux moschata seu macis arbor Indis*, *Dooghan*. *Dunghan v. Gonogono* may or may not be similar to *cumingii* and creates the name *M. spuria* Bl. for it. Warburg adds *M. spuria* as a doubtful synonym. From Camello’s and Blume’s description I cannot be certain in the absence of a type whether the plant is *M. ceylanica* var. *ceylanica* (*M. cumingii*) or *M. philippensis* or some other species of *Myristica*. Sterile material of *philippensis* with small leaves and slender twigs can at times be confused with large-leaved, sterile specimens of *cumingii*. (See notes under *M. philippensis*). So it may be difficult to separate the two even when specimens are at hand unless one has flowers or fruit.

Warburg’s figure of *M. cumingii* is not a good one. He has drawn the smooth part of the inflorescence axis much too long and it thus resembles that of *iners* where the axis is of the branched section I type. The leaves of *ceylanica* at times resemble those of *iners*, especially those with the more distinct type of venation, but they are generally broader in the former. Airy Shaw mistook certain Bornean specimens of *iners* for *cumingii* which he named *cumingii* var. *floribunda* while several authors, De Candolle, Miquel, Fernandez-Villar and Vidal thought that the Philippine specimens...
of *cumingii* were *iners*. In the list of synonyms here will also be found *M. mindorensis*, *negrosensis*, *nitida* and *urdanetensis* which are not different from *ceylanica*.


As far as I can see there is no formal combination here and *M. laurifolia* var. or forma would appear to be a synonym of *M. zeylanica* A. DC. Now Trimen in his *Systematic Catalogue*, page 74, apparently from the above circumscriptions thought that Thwaites was involved or made the combination as he (Trimen) states:

**MYRISTICA LAURIFOLIA**, Hk. f. & Th. 11.

var zeylanica, Thw. 11 & 399.

Actually it was Trimen who made the reduction and combination which should be *Myristica laurifolia* Hk. f. et Th. var. *ceylanica* (A. DC.) Trimen. Trimen uses small capitals to indicate that the tree is endemic in Ceylon. The figures 11 & 399 are the page references in *Thwaites Enumerario*.

*M. ceylanica* var. *cagayanensis* is a variant of the typical with smaller, much more coriaceous leaves and thicker twigs. It probably arose due to long and continued exposure in such habitats as rocky mountains or windy coasts where the full strength of the sun beats down during the hot season in a salt-laden atmosphere and where the lower temperatures of the more northerly latitude take effect during the cold season. At one time I thought that the specimens belonged to *guatteriifolia* which they certainly resemble except for the absence of the yellow scales on the lower surface of the leaf. This view I had to abandon when Hui-Lin Li’s book, *Woody Flora of Taiwan* appeared depicting the male inflorescence and male flowers. This inflorescence is a condensed *Knema*-like one, very different from the elongate, branched type of *guatteriifolia* while the male flowers and staminal column are exactly like those of *ceylanica*.

The Formosan specimens of var. *cagayanensis* being rather poor were at first identified by Hayata as *M. laurifolia* Hk. f. (et Th.) with a query and later altered by him to *M. heterophylla* F.-Vill. Actually the *M. heterophylla* of F.-Vill. is *Knema glomerata* (Blanco) Merr., synonym *Knema heterophylla* (F.-Vill.) Warb. *Knema glomerata* was based on *Sterculia glomerata* Blanco, but Kudo and Masamune then created the superfluous name *Myristica glomerata* Kudo et Masamune for the Formosan specimens. This name is shown as a combination, *Myristica glomerata* (Blanco) Kudo et Masamune in the original publication in *Ann. Rep. Taihoku Bot. Gard*. 2 (1932) 89 and in *Kew Index*, Suppl. 9 for 1931–35 (1938) 184 since it was based on *Sterculia glomerata* Blanco. I pointed out in *Gard. Bull. Sing*. 18 (1961) 226 that the Formosan specimens were a coriaceous leaved variety of *M. cumingii* also known as *M. cagayanensis* Merr., but I did not know at that time that *cumingii* was a synonym of *ceylanica*. 

*Panam-palca*, Rheede, Hortus Malabaricus 4 (1683) 9, t. 5  
*pro parte quoad folia et fructus tantum. Nux moschata mala-  
barica* Valentini, Mus. 1 Epist. Orient. (1716) 83 t. 4.  
*Myristica fructu inodoro*, Linn. f. Fl. Zeyl. (1747) n. 588 — Fig. 78.

Tall tree up to 27 m high, stilt-roots present when old. *Bark* rather smooth, orange-grey. *Twigs* glabrous except for the narrow, elongate, minutely puberulous, acute terminal bud, the younger parts 3–4 mm thick, dark reddish brown, smooth and often shining, the older 4–6 mm thick, longitudinally striate and greyish brown.  
*Leaves* coriaceous, glabrous, shining above, drying a pale greyish brown with a slight greenish metallic gloss above, glaucous or greyish-silvery colour beneath with dark reddish brown nerves and midrib, the silvery colour due to minute scales, oblong-lanceolate, elliptic-lanceolate or oblanceolate, broadest at the middle, though occasionally broadest above the middle, acute at the apex, acute or often rounded at the base and then bluntly acute at the junction of the petiole; nerves 14–20 pairs, sometimes with a secondary one between a main pair, impressed above, slender but raised beneath, oblique but rather crooked, curving irregularly, interarching at the margins; reticulations absent or indistinct above, forming a fine lax network beneath, the loops with an irregular, rounded outline; length 13–30 cm, average 22 cm; breadth 6–10 cm, average 8 cm; petiole 1.5–3 cm long, generally 2 cm long, and 3–4 mm thick. *Male inflorescence* a short, woody, tomentose, knarled, scar-covered, 1–1.5 cm long axis, simple or often bifurcate, sometimes with 3–4 short branches (dactylooid). *Male flowers* rather numerous in dense umbels, coriaceous, densely dark rusty-tomentose, ovoid or obovoid and rounded at the apex and base in bud, 5 mm long and 2.5 mm broad, split down ⅓ to nearly ⅓-way into the broadly ovate, erect, somewhat obtuse lobes; staminal column cylindrical, the fertile part 2 mm long with 10 anthers, obtuse at the apex with a minute rounded apiculus, the stalk 2 mm long, as long as the fertile part and almost as broad, densely rusty-tomentulose; pedicels 3–4 mm long and 1–1.3 mm thick, densely rusty-tomentose as is the minutely obtuse, orbicular-ovate bracteole. *Female flowers* fewer in the fascicle, sessile, the ovary oblong-globose, narrowed to the apex, adpressed-pubescent. *Fruit* solitary or in pairs, densely rusty-tomentulose, oblong or oblong-ovoid, 6 cm long and 3 cm broad, the pericarp hard, 3 mm thick, the apex obtuse or in immature fruit apiculate-uncinate; stalk 1 cm long and 5 mm thick.  
*Aril* red, fleshy. *Seed* chocolate-brown, 2–3 cm long and 1.3–1.8 cm broad, smooth.
Fig. 78. *Myristica dactyloides* J. Gaertner.

Probably Ceylon, ex Herb. Gaertner, Tübingen Univ. Dept. coll. 963 (TUB).

Herb. Heyne, Wall. Cat. 6789 (CAL, K) as Myristica heymane Wall., not M. malabarica as stated by Warburg. There are some leaves of Knema attenuata (not Lauraceae) also mounted on the sheet.

_Dalzell s.n._ (CAL, DD, K); _Dalzell 1328 (A); Bhoma Shunkur, Colonel Sykes (Herb. Royale) 28th Jan. 1826 (BR) and 1st May 1828 (BR); Jog Falls, Jog Forest, region east of Goa boundary, Joseph Fernandes 845C (A); South Concan, forest below Hurrichunder towards Sakurbae, Gibson s.n. (A, K) mixture of _M. malabarica_ and _dactyloides_, the latter as _M. contorta_ Warb.

_Carnatic_ (Southern Mahratta Country):—Astoli, Belgaum, Talbot 2036 (DD).

_North Kanara_:—s.l., Talbot 33 (CAL) and Young, 22nd May 1881 (BM); Tinai Ghat, Sedgwick 3368 (CAL); Gaïrsoppa Falls, Talbot s.n. (DD); Devimane Ghat, _Bor 9588_ (DD); summit of Devimane Ghat, _Talbot 225 (K); Wuddu Ghat, Talbot 304 (CAL, DD, E); Kodkani, _Bor No. 11182_ (DD) and _11221_ (DD); _Katti Ken, Bor 11427_ (DD).

_Mysore_:—Coorg:—Coorg, Beddome 113 (PDA); Mercara, Cleghorn, date 1857 (E); Kerti, Range Officer DD Acc. No. 91326 (DD); Balabudan Hills, Kulkisty, Meebold 9455 (BP, BRSL, Z).

_Kerala_:—Silent Valley, _Bor 8297_ = _DD, Acc. No. 80843_ (DD) and _Bor 8298_ = _DD, Acc. No. 80844_ (DD); Wynaad, Drew, date 1857 (E); Lawson, date 1884 (DD, K); Chandarathodu, _Bor 8503_ (DD); Gudalur Ghat, Wynaad District, _Barber 5547_ (K) and _Gamble Nos. 14912_ (CAL, K) and _18294_ (BM, K).

_Travancore_:—Vendamettu, _Meebold 12964_ (CAL); Santhanpara _Meebold 13134_ (CAL); Rockwood Estate, Colattorpolay, _Lawson 94_ (CAL, DD, K).

_Madras_:—S.I., Beddome 231 (PDA); 263 (K) and 327 (PDA); Nilgiri Hills, Nadooputtah _Wight 2487_ (A, C, CAL, K, L, P; PDA); Sispara Ghat, Nilgiris, _Gamble Nos. 13415_ (K) and _14466_ (K); Karian Shola, Coimbratore, _Fersit Ranger DD Acc. No. 95436_ (DD); Honnamettia Shola, Kollegal Taluk, Coimbratore, V. Narayanaswami 3866 (DD); Udumanparai, Anamalai Hills, _Barber 4108 (K); Anamalai Hills, Beddome s.n. (BM); Courtallam Hills, Beddome, date 1873 (K); Kollimalai. Trichinopoly, _Herb. Madras 11327_ (K); Lower Pulneys, Tandigudi, _Bourne 2093_ (CAL, K); Tinnevelly, Kannikatti, _Barber Nos. 2941_ (K, NSW); 2942 (CAL, K) and _2955_ (CAL); Tinnevelly Ghats, Beddome s.n. (BM).

_Ceylon_:—S.I., Gardner 749 (BM, CGE, K); Herrmann 588, specimen not found; _Walker 170_ (P) & s.n. (FI).
North Central Province:—Trincomalee, District Forest Officer, 16th Feb. 1950 (PDA); Dolasbaga Gardens, Thwaites C.P. 416 (BM, BO, CAL, CGE, DD, FL, G & Boiss. & Prodr., K, P, PDA); Kadugannawa, Worthington 1259 (BM); Kalatuwawa Catchment, Worthington 3512 (BM).

Sabaranamuwa Province:—Wallandka Forest, Pamilla, sine coll., Dec. 1893 (PDA).

DISTRIBUTION:

Ceylon and in Peninsular India on the Western Ghats from Bombay to the Timnevelly Hills in South Madras. In the moist valleys mostly at the foot of the hills, but ascending from 1,000-5,000 feet, (300-1,500 m). In Ceylon common in the wet moist forests at the same altitude while the rarer, near allied species M. ceylanica is found in drier places.

TYPE MATERIAL:

M. dactyloides Gaertn. He did not choose a type but Hermann 388, Ceylon is quoted. It has not been located. Authentic material of dactyloides, Ex. Herb. Gaertner Tubingen Univ. Dept. Ref. No. 963 (TUB) exists and Gaertner's illustration appears to have been drawn from this. See discussion in the notes. M. beddomei King, no type specimen chosen nor any numbers quoted, but type locality is given as Western Ghats from Kanara to Travancore. King's plate 118 f.3 and 4 are copied from Beddome's plate of M. laurifolia. Warburg later added the numbers Beddome Nos 6719 and 6721 and Wight 2487. M. diospyrifolia A.DC., Thwaites 416 (BM, BO, CAL, CGE, G & Boiss. Prodr. holotype, K, P, PDA) Ceylon. Although De Candolle gives M. tomentosa (non Thunb.) Thwaites as a synonym of diospyrifolia, i.e. C.P. 416, Thwaites himself does not use the name tomentosa Thwaites in his Enumeration. The name M. tomentosa Thunb., a misidentification, appears on the three Geneva sheets of C.P. 416 but not on the Kew one. M. contorta Warb., four syntypes (1) Gibson s.n. (A, B burnt, K) S. Concan, the A and K sheets also have M. malabarica mounted on them, but probably the B sheet had a single species; (2) Talbot s.n. (K) fruit and female flowers, must be Talbot 225 (K); (3) Thomson s.n. (K) fruit in museum, Malabar and (4) Gamble s.n. (BM) fruit, South India. M. heyneana Wall, Cat 6789 (CAL, K) without locality; there are some leaves of Knema attenuata also mounted on the sheet. M. heyneana is wrongly named Lauraceae and M. malabarica by Warburg and must be excluded from the latter. M. laurifolia Hk.f. et Th. three syntypes, Gardner, Thwaites and Walker, Ceylon. These are without numbers but Warburg cites them with the following numbers:— Gardner 749 (BM, CGE); Thwaites 416 (BM, BO, CAL, CGE, DD, G & Boiss. & Prodr., K, P, PDA) = also the diospyrifolia of A. DC. see above and
Walker 1087. The last is M. ceylanica rather than laurifolia but Walker 170 (P) and Walker s.n. (FL) are alright for dactyloides. M. laurifolia var. lanceolata Hk. f. Beddome s.n. (K) South India; the Kew sheet, Beddome 263 (K) is marked as the type of this variety as it was the one with the narrow leaves.

VERNACULAR NAMES:

India:—Jaijikai (Kanarese); jayajhal (Maharatti); kathujathikai (Tamil); pattahanu (Malayalam). Ceylon:—
Malaboda: perimavara (Sinhalese);
palmanikam (Tamil).

USES

The wood has been used for making tea chests, but it splits too freely on seasoning to be of much good. According to Trimen, the bark and the leaves are boiled in Ceylon and the liquid used as a gargle in throat infections.

The differences between dactyloides and its rarer ally ceylanica are rather slight, especially in sterile material. In Ceylon the former is found in the wetter regions, the latter mostly in the drier areas. The twigs in the former are stouter and the leaves more coriaceous. Their undersurface, at least in young leaves, is usually whitish due to minute scales. A fairly good mark of distinction is the presence of numerous, fine, lax reticulations with a crazy pavement-like pattern on the lower surface of the leaf when dry. In ceylanica they are usually absent or there may be a few, very faint, scalariform ones. The veins are usually more numerous in dactyloides. The flower is densely tomentose, often a dark brown colour and so are the pedicels and bracteoles, while all these parts are only minutely tomentulose in ceylanica. The amount of tomentum seems to be one of the best distinguishing features. The stalk of the staminal column, too, is more hairy. It is glabrous or nearly so in ceylanica. There is a tendency for the woody tubercles to be more branched than those of ceylanica, hence the name dactyloides, but this character is not reliable as both of them may be simple or branched.

The best known name for our species is M. laurifolia Hooker f. et Thomson. These authors originally gave this name to the Ceylon material, not knowing then that the species occurred in India as well. However, Hooker filius in Flora Br. India, page 103, recognized M. laurifolia i.e. var. laurifolia as a tree both of India and Ceylon. He created var. lanceolata Hk.f., for a narrow-leaved form collected by Beddome in South India, but Warburg included var. lanceolata in M. beddomei King. I, myself, have included this variety in laurifolia and hence in dactyloides. Hooker filius lists another variety, namely var. zeylanica, confined to Ceylon. This is Alphonse De Candolle’s M. ceylanica, our previous species which is indeed confined to Ceylon. Actually Trimen, in his Systematic Catalogue (1885) made this reduction and combination (see notes after M. ceylanica) but assigned it to Thwaites, probably because of the latter’s citation on page 399 of his, Thwaites’ Enumeratio. King created the species M. beddomei, mentioned above, for the Indian tree and Warburg and Cooke followed him, but I cannot see any difference between beddomei.
and *laurifolia var. laurifolia* and agree with Hooker *filius*. Gamble also used the name *beddomei*. In his *Manual of Indian Timbers* he considered this tree to be in both India and Ceylon. In *Flora Pres. Madras*, page 1214, he did not say that the tree is found in Ceylon but regarded the Indian material of *laurifolia* (except the flowering branch of Beddome’s plate 267) and *laurifolia var. lanceolata* as synonymous with *beddomei*. Beddome’s plate in his *Flora Sylvatica* is correct for *laurifolia* and the leaves and flowers are not *M. malabarica* as stated by King and later by Warburg and Gamble. *M. contorta* Warb. is also not different from *laurifolia* and *dactyloides*. The fruit is immature and the slightly apiculate, falcate beak may be due to shrinkage on drying or more probably, as is common in other *Myristica* species, due to its immaturity, and will disappear when the fruit “fills out” on ripening. Incidentally, Warburg’s synonym *M. tomentosa* (non Auctt.) Graham will have to be excluded partly from his citation of *contorta* for it is partly *M. malabarica* and partly *dactyloides*. See notes under *M. malabarica* in Type Material. Also some of the sheets of the syntype Gibson s.n. have a specimen of *malabarica* mounted on them as well as *contorta* (*laurifolia*). This has already been mentioned under the sytypes of *contorta*.

Some authors have pointed out that they believe that Gaertner’s *M. dactyloides* is the oldest name for *laurifolia* but they have not used it. Thus Trimen on page 434 of *A Hand-Book to the Flora of Ceylon* states “*M. dactyloides*, Gaertner, *Fruct.* 194, however seems to be *M. laurifolia*; his figure, t.41 f.2, agrees so far as it goes and he quotes F1. *Zeyl.* n.588, which is, no doubt, this tree, but was not named by Linnaeus, as there was no specimen in Hermann’s *Herbarium*”. King mentions Trimen’s view, and his own comments are that Gaertner’s figure does agree well with *laurifolia* but that Gaertner probably included other species under the name *dactyloides*. Warburg, who was most cautious about reducing or uniting other botanist’s species, remarks that there is a very close resemblance between Gaertner’s figure and *laurifolia* especially on account of the deep raphe of the seed, but that the locality for *dactyloides* is not given. He goes on to say that the synonymy includes *M. malabarica* and *Raphe sp.* and that the name *dactyloides* agrees well with that of Rheede’s description for *malabarica*; *dactyloides* cannot be given priority if it consists of a mixture.

The modern view is to regard *dactyloides* as the oldest and the correct name for *laurifolia*. Alston has used it and so have the present day foresters Abeyesundere and de Rosayro as well as Worthington in *Ceylon Trees*, but unfortunately without explanations. My own arguments for the typification of *dactyloides* about to follow may not be entirely convincing, but for those who remain in doubt or who refuse to accept it, there must be the disturbing thought that they cannot now believe in the priority of *laurifolia* with the same confidence and they will have difficulty in proving that *laurifolia* is not *dactyloides*. 
It is true that no specimen No 588 has been found in the Hermann herbarium, now in the British Museum, nor No. 598 which is Gaertner’s next species Horsfieldia irya but Gaertner must have had some reason for quoting this number. There is a specimen, however, which everyone has overlooked and this is in the Gaertner collection in Tübingen. It is named *M. dactyloides* Gaertner, *Dept. Coll. Ref. No. 963* but there is no locality stated on the label. I have to thank Dr. Klaus Ulrich Leistikow kindly for sending me a photograph of this specimen. Can this specimen be *Hermann 588* and how did Gaertner come by it?

Now let us consider this specimen, Gaertner’s plate, description and references for the case of *dactyloides* and see if they clarify the problem. The drawing in Gaertner’s illustration consists of two convex halves of a seed (a and b); c the cut surface of one of the halves showing the cracks of rumination and the embryo cavity; d the peculiar embryo with deep multi-lobed cotyledons and D the same enlarged. In b the seed is shown with a raphe. This is the only species for which the fruit is not illustrated by Gaertner. The photograph of the specimen also consists of two convex halves of a seed corresponding to a and b, and the same two viewed with the cut surfaces showing the rumination and embryo cavity. The embryo appears to have been removed from the cavity possibly for drawing but it is not shown in the photograph. The raphe is not apparent either. In detail the items in the drawing are not exactly the same as those in the specimen but many of the lines of rumination correspond. I should say that the drawing is a simplified representation of the photograph. Certainly both the drawing and the photograph represent a single species of the same identity and more than one species is not involved. They both agree with *M. laurifolia* but might also pass for *ceylanica*. I say might as we do not know what the cotyledons of *ceylanica* look like. The drawing is almost the same as that of Lamarck’s for his *malabarica* except for some of the minute details of the ruminations. It is clear that Lamarck used Gaertner’s drawing for his own illustration of *malabarica* but he actually had in mind a different species with a tomentose fruit.

Gaertner does not describe the leaves but then he was dealing mostly with fruits and seeds in his publication. Flowers are not dealt with either except in general in his generic description of *Myristica*. The fruit is described as ovate-oblong which is correct for both *laurifolia* and *ceylanica*. He says that it is “viride flavescens” which is the usual colour for glabrous fruits of *Myristica* including *laurifolia*. He does not actually use the word glabrous here but it is implied from his reference *nux indica oblonga, intrinsecus similis nuci moschatae*, J. Bauhin, *Hist. Pl.* 1 page 399, *nuci moschatae* being *M. moschata = fragrans* which has a glabrous fruit. If the fruit were tomentose he would surely
have mentioned the fact. His *dactyloides* therefore cannot be *M. malabarica* Lamarack for that has a densely tomentose fruit. The remarkable appearance of the cotyledons already mentioned might be of great value in distinguishing *dactyloides* from *ceylanica* if only we knew what those of the latter look like. We also do not know what those of its synonyms *cumingii*, *negrosensis*, *nitida*, etc. look like and we have no idea if this cotyledon character is even constant for *dactyloides*. I have looked through Warburg's illustrations but very few cotyledons at all are depicted. The two connate cotyledon lobes are either simple or only slightly crenate round the margins and this is their usual appearance as found in *Myristica*. Nothing similar to those of *dactyloides* is illustrated in Warburg. Fresh nuts are necessary for a study of the embryo and then it is difficult to extract the minute germling intact from the hard surrounding mass of endosperm. One cannot mutilate fruits of rare type specimens on loan from outside herbaria looking for embryos which may not even be present. Actually embryos are not always formed in the *Myristicaceae* and the fruit may develop quite well without them. We might expect series *Teijsmanniae* which is closely related to series *Laurifoliae* to have similar cotyledons but again Warburg has no illustrations of any from the former series. Lastly since *ceylanica* is close to *dactyloides* in many ways, I am of the opinion that its cotyledons will not be very different either.

Let us now examine the accompanying literature cited by Gaertner under *dactyloides* and see what may have to be excluded. Actually the species is not quite the mixture that King and Warburg have suggested. The first reference *nux indica oblonga*, *inrinsicus similis nuci moschatae*, J. Bauhin, *Hist. Pl.* 1 page 399, already mentioned is alright as it shows that we are dealing with a glabrous fruit like that of *M. moschata = officinalis* and *fragrans*. The second, *panam-palca*, Rheede, *Hortus Malabaricus* 4, page 9, t. 5 (various spellings) is only partly alright. It is correct as to the drawing of the twig with reticulate leaves and glabrous fruit but the flowering branch with male flowers has to be excluded from the citation since the latter is *M. malabarica* Lamarck, see my revision under that species. This reference is of value as it tells us that Gaertner's *dactyloides* is found in India, *malabarica* also being found in India. The next reference *nux moschata malabarica*, Valentini, *Mus. 1 Epist. Orient.* page 83 t.4, is more or less the same as the preceding — the species occurs in India and has a glabrous fruit. Once again it is not the *M. malabarica* of Lamarck with the densely tomentose fruit which was published three years after Gaertner's species. The last reference, *Myristica fructu inodoro*, Linn. *Fl. Zeyl. Hermann No* 588 is the most important of all for it explains that the fruit was not fragrant (cannot be *M. fragrans*) and that it occurs in Ceylon. There are not many *Myristica* species in Ceylon so the problem should be easy now.

Up till the time of Gaertner's publication there were not many plant collecting expeditions which brought in *Myristicaceae* and very few species of *Myristica* were known. Those that did exist were *M. fragrans* Houtt. 1774, *M. officinalis* L.f. 1781, *M. moschata*
Thunb. 1782 and *M. aromatica* Swartz 1788. These represent really only one species *M. fragrans* Houtt. The others were *M. fatua* Houtt. 1774 and a synonym of it *M. tomentosa* Thunb. 1782. Gaertner in his account dealt with only four *Myristicaceae* and these were all from India or Ceylon or both. They are *M. officinalis* which is *fragrans*, *M. dactyloides* and the two *Horsfieldia* species *H. irya* (Gaertner) Warb. and *H. iryaghedhi* (Gaertner) Warb. Apart from *dactyloides* these three can be identified very readily from his illustration even without leaves and twigs. *H. irya* is especially clear because of the hollow cavities in the globose nut, and the figure of *officinalis* is a well-known one, being reproduced later as *fragrans* in several text-books.

We therefore have *M. dactyloides*, a species with a glabrous, oblong, non-aromatic fruit and peculiar cotyledons which occurs in both India and Ceylon. *M. fragrans* is a cultivated species with a glabrous fruit occurring also in India and Ceylon but we have eliminated it and its synonym *officinalis* dealt with by Gaertner for *fragrans* differs from *dactyloides*, the latter having an oblong non-aromatic fruit. It is not really necessary to consider the Indian species any further once we have found one corresponding to *dactyloides* with a glabrous fruit which occurs in Ceylon as well as India. *M. ceylanica* is a species with a glabrous fruit confined to Ceylon so that does not suit. Our only choice therefore is *laurifolia* for that occurs in both India and Ceylon and fulfills all the conditions. So *Myristica laurifolia* and not *ceylanica* is a synonym of *dactyloides*, the last being the oldest name for our present species. There is one minor point. *M. ceylanica*, as pointed out, is not a common species so the chances are also that Gaertner would be describing *laurifolia* rather than *ceylanica*.

**19. SERIES CASTANEIFOLIAE**


Twigs slender, 1–3 mm. thick in the apical parts to stouter lower down, 5–6 mm. thick in the large-leaved species. Leaves mostly chartaceous, coriaceous in large-leaved specimens, small or medium size-class, not usually exceeding 24 cm. long except in the oldest leaves of *castaneifolia* which are 30 cm. long or over and may reach 60 cm., mostly elliptic, sometimes lanceolate, the base acute, the apex obtuse, the upper surface drying medium brown or greyish brown, the lower paler brown or glaucous even in the same species; nerves 12–20 pairs but up to 30 in the old leaves of *castaneifolia*, oblique, close together, rather fine and faint even in large leaves, secondary nerves present, abundant in *lancifolia* and *chartacea*, fewer or rare in large-leaved species:
reticulations faint, present above but indistinct or absent below except in lancifolia var. bifurcata; petiole generally well developed in proportion to the lamina. Male inflorescence small with numerous scars, 1–3 mm. long in the small-leaved species, occasionally with a slight development of a smooth basal portion (petiolata and lancifolia var. bifurcata), sometimes with an abnormal development 1–7 cm. long and closely covered with scars in castaneifolia. Male flowers rather small, 4–6 mm. long and up to 1 cm. long in the largest, oblong or oblong-ellipsoid, more ovoid or ovoid-globose in the large-leaved species, tomentulose to tomentose outside, split down $\frac{1}{4}$-way into the non-reflexed lobes; pedicels shorter to as long as the flowers: bracteole as long as the flower-buds; staminal column mostly with a sterile apex, the fertile part longer and broader than the mostly glabrous stalk. Fruit small size-class, 1.6–4 (5.5) cm. long and 1–3 cm. broad, oblong, oblong-ellipsoid to sub-globose, the apex often oblique in those with ellipsoid fruits, tomentum pale, sparse and short (tomentulose) but dark chocolate-tomentose in petiolata and castaneifolia, sessile or on a rather short and proportionately thick stalk, 3–5 mm. thick. 4 species — M. lancifolia with vars bifurcata, clemensii and montana and M. chartacea, castaneifolia and petiolata.

**TYPE SPECIES:**

M. castaneifolia A. Gray

The outstanding features are the elliptic or lanceolate leaves, the faint, oblique, straight nerves, the small flowers split down $\frac{1}{4}$-way into the lobes, the small fruits and the rather long petioles. Series Castaneifoliae might have been divided into two by separating M. lancifolia from the rest of it as Warburg has done, but this species is so close to the next M. chartacea, that it cannot be left out. In fact sterile material of the two can be confusing. Both have a good development of secondary nerves, especially the first. The male perianth is deceptively similar in both but tends to be more ovoid and just slightly longer in chartacea and this is the shape that we find in the remainder of the species. The considerable variation in the size and shape of the fruit in the first is in keeping with its wide distribution. However, if one had to pick out the two species in this series which most closely resemble each other, the answer is chartacea and castaneifolia for the latter is a more robust edition of the former on a larger scale. Sometimes there is difficulty in separating small thin-leaved specimens of the one from the other. Gradually and almost imperceptibly we end up with M. petiolata which has many similarities with the preceding M. castaneifolia, seen in the long petioles, the elliptic leaves with similar venation and strikingly in the dark chocolate-brown-tomentose, oblique, ellipsoid fruits. Thus there is an unmistakable, almost elastic continuity, stretching from one end of the series to the other, holding as it were, the species in place and the changes from one species to another are so gradual, congruous and progressive that we pass from one to the next without scarcely being aware of the transitions.
What about the relationship of this series to its neighbours? I do not think that the full answer is in the key so hence I ask this question. Most of the series are clearly related to certain others but I have had greater difficulty with this one than with any of the other glabrous leaved ones from Cimiciferae onwards. It is probably nearest to series Heterophyllae, being connected to M. kajewskii through M. petiolata by the long petioles. I have considered putting petiolata in series Heterophyllae but that does not work. There is also a comparison between the sub-globose male flower-buds of species like hollrungii and hypargyraea with those of castaneifolia. A certain similarity to M. globosa through M. lancifolia especially var. montana exists but may be only superficial. The last four series are all close to each other though their species are distinct.


var. lancifolia — Fig. 79.

Tree 6–20 m. high. Bark brownish black, longitudinally fissured in old trees but not flaking; sap red, copious. Twigs greyish brown, finely striate, rather slender, 2–4 mm. thick in the apical parts and 4–5 mm. thick lower down, glabrous except the adpressed-pubescent terminal bud. Leaves coriaceous to chartaceous, dark green above when fresh, paler beneath, drying a blackish or a greyish brown above depending on the texture and an ashy-brown beneath, rather variable in shape, mostly lanceolate or broadly lanceolate, less often elliptic or narrowly elliptic and not so proportionately broad at the middle as in var. montana, apex acute or bluntly acute, base acute, rounded or rounded and then slightly acute where it joins the petiole; midrib flat and lying in a groove above, raised beneath; nerves 12–15 pairs, close together, nearly parallel, often with some secondary ones, invisible or almost so above, fine but more distinct beneath or quite obscure when the leaf is coriaceous: reticulations invisible: length 8–16 cm., average 12 cm., breadth variable, 2–6 cm., average 4 cm.; petiole 8 mm.–1.5 cm. long. Male inflorescence a simple, woody scar-covered tubercle, occasionally bifurcate. Male flowers numerous on the tubercles, membranous, cream-coloured, pale brown-tomentose outside, the tomentum not so thick or so
Fig. 79. *Myristica lancifolia* Poiret var. lancifolia.

shaggy as in var. *bifurcata*, oblong-ellipsoid or ellipsoid in bud with an obtuse apex, 4–5 mm. long and 1.8–2 mm. broad, the perianth lobes ½ of the whole flower; pedicels 3 mm. long; staminal column 3 mm. long with about 6 anthers, ending in a minute, obtuse, sterile apiculus, stalk ½ the length of the whole column, glabrous; bracteole membranous, amplexicaul, 1 mm. long, tomentose outside and ciliate along the edges, closely applied to the perianth at its base, slightly diverging from it at its apex. *Female flowers* 3–5, fewer in the cluster, ovoid, 3 mm. long and 2–2.5 mm. broad, tomentum as in the male; pedicels 2–3 mm. long. *Fruit* orange when ripe, cinnamon-brown when dry, minutely tomentulose, becoming nearly glabrous, broadly ovoid to nearly sub-globose, 1.6–1.8 cm. long and 1.4–1.5 cm. broad, rounded at both ends, the remains of the stigma present as a minute apiculus at the apex; pericarp-wall hard, 3 mm. thick, thicker than in the other varieties; stalk 4–5 mm. long 3 mm. thick. *Seed* ellipsoid, 1.4 cm. long and 9 mm. broad.

**NEW GUINEA**

**Vogelkop**

(Dutch West New Guinea):

Vogelkop, Tuyama 1552 (*RINR*); near Andai, Teijssmann 7585 (BO, L) in pencil on the BO sheet is written without authors’ names *M. microcarpa* var. oblonga, a nom. nud. (*M. microcarpa*) Willd. is not Myristicaceae, see Sinclair *Gard. Bull. Sing.* 18 (1961) 173. However the *microcarpa* intended here is probably that of Zippel, a nomen nudum which is *M. lepidota* (BL): Sider. Koster BW6753 (K, KEP, L); Arfak, Angi Gita Lake, Manokwari, Kostermans 2439 (BO); Mt Arfak, Putat, Becari 903 (FI); Tanjong Bair, Becari 27 (FI); Fak-fak (Pik-pik) bb22228 (BO, L); Dijtmau, south of Lake Ajamaru, Schram BW6112 (L).

**Dutch North New Guinea**:

Nabire, Chaban. *Kanehira & Hatusima* Nos 11902 (BO) and 11903 (A, BO); Patima. *Inokuma & Hara* 498 (TOFO); Boden River, 60 km south-east of Sarmi. Koster BW8057 (L); hill north of Hollandia, bb25049 (A, BO, K, L, SING); mouth of Tami River, Hollandia. Schram BW2815 (BO, CANB, L); Dok 5, Hollandia, v.d. Sijde BW4062 (K, L).

**Papua**: Central District:—Subitana area, Sogeri Plateau, Schodde 3139 (L, LAE).

Gulf District:—Bamu River, A. Cameron 38 (L, LAE).

Western District:—Upper Orimo River, 40 miles from the coast McVeagh N.G.F. 8283 (BM, K, L, SING).

**T.N.G.**

Sepik District:—Ledermann Nos. 6653 (L, SING); 6664 (SING); 7471 (SING) & 7793 (SING).

Madang District:—Ramu River, Lauterbach 2683 (BM, BRSL, G Boiss., K, M) quoted by Markgraf as 2683 but on the label as 683; Gogol, Lauterbach 1139 (BRSL); Josephstaal. K. J. White N.G.F. Nos 10235 (SING) and 10265 (CANB, K, L, SING).

*Foot-note:—RINR = Royal Institute for Natural Resources, Tokyo.*
Sinclair — Myristica

This variety is best distinguished from the others by the shape of the fruit, broadly ovoid to nearly sub-globose. The hard pericarp in the dry state is thicker than that of the other varieties. It does become thinner as in most Myristica species when the seed matures so perhaps this is not a reliable character. The size of the mature fruit, 1.6–1.8 cm. long and 1.4–1.5 cm. broad, may help also as here its measurements are smaller than in the others. The inflorescence is usually simple but occasionally it may be bifurcate. The perianth is not so fleshy nor so densely tomentose as that of var. bifurcata, but is more tomentose than in var. montana. The leaves, though less reliable, are more like those var bifurcata, being usually lanceolate, whereas they tend to be broader or more broadly elliptic in var. montana. The actual type has narrow elliptic leaves and Poirét states that Pulau Buton is the type locality for this species collected by Labillardière. There are two sheets in Herb. Paris: the localities, however, on these are given as Pulau Waigeo and Java. There are also two sheets in FI, the one from Pulau Waigeo and the other from Pulau Buton. Warburg expresses doubt about P. Buton being the type locality and thinks P. Waigeo is the correct one. Now van Royen has recently obtained excellent material, an exact match of the type, and far better specimens. They are from Pulau Waigeo. After seeing these there is no doubt that the original came from Pulau Waigeo which is also more in keeping with the geographical range of the other material of this variety. The Java specimen probably came from material cultivated in Bogor but originally collected in Pulau Waigeo. I have tried to
separate the type with the narrower leaves from the rest of the New Guinea material but have failed. There are other collections namely \textit{Koster BW6753} where the Leiden duplicate has narrow leaves like the Waigeo specimens but in the Singapore duplicate there are two broad leaves on the same twig as the narrow leaves. The Josephstaal collections also show broad and narrow leaves on the same specimen. \textit{M. papuauna} Scheff. is very similar to the Waigeo plants, but some of the leaves are a trifle broader. These lead on through plants with intermediate leaves to some with broader lanceolate leaves from P. Biak. Some of the Biak specimens have a few narrow or intermediate leaves also so one just cannot separate the specimens on this basis. Both coriaceous and thin leaves occur so this character, too, cannot be used as a criterion for separating var. \textit{lancifolia} from the other varieties. In the coriaceous forms the veins tend to be indistinct or not visible. The leaves of the other varieties usually dry a medium brown above whereas in \textit{lancifolia} they may dry blackish brown (in coriaceous leaves) or medium to greyish brown (in thin leaves) so the black colour again cannot be used as an absolute criterion for separation. \textit{M. lancifolia} with three other varieties is a somewhat variable species. Its nearest relative on the western side appears to be \textit{M. snythiesii}, the flowers of which are almost identical with those of the var. \textit{bifurcata}, having a similar shape with the same dense rusty-brown kind of tomentum. A similar tomentum is found on the flowers of \textit{Knema laurina}. The fruit, too, is similar to that of \textit{M. snythiesii}. \textit{M. snythiesii}, however, far from being a distant geographical variant or subspecies of \textit{lancifolia}, is very distinct in having the undersurface of the leaf covered with cinnamon-coloured scales. It can also be separated by its thicker twigs with the bark tending to crack, the leaves more coriaceous with shorter, stouter petioles, the midrib thicker and the veins less distinct. In latitudes further east the nearest ally seems to be \textit{M. chartacea} with somewhat similar veins, fine or indistinct, and especially the presence of secondary ones among the primary. The small fruit is also somewhat similar but differs in being sessile or almost so and not narrowed to the apex.

\textit{var. bifurcata} J. Sinclair, \textit{var. nov.} — Fig. 80.

A var. \textit{montana} et a var. \textit{lancifolia} innovationibus et floribus magis tomentosis, inflorescentia bifurcata fructibus maioribus differt.

Arbor 14–20 m. alta. Cortex atro-brunneus. Ramuli innovationibus ferrugineo-furfuraceis exceptis, glabri. \textit{Folia} chartacea, glabra, (costa subtus in juventute pilis ferrugineis parce obtecta) lanceolata, supra in sicco saepe nitida, modice vel atro-brunnea, subtus pallido-brunnea, 8–18 cm. longa, vulgo 13 cm.; 2.5–7 cm. lata, vulgo 4 cm.; nervi c. 15-jugati; reticulationes plerumque invisibles; petioli 1.5–2 cm. longi, graciles. \textit{Inflorescentia mascula}: axis primarius simplex, laevis, brevis, 2–8 mm. longus, apice in ramulos cicatricos 3–5 mm. longos bifurcatos. \textit{Flores masculi} oblongi, 4 mm. longi (nondum aperti) carnosi, pilis ferrugineis
Fig. 80. *Myristica lancifolia* Poiret var. *bifurcata* J. Sinclair.

1 mm. longis dense villosi; columna staminalis 2–3.5 mm. longa, stipes parti fertili brevior; antherae 8–10. Inflorescentia feminae simplex, 8 mm. longa, apice cum floribus duobus praedita. Flores feminae 5 mm. longi; pedicelli 5 mm. longi. Fructus oblongo-ellipsoides, apicum obtusum versus leviter angustatus, parce tomentellus, 3–4 cm. longus, 1.5–1.8 cm. latus; stipes tenuiusculus, 8 mm. longus, 3 mm. crassus. Semen 2 cm. longum, 1.3 cm. latum, atro-brunneum, nitudum. Alia signa ut in var. montana.

Tree 14–20 m. high. Bark dark brown. Twigs glabrous except for the rusty-furfuraceous innovations. Leaves chartaceous, glabrous (the lower midrib sparsely covered with rusty hairs when young) lanceolate, drying a medium to dark brown above and often glossy as well, pale brown beneath; nerves about 15 pairs; reticulations for the most part invisible on both surfaces (occasionally seen): length 8–18 cm. long, average 13 cm.: breadth 2.5–7 cm., average 4 cm.: petiole 1.5–2 cm. long, slender. Male inflorescence: the main axis simple, smooth, short, 2–8 mm. long, branched at the apex into two scar-covered, 3–5 mm. long branches. Male flowers oblong, 4 mm. long and 3 mm. broad, (not yet open) fleshy, densely covered with 1 mm. long, shaggy hairs; staminal column 2–3.5 mm. long, the stalk thinner and slightly shorter than the fertile part, glabrous or almost glabrous, the apiculus absent (it is probably present in mature stages): anthers 8–10; pedicels 2 mm. long. Female inflorescence simple, bearing two flowers at its apex. Female flowers 5 mm. long, pedicels 5 mm. long. Fruit oblong-ellipsoid, narrowed slightly towards the obtuse apex, tomentulose in patches, 3–4 cm. long, 1.5–1.8 cm. broad and pericarp 1 mm. thick when ripe; stalk rather slender, 8 mm. long and 3 mm. thick. Seed 2 cm. long and 1.3 cm. broad, dark brown, shining. Other characters as in var. montana.

**CELEBES CENTRAL CELEBES:**

Lengkobale, bb25533 (A, BO, L, SING)?

Todjambu, Kjellberg 2990 (BO, S)?

**MOLUCCAS MOROTAI:**

Mt. Permataung, Kali Sangwo, Kostermans 944 (A, BO, K, L, LAE, PNH, SING). The remaining four from Tobelo—

Daruba, Kostermans 6 = bb33723 (A, BO, K, L); Totodoku, Kostermans 71 = bb33767 (A, BO, K, L, PNH, SING); North Tjao (Tiaw) Kostermans 231 = bb33901 (A, BO, K, L, LAE, PNH, SING); Tiaw, Kostermans 1506 (A, BO, K, L, LAE, PNH, SING).

**HALMAHERA:**

Tiloppe, Weda, G. de Haan 446 = bb24844 (A, BO, K, L); Galela, Beguin 1778 (BO, SING); Gunong Sembilan, Pleyte 339 (BO, K, L, PNH, SING).

**OBI:**

A Kasina, bb29800 (BO, L).

**ISLANDS:**

Pulau Sanana, Kabauw, bb28880 (BO, K, L, SING); Pulau Mangoli, North Mangoli, bb29751 (A, BO, L).

**NEW GUINEA Vogelkop (Dutch West NEW GUINEA):**

Warnapi, north of Ransiki, Kostermans 4743 (BO, K, L, PNH, SING).
The most reliable character for distinguishing this variety from the other two is its large fruit. Other good characters are the bifurcate inflorescence and the more densely tomentose flowers. The inflorescence should not be mistaken for that of a section I species as the main axis is too short and the whole structure appears to be persistent. Occasionally var. lancifolia has a bifurcate inflorescence also, but the leaves, although not always reliable, are usually more coriaceous with a thicker midrib and lack the hairs that are often seen on those of var. bifurcata on the lower midrib when young. Sometimes the leaves of bifurcata also retain their gloss on the upper surface when dry while those of the other two varieties are dull. The veins on the lower surface of the leaf vary a lot in degree of distinctness according to its texture but they are generally less distinct in bifurcata than in var. montana. The flowers have a denser tomentum than that of var. lancifolia. They are villose with erect hairs and look like those of Knema laurina. Another diagnostic character of lesser importance is the presence of rusty-furfuraceous tomentum on the innovations.

I have, with some doubt, placed two specimens from Celebes here. Possibly one of them if not both, represents yet another variety of M. lancifolia, but I am not prepared to describe it as new unless I can see more material from Celebes. The specimen Kjellberg 2990 has a large fruit which is very similar to that of var. bifurcata, but the other, bb25533 has a much smaller fruit which appears to be mature. Its leaves also are for the most part smaller. However, the largest of them are exactly like the smallest of the Kjellberg plant, both having dried a blackish brown. It would thus appear that the Kjellberg plant is the same as bb25533 and hence the same as var. bifurcata. If future collections repeatedly showed plants with small black coriaceous leaves and small fruits, only then one would be justified in separating them. This is a problem that the future student should try to verify in the field and it should be done quickly before all the forest in Celebes is cut down.

var. clemensii (A. C. Smith) J. Sinclair, stat. nov.

Basionym: Myristica clemensii A. C. Smith in Journ. Arn. Arb. 22, 1 (1941) 87. — Fig. 81.

Tree 10–30 m. high, sometimes with stilt-roots. Bark dark brown or blackish, flaking, hard: sap red, watery. Twigs greyish or blackish, glabrous except the terminal bud, striate, of medium width, 3 mm. thick at the apex and 5 mm. thick lower down. Leaves coriaceous to chartaceous, narrowly lanceolate or spathulate,
Fig. 81. **Myristica lancifolia** Poiret var. *clemensii* (A. C. Smith) J. Sinclair.

drying glossy and olive green above (dull in Brass 7079 and White N.G.F. 10949) and a rich dark-yellowish brown beneath, the margins usually thickened and revolute, base acute or less often rounded, apex acute or bluntly acute; midrib sunk and lying in a groove above, raised and prominent beneath; nerves 10–15 pairs, sunk above, very fine and faint, often invisible beneath; reticulations invisible; length 10–17 cm.; breadth 2–4.5 cm., average 3 cm.; petiole 1 cm. long and 1–2 mm. thick, rather slender. Male inflorescence a short woody, tuberculiform unbranch- ed axis, 3–5 mm. long, completely covered with scars or smooth at the very base for the first 2–3 mm., bearing several flowers in umbellate fashion at the apex. Male perianth coriaceous, medium brown when dry, glabrous or tomentulose, 5–6 mm. long and 2–3 mm. broad, oblong or nearly tubular, angled at the apex, spilt down \( \frac{1}{2} \) of its length by the oblong-deltoid lobes which are obtuse at their apices; pedicels slender, 5 mm. long; bracteole at the base of the perianth, early caducous, 0.5 mm. long; staminal column about 5 mm. long, the glabrous stalk 2 mm. long and the fertile portion 3 mm. long, as broad as the stalk and ending in a minute, rounded sterile apiculus; anthers 10–12. Female inflorescence 1–4-flowered, generally 3-flowered, the short rigid, smooth, main axis 4–5 mm. long and the pedicels 4–6 mm. long, often curved, rigid, 2 mm. thick. Female flowers ovoid, narrowed at both ends, coriaceous, 8 mm. long and 4 mm. broad at the middle, prominently 3-angled where the lobes meet at the apex. Fruit ellipsoid, medium brown, nearly glabrous, 4.7–5.5 cm. long and 2.3–2.5 cm. broad, the pericarp thin but very hard when dry, 1–2 mm. thick; stalk 8 mm.–1 cm. long and 3 mm. thick. Aril dark red when dry. Seed cylindrical, narrowed and rounded at each end, 3.5 cm. long and 1.5 cm. broad.

NEW GUINEA PAPUA: Central District:—Sogeril Region, Forbes 710 (BM, CAL).

Western District:—Palmer River, 2 miles below junction of Black River, Brass 7079 (A, BM, BO, BRI, L. LAE).

T.N.G.: Morobe District:—Wareo cart road, Clemens 1668 (A, B, L, SING); Morobe, Womersley N.G.F. 3148 (A, BRI, CANB, K, L, LAE); ridge above Markham Point, Heintz N.G.F. 14884 (L).


DISTRIBUTION: Papua, Mandated Territory and New Britain. A medium-sized tree in forest on mountain slopes, ascending from 100–677 m.

TYPE MATERIAL: Clemens 1668 (A holotype, B, L, SING). The Clemens material in B was not destroyed.

The Berlin isotype of Clemens 1668 bears the following note written by Mrs. Clemens:—"It was under this tree that my soul companion for over 40 years of wedded life, bade me farewell for the higher life." He died in New Guinea of food-poisoning.
M. clemensii was described as a species by A. C. Smith from a single gathering, *Clemens* 1668. Its leaves are rather similar to those of *M. rosselensis*, a section I species, but its inflorescence and flowers are very different. It is much more variable than one might imagine, the type collection alone being hardly sufficient to give one a proper conception of its diversities or to provide a clue to its relation with other species. It was, in fact, due to its variability that I have been able to determine its systematic position, but not until after much study. It was noticed that certain specimens of *M. lancifolia* var. *lancifolia* came near to *M. clemensii* as well as with var. *lancifolia* (*M. papuana*). On examining the flowers carefully, I found that they were very similar to those of *clemensii* and that the long, narrow leaves, although not revolute at the margins, were more like those of *clemensii* than the leaves of *lancifolia* var. *lancifolia*. I have therefore had to remove it from the latter to *clemensii* and further have had to reduce *clemensii* from a species to a variety of *lancifolia*. Actually var. *clemensii* is nearer to var. *bifurcata* than to var. *lancifolia*. There are specimens of it where the leaf is exactly like that of var. *bifurcata* even down to the revolute margin. Occasionally one may find leaves of var. *lancifolia* which show a slightly revolute margin, though they are normally quite flat in this as well as in var. *bifurcata*.

The variety *clemensii*, a tree of the mountain forest usually above 600 m. (2,000–2,500 feet), may be distinguished from the other vars by the following:— The leaves, 2–4.5 cm. broad, average breadth 3 cm., are narrower. The broadest ones (as pointed out above) resemble those of *bifurcata*. They are generally coriaceous, often retaining their gloss above when dry, but this character is not reliable as thin, dull ones are also to be found. The margins are revolute except in *Brass* 7090 (see above), but again this character does not always seem to be reliable; the undersurface often dries a yellowish colour. The male inflorescence is not bifurcate. This character will separate it from *bifurcata*. The amount of tomentum on the perianth seems to vary from minutely tomentose in the New Britain material to nearly glabrous in the type and entirely glabrous in the female flowers of *Womersley* 3148 (the latter, however, look as if they might have had tomentum and lost it). The perianth is fleshy and coriaceous as in var. *bifurcata*, not membranous as in vars *lancifolia* and *montana*. The female flowers are large, larger than those of the other varieties, but I do not know how far this is reliable as I have seen very few female flowers of these other varieties. The fruit is also larger, not unlike that of *bifurcata*, but larger still. The best distinguishing characters, therefore, seem to be the narrower leaves and the large fruit, which the others
mentioned are either minor or not very reliable. In fact the differences are not sufficiently striking to elevate the plant to the status of a separate species, though they are probably adequate enough to justify reasonable varietal rank. The above lengthy description and notes, fuller than that normally given to a variety, is intended for the guidance and information of those who may be surprised at the reduction of *M. clemensii* from a species to a variety. They will, if in doubt, naturally wish to have the details of the similarities as well as the differences between this variety and its related species.

var. *montana* (Roxb.) J. Sinclair, *stat. nov.*


*Synonym: M. diversifolia* Miq. Ann. Mus. Bot. Lugd.-Mat. 1, 2 (1864) 205. — *Fig. 82.*

Tree 6–15 m. high. *Bark* greyish brown, nearly smooth, the inner soft, reddish brown; sap copious, red. *Twigs* greyish brown, striate, glabrous except at the extreme tips, rather slender, 2 mm. thick at the apex, and 3–4 mm. thick some distance down. *Leaves* chartaceous, glabrous, variable in shape, elliptic, or oblong-elliptic, dark green and glossy above, paler beneath and slightly glossy and with a yellowish green lower midrib, drying a greyish brown above and pale brown or slightly glaucous beneath, apex acute or bluntly acute, base mostly acute, occasionally rounded; midrib flat above and lying in a groove, raised beneath and darker brown than the surrounding matrix; nerves 15–20 pairs, nearly parallel, very faint or invisible above, fine and close together beneath, often with some secondary ones; reticulations absent on both surfaces or very sparse and visible only with a lens beneath; length 9–16 cm., average 12 cm.; breadth 3.5–7 cm., average 5 cm.; petiole 8 mm.–1 cm. long, rather slender. *Male inflorescence* Knema-like with several flowers on 1–5 mm. long, simple, rarely bifurcate, woody tubercles, the smooth basal portion absent. *Flowers* of both sexes fragrant, cream-coloured, membranous, adpressed-pubescent to slightly tomentose with minute hairs outside and glabrous inside. *Male flowers* oblong, often oblique on the pedicel, obtuse at the apex in bud, 4–6 mm. long and 2–2.5 mm. broad: perianth lobes $\frac{1}{2}$ the length of the whole flower, oblong, rounded at the apex and then obtusely acute; staminal column 3–4 mm. long, the stalk $\frac{1}{2}–\frac{3}{4}$ the length of the whole column, glabrous, anthers 5–6 extending almost to its obtuse apex which usually ends in a sterile, obtuse apiculus; bracteole membranous, amplicaul, 1 mm. long, tomentose outside and ciliate along the edges, closely applied to the perianth at its base, slightly diverging from it at its apex; pedicels slender, 3–5 mm. long, their tomentum similar to that of the perianth and bracteole. *Female flowers* arising in clusters of 1–3 directly from the twigs or from much shorter tubercles than in the male, ovoid and narrowed to the
Fig. 82. *Myristica lancifolia* Poiret var. *montana* (Roxb.) J. Sinclair.

apex in bud, 4 mm. long and 3 mm. broad at the base, the lobes bluntly acute and reflexed at the apex after opening; pedicels 2 mm. long and 1 mm. thick; ovary ovoid, 2 mm. long, rusty-tomentose with a glabrous bi-lobed stigma. *Fruit* 2–3 cm. long and 1–1.4 cm. broad, ellipsoid or oblong-ellipsoid, narrowed towards the acute, obliquely acute, or less often obtuse apex, yellowish to orange when ripe, cinnamon-brown and minutely tomentulose when dry, becoming almost glabrous and the pericarp then only 0.25–0.5 mm. thick; stalk 3 mm. long and 3 mm. broad. *Aril* red. *Seed* dark brown, filling the carpel.

**LESser SUNDA ISLANDS**

- **Timor**

  Forbes 3308 (CAL, K).

- **Tanjimbar Islands (Timor Laut)**

  Ilgnei-Otimmer, *bb* Nos. 24257 (BO, L, SING) and 24304 (BO, K, L, SING); Jamdena, Central part near Ranarome River near Norkese, *J. v.* *Borssum Waalkes* 3300 (K, L).

**MOLUCCAS ORI ISLANDS**

- **Buru**

  Pulau Bisa, *Saañan* 50 (BO, L, SING).

- **Ceram**

  Leksula, *Toxopeus* 641 (BO, L, SING).

  Rumoga to the W. Tasikmi, a tributary of River W. Semos, *Buwalda* 5927 (BO, K, L, SING); West Ceram, forest near Gemba, Kairatu, *Kuswata & Soepadmo Nos.* 13 (K, L, SING); 16 (K, L) and 90 (BM, K, L, SING); Wai (Wahai). *Riocapa, Rutten* 1614 (L); south of Eti, Rutten 1652 (BO), south of Lisabata, Wai, Rutten 2097 (L, U); Wai, *Teijjsman Nos.* 1951 (A, BO, SING, U) & 16751 (BO, L, SING) *de* *Vriese* s.n. (L); East Ceram, Kwaos, *Kornassi* 954 (BO, L); North Ceram, Wai Ake Ternate, *Kornassi (Rutten)* 1068 (BO, SING).

**AMBON**

S.1. *Robinson Nos.* 242 (US); 243 (US); 244 (US); 1877 (A, BM, BO, K, L, NY, P); 2033 (A, BM, BO, K, L, NY, P) and 2042 (BM, BO, K, L, NY, P); *Teijjsman Nos.* 5057 (BO, U, SING); *de* *Vriese* s.n. (L, U); Kampomg Wai, *Buwalda* 6135 (BO, K, L); Wai, *Teijjsmann* 1964 (BO, U) and *Teijjsman* s.n. (BO, K, SING); Pulau Poka, *Saañan* 22 (BO, L); Mt. Salahutu, *Teijjsman* s.n. (BO, SING).

**BANDA**

*Smith, Herb. Roxb. s.n.* (BR, G & Prodr., K, P) and *Wall. Cat. 6792 (Herb. Roxb.* (CAL, K, M).

**KAI ISLANDS**

*Jaheri Nos.* 84 (BO); 87 (BO); 89 (BO); 93 (BO); 94 (BO).

**CULTIVATED**

Hort Bog, *Fevrell & Heide, Jan.* 1922 (S): *June 1922 (S, UPS)* and *Sept. 1922 (S, UPS)* all three ex Ceram; *Binnendijk* 2 (BO, L) ex Ambon; *Binnendijk* 92 (FI) and *138 (BO, FI, L, SING)* both ex Ceram; *Rastini* 95 (IVH63) (K, L); *Sinclair Nos.* 10030 (IVH79) (A, E, K, L, SING) & 10031 (IVH63) (A, B, E, K, L, M, NY, SING) and *Sutrisno* 123 (IVH63) (BO, L, SING) all four ex Cerani; *Warburg* 17645 (L) ex Ceram; Hort. Mauritius, *Labillardiere s.n.* (FI)
The leaves of this variety, although more variable in shape than those of the other varieties, tend to be more broadly elliptic with more distinct veins. They usually dry medium brown or greyish brown above. The best guide lies in the shape and size of the fruit. It is larger than that of var. lancifolia but smaller than those of the other two, the shape being ellipsoid or oblong-ellipsoid and narrowed at the apex. The apex may be obtuse but more often it is acute or obliquely acute. The base is broader than the apex. The perianth is generally less dense inomentum than that of var. lancifolia and bifurcata.


**Synonym:** M. hornei Warb. Monog. Myrist. (1897) 107 et 494; A. C. Smith in Bull. Torr. Bot. Club 68, 6 (1941) 406 **nomen nudum = Horne 966. — Fig. 83.**

Tree 5–20 m. high with slender bole. Twigs glabrous except the elongate, puberulous, terminal bud, reddish or greyish brown and slender in the younger parts, 1.5 mm. thick at the apex and 2 mm. thick for a considerable distance down, greyish brown or grey and 3–4 mm. thick in the oldest parts, finely longitudinally striate throughout. **Leaves** chartaceous, glabrous, drying a yellowish-greenish brown above, dull or slightly shining in parts, slightly paler beneath, narrowly elliptic or lanceolate, base bluntly acute to obtuse but mostly rounded, sometimes a trifle unequal-sided, apex acute or obtuse; midrib lying in a groove above, raised beneath; nerves 16–20 pairs, average 18 pairs, very fine and slender on both surfaces, sometimes only parts of them visible, at other times a little more prominent, sunk above, lievei with the lower surface or only slightly projecting, oblique but
Fig. 83. *Myristica chartacea* Gillespie.

some of them rather crooked, close together, often with a secondary one between two main ones; reticulations faint or absent, sometimes a few lax, sunk ones seen above; length (5)—8—15 cm., average 10 cm.: breadth 2—5.5 cm.; petiole slender, 1.5—2.5 cm. long and 1.5—2 mm. thick. Male inflorescence a very short, 2—5 mm. long, simple, pubescent, section 2 axis with the scars and the 3—6 flowers in sub-umbellate fashion at its apex. Male flowers ovoid and obtuse at the apex in bud, rather thin in texture, medium or yellowish brown, adpressed-tomentulose or when young shortly tomentose outside, glabrous inside, 5 mm. long and 3—4 mm. broad, split down to about half-way by the slightly reflexed lobes; staminal column with 10 anthers, the fertile part 3 mm. long, including the 0.75 mm. long blunted or truncate, sterile apex, stalk glabrous, 2 mm. long; bracteole as long as the flower bud, later surpassed by it, 2—4 mm. long when mature, early deciduous, its semi-circular remains at the base of the perianth; pedicels slender, 4 mm. long and 0.75 mm. thick. Female flowers usually only 2 in the cluster, sub-campanulate or sub-globose, 4 mm. long and 4 mm. broad, more coriaceous than in the male, split down ½-way by the acute, reflexed lobes; ovary densely rusty-tomentulose, bracteole persisting when flower is mature; pedicels 1 mm. long only. Fruit single or in pairs, oblong with a flat, horizontal base and a rounded, shortly apiculate, often uncinate apex, rusty-brown-tomentulose (the tomentum tending to disappear with age) 3.5—3.7 cm. long and 1.7—2 cm. broad, pericarp hard and thick, sessile with the base adpressed to the twig or on a very short, stout stalk, 3—5 mm. long and 5 mm. thick. Aril scarlet. Seed oblong, greyish brown, 2 cm. long and 1.5 cm broad.

FIJI Vanua Levu:


Nandronga and Narosa (Tholo West):—vicinity of Mbelo near Vatukarasa, Degener 15529 (A, K, L, UC).

Mba (Tholo North):—Hills between Nggaliwana and Nandala Creeks, south of Nauwanga, A. C. Smith 5842 (A, K, L); vicinity of Nandarivatu, Valley of Sigatoka (Singatoka), Gillespie 4206 (UC).

Namosi Province:—Gillespie 4264 (A, K).

Navosa Province:—ravine between Matasa (Natosa) and Beila, Horne 966 (A, K).

Naitasiri Province:—Central Road, Suva, Tohill Nos. 423 (A, K) and 571 (K).

East Coast:—Tailevu. Ravalevu Road, B. E. Parham 5633 (A).

Viti Levu:

Moala:

DISTRIBUTION: Fiji.

TYPE MATERIAL: M. chartacea Gillespie, Gillespie 4206 (BISH holotype, not seen, UC); Gillespie 2871 (BISH paratype, not seen); Gillespie 4264 (A, K paratype); Parks 20457 (BISH paratype, not seen).

VERNACULAR NAMES: Male (most frequent name on labels); kalimale; kau-yalewa; wale (the correct name is wale according to Gillespie). However, "male" is applied to all members of the genus in Fiji.

A miniature and more elegant edition of M. castaneifolia with more slender, smoother twigs, smaller leaves of exactly the same shape, but with finer, and at times partially indistinct veins, smaller flowers with a shorter indument, more slender pedicels and a smaller fruit with shorter tomentum. There are specimens of castaneifolia with small leaves which at times come close to the present species and which may give difficulty in identification. In most cases they will prove to be the apical portions of young twigs of castaneifolia from exposed ridges. I do not think they are so likely to be hybrids between the two species, though the possibility should not be ruled out. As the two are close, I see no reason why they should not hybridize. See also under M. castaneifolia. M. chartacea seems to be very close also to M. lancifolia, especially the Moluccan var. montana in the very similar leaves with faint venation and short secondary veins but differs in the longer petioles. The flowers too are very similar, even the staminal column, but they are slightly larger and broader in chartacea. Again the fruit with its very short tomentum and short stalk is comparable, that of chartacea being somewhat broader and its stalk thicker. The nuts of chartacea are eaten and distributed by pigeons.


Fig. 84. *Myristica castaneifolia* A. Gray.

Tree 7–20 m. high with horizontal branches. Twigs glabrous except the pubescent terminal bud, very stout, 5–7 mm. thick in the upper portions and 1 cm. thick lower down, greyish brown or greyish with very rough, fissured bark, slightly glossy here and there, a few lenticels present. Leaves coriaceous, glabrous, drying a greyish-yellowish brown above, dull or glossy in parts, lower surface the same colour or slightly paler, oblong or broadly elliptic, broadest at the middle and from there equally narrowed to both ends, base acute or rounded, sometimes slightly cordate, apex obtuse or rounded, occasionally bluntly acute; midrib very stout on both surfaces, flat above and 5–(7) mm. broad on the upper surface at the base; nerves 15–30 pairs, average 20 pairs, rather fine and slender in the apical leaves, much more prominent beneath, especially in the older and larger leaves, raised above but in depressions of the leaf surface, oblique, parallel; close together, interarching at the margin, a short secondary one often present between two main ones; reticulations fine, scalariform, best seen above: length very variable (those of herbarium specimens nearly always the smaller apical ones) these 15–24 cm. long, average 18 cm., the largest ones 30–60 cm. long, average 30 cm.; the apical 5.5–9 cm. broad, average 7 cm. but up to 15 cm. in the broadest; petiole (apical leaves) 1.8–3 cm. long, average 2.4 cm., 3–4 mm. thick, 3–3.5 cm. long in the largest and 6 mm. thick, drying blackish. Male inflorescence axis mostly 1.5 cm. long, stout, woody, closely covered with scars, no smooth portion, the flowers confined to its tomentose apex, simple or bifurcate (the axis in so-called macrantha up to 7 cm. long and 7 mm. thick). Male flowers (all young and only half-developed in the material available, mature in macrantha), 1 cm. long (probably reaching 1.2 cm.) and 5 mm. broad, densely tomentose outside (the hairs 0.75–1 mm. long) coriaceous, ovoid-globose in bud, narrowly ellipsoid when older, split down ½-way by the obtuse, oblique and slightly reflexed lobes; staminal column with 10 anthers, the fertile part 5 mm. long including the 0.75 mm. long, obtuse, sterile apex, stalk slightly narrower, glabrous, 2.5 mm. long; pedicels 6 mm. long and 1 mm. thick. Female flowers as in the male but broader, 1 cm. long and 7–7.5 mm. broad; ovary densely tomentose. Fruit oblong, 4.5 cm. long and 2.5–3 cm. broad, dark brown-chocolate-tomentose, the apex apiculate and often oblique, the pericarp hard and woody, 5 mm. thick; stalk 5 mm. long and 7 mm. thick or almost absent. Aril bright red. Seed oblong, 3–3.5 cm. long and 1.7 cm. broad.

**FIJI s.l.:**

**Vanua Levu:**

*Horne Nos.* 205 (A) and 1129 (K).

South-west slopes of Mt. Bbatini, Thaikaundrove, *A. C. Smith 613* (K, UC); Lower Wainunu River Valley, Mbuia, *A. C. Smith 1719* (BO, K, UC); Mathuata, southern slopes of Mt. Numiblaoa east of Lambasa, *A. C. Smith Nos.* 6336 (K, L) and 6383 (A, K, L) atypical, with smaller leaves, the fruit not so tomentose.
Gardens' Bulletin, Singapore — XXIII (1968)

Taveuni: Trail from Somo-somo, Gillespie 4832 (UC).


Viti Levu: Mba (Tholo North) Nandarivatu, the following:—Greenwood 857 (A, K, UC) and Mead S.F.N. 1980 (K); Nauwanga, Otto Degener 14608 (A, BM, K, L, UC); Mt. Matomba, Nandala, Degener 14723 (A, K, UC); 2 miles down the Ba Road, Gillespie 4216 (UC); southern slopes of Mt. Ndelaianathovu on the escarpment west of Nandarivatu, A. C. Smith 4946 (A, K, L); western and southern slopes of Mt. Tomanivi (Mt. Victoria), A. C. Smith 5122 (A, K, L).

Nandronga and Narosa (Tholo West):—northern portion of Rairaimatuku Plateau between Nandau and Nanga, A. C. Smith 5550 (A, K, L).

Serua:— Vicinity of Ngaloa, Vatuvilakia, Degener 15127 (A, K, L, UC); Vatutavatho, Degener 15184 (A, K, UC); Sigatoka (Singatoka River), Gillespie Nos. 3964 (UC) and 4312 (K, UC).

Namosi Province:—Mt. Naitaradamu, Gillespie 3357 (K, P).

Natasiri Prov.:—Tamavua woods, 6 miles from Suva, Gillespie Nos. 2032 (K, UC) and 2056 (BO, P, UC); summit, Central Road, Suva, Tothill 683 (K) M. hypertygra var. gillespieana is also mounted on this sheet.


DISTRIBUTION: Fiji.

TYPE MATERIAL: M. castaneifolia A. Gray, Cpt. Wilkes s.n. date 1838-42 (A, K, NY, P, US) Ovalau, the NY and US specimens not seen by me. A. C. Smith states that the A sheet is the holotype, but the A sheet which I had on loan has a label with the words “Distributed by the Smithsonian Institution from the herbarium of the U.S. South Pacific Exploring Expedition under the command of Cpt. Wilkes U.S.N. 1838-42”. Unless there is a duplicate of this in A in a special cabinet for types then it seems to me that the US sheet will be the actual holotype. M. macrantha A. C. Smith, Smith 1719 (A, BO, K, NY holotype, UC, US) the A, NY and US sheets not seen by me. A. C. Smith 613 (K, UC) paratype. M. macrophylla A. Gray, Cpt. Wilkes s.n. (US holotype) Ovalau=M. grandiflora A. DC.

VERNACULAR NAMES: Kali (the most frequent name); malewangga (macrantha); mbaumbulu.
Warburg placed this species in a series of the same name. There should be no difficulty in recognizing typical specimens of this tree. It varies, however, greatly in the size of its leaves and small-leaved specimens with more slender twigs approach, as has been pointed out, *M. chartacea*. Other specimens with smaller leaves, but with shorter and less dense tomentum on the fruits have also been placed under *castaneifolia*. Some of these, mostly from Vanua Levu are alright as that species but the majority are in fact *hypargyraea var. gillespieana*. Although their leaves are smaller, they usually have parallel sides, not widest at the middle and from there not gradually tapered to both ends as we find in *castaneifolia*. Being small in size, their veins are consequently close to each other. The twigs are not so stout or so rugose as in *castaneifolia*. The fruit also is more sub-globose, with a shorter, rusty tomentum and the stalk is longer than in *castaneifolia*. Probably these specimens are from more exposed situations or are representative of the younger twigs. There may be some hybridization involved but it is very difficult to be sure of this from herbarium specimens.

I cannot see that A. C. Smith's species, *M. macrantha* with the large leaves up to 60 cm. long is a different species. Nearly all the specimens of *castaneifolia* seen in herbaria consist of leaves from the apices of twigs. The exceptions are the type and paratype specimens of *macrantha*, the leaves of which are from much older branches. They are in no way different from those apical leaves except that they are larger with more strongly developed veins. Their flowers are mature and about 1 cm. long. In every case the flowers from the rest of the material are all immature being of a sub-globose shape. They elongate later and their size given by Warburg and others is consequently less than that of what the mature flowers ought to be. The long, elongate inflorescence of *macrantha* seen in A. C. Smith's specimens is essentially the same as that of normal specimens, both having numerous scars, but it is only natural that they should be longer when they are from older portions of the twigs. In fact they are not all long; there are short ones present as well. Very often one sees exceptionally long and old inflorescences in other *Myristica* species too. There are good examples in *M. hollrungii*, *longipes* and *tubiflora* and even in the related *hypargyraea* where the woody axis continues to grow and to produce flowers from time to time at its apex. In *Knema* also, there are numerous examples of this kind. I have seen the holotype of *M. macrophylla* A. Gray and agree with Warburg that it is not different from *M. castaneifolia*. The leaves again are from the lower portions of the twigs and not from the apex. Hence they are larger.
(72) *Myristica petiolata* A. C. Smith in J. Arn. 22, 1 (1941) 69. — Fig. 85.

Tree. Twigs glabrous except the puberulous terminal bud, dark reddish brown, longitudinally striate, a few lenticels present, moderately slender, 5 mm. thick, only the young portions present. Leaves coriaceous, glabrous, drying a rich, glossy, medium brown above, slightly paler brown beneath with a waxy bloom, oblong or elliptic-oblong, base rounded or broadly obtuse, slightly decurrent on to the petiole, apex bluntly acute or obtusely cuspidate, midrib lying in a groove above, reddish brown and prominent beneath; nerves 20–25 pairs, average 22 pairs, fine on both surfaces, slightly impressed above, a little more prominent beneath, oblique, parallel and rather close together, the interarching indistinct; reticulations invisible or absent; length 18–23 cm., average 20 cm.; breadth 5–8 cm., average 7 cm.; petiole 2.5–6 cm. long, average 4.5 cm., glabrous, longitudinally striate when dry, 3 mm. thick. Flowers not seen. Fruit. arising from a woody tuberacle, solitary or 3–4 in a cluster, oblong-ellipsoid, slightly oblique and apiculate at the apex, 2.5–3.5 cm. long and 1.7–2.3 cm. broad, the pericarp dark chocolate-brown-tomentose (hairs 2 mm. long), hard and woody; peduncle 1.5–1.7 cm. long, pedicels 5 mm. long and 4–5 mm. thick. Seed ellipsoid.

SOLOMONS YSABEL ISLAND: Tatamba, Brass 3434A (A holotype, not seen, BM, BO, BR1, G, L, SING).

DISTRIBUTION: Known from this single collection. In fruit in January. Altitude 50 m.

It is not possible to say much about this species since it is known from a single gathering. I am of the opinion that it is allied to *M. castaneifolia* on account of a distinct similarity in the leaves, their shape, oblique venation and long petioles and in the fruit, dark chocolate-brown-tomentose in both species. *M. castaneifolia* differs in that its leaves often have distinct reticulations and its fruit is sessile or nearly so. The collector's notes on the label of Brass 3434A, the type of *M. petiolata* actually refer to Brass 3434 which is *M. fatua* var. papuana Mgf (*M. procera* A. C. Smith). The A was apparently added to the number later when it was discovered that it consisted of two different species. The words "tall, slender tree, the bark grey, slightly fissured, the branchlets rusty brown" copied from the labels of these above numbers also appear under A C. Smith's descriptions of both *petiolata* and *procera* when they should, more properly, apply to *procera*.

*Foot-note:*—See Addenda, page 513.
Fig. 85. *Myristica petiolata* A. C. Smith.
Leafy twig with fruit from *Brass 3434A* (BRI isotype).
DOUBTFUL AND EXCLUDED SPECIES

Species obscureae (Warburg, New Guinea).

The following three species were described by Warburg from seeds with arils or seeds only. Sometimes even the testa is not present. Very few Myristica species can be identified from such parts alone. Their seeds are so uniform, differing in size only. Neither Markgraf nor I, myself, have succeeded in being certain of what they are and I feel that no one will be able to do so correctly. The names attributed to them by Warburg are probably in any case just synonyms of other common or well-known species and I propose to exclude them from the list of known species from New Guinea. They will be mentioned briefly with their references and then dismissed.


Note: The spelling in the index to Warburg's Monograph, page 665, is M. avis-paradisi Warb.

Seeds without arils, 1.3–1.5 cm. long and 8 mm. broad in the stomachs of Birds of Paradise, the testa ½ mm. thick, grey, deeply grooved with the configuration of the aril.

NEW GUINEA: S.I.

TYPE MATERIAL: (L.)

Warburg has stressed the presence of the marks on the testa left by the aril. This feature will not serve to identify the species as all Myristica species show similar marks when the aril is removed. He states that the seeds are the smallest in the genus. Several species have small seeds, the smallest being M. lancifolia var. lancifolia and M. concinna. It is quite impossible and a waste of time trying to match these seeds with those of any known species and they should never have been given a name. Incidentally the specific epithet avis-paradisiaceae ought to have been avisparadisiaceae or avis-paradisiacae.


Only a seed with an aril. Seed 4 cm. long and 2.2 cm. broad, odourless. Aril with broad segments.

NEW GUINEA PAPUA: Gulf District:—Aird River.

TYPE MATERIAL: (B).

Again it is quite impossible to say to which species the seed belongs. Among seeds of this size is M. fatua var. papuana, a common species with a wide distribution. However, to make any suggestion as to its identity is only guessing.

*Fruit* like that of *M. argentea*, 7 cm. long and 5 cm. broad, glabrous, globose; stalk 7 mm. long and 5 mm. thick. *Aril* with more numerous and finer divisions than in *argentea*. *Seeds* 4 cm. long and 2 cm. broad, testa dark reddish brown.

NEW GUINEA t.n.g.: Madang District—Astrolabe Bay.

**TYPE MATERIAL:** (B, HBG) the specimens obtained by the New Guinea Company, were shown at a Colonial Exhibition in Berlin in 1896 and later presented to the Berlin and Hamburg Botanical Museums.

Markgraf states that he does not know what the description of the fruit was taken from as he saw seeds only. Similarly I have seen the Berlin and Hamburg material and in both cases it consisted of seeds only. I might have been able to identify it had I seen fruit but certainly not from seeds alone. The *Lane-Poole* specimen, *Lane-Poole* 206 (BRI) which Markgraf mentions but did not see is not *M. pseudo-argentea* as it has densely and shortly tomentulose medium brown fruit. I have placed it under *M. umbrosa* and have seen the Brisbane material. The references to it mentioned by Markgraf are:— *Lane-Poole*, *The forest-resources of the territories of Papua and New Guinea* (1925) 87; White and Francis in *Proc. R. Soc. Queensland* 38 (1927) 229.

**Species obscura** (Warburg, Celebes).

*Myristica impressa* Warb. Monog, Myrist. (1897) 537 t.15 f.1–3.

This species was destroyed at Berlin. It is dealt with in the notes after *M. impressinervia*. It may have been an atypical specimen of *M. koordersii*.

**Mixtum compositum now destroyed.**


NEW GUINEA t.n.g.: Sattelberg near Finschhafen, *Warburg* 20715 (B holotype, burnt).

The holotype and only sheet was destroyed at Berlin, but this will not matter now as Markgraf has seen it and says that it is only a leaf-twig of *M. argentea* with loose fruit of *M. fatua* (var. *papuana*). I have therefore entered the name *M. finschii pro parte* under both these species in the citation of literature in this revision.
Excluded Species (Gandoger Names)

None of the Gandoger names stand. Some of them are synonyms of well-known species of Knema and Myristica, and these have been dealt with. The following, however, does not belong to Myristicaceae:

Myristica malaccensis = Ardisia teijsmanniana Scheff.

Gandoger

Excluded Species (Wall. Catalogue)

6790 Myristica glaucescens = Litsea venulosa (Meissner) Hk.f. (Tetranthera venulosa Meissner).

6793 Myristica finlaysoniana = Fissistigma fulgens (Wall. ex Hk.f. et Th.) Merr.

6802b (M. sp.? ) Singapore 1822 = Lauraceae, most probably. Not Myristicaceae.

6808 Myristica ? obtusifolia = Sapotaceae probably but not Myristicaceae.

6809 Myristica ? sesquipedalis = Actinodaphne sesquipedali Wall. ex O.K.) Hk.et Th. ex Meissner.

Gamble, page 180, gives 6802b as Litsea noronhae Bl., but this species is not found in Singapore. Note Gamble’s incorrect citation of Wall. Cat. 6802b under L. noronhae. He gives it as Myristica hookeriana Wall. Cat. 6802? Wallich’s citation under 6802b is b? Singapore 1822. Now Wall. Cat. 6802, Penang is certainly Knema (Myristica) hookeriana but 6802b is left blank by Wallich.

Warburg suggests Myristica maingayi Hk.f. for 6808. This was later published as Myristica obtusifolia Wall. ex HK. f. et Th. in Fl. Ind. 1 (1855) 163.

Excluded Species (Lamarck and Willdenow)

Myristica microcarpa Willd. = Non Myristicaceae. Willdenow thinks that it is the same as M. uviformis. I do not think so.

Myristica uviformis Lamarck = Euphorbiaceae (Aporosa sp.).


Excluded Species (Kew Index, Compilers’ Errors)

Myristica bombycina King ex = Machilus bombycina King ex HK.f.

Myristica duthiei King ex HK.f. = Machilus duthiei King ex HK.f.

Myristica gamblei King ex HK.f. = Machilus gamblei King ex HK.f.

Myristica kurzii King ex HK.f. = Machilus kurzii King ex HK.f.

Myristica myrmecophila Bower = Myristica subalulata Miq. (M. myrmecophila Becari).

For explanation of the last see notes after Myristica sabalulata Miq. of this revision.
Page 859 of *Flora of British India*, vol. 5, Additions and Corrections, begins with some additional species of *Myristica*. These are followed by additional species of *Machilus* (*Lauraceae*). On pages 860 and 861 more species of *Machilus* are given, including the above four, *Machilus bombycina*, *duthiei*, *gamblei* and *kurzii*. The words *Myristica* and *Machilus* both begin with the letter *M*, and when *Index Kewensis*, 1st Supplement was being prepared, it seems that the compilers mistook the *M* of *Machilus* in *Fl. Br. Ind.* for the *M* of *Myristica* and thought they were still dealing with species of *Myristica* when they had actually finished with them and had started on *Machilus*. Unfortunately, as a result, the four species of *Machilus* were put under *Myristica*.

**Other Miscellaneous Excluded and Doubtful Species**

These are taken from the *Index Kewensis* and from Warburg, page 651.

(a) Excluded Species

*Myristica*

*integrifolia* Steud. Nom. Ed. = in error for *Myrica integrifolia* Wall.

*leucoxylya* Miq. Fl. Ind. Bat. = *non Myristicaceae*.


(b) Doubtful Species

*Myristica*

*sparsa* without author in = *M. fatua* Houtt. (Stated to be an East Indian Islands species).

*verrucosa* without author. = probably *M. guatteriifolia* A.DC.

A certain *M. verrucosa* from Indo-China, a *nomen nudum* mentioned in Christy’s *Commercial Plants* No. 8 (1885) 26 is according to Warburg, *Monog. Myrist.* page 416 probably *M. cookii*. The latter is a synonym of *M. guatteriifolia*. 
List of Names in Myristica for Species now in the African and American Genera

The names in *Myristica* from Index Kewensis and elsewhere (left-hand column) have been placed in the genera assigned to them by the most recent authors working on African and American genera. I have not revised these genera myself so the circumscriptions are not necessarily in accordance with any view held by me. The list is merely for convenience. Other names in *Myristica* will be given when the revision of *Horsfieldia* is completed.

Myristica

<table>
<thead>
<tr>
<th>Name</th>
<th>Synonym</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>acuminata</em> Lamk</td>
<td>= <em>Brochoneura acuminata</em> (Lamk) Warb.</td>
</tr>
<tr>
<td><em>angustifolia</em> Lamk</td>
<td>= <em>Virola surinamensis</em> (Rottb.) Warb.</td>
</tr>
<tr>
<td><em>bicuhyba</em> Schott</td>
<td>= <em>Virola oleifera</em> (Schott) A.C. Smith.</td>
</tr>
<tr>
<td><em>capitellata</em> Poepp. (msc.) ex A.DC.</td>
<td>= <em>Compsoneura capitellata</em> (Poepp. ex A.DC.) Warb.</td>
</tr>
<tr>
<td><em>carinata</em> Spruce ex Benth.</td>
<td>= <em>Virola carinata</em> (Spruce ex Benth.) Warb.</td>
</tr>
<tr>
<td><em>chapelieri</em> Baill.</td>
<td>= <em>Brochoneura chapelieri</em> (Baill.) H. Perr.</td>
</tr>
<tr>
<td><em>cordifolia</em> Mart. ex A.DC. <em>pr.</em></td>
<td>= <em>Virola sebifera</em> Aubl. syn.</td>
</tr>
<tr>
<td><em>cumara</em> Poepp. (msc.) ex A.DC.</td>
<td>= <em>Dialyanthera parvifolia</em> Mgfl. in Prodr. 14, 1 (1856) 199 pro syn. <em>M. otoba</em>.</td>
</tr>
</tbody>
</table>

cuspidata Spruce ex Benth. (Spruce p.p.)
— var. globifera Spruce ex A.DC.
— var. rufula A.DC.

dardaini Heckel

debilis Spruce (Herb.) ex A.DC.

egensis Poepp. msc. = probably the original spelling. The locality is Ega according to Warburg.
elongata Benth.

fatua Swartz

fulva Richard ex Warb.
gardneri A.DC.
gordoniaeifolia A.DC.
gracilis A.DC.
grandis Freire Allem.
gutemalensis Hemsl.

hostmanni Benth.
hypoleuca Spruce ex Warb. a nomen nudum and herb. specimen mentioned in a paper, “On the mode of branching of some Amazon trees” by R. Spruce in J. Linn. Soc. London 5 (1861) 4
kombo Baill.
lancifolia Poepp. (msc.) ex Warb.
laurifolia Poepp. (msc.) ex Warb. may be an error for lancifolia Poepp. but according to Warburg = Virola venosa var. poeppigii (A.DC.) Warb.

laurifolia Spruce (Herb.) ex A.DC. pro syn. = Compsoneura sprucei (A.DC.) Warb.

longicuspis Spruce (msc.) published as Virola elongata (Benth.) Warb. var. longicuspis Spruce ex Warb. = Virola elongata (Benth.) Warb.

longifolia Welw. (msc.) ex Christy (1885) pro syn. = ? Pycnanthus niohue (Baill.) Warb.

macrocarpa Welw. (msc.) ex Christy (1885) pro syn. = ? Staudtia pterocarpa Warb.

macrophylla Spruce (msc.) ex Benth. = Iryanthera macrophylla (Spruce ex Benth.) Warb.

madagascariensis Lamk = Brochoneura acuminata (Lamk) Warb.

mannii Benth. = Scyphocephalium mannii (Benth.) Warb.

melinonii Benoist = Virola melinonii (Benoist) A. C. Smith.

membranacea Poepp. (msc.) ex A.DC. = Virola cuspidata (Spruce ex Benth.) Warb.


microcephala Benth. = Pycnanthus microcephalus (Benth.) Warb.


moca Poepp. (msc.) ex A.DC. = Virola sebifera Aubl.

mollissima Poepp. (msc.) ex A.DC. = Virola mollissima (Poepp. ex A.DC.) Warb.

mouchico Baill. ex Lanessan = Iryanthera sagotiana (Benth.) Warb.

mouchigo Baill. = original spelling by Baillon in footnote as a species without descr., vol. 2 page 504 and in English edit. page 498 = Iryanthera sagotiana (Benth.) Warb.

mouchio Stone = spelling in A. C. Smith and Wodehouse's account of American Species of Myristicaceae = Iryanthera sagotiana (Benth.) Warb.
niohne Baill. ex Lanessan, Pl. Util. Colon. Franc. (1886) 342

niohue Baill. Adansonia 9 (1868) 79. This is also the spelling used by Warburg, page 259


ocuba Humb. et Bonpl. A manuscript error for M. otoba from Brongn, Weisner etc. (Rohstoffe des Pflanzenreiches, page 233)

officinalis (non Mart.) Benth. in Hk. Kew Journ. Bot. 5 (1853) 3 pro parte

officinalis Mart. p.p. (1) date 1828 non L.f. (1781)

officinalis Mart. p.p. (2) = Virola officinalis Warb.

Virola bicuhyba (Mart.) Warb.

oleifera Schott = Virola oleifera (Schott) A. C. Smith.

otoba Humb. et Bonpl. (msc.) ex Willd.

— var. glaucescens A.DC. = Dialyantera parvitolia Mgfr.

pacimonensis Spruce (msc.) ex Warb. Warburg says that it is the same as Virola surinamensis

panamensis Hemsl. A. C. Smith reduces V. panamensis (Hemsl.) Warb. to V. sebifera Aubl.

paradoxa Schwacke = Iryanthera paradoxa (Schwacke) Warb.

pavonis A.DC. = Virola pavonis (A.DC.) A. C. Smith.

peruviana A.DC. = Virola peruviana (A.DC.) Warb.

platysperma Spruce (Herb.) ex A.DC.

punctata Spruce (Herb.) ex Benth.

rufula Mart (Herb.) ex A.DC. pro syn. = Virola elongata (Benth.) Warb.

punctata Spruce (Herb.) ex A.DC. = Virola elongata (Benth.) Warb.
rugulosa Spruce, herb. specimen and nomen nudum. It is mentioned in a paper, "On the mode of branching of some Amazon trees" by R. Spruce in J. Linn. Soc. London 5 (1861) 4

rugulosa Spruce ex Warb. pro syn.

sagotiana Benth. = Virola rugulosa Warb.

sebifera [non (Aubl.) Swartz] Rusby = Virola boliviensis Warb.

sebifera (non Swartz) Seemann = Virola panamensis (Hemsl.) Warb.

sebifera Swartz (1788) = sebifera (Aubl.) Swartz
— var. cordifolia A.DC.
— var. curvinervia A.DC.
— var. longifolia Lamk = Virola sebifera Aubl. (1775).

sebophora Neck.

sessilis A.DC. = Virola sebifera Aubl.

sprucei A.DC. = Virola sebifera Aubl.

subsessilis Benth. = Virola sebifera Aubl.

surinamensis Rolander ex Rottb. (This is the citation in Index Kewensis)

theiodora Spruce (Herb.) ex Benth. = V. theiodora (Spruce ex Benth.) Warb.

uapensis Spruce (Herb.) ex A.DC. = spelling in A.DC. Prodr. (uapensis = spelling in Index Kewensis) = Virola elongata (Benth.) Warb.

venosa Benth.

— var. poeppigii A.DC. = Virola venosa (Benth.) Warb.

virola Raeusch. = Virola venosa (Benth.) Warb.

voury Baill. This is apparently the original spelling but Warburg changed it to vousi. It would have been better as vousii. = Brochoneura acuminata (Lamk) Warb.
LIST OF COLLECTORS’ NUMBERS

ACHMAD (ACHMAT) — 203; 204; 289 & 519 iners: 613 maxima; 953; 1123 & 1548 iners.

ADDURU — 128 elliptica var. simiarum; 21953 philippensis.

AET — 3 & 16 subalulata; 142 & 147a fatua var. papuana; 169 argentea: 182 tubiflora; 256 & 279 lepidota; 485 tubiflora; 486 fatua var. morindiifolia.

AET & IDJAN — 548; 550 & 864 lancifolia var. lancifolia.

AGAMA & VALERA — 9447 & 44620 guatteriifolia.

AGUILAR — 20185 guatteriifolia.

AGULLANA — 3887 iners.

AHERN — 20 guatteriifolia; 363 ceylanica var. ceylanica; 421 cinnamomea; 558 philippensis; 590 guatteriifolia; 758 agusanensis.

AHERN’S COLLECTOR — 99; 1438 & 3190 philippensis.

ALAMBRa — 27411 ceylanica var. ceylanica.

d’ALBERTIS — 3 subalulata; 9 hollrungii — FI Acc. No. 7746 subalulata.

d’ALLEIZETTE — 6151 fragrans.

ALSTON — 16254 elliptica var. celebica.

ALVAREZ — 12929 philippensis; 21442 & 22199 ceylanica var. ceylanica; 23698 guatteriifolia; 23709 ceylanica var. ceylanica.

AMDIJAH — 73 malaccensis.

ANDERSON, J. A. R. — SAR Nos. 128 & 2176 lowiana; 4325 villosa; 4343 malaccensis; 11036 cinnamomea; 12571 & 12925 villosa; 13273 lowiana; 13280 villosa; 14382 maxima.


ANGIAN — 7763 guatteriifolia.

ARDZI & RASHID — SAR 10251 malaccensis.

ARMSTRONG — 580 insipida.

ASHTON — BRUN Nos. 21 cinnamomea; 30 smythiesii; 118 maxima: 186 probably malaccensis; 189 smythiesii; 577 malaccensis; 5097 & 5244 cinnamomea; 5511 smythiesii; 5513 villosa — SAR Nos. 5945 malaccensis; 7878 lowiana; 16467 elliptica var. elliptica; 16490 maxima; maxima; 18329 papyracea; 19432 cinnamomea; 19511 malaccensis.

ASHTON; SMYTHIES & WOOD, G. H. S. — SAN Nos. 17126 malaccensis; 17417 lowiana; 17421 malaccensis; 17440 smythiesii; 17502 iners.

ASHTON & WHITMORE — BRUN Nos. 581 cinnamomea; 634 villosa.

ATASRIP — 1 & 2 fragrans; 3 tubiflora; 4 subalulata & succedanea; 7 & 19 fragrans; 48 fatua var. morotaiensis; 79 garciiniifolia; 111; 112; 123; 124 & 125 fragrans; 126; 127 & 128 succedanea; 129 & 130 fragrans; 707 argentea; 709 tubiflora; 716 garciiniifolia.
Atje — 370 fatua var. morotaiensis.

Australian Forest Survey Company — N.G.F. Nos. 246 hollrungii; 270 globosa; 2504 subalulata; 2516 hollrungii.

Backer, C. A. — 11487; 11571 & 11826 teijsmannii; 27612; 27824 & 29419 guatteriifolia; 30445 teijsmannii; 30570 iners; 33975; 33976 & 37596 fragrans.

Bakar, A. — SAN 24984 villosa.


Bamler — 2 subalulata; 50 crassipes.

Barber — 2941; 2942; 2955; 4108 & 5547 dactyloides.

Barclay — 3530 schleinitzii.

Barnes — 52 philippensis.

Barrett — N.G.F. 4168 globosa.

Bartlett — 7177 elliptica var. elliptica; 8283 fragrans.

Bauerlen — globosa.

Bawan — 24935 ceylanica var. ceylanica

Bayak — 2632 guatteriifolia.

bb Nos. — 1812 guatteriifolia; 2300 iners; 2357 guatteriifolia; 3128 & 3772 iners; 5372 lowiana; 5816 gigantea; 7094 villosa; 7150 elliptica var. elliptica; 7361 lowiana; 7524 & 7543 elliptica var. celebica; 7935 iners; 8865 guatteriifolia; 8933 fatua var. spanogheana; 9172 elliptica var. elliptica; 9182 iners; 9794 maxima; 9882 iners; 9962 lowiana; 10022 cinnamomea; 10071 maxima; 10149 fragrans; 10175 maxima; 10238 elliptica var. elliptica; 10760 iners approaching malaccensis; 11176 gigantea; 11238 iners; 11396 fatua var. spanogheana; 11489 lowiana; 11652 iners; 11692 maxima; 11812 & 11833 iners; 11887 villosa; 11898 iners approaching malaccensis; 12141 & 12171 iners; 12446 fatua var. spanogheana; 12862 iners; 12959 villosa; 13148 elliptica var. elliptica; 13508 & 13678 elliptica var. celebica; 13807 fatua var. affinis; 14239 iners; 14538 fatua var. affinis; 14788 guatteriifolia; 15068 lepidota; 15395 elliptica var. elliptica; 15697 fatua var. affinis; 15868 iners; 15904 hollrungii; 15972 fatua var. spanogheana; 16162 papyracea; 16284 gigantea; 16446 fatua var. morotaiensis; 16511 maxima; 17057 fatua var. affinis; 17368 & 17546 lowiana; 17807 beccarii; 17819 maxima; 18495 gigantea; 18653 & 18981 iners; 19139 maxima; 19290 iners; 19609 elliptica var. celebica; 19664 guatteriifolia; 19848 elliptica var. elliptica 20714 malaccensis; 20757 fatua var. affinis; 20897 elliptica var. celebica; 21130 & 21330 fatua var. affinis; 21331 elliptica var. celebica; 22222 argentea; 22228 lancefolia var. lancefolia; 22429 iners; 22844 fatua var. morotaiensis; 23138 & 23139 fatua var. fatua; 23157 kordersii; 23183 & 23201 fatua var. fatua; 23470 crassa; 23777 globosa; 23800 lancefolia var. bifurcata; 23908 elliptica var. celebica; 23913 & 24131
koordersii; 24257 & 24304 lancifolia var. montana; 24416
insipida; 24844 lancifolia var. bifurcata; 24966 koordersii:
25016 sphaerosperma; 25049 lancifolia var. lancifolia; 25255
lepidota; 25263 fatua var. papuana; 25368 lepidota; 25461
lancifolia var. lancifolia; 25533 lancifolia probably var. bifur-
cata or var. nov.; 25679 hollrungii; 25785 lowiana; 25816
fatua var. fatua: 25843 globosa; 25849 & 25990 fatua var.
fatua; 26017 koordersii; 26194 villosa; 27000 gigantea; 27019
cinnamomea; 27204 fatua var. spanogheana; 27428 lowiana;
27482 & 27505 iners; 27632 lowiana; 28189 iners; 28230
elliptica var. celebica; 28323 gigantea; 28342 maxima; 28442
iners; 28470 elliptica var. elliptica; 28552 lowiana; 28561
iners; 28698 elliptica var. elliptica; 28806; 28814 & 28824
effective var. celebica; 28880 lancifolia var. bifurcata; 28934
tubiflora; 28987 globosa; 29157 lowiana; 29299 & 29323
gigantea; 29482 fatua var. affinis; 29535 & 29548 elliptica
var. elliptica; 29751 lancifolia var. bifurcata; 29828 & 29830
effective var. celebica; 30255 lancifolia var. lancifolia; 30320
fatua var. papuana; 30458 & 30459 globosa; 30596 subalulata;
30671 tubiflora; 30696 & 30766 lancifolia var. lancifolia;
30768 globosa; 30814 lancifolia var. lancifolia; 30833 globosa;
30872 & 30900 lancifolia var. lancifolia; 30960 & 30971
globosa; 31303 fatua var. papuana; 31320 globosa; 31680
iners; 31880 elliptica var. celebica; 31957 iners; 32388 lowiana;
32650 tubiflora; 32681 fatua var. morindiifolia; 32713 argentea;
32819 lepidota; 32832 fatua var. morindiifolia; 32840 &
32856 lepidota; 32864 fatua var. papuana; 32912 fatua var.
morindiifolia; 32944 fatua var. papuana; 32947 tubiflora:
32986 argentea; 33116 fatua var. affinis; 33369 tubiflora;
33384 subalulata; 33461 fatua var. papuana: 33462 & 33481
tubiflora; 33494 sulcata; 33723; 33767 & 33901 lancifolia
var. bifurcata; 34341; 34380 & 34410 villosa; 34613 gigantea;
34618 beccarii; 34625 maxima.

Beccari — 27 lancifolia var. lancifolia; 42 argentea; 70 subalulata:
96 globosa: 247 beccarii; 287 elliptica var. elliptica; 403
subalulata; 613 elliptica var. elliptica; 652 & 666 malaccensis;
669 hollrungii; 681 sulcata; 702 elliptica var. elliptica; 903
lancifolia var. lancifolia; 913 fatua var. subcordata; 1270
malaccensis; 1526 villosa; 1556 maxima; 1574 & 1575 malac-
censis; 1590 iners; 2053 beccarii; 2328 malaccensis: 3550
elliptica var. elliptica; 4027 iners. See also under FI Acc. Nos.

Becking — 11 lowiana; 36 & 56 guatteriifolia.

Beddome — 15 malabarica; 113 & 231 dactylloides; 242 fatua var.
magnifica; 263 & 327 dactylloides; 6713; 6714; 6715 & 6716
malabarica; 6725 & 6726 fatua var. magnifica: 6732 fragrans.

Bequin — 263 & 493 lowiana; 786: 787; 788 & 789 fragrans: 1006
succeedanea; 1328 fragrans: 1778 lancifolia var. bifurcata: 2231
fatua var. fatua.

Bejaud — 122 iners.

Bernardo — 24277 ceylanica var. cagayanensis.
Binnendijk — 2; 92 & 138 lancifolia var. montana.

Biro — 21 longipes; 61 subalulata; 159 & 163 schleinitzii; 209 subalulata.

Boden Kloss, C. — See Kloss.

Boerlage — 281 fatua var. fatua

Boivin — 1293 fragrans.

Boerlage — 281 fatua var. fatua

Bordillon — 91; 115 & 118 malabarica; 730 & 731 fatua var. magnifica; 1202 malabarica.

Bourne — 2093 dactyloides.

Bradtke — 296 schleinitzii.

Branderhorst — 11 & 294 insipida: 329 tubiflora; 435 subalulata.

Brandes — BW 7288 fatua var. papuana.

Brass — 510 insipida; 570 subalulata; 940 tubiflora; 1070 fatua var. papuana; 1454 subalulata; 1552 hollrungii; 1633; 1987 & 2134 insipida; 2744 globosa; 3106 fatua var. papuana; 3237 & 3288 schleinitzii; 3434 fatua var. papuana; 3434a petiolata; 3914fatua var. papuana; 3946 globosa; 4174 sphaerosperma; 5765 & 5766 hollrungii; 6430 & 6505 insipida; 6857 ensifolia; 6982 archboldiana; 7097 lancifolia var. clemensii; 7181 firmipes; 7273 & 7274 subalulata; 8008 hollrungii; 8122 insipida; 12147 & 12173 longipes; 12254 brassii; 12738 cucullata; 13706 subalulata; 21764 schleinitzii; 21808 globosa; 23241 longipes; 23293 sulcata; 23427 subalulata; 23882 globosa; 24093 fatua var. papuana; 24387 & 24388 schleinitzii; 24706 & 24772 sulcata or sp. aff.sulcata; 25471 hooglandii; 25869; 25893 & 25986 chrysophylla var. entrecasteauxensis; 27129 subalulata; 27447 rosselensis; 27658 tenuivenia; 27813 & 27918 globosa; 27961 rosselensis; 28055 & 28126 inopinata; 28245 rosselensis; 28302 globosa; 28528 tenuivenia; 28894 buchneriana; 29146 subalulata; 29239 globosa; 31999 fatua var. morindiifolia.

Brass & Versteegh — 11925 longipes; 12512 cucullata; 12547 sphaerosperma; 12574 & 12597 longipes; 13185 fusca; 13523 cucullata; 13545 fusca; 13573 longipes.

Broadway — 4393; 4828 & 5220 fragrans.

Brouwer, A. — BW Nos. 834 buchneriana: 839 & 862 hollrungii; 2537 & 2629 sulcata.
BROWN, R. — 25: 2312 & 3012 insipida.
BROWNE, F. G. — 63 iners; 70 smythiesii.
BRUNIG — SAR Nos. 1181 villosa; 6744 iners; 8865 lowiana; 8895 villosa; 11956 malaccensis.
BRUYN, FEUILLETAUDE — 149 subalulata.
BRYAN — 73 fatua var. inutilis.
BUJANG (HAJI) b. SEDIK — SAR Nos. 12752 malaccensis; 12795 iners.
BURCHELL — 9577 fragrans.
BURGER — 2155 teijsmannii.
BUWALDA — 86 iners: 221 lepidota; 247 elliptica var. elliptica; 335 lepidota; 3001 & 3142 guatteriifolia: 4906 lepidota; 4918 fatua var. papuana; 5132 lepidota; 5428 lancifolia var. lancifolia; 5597 & 5641 globosa; 5927 & 6115 lancifolia var. montana; 6146 fatua var. fatua; 6619 & 6718 iners; 6741 cinnamomea; 6862 & 7956 elliptica var. elliptica.
CABILING — 3832 guaterriifolia.
CALDER, C. C. & RAMASWAMI, M. S. — 1431 malabarica.
CALLERY — 33 philippensis; 34 elliptica var. simiarum.
CAMERON, A. — 38 lancifolia var. lancifolia.
CANICOSA — 9716 philippensis.
CARR — 11917 undulatifolia; 12374 globosa; 12597 subalulata; 12707 & 12870 longipes; 12890 & 12899 globosa; 13122: 13285 & 13297 longipes; 13265 globosa; 13267 subalulata; 13284 longipes; 13348 subalulata; 13394; 13395 & 13524 longipes; 14302 subalulata; 14325 globosa; 14391; 14403 & 14609 longipes; 14897 crassipes: 14901 globosa; 14907 & 14908 uncinata; 15051 tubiflora; 15509 crassipes; 15549 & 15550 flosculosa; 15800 tubiflora; 15861 globosa; 16086 & 16087 tubiflora; 16091 crassipes; 16128 & 16129 carrii; 16167 tubiflora; 16228 chrysophylla var. chrysophylla: 16259 subalulata; 16344 carrii; 16410 umbrosa; 16446 markgravianna.
CARTER — 178 andamanica.
CASTRO & MELEGRITO — 1624 guaterriifolia.
CEL. Nos. — Cel II- 403 koordersii; Cel. V- 250 fatua var. affinis.
CELESTINO & CASTRO — 1995 ceylanica var. ceylanica.
CENABRE — 29153 & 29189 guatteriifolia.
CENABRE; CORTES & SHERFESEE — 20990 philippensis.
CENABRE, PONCE & SHERFESEE — 21649 elliptica var. simiarum.
CHALMERS — 5 globosa; 6 subalulata; 7 schlenitzii; 10 globosa.
CHARINGTON & NICHOLSON — SAN Nos. 17726 & 21553 cinnamomea.
CHRISTOPHERSEN — 150 & 314 hypargyraea var. hypargyraea; 984; 995; 2838 & 3202 fatua var. inutilis; 3203 hypargyraea var. hypargyraea; 3473 fatua var. inutilis; 3474a & 3474b hypargyraea var. hypargyraea.

CHRISTOPHERSEN & HUME — 2486 hypargyraea var. hypargyraea; 2612 fatua var. inutilis.

CLEMENS — 178; 300 & 426 subalulata; 1015 longipes; 1142 markgraviana; 1668 lancifolia var. clemensii; 1717 longipes; 1817 markgraviana; 1860 buchneriana; 2152 sulcata; 2183 markgraviana; 2186 subalulata; 2200 chrysophylla var. chrysophylla; 4074 & 4527 sphaerosperma; 4764 cucullata; 4836 longipes; 4971 & 5153 cucullata; 5475 subalulata; 6433 sphaerosperma; 6650 & 7783 subalulata; 7810a & 7810b cucullata; 8000 schleinitzii; 8219 & 8245a subalulata; 9312 cucullata; 9633 guatteriifolia; 10479 globosa; 10511 hollrungii; 20118 elliptica var. elliptica; 24099 ceylanica var. ceylanica.

COLLINS — 2352 fragrans.

COMINS — 121 globosa.

COMMerson — 80 philippensis.

CONTRERAS — 24099 ceylanica var. ceylanica.

COPPACk & GRAY, E. C. G. — N.G.F. 7152 globosa.

CORNER — BRUN Nos. 5364 & 5365 guatteriifolia.

COWMeadow & TEona — BSIP Nos. 2533 fatua var. platyphylla; 2542 globosa.

C. P. Nos. — 416 dactyloides; 2923 ceylanica var. ceylanica.

CRUttWELL — 32 schleinitzii.

CUMING — 829 philippensis; 903 ceylanica var. ceylanica; 1481 philippensis; 1570 ceylanica var. ceylanica; 1582 & 1583 guatteriifolia; 2418 fragrans.

CUNNINGHAM, A. — 288 & 312 insipida.

CUNNINGHAM, H. M. — 3839 guatteriifolia; 10119 philippensis; 10219 elliptica var. simiarum; 10496 guatteriifolia; 10556 agusanensis; 10641 elliptica var. simiarum; 10692 guatteriifolia; 13155 elliptica var. simiarum; 17202 ceylanica var. ceylanica; 17667 philippensis.

DACHLAN — 95 beccarii.

DALZELL — 1328 dactyloides.

DAMES — 2 guatteriifolia.

Dan b. HAJI Bakar — SAR Nos. 4365 malaccensis; 4366 smythiesii.

DANAO — 21590 guatteriifolia.

Darbyshire — 929 cylindrocarpa.

Dd ACC. Nos. — 80843; 80844 & 83152 dactyloides; 83687 & 84902 malabarica; 91326 & 95436 dactyloides.

DEGENER — 14608; 14723; 15127 & 15184 castaneifolia; 15289 chartacea.
Sinclair — Myristica

DeGener & Ordonez — 14134 chartacea; 14155 hypargyraea var. gillespieana.

Dias — 29890 ceylanica var. ceylanica.

Dickson — 9 elliptica var. elliptica.

Didrichsen — 3688 andamanica.

Diepenhorst — 2570 elliptica var. elliptica.

Din — 240 iners.

Docters van Leeuwen, W. M. — 9085 & 9181 subalulata; 9217 tubiflora; 9306 subalulata; 9700 hollrungii; 9844 & 9845 subalulata; 9856 fatua var. subcordata; 10651 subalulata; 11088 & 11102 hollrungii; 11115 tubiflora; 11297; 11330; 11402 & 11403 subalulata.

Domingo — 21678 philippensis.

Dommers — 203 guatteriifolia.

Dorst — 154E1P846 & 154E1P940 elliptica var. elliptica; 183E1P942 cinnamomea. See also Endert, Thorenaar and E1P, E2P and T3P Nos.

Dyke — 79 fragrans.

E1P, E2P; T3P Nos., etc. — 55E1P551; 55E1P572; 55E1P601; 55E1P623 & 55E1P624 maxima; 57E1P554; 57E1P575; 57E1P589; 57E1P591 & 57E1P596 iners; 154E1P940 & 154E1P846 elliptica var. elliptica; 185E1P883 iners; 183E1P884 & 183E1P942 cinnamomea; 185E2P942; 185E2P1005; T3P543 & T3P599 iners; T1141 & T1208 elliptica var. elliptica.

Eames — 186 fatua var. inutilis and hypargyraea var. hypargyraea.

Edano — 15449 fatua var. wenzelii; 34497 & 75863 ceylanica var. ceylanica; 76037 elliptica var. simiarum; 77815 umbellata; 79290 ceylanica var. cagayanensis.

Edwards — N.G.F. 10726 hollrungii.

Eggers — 568 & 6153 fragrans.

Elbert — 3025 koordersii; 3809 fatua var. spanogheana.

Elgincolin — 27840 philippensis.

Elmer — 6169 philippensis; 6357 elliptica var. simiarum; 7345 ceylanica var. ceylanica; 7377 elliptica var. simiarum; 8314 philippensis; 10133 ceylanica var. ceylanica; 11063 fatua var. fatua; 11136 agusanensis; 12228 guatteriifolia; 12414 ceylanica var. ceylanica; 12537 agusanensis; 12820 & 13166 umbellata; 13284 agusanensis; 13294 & 13295 ceylanica var. ceylanica; 13502 & 15469 elliptica var. simiarum; 16010 agusanensis; 16921 ceylanica var. ceylanica; 20850 guatteriifolia.

Endert — 222 crassa; 236 cinnamomea; 2576 maxima; 3456 malaccensis; 5001 iners — 57E1P554; 57E1P575; 57E1P589 & 185E1P883 iners.

Eyma — 4283 cucullata.
FENIX — 4105 ceylanica var. cagayanensis; 26011 agusanensis.
FERNANDES, J. — 171 malabarica; 845C dactyloides.
FERRARIS — 23041 ceylanica var. ceylanica.
Fi Acc. Nos. — Herb. Beccari, mostly all collected by Beccari — 7654 teijsmannii; 7657 & 7657a globosa; 7659; 7660; 7662; 7663; 7664; 7665; 7666 & 7667 fragrans; 7668 & 7668a fatua var. affinis; 7669; 7670 & 7671 fatua var. fatua; 7672 & 7673 fragrans; 7680 & 7682 iners; 7694; 7695; 7696; 7697 & 7698 succedanea; 7699; 7700 & 7701 fragrans; 7702; 7703 & 7704 neglecta; 7707; 7707a & 7707b fatua var. papuana; 7710; 7711; 7713a; 7731b & 7731c succedanea; 7733; 7733a; 7733b & 7733c argentea; 7735 & 7735a garciiniifolia; 7742 & 7745 subalulata; 7746 (coll. d’Albertis) subalulata; 7749 & 7749a (coll. Riedel) guatteriifolia; 7750 guatteriifolia; 7754; 7754a; 7754b; 7755; 7755a; 7755b; 7755c; 7755d & 7755e lancifolia var. lancifolia; 7756; 7756a; 7756b & 7756c globosa.
FLOYD — N.G.F. Nos. 3450 globosa; 5634 umbrosa; 6433 globosa; 6652 fatua var. morindiifolia; 7218 buchneriana.
FLOYD & GRAY, E.C.G. — N.G.F. Nos. 7173 undulatifolia; 8054 subalulata.
FLOYD; GRAY, E.C.G. & MIDDLETON — N.G.F. 8079 tubiflora.
FLOYD & HAVEL — N.G.F. 7446 subalulata.
FORBES — 18 schleinitzii; 212 globosa; 242 & 396 longipes; 404 subalulata; 544 iners; 592 & 647 longipes; 710 lancifolia var. clemensi; 916 subalulata; 1156 fatua var. fatua; 1157 & 2971 iners; 3308 lancifolia var. montana; 3368 insipida.
FORESTRY SCHOOL, MT. MAKILING — 20111 philippensis; 20112 elliptica var. simiarum.
FOREST STAFF, MIRI — SAR 9778 guatteriifolia.
FORMAN — 34 teijsmannii; 201 elliptica var. celebica; 262 koordersii; 272 elliptica var. celebica; 318 koordersii; 371a & 372 elliptica var. celebica; 468 maxima.
FOX, R. B. — 9061 agusanensis.
FOXWORTHY — 9; 31 & 54 philippensis.
FRAKE — 38347 elliptica var. simiarum.
FRANCO — 18833 guatteriifolia.
GAMBLE — 11558 fragrans; 13415; 14466; 14912 & 18294 dactyloides.
GAMMIL — 281 guatteriifolia.
GARBER — 609 fatua var. inutilis; 928 hypargyraea var. hypargyraea.
GARCIA — 1023 philippensis.
GARDNER — 749 dactyloides.
GAUDICHAUD — 187 fragrans.
GHAZALLI b. SERUJI — SAR 13665 villosa.
Gibot, A — SAN 29565 cinnamomea.

Gillespie — 2032; 2056 & 2311 castaneifolia; 2871 chartacea; 3357 & 3964 castaneifolia; 4206 chartacea; 4216 castaneifolia; 4264 chartacea; 4312 castaneifolia; 4648 hypargyreae var. gillespieana; 4832 castaneifolia.

Gjellerup — 183 subalulata; 274 tubiflora; 644 subalulata.

Glassman — 2729 hypargyreae var. insularis.

Godefroy — 814 fragrans.

Goklin — 1977 & 2051 guatteriifolia.

Græffe — 2 hypargyreae var. hypargyreae; 36 fatua var. inutilis; 66 & 66a hypargyreae var. hypargyreae; 68 hypargyreae var. gillespieana; 105 fatua var. inutilis; 211 hypargyreae var. hypargyreae; 512 fatua var. inutilis.

Grashoff — 114 lowiana; 239 iners; 750 lowiana; 878 maxima; 881 elliptica var. elliptica; 908 maxima; 913 cinnamomea; 919 maxima; 958 crassa; 1120 iners.

Gray, E.C.G. — N.G.F. Nos. 4071 hollrungii; 7161 fatua var. papuana; 8085 insipida; 8142 cornutiflora.


Gray, E.C.G. & White, K.J. — N.G.F. 10418 hollrungii.

Greenwood — 857 castaneifolia; 953 hypargyreae var. gillespieana.

Griffith — 4353 philippensis.

Guillemin — Cat. No. 113 fragrans.

Guppy — 209 schleinitzii.

Haan, G.A.L. De — 446 lancifolia var. bifurcata.

L'hahn — 345 & 346 fragrans; 1137 philippensis.

Hallier — 24 elliptica var. elliptica; 2851 maxima; 4699 ceylanica var. ceylanica.

Hamzah b. Tahir — K.F.N. 93623 elliptica var. elliptica.

Harvey — A115 guatteriifolia.


Hassan — SAR 2210 guatteriifolia.

Haviland & Hose — 3289 iners; 3645 lowiana; 3726 elliptica var. elliptica.

Hellwig — 247 subalulata.

Henty — N.G.F. Nos. 10546 globosa; 10548 chrysophylla var. chrysophylla; 10622 & 10623 subalulata; 10673 globosa; 11520 hollrungii; 11944 buchneriana; 13648 hollrungii; 14828 mark-graviana; 14884 lancifolia var. clemensii.

Hepplethwaite — N.G.F. 550 fatua var. papuana.

Herre — 309 & 330 hollrungii; 1078 guatteriifolia.

Hill — 80 & 432 insipida.
Hochreutiner — 3436 fatua var. inutilis.
Hohenacker — 515 malabarica; 784 philippensis.
Hollrung — 153 schleinitzii; 178 subalulata; 648 & 701 hollrungii.
Holtze — 6151 insipida.
Hoogland — 3521 carrii; 3522 umbrosa; 3642 chrysophylla var. chrysophylla; 3701 hooglandii; 3702 carrii; 3717 flosculosa; 3772 sulcata; 3773 concinna; 3935; 3971 & 3972 tubiflora; 3982 subalulata; 4206 hooglandii; 4215 concinna; 4257 sulcata; 4329 schleinitzii; 4393 globosa; 4534 hooglandii; 4938 globosa; 4996 buchneriana.
Hoogland & McDonald — 3421 umbrosa.
Hoogland & Pullen — 5831 & 5850 subalulata.
Herb. Hooker — 749 ceylanica var. ceylanica.
Horne — 10 fatua var. inutilis and hypargyraea var. hypargyraea; 29 hypargyraea var. hypargyraea; 205 & 243 castaneifolia; 966 chartacea; 1129 castaneifolia.
Horsfield — 196 teijsmannii; 297 & 623 guatteriifolia; 683 iners.
Hort. Bog. Cultivated — IVG 16 fatua var. papuana; IVG 24 insipida; IVG 73 iners; IVG 76 & 76a fragrans; IVG 77 iners; IVG 78 & 78a teijsmannii; IVG 79 guatteriifolia; IVG 81 fatua var. fatua; IVG 82 fatua var. affinis; IVG 91; IVG 91b & IVG 94 fatua var. fatua; IVG 99 & IVH 17 iners; IVH 28 sulcata; IVH 55 fragrans; IVH 62 & IVH 62a fatua var. fatua; IVH 63 lancifolia var. montana; IVH 66 & IVH 66a fatua var. fatua; IVH 69 & IVH 70 fragrans; IVH 79 lancifolia var. montana; IVH 83; IVH 84a; IVH 86; IXB 4 & IXB 4a succedanea; XF 55 & XF 55a papyracea; XF subalulata.
Hose — 392 iners; 532 guatteriifolia; 819 fragrans.
Hosokawa — 5522 hypargyraea var. insularis.
Hubbard, C.E. & Winders — 6510 insipida.
Hulstijn van, P. — 370 fatua var. morotaiensis.
Hurlimann — 56; 279 & 280 hypargyraea var. gillespieana.
Hutchinson — 127 philippensis; 130 guatteriifolia; 3454 fatua var. fatua; 4012 philippensis.
Hutchinson & Whitford — 9454 guatteriifolia.
Iboet — 105a fatua var. spanogheana; 507 maxima; 519 fatua var. spanogheana.
Ijiri & Niimura — 455 & 660 subalulata.
Ilias — SAR 19511 malaccensis.
Inokuma & Hara — 498 lancifolia var. lancifolia.
Iwanggin — BW Nos. 5202 garciniifolia; 5713 globosa; 5742 hollrungii; 5775 sulcata; 9041 cucullata; 9184 sulcata.
JA Nos. — 1607 & 1712 guatteriifolia; 1959 iners; 2694 & 3069 teijsmannii; 3136 & 3960 iners; 4224 guatteriifolia.

JACK — 8509 fragrans.

JACKSON — N.G.F. Nos. 2737 hollrungii; 4521 insipida.

JACOBS, M. — 5424 iners.

JACOBS, M.S. — 9 insipida.

JAHERI — 84 lancifolia var. montana; 85 subalulata; 87 & 89 lancifolia var. montana; 91 subalulata; 93 & 94 lancifolia var. montana; 712 & 713 subalulata; 951 cinnamomes; 1311 malaccensis.

JALALUDIN b. MUNAF — K.F.N. 92595 elliptica var. elliptica.

KADIM & MOHD SHAH — 506 iners.

KADIR — A2570 iners.

KAJEWSKI — 44 & 220 fatua var. papuana; 422 hypargyraea var. guillauminiana; 757 fatua var. papuana; 1007; 1168 & 1392 insipida; 1582 schleinitzii; 1587 fatua var. papuana; 1736 & 1827 kajewski; 1916 fatua var. platyphylla; 2068 kajewski; 2101 fatua var. papuana; 2236 schleinitzii; 2373 globosa; 2442 fatua var. platyphylla; 2552 globosa; 2613 kajewski.

KALKMAN — BW Nos. 3509 & 3696 subalulata; 3776 globosa; 3791 hollrungii; 4368 subalulata; 6340; 6341 & 6342 fragrans; 6343; 6344 & 6346 argentea; 6347 fragrans; 6413 & 6460 cornutiflora; 6491 undulatifolia.

KAMIS — 4280 papyracea.

KANDILIS — 6203 guatteriifolia.

KANEHIRA — 727; 763; 1529; 1545 & 1865 hypargyraea var. insularis.

KANEHIRA M HATUSIMA — 5009 hypargyraea var. insularis; 11518 garcinifolia; 11656 fatua var. papuana; 11691 subalulata; 11902 & 11903 lancifolia var. lancifolia; 12091 & 12223 subalulata; 12277 gracilipes; 12670 hollrungii.

KARSTEL — BW Nos. 5321 & 5324 cucullata; 5339 hollrungii.

KAUDERN — 7 fragrans.

KEITH — 9919 guatteriifolia.

KERR — 9237; 9237a & 14591 iners; 15014 crassa; 19392 iners.

K.F. Nos. — 30450 guatteriifolia.

KIAH — S.F.N. 24381 elliptica var. elliptica.

KIKUCHI, Y. — 2630 elliptica var. simiarum.

KING — 186 andamanica.

KJELLBERG — 1736 fatua var. affinis; 2427 impressinervia; 2447 & 2504 fatua var. affinis; 2962 koordersii; 2990 lancifolia probably var. bifurcata.

KLEMME — 7128 philippensis.

KLOSS — S.F.N. 14772 maxima.
Koch — 19 & 20 subalulata; 708 insipida.
Kochummen — K.F.N. 72496 iners.
Koerniasi — 16 fatua var. fatua.
Koorders — 121; 543a; 5229; 5230; 5231; 5232; 5233; 5234; 5235 & 5236 guatteriifolia; 5249; 5252 & 5264 iners; 10384 & 13143 guatteriifolia; 13594 & 13596 teijsmannii; 17437 elliptica var. celebica; 18125; 18126 & 18127 fatua var. affinis; 18128 & 18129 koordersii; 18131 & 18138 fatua var. affinis; 18139 elliptica var. celebica; 18141 & 18142 fatua var. affinis; 18143 elliptica var. celebica; 18144 koordersii; 18145 & 18148 fatua var. affinis; 18149 elliptica var. celebica; 18151 & 18153 fatua var. affinis; 18154; 18155; 18159; 18160; 18161; 18162; 18163; 19165; 18166; 18168 & 18187 elliptica var. celebica; 19736 fatua var. affinis; 9749 elliptica var. celebica; 22738; 22794; 22854; 23051; 23394 & 23612 teijsmannii; 24064 elliptica var. celebica; 24876; 25300; 26099; 27227 & 27230 guatteriifolia; 27480 iners; 28132; 35030 & 35031 guatteriifolia; 38776 teijsmannii; 39669 & 39670 fragrans; 42288; 42302; 42315; 42329 & 42356 guatteriifolia; 43398 & 47611 iners.

Kornassi — 954 lancifolia var. montana; 990 fatua var. fatua; 1068 lancifolia var. montana.

Koster — BW Nos. 1016 & 1061 fatua var. papuana; 1124 sulcata; 1162 garcinifolia; 1220 & 1305 hollrungii; 1434 fatua var. papuana; 1445 globosa; 1450; 1458 & 1485 fatua var. papuana; 4320 garcinifolia; 4348 sulcata; 4370 & 4371 hollrungii; 6753 lancifolia var. lancifolia; 6820 hollrungii; 8057 lancifolia var. lancifolia; 10780 sphaerosperrna.

Kostermans — 6 lancifolia var. bifurcata; 46 fatua var. subcordata; 47 & 47a tubiflora; 71 lancifolia var. bifurcata; 146 tubiflora; 162 & 209 subalulata; 231 lancifolia var. bifurcata; 262 fatua var. papuana; 263 & 289 tubiflora; 306 sulcata; 697 & 771 fatua var. morotaiensis; 944 lancifolia var. bifurcata; 1039 fatua var. sangowoensis; 1506 lancifolia var. bifurcata; 2439 lancifolia var. lancifolia; 2440 tubiflora; 2664 hollrungii; 2665; 2665a; 2666 & 2667 tubiflora; 2842 fatua var. subcordata; 4400 iners; 4476 maxima; 4687 elliptica var. elliptica; 4743 lancifolia var. bifurcata; 4873 & 5422 guatteriifolia; 5475 & 5597 iners; 5623 elliptica var. celebica; 5732 papyracea; 5805 maxima; 5895 elliptica var. celebica; 6125 elliptica var. elliptica; 6438 villosa; 6589 maxima; 6789 & 6972 iners; 6982 guatteriifolia; 7012 villosa; 7451 & 7600 iners; 7718 maxima; 7887 & 7889 globosa; 8053 maxima; 8085 villosa; 8647 & 8667 cinnamomea; 8671 beccarii; 8960 cinnamomea; 9230 guatteriifolia; 10093 villosa; 10144 maxima; 10150 papyracea; 10225 gigantea; 10450 maxima; 13365; 13772 & 13866 elliptica var. celebica; 13878 papyracea; 18113 & 19075 fatua var. spanogheana.

Kostermans & Anta — 389 guatteriifolia.
Krukoff — 4125 elliptica var. ellipitica; 4343 cinnamomea; 4384 probably maingayi.
Kurz — 265 andamanica.
Kuswata & Soepadmo — 13 lancifolia var. montana; 14 fatua var. fatua; 16 lancifolia var. montana; 39; 57 & 71 fatua var. fatua; 90 lancifolia var. montana; 125 & 272 fatua var. fatua.
Kwang, Chua Ming — A34106 papyracea.
Lakshnakara — 435 fragrans.
Lam, H. J. — 2438 faua var. affinis; 3713 succedanea.
Lane-poole — 206 umbrosa.
Lasschuit — BW 4512 hollrungii.
Lauterbach — 771 schleinitzii; 1107 hollrungii; 1139 lancifolia var. lancifolia; 1238 subalulata; 1263 hollrungii = (638); 1263 lancifolia var. lancifolia = (683); 2865 subalulata = (865).
Lawson — 90a 90b & 93 fatua var. magnifica; 94 dactyloides.
Ledermann — 6514 schleinitzii; 6653 & 6664 lancifolia var. lancifolia; 6727 fatua var. papuana; 6852 hollrungii; 7471 & 7799 lancifolia var. lancifolia; 7799 globosa; 7888 hollrungii; 8372 tubiflora; 8730 cornutiflora; 8779 & 8819 globosa; 9110 cuculata; 9712 subalulata; 9728 cornutiflora; 9810 tubiflora; 9828 longipes; 10131 cucullata; 10244 & 10249 longipes; 11175 subalulata; 11769 & 12026 crassipes; 12333a globosa; 12802a subalulata.
Herb. Lindley — 1123 fragrans.
Lipaqueto (Lipaquito on label = Lipangeto) — BSIP 3420 & 3522 kajewskii.
Loher — 4194; 5195 & 6713 philippensis; 6716 agusanensis; 6717; 6719; 13918 & 15050 philippensis.
Lörzing—961 teijsmannii; 5220 & 5504 fragrans; 5578 elliptica var. elliptica; 7516 maxima; 13283 fragrans; 14260 lowiana; 15237 elliptica var. elliptica; 16826 fragrans.
Lund — 179 fragrans.
Lundquist — 3 fatua var. morindiiifolia 31 tubiflora; 94 argentea; 100 lepidota; 113 fatua var. morindiiifolia; 121 & 137 lepidota; 145 fatua var. papuana; 169 argentea; 193 fatua var. morindiiifolia; 225 fatua var. papuana; 228 tubiflora; 256 lepidota; 267 argentea; 279 lepidota.
Lütjeharms—4560 iners.
Herb. Madras — 11327 dactyloides.
Mail — 7062 guatteriifolia.
Mair — N. G. F. Nos 550 fatua var. papuana; 1835 globosa; 1873 schleinitzii 1877 hollrungii.
Manalo — 7437 guatteriifolia.
Mangold — BW Nos 2150; 2221 & 2276 hollrungii; 2334 globosa.
MASIAS; SARENO & TORRIBLE — 30131 ceylanica var. ceylanica.
MAULE — 385 philippensis.
MAYR, E. — 227 subalulata.
MCADAM — 230 subalulata.
MCDANIELS — 1066 hypargyraea var. gillespieana.
MCDONALD, G. — N. G. F. Nos 8161 subalulata; 8189 fatua var. papuana; 8191 sulcata.
MCGILLIVRAY, J. — 102 insipida.
MCGREGOR, R. C. — 22824 guatteriifolia; 43717 ceylanica var. ceylanica.
MCGREGOR, W. — 12 insipida.
MCKEE — 2876 hypargyraea var. hypargyraea; 2909 fatua var. inutilis.
MCVEAGH — N. G. F. Nos 8283 lancifolia var. lancifolia; 10750 cucullata.
Mead — S. F. N. 1980 castaneifolia.
MEDINA — 23545 philippensis.
MEEBOLD — 9455; 12964 & 13134 dactyloides; 21351 fatua var. inutilis.
MEIJER, W. — 4221 gigantea. SAN Nos. 19541 iners; 19560 beccarii; 20022 cinnamomea; 20217 & 23128 guatteriifolia; 24053 iners; 36277 lowiana.
MEIJER DREES, E. — 614 & 631 subalulata.
MENDOZA & CONVOCAR — 10321 ceylanica var. ceylanica.
MERRILL — 80 ceylanica var. ceylanica; 178 philippensis; 605 guatteriifolia; 1023 philippensis; 1917; 1924; 2052 & 2117 guatteriifolia; 2304 & 2834 philippensis; 2849 guatteriifolia; 2863 & 2984 hilippensis; 9253 & 9353 guatteriifolia.
MERRILL & DARLING — 13873 philippensis.
MERRITT — 3663 ceylanica var. ceylanica; 3686 philippensis; 3698 & 8585 ceylanica var. ceylanica; 8607 & 8640 guatteriifolia.
MESA, A DE — 27584 elliptica var. simiarum.
MESA, A. DE & MAGISTRADO — 26511 guatteriifolia.
MEYER, R. — 2630 elliptica var. simiarum; 3236 agusanensis.
MICHAEL — 5 insipida.
MIERS — 3391 fragrans.
MIKIL, G. — SAN Nos. 30172 maxima; 30178 villosa.
MILLAR — N.G.F. 9781 globosa.
MIRANDA — 18928 philippensis; 18973 guatteriifolia; 21141 philippensis.
MIRANDA; PONCE & RAFAEL — 20766 elliptica var. simiarum.
MOHAMED SALLEH — SAR Nos. 1212 lowiana; 1456 guatteriifolia.
Mohamed Shah & Kadim b. Tassim — 506 iners.
Moksin b. A. Bakar — SAR 1904 lowiana.
Moll — BW Nos. 2388, 9688; 9701 & 9703 lancifolia var. lancifolia.
Mondi — 19 lowiana; 131 guatteriifolia.
Motley — 26 villosa; 139 guatteriifolia; 145 gigantea; 166 villosa.
Muas — SAR 13367 elliptica var. elliptica.
Mueller — 149 fatua var. inutilis.
Nahar — SAR Nos. 12668 iners; 12677 villosa; 12680 papyracea; 12684 & 12685 iners; 12705 beccarii.
Narayanaswami, V. — 3866 dactyloides.
Nautje — BW Nos. 6559 fatua var. subcordata; 6581 hollrungii; 6614 fatua var. morindiifolia.
N.G.F. Nos. (sine collector) — 246 hollrungii; 270 & 331 globosa; 926 & 2028 fatua var. papuana; 2037 globosa; 2041 sulcata; 2504 subalulata; 2516 hollrungii.
Nielsen — 901 hollrungii.
Noesi — BW 8137 sulcata.
Nyman — 46 schleinitzii; 424 subalulata; 1039 & 1049 schleinitzii.
Oro — 30702 ceylanica var. ceylanica; 30713 & 30801 guatteriifolia.
Paie, Ilias — SAR 19511 malaccensis.
Pancho — 33269 fatua var. wenzelii.
Paraiso — 13005 & 23619 philippensis; 23632 elliptica var. simiarum; 25464 philippensis; 26484 elliptica var. simiarum; 31260 philippensis.
Parham — 1295 hypargyraea var. gillespieana; 5633 chartacea.
Parkinson — 636; 669 & 1170 andamanica.
Parks — 16160 hypargyraea var. gillespieana; 20457 chartacea.
Pascual — 216 guatteriifolia.
Paymans — 11 gigantea; 15 villosa; 16 beccarii; 33 villosa; 76 cinnamomea; 149 iners.
Pearson — 963 fragrans.
Peekel — 16 schleinitzii; 241 & 400 fatua var. papuana.
De Perry — 5433 guatteriifolia.
Herb. Pierre — 5430 fragrans; 5433 guatteriifolia; 5435 iners; 5454 succedanea; 5457 & 5460 guatteriifolia.
Plernchit — 382 iners.
PLEYTE — 175 fatua var. fatua; 310 koordersii; 339 lancifolia var. bifurcata; 483 subalulata; 512 fatua var. papuana; 1099 subalulata.

PONCE — 23917 elliptica var. simiarum.

POTTS — 1 fatua var. inutilis.

POWELL — 204 hypargyrea var. hypargyreae.

PULLE — 7 & 17 subalulata; 53 tubiflora; 508 & 1232 subalulata.

PULLEN — 944 pedicellata; 960 subalulata; 1173 globosa; 1339 hollrungii; 1391 & 1898 buchneriana.

PULSFORD & FLOYD — N.G.F. 5440 buchneriana.

PUT — 255 & 419 iners; 1693 elliptica var. elliptica.

QUADRAS — 258 philippensis; 294 guatteriifolia.

RAHMAT SI BOEEA — 8242 & 8368 fragrans.

RAM, KIRAT — 3777 andamanica.

RAMOS — 1016 ceylanica var. ceylanica; 1053 & 1118 philippensis; 1542 ceylanica var. ceylanica; 1543; 1609 & 14657 elliptica var. simiarum; 17462 & 19437 philippensis; 19465 elliptica var. simiarum; 20414 ceylanica var. ceylanica; 20531 philippensis; 22046 ceylanica var. ceylanica; 22372 philippensis; 23322 & 24147 ceylanica var. ceylanica; 24472 elliptica var. simiarum; 24507 fatua var. wenzelii; 27276 & 32718 elliptica var. simiarum; 33020 philippensis; 40814; 40867; 40909; 40910 & 46373 ceylanica var. ceylanica; 80064 & 80173 elliptica var. simiarum; 80422 & 80600 ceylanica var. cayanensis.

RAMOS & CONVOCAR — 83431 philippensis; 83614 & 83678 ceylanica var. ceylanica; 83692 elliptica var. simiarum; 83742 philippensis.

RAMOS & EDANO — 28709 elliptica var. simiarum; 28865 ceylanica var. ceylanica; 29206 & 31173 elliptica var. simiarum; 33459 guatteriifolia; 33497 ceylanica var. ceylanica; 33505 & 36982 guatteriifolia; 37070 & 37097 philippensis; 38971; 48050 & 48194 ceylanica var. ceylanica; 48388 & 49001 ceylanica var. ceylanica; 75198 elliptica var. simiarum; 84981 fatua var. fatua; 85171 ceylanica var. ceylanica.

RAMOS & PASCASIO — 34469 elliptica var. simiarum.

RANT — 472 koordersii; 823 fragrans.

RASTINI — 95 lancifolia var. montana; 222 sulcata.

RAZON — 23019 fatua var. wenzelii.

RECHINGER, K. — 1224 & 1491 fatua var. inutilis.

REILLO — 1167 guatteriifolia; 15498 agusanensis.

REINECKE — 97 & 103 fatua var. inutilis; 133; 248 & 445 hypargyrea var. hypargyreae.

REINWARDT — 1371 fatua var. fatua.

RENSCH — 1414 fatua var. fatua.
Richard Catalogue — Herb. Jussieu 16700 & 16700a fragrans.
Richards, P. W. — 1190 villosa; 1522 & 1615 iners.
Riedel — Fl Acc. Nos. 5823 fatua var. affinis; 7749 & 7749a guatteriifolia.
Riesenbего — 57 hypargyraea var. insularis.
Robbins — 474 & 976 subalulata; 1010 globosa; 1155 crassipes; 1347 hollrungii; 1567 cylindrocarpa; 1717 schleinitzii.
Robinson, C.B. — 242; 243 & 244 lancifolia var. montana; 245 & 246 fragrans; 1877; 2033 & 2042 lancifolia var. montana.
Rodatz & Klink — 3 & 33 hollrungii; 70 globosa.
Römer von, L.S.A.M. — 96 subalulata; 206 hollrungii; 260 subalulata; 304 tubiflora; 1063 subalulata; 1063a cucullata.
Rosenbluth — 12523 ceylanica var. ceylanica; 12783 philippensis.
Ross — N.G.F. 9609 subalulata.
Royen van, P. — 3017 subalulata; 3457 tubiflora; 3475 subalulata; 3498 neglecta; 3579 globosa; 4670 hollrungii; 5328 lancifolia var. lancifolia.
Runtoboy, R. — BW 3326 garciniifolia.
Rutten — 1068; 1614; 1652 & 2097 lancifolia var. montana.
Saanan — 22 & 50 lancifolia var. montana.
Sablaya — 8 ceylanica var. ceylanica.
Sagot — 1254 fragrans.
Sales — 1489 cinnamomea.
Salleh, MD. — SAR Nos. 1212 lowiana; 1456 guatteriifolia.
Salverda, Z. — 302 argentea.
Santos, Jose Vera — 5329 ceylanica var. ceylanica.
Sanusi b. Tahir — SAR Nos. 5503 & 9227 lowiana; 12320 iners.
Sata, T. — 1260 ceylanica var. cagayanensis; 1270 elliptica var. simiarum.
Satake & Niimura — 880 hollrungii.
Saunders — 12 hooglandii; 28 concinna; 57 intermediate between chrysophylla var. chrysophylla and var. entrecasteauxensis; 175 flosculosa; 207 sulcata; 219 & 244 globosa; 257 & 275 sulcata; 296 & 310 markgraviana; 335 globosa; 364 markgraviana; 369 sulcata; 384 markgraviana; 412 sulcata; 415; 419; 425; 426 & 428 markgraviana; 431 globosa; 443 markgraviana; 456 globosa; 491 & 499 markgraviana; 510; 514 & 516 globosa; 522 fatua var. papuana; 526; 533; 537; 538 & 562 markgraviana; 707 subalulata; 921 & 965 hollrungii.
Sayer — 2 subalulata.
Schlechter—13723 schleinitzii; 14144 subalulata; 14512 & 16037 schleinitzii; 16452 subalulata; 16789 markgraviana; 16848 fusca; 17749 subalulata; 17795 & 18670 tubiflora.

Schodde—1390 longipes; 2187 subalulata; 2260 cornutiflora; 2291 gracilipes; 2420 subalulata; 2886 undulatifolia; 3139 lancifolia var. lancifolia.

Schram—BW Nos. 523 sulcata; 1503 tubiflora; 1542 buchneriana; 1721 & 1876 sulcata; 1896 tubiflora; 1996; 2756 & 2795 hollrungii; 2801 fatua var. papuana; 2815 lancifolia var. lancifolia; 2928 fatua var. papuana; 2984 & 6065 globosa; 3139 fatua var. morindiiifolia; 6099 fatua var. lancifolia; 6158 & 6159 argentea; 9274 fatua var. papuana; 9374 globosa; 9461 garciiniifolia; 10527 fatua var. papuana.

Schut—K6 maxima.

Sedgwick—3368 dactyloides.

Sedgwick & Bell—7191 fatua var. magnifica.

Seemann—6 & 7 hypargyrae var. gillespieana.

Selorio—27709 philippensis.

Setchell—67 fatua var. inutilis; 342 hypargyraea var. hypargyraea.

Setchell & Parks—15275; 15432 & 15505 hypargyraea var. gillespieana.


Sieber—75 philippensis; 126 & 258 fragrans; 365 philippensis.

Suide—BW Nos. 4062 lancifolia var. lancifolia; 5557 subalulata.

Sinclair—8941 villosa; 8948 iners; 8950 cinnamomea; 8951 villosa; 9293 iners; 9368 guatterifolia; 9469 elliptica var. simiarum; 10023 & 10024 fatua var. fatua; 10025 & 10026 teijsmannii; 10027 insipida; 10028 succedanea; 10030 & 10031 lancifolia var. montana; 10032 & 10033 fragrans; 10034 iners; 10038 sulcata; 10042 fatua var. papuana; 10043 fatua var. affinis; 10178 malaccensis; 10181 villosa; 10194 malaccensis; 10232 cinnamomea; 10233 papyracea; 10235 iners; 10242 cinnamomea; 10245 beccarii; 10280 & 10286 malaccensis; 10299 beccarii; 10300 gigantea; 10419 & 10426 lowiana; 10434 villosa; 10523 & 10527 guatterifolia.

Sinclair & Edano—9595 philippensis.

Singh, J.—SAN 31080 papyracea.

Slooten van—2389 fragrans.

Smith, A.C.—124 castaneifolia; 501 chartacea; 613 castaneifolia; 946 hypargyraea var. gillespieana; 1048 castaneifolia; 1316 & 1319 chartacea; 1457; 1537 & 1597 hypargyraea var. gillespieana; 1719 castaneifolia; 1745 hypargyraea var. gillespieana, 1825 chartacea; 4445 & 4715 hypargyraea var. gillespieana; 4946; 5122 & 5550 castaneifolia; 5842 chartacea; 6336 & 6383 castaneifolia.
SMITH, C.—299 fragrans; 300 & 2640 fatua var. fatua.
SMITH, J.J.—64 guatteriifolia.
SMITH, L.S.—N.G.F. Nos. 1007 longipes; 1040 subalulata; 1076 cucullata; 1263 sulcata; 1270 fatua var. quercicarpa; 1313 markgraviana.
SMITTANAND—850 elliptica var. elliptica, F.D. 8583 fragrans.
SPECHT—666; 841 & 841b insipida.
SPLITTGERBER—534 fragrans.
STEENIS van—416 fragrans.
STODDARD—10 globosa; 29 fatua var. papuana.
STORCK—866 hypargyraea var. gillespieana.
SUIHILI (HAIJ)—SAR 14524 lowiana.
SULIT, M.D.—2; 5 & 3431 philippensis; 3628 & 3659 ceylanica var. ceylanica; 11778 guatteriifolia; 15023 fragrans; 21548 ceylanica var ceylanica.
SULIT, M.D. & CONKLIN—17645 ceylanica var. ceylanica
SUTRISNO—69 sulcata; 119 fatua var. fatua; 122 fatua var. papuana; 123 lancifolia var. montana; 124 insipida; 125a fatua var. affinis.
TAKAMATSU—713 & 1023 hypargyraea var. insularis.
TALBOT—10 malabarica; 33 & 225 dactyloides; 301 & 302 malabarica; 304 & 2036 dactyloides; 3720 malabarica, 3723 fatua var. magnifica.
TAMESIS—21513 philippensis.
TANGKILISAN—2 fatua var. affinis.
TAPPENBECK—3 & 33 hollrungii; 70 globosa.
TEIJSMANN—30 fatua var. affinis; 477 elliptica var. elliptica; 1756 guatteriifolia; 1830 fatua var. fatua; 1837 fatua var. affinis; 1895 fatua var. fatua; 1951 & 1964 lancifolia var. montana; 2082 elliptica var. elliptica; 3741 fatua var. affinis; 3794 maxima; 5057 lancifolia var. montana; 5148 fatua var. fatua; 5621 succedanea and a Bogor sheet is fatua var. fatua; 5801 & 5872 elliptica var. celebica; 5891 fragrans; 7584 subalulata; 7585 lancifolia var. lancifolia; 7586 & 7587 succedanea; 7821 fragrans; 8681 & 8682 elliptica var. elliptica; 8684 lowiana; 11722; 11738; 12118; 12571 & 12670 koordersii; 13913 iners; 14063 koordersii; 16751 lancifolia var. montana; 21616 teijsmannii.
TEIJSMANN & DIEPENHORST—482 elliptica var. elliptica.
Thaufeck, Mohd—SAN 27981 lowiana.

Thorenaar—3 guatteriifolia; 55E1P551; 55E1P572; 55E1P601; 55E1P623 & 55E1P624 maxama; 57E1P596 iners; T1141 & T1208 elliptica var. elliptica; T3P543 & T3P599 iners.

Thwaites—C.P. Nos. 416 dactyloides; 2923 & 5473 ceylanica var. ceylanica.

Tinggi—SAR 43 iners.

Tingguan, S.—SAN Nos. 18788 & 36312 cinnamomea; 37370 villosa.

Toeppler—568 fragrans.

Tomeldan—28634 elliptica var. simiarum.

Tothill—423 &571 chartacea; 682 hypargyraea var. gillespieana; 683 castaneifolia and hypargyraea var. gillespieana.

Toxopeus, L.J.—641 lancifolia var. montana.

Turner, R. Lister — 111 fatua var. papuana.

Tuyama — 767 subalulata; 1013 hollrungii; 1185 subalulata; 1186 fatua var. papuana; 1552 lancifolia var. lancifolia; 1908 argentea.


Vaupel — 300 hypargyraea var. hypargyraea.

Verduyn Lunel, F. A. — T.B. 1081 iners.

Vergara — 23566 guatteriifolia.

Versteeg, G. M. — 1367; 1758 & 1786 subalulata.

Versteegh, C. — BW Nos. 18 hollrungii: 25 subalulata; 39 tubiflora; 3802 & 3810 fatua var. papuana; 3818 globosa; 3864 hollrungii; 3974 tubiflora; 4847 hollrungii; 7454 subalulata; 7475 tubiflora; 7579 subalulata. — 13573 longipes.

Vidal y Soler, S. — 854 ceylanica var. ceylanica; 855 philippensis; 1677 guatteriifolia; 1678 philippensis; 1679 agusanensis; 3550 elliptica var. simiarum; 3553; 3556 & 3562 guatteriifolia; 3569 philippensis; 3570 elliptica var. simiarum.

Villamil — 249bis villosa; 20398 elliptica var. simiarum.

Vink & Schram — BW 8792 cucullata.

Volk & Robinson — N.G.F. 599 fatua var. platyphylla but approaching var. papuana.

de Voogd — 1617 & 1802 fatua var. spanogheana.

Vreeden, Buurman van — 135 guatteriifolia; 138 elliptica var. elliptica: 139 crassa.
WALKER, G. W. — 170 dactyloides; 1087 ceylanica var. ceylanica.

WALKER & WHITE, C. T. — 36 (guadalcanalensis) insipida; 198 kajewskii.

WALL. CAT. — 6785a (moschata) fragrans; 6785b (aromatica) fragrans; 6785c (moschata) fragrans; 6785d (aromatica) fragrans; 6785e (aromatica) fragrans; 6785f (moschata) fragrans; 6786 (dactyloides Gaertn. & ? tomentosa Herb. Heyne) malabarica; 6787 (notha) malabarica; 6789 (heyneana *Wall.) Lauraceae, Litsea venulosa (Tetranthera venulosa); 6790 (glaucescens *Wall.) Lauraceae, Listea lancifolia var. montana; 6792 (montana) lancifolia var. montana; 6793 (finlaysoniana *Wall.) Fissistigma fulgens; 6798a (elliptica *Wall.) elliptica var. elliptica; 6798b (macrocarpa Wall. This name does not appear in the Wall. Cat. but is on the herb, sheet) elliptica var. elliptica + a leaf of an unknown plant, may be a Knema; 6800a (sylvestris) philippensis 6800b (grandiflora. This name does not appear in Wall. Cat.) philippensis; 6802a (philippensis) philippensis; 6808 (? obtusifolia *Wall.) probably Lauraceae; 6809 (? sesquipedalis *Wall.) Actinodaphne sesquipedalis. Other Wall, numbers: — 2129 & 2154 philippensis. These are not Wall. Cat. numbers. The asterisk denotes that the author’s name “Wall.” actually appears after the specific epithet in the Wall. Cat.

WARBURG — 1740 fragrans; 1741 fatua var. fatua: 11006 fragrans; 13300 fatua var. fatua; 16716 impressa; 16983 fatua var. spanogheana; 17645 lancifolia var. montana; 17646 fatua var. fatua; 18297 succedanea; 19500 insipida; 20704 & 20706 subalulata; 20710 & 20712 schleinitzii; 20714 buchneriana; 20715 argentea & fatua var. papuana; 20717 argentea; 20720 fatua var. subcordata; 20721 & 20722 fatua var. papuana.

WARINT — BW 5156 subalulata.

WATERHOUSE, J. H. L. — 166 kajewskii; 919 schleinitzii.

WEBER, C. M. — 1076 elliptica var. simiarum.

WENZEL — 134 philippensis; 439 elliptica var. simiarum; 1152 fatua var. wenzeli; 2773 & 2994 elliptica var. simiarum; 3437 & 3537 ceylanica var. ceylanica.

WHITE, C. T. — 386 & 551 subalulata; 734; 1284 & 8140 insipida.

WHITE, K. J. — N.G.F. Nos. 9546 chrysophylla var. chrysophylla; 9577 subalulata; 9647; 9671 & 9697 globosa; 9699 hollrungii; 10035 & 10049 fatua var. morindifolia; 10118 hollrungii; 10149 longipes; 10235 lancifolia var. lancifolia; 10251 hollrungii; 10259 buchneriana; 10265 lancifolia var. lancifolia; 10288 cylindrocarpa; 10467 chrysophylla var. chrysophylla; 10476 globosa; 10810 hollrungii; 10865 & 10939 globosa; 10943 hollrungii; 10949 lancifolia var. clemensii.
Whitford — 346 elliptica var. simiarum; 361 & 19730 philippensis.

Whitford & Hutchinson — 9454 guatteriifolia.

Whitmee — 86 fatua var. inutilis; 87 & 88 hypargyraea var. hypargyraea; 89 fatua var. inutilis; 90 & 101 hypargyraea var. hypargyraea.

Whitmore & Collectors — SAN 17651 cinnamomea. BSIP Nos. 683 & 736 fatua var. platyphilla; 769 globosa; 892 fatua var. papuana; 1373 kajewskii; 1411 & 1429 fatua var. papuana; 1478 fatua var. platyphilla; 1622 hypargyraea var. guillauminiana; 1662 fatua var. platyphilla; 1726; 1801A; 1817 hypargyraea var. guillauminiana; 1900 fatua var. papuana; 1901 globosa; 1945; 2145 & 2439 fatua var. papuana; 2484 kajewskii; 2684 schleinitzii; 2697: 2701; 2735 & 2760 fatua var. papuana; 2880 globosa; 2981 kajewskii; 3011 schleinitzii; 3075 & 3829 fatua var. papuana; 3967 globosa; 4128 fatua var. papuana; 4148 kajewskii; 4160 globosa; 4168 schleinitzii; 4171 & 4214 fatua var. papuana; 4251 kajewskii; 4274 petiolata; 5354 & 5490 fatua var. papuana; 5496 globosa; 5601 kajewskii; 5607 fatua var. papuana; 5626 schleinitzii; 5659; 5685; 5698 & 5737 kajewskii; 5741 fatua var. papuana.

Whitmore & Womersley — BSIP 805 kajewskii.

Wight — 109 & 722 fragrans; 870 malabarica; 871 & 872 ceylanica var. ceylanica; 2487 dactyloides; 2488 fragrans; 2490 malabarica; 2814 fragrans.


Williams, R. S. — 537 & 2145 philippensis.

Winkler, Hubert — 2405 malaccensis.

Woerjantoro — 98 succedanea.

Womersley — N.G.F. Nos. 2957 umbrosa; 3142 fatua var. morobensis; 3148 lancifolia var. clemensii; 3190 globosa; 3194; 3206 & 3220 buchneriana; 3238 globosa; 3243 buchneriana; 3255 chrysophylla var. chrysophylla; 3393 cucullata; 3687 hollrungii; 3708 globosa; 3734 buchneriana; 3755 & 3774 hollrungii; 3804 subalulata; 3889 & 3931 hollrungii; 4333 subalulata; 5103 & 6008 fatua var. morindiifolia; 6022 longipes; 7931; 8684 & 9403 globosa; 9405 chrysophylla var. chrysophylla; 11374 womersleyi; 11422 longipes; 13447 crassipes.

Womersley & Brass — N.G.F. 11018 subalulata.
Womersley & Gray, E. C. G. — N.G.F. Nos. 4075 subalulata; 8613 chrysophylla var. entreasteauxensis.

Womersley & Kazakoff — N.G.F. Nos. 7069 globosa; 7070 fatua var. morindiifolia.

Womersley & Millar — N.G.F. Nos. 8442 subalulata; 8444 cucullata.


Wood, G. H. S. — A Nos. 1967 iners; 3666 papyracea; 4747 villosa; 4748 cinnamomea; 4775 papyracea. SAN Nos. 15066 cinnamomea; 15253 villosa; 16051 & 16146 guatteriifolia; 16550 villosa: 16808 maxima.

Wood, G. H. S. & Wyatt-Smith — A Nos. 4287 & 4505 guatteriifolia.

Worthlington, T. B. — 1259 dactyloides; 1989 ceylanica var. ceylanica; 3021 fragrans; 3512 dactyloides; 5589 fragrans.

Wyatt-Smith — K.F. Nos. 64474; 64754; 64785 & 76458 iners.


Yacup — SAR 9350 malaccensis.

Yates — 2123 elliptica var. elliptica.

Yuncker — 9419 hyparyragraea var. hyparyragraea: 9541 fatua var. inutilis; 15064; 15385 & 15968 hyparyragraea var. gillespieana.

Zainal Abidin — 23 maxima; 24 villosa.

Zollinger — 392 fragrans; 1106 fatua var. spanogheana; 1310 & 1313 fragrans.

Addenda

Some unexpected and additional collections made by Dr. T. C. Whitmore and his collectors in the Solomons have arrived since the main one was examined and incorporated into this account. The script has already been altered and retyped three times to accommodate them. New information, now at hand, must go into a postscript. It cannot be inserted conveniently at this late stage in any other place without upsetting text, introduction and keys. In the enumeration of specimens I have attempted to give at least one record for every island where a species occurs rather than to quote all the numbers in Whitmore's long list.

Myristica hyparyragraea A. Gray

var. guillauminiana (A. C. Smith) J. Sinclair
To the description given earlier in the text add:—

_Bark_ grey, finely superficially fissured. _Leaves_ membranous to slightly coriaceous. _Fruit_ with a few scattered warts. _Aril_ bright red.

**SOLOMONS SANTA CRUZ GROUP:**

**Vanikoro Island:**—_Emwa._ *Whitmore BSIP 1726* (L, LAE); 30 years old re-growth forest near Peou, *Whitmore BSIP 1622* (L, LAE, SING); secondary forest near plantation, Peou, *Whitmore BSIP 1801A* (L, LAE, SING); ridge near Peou, *Whitmore BSIP 1817* (LAE).

**VERNACULAR NAMES:** _Kuku_ (Kwara‘ae language).

This tree is now recorded for the Santa Cruz group at the extreme southern tip of the Solomons, the first and only other record being from Vanua Lava Island in the Banks group, near the New Hebrides. Geographically the Santa Cruz group should be included with the New Hebrides rather than with the Solomons or considered as a separate unit allied to the New Hebrides. The characteristic sub-globose fruits with their hard pericarp at once identify these collections with the variety from the Banks Islands. The fruits tend to be slightly more warted than those of the single gathering from the type locality. The obovate character of the leaves (they can also be oblong) holds, but the new specimens show that the leaves can be slightly coriaceous as well as membranous.

**Myristica kajewskii** A. C. Smith

Many more fruiting collections of this species have been obtained, but at last there is one, *Whitmore BSIP 1373* with male flowers. Here is the description:—

_Male inflorescence_ 1–2 cm. long and 5 mm. thick, simple or bifurcate, woody, the scars close together without any smooth basal portion. _Male flowers_ coriaceous, dark brown, tomentulose outside, sub-globose in bud and half-surrounded by a triangular, amplexicaul bracteole, split down $\frac{1}{2}$-way into the perianth segments, 6–8 mm. long and 5–6 mm. broad; staminal column 5 mm. long including the 2 mm. long, furrowed, glabrous stalk, the fertile part somewhat triangular in outline with 12 anthers and obtuse at the apex with a short obtuse or truncate sterile apiculus; pedicels 3 mm. long and 1–1.5 mm. thick, flattened.

From this single gathering the inflorescence and male flowers differ from those of _M. hypargyraea_ in the following characters:—absence of smooth portions on the inflorescence axis, larger flowers, darker in colour with less dense tomentum, staminal column without basal hairs but ending in a sterile apiculus (only var. _insularis_ seems to have one) and shorter pedicels.

It will be recalled that _M. kajewskii_ is near to _M. hypargyraea_ but differs in a number of vegetative features including the presence of stilt-roots and in its large fruit. It was pointed out that _M. hypargyraea_ var. _gillespieana_ is the variety that most resembles _kajewskii_, also having a large fruit, but that in the absence of flowers it was doubtful whether _kajewskii_ could be regarded as anything more than just another variety of _hypargyraea_.

After having seen these flowers I have now greater hopes of kajewskii being retained as a distinct species. They show more differences than I had expected. The flowers of the varieties of hypargyraea hardly differ at all from each other especially those of var. hypargyraea and var. gillespieana. I therefore do not intend to make any alteration in the status of kajewskii as a species but a genetic study of its chromosomes and those of the varieties of hypargyraea would be desirable.

Myristica petiolata A. C. Smith — Fig. 86.

This species has now been collected for the second time and the specimens bear male flowers. A drawing, figure 86, has been added as well as the following descriptive notes:

_Bark_ scaly-fissured. _Leaves_ with minute, golden, stellate scales beneath. (The scales were not seen in the type. Possibly they are confined to young leaves and may not be a constant feature.) _Male inflorescence_ 1–2.5 cm. long, simple or bifurcate, the basal portion, smooth, woody and flattened, 5 mm.–1 cm. long. _Male flowers_ 5–6 mm. long and 5 mm. broad, coriaceous, dark brown-tomentose outside, cream inside, sub-globose or ovoid-globose in bud, slightly 3-angled at the apex, split down half-way into the lobes; staminal column obtuse at the apex without an apiculus, 4.8 mm. long including the 0.8 mm. long, glabrous stalk, the base of the latter surrounded by some hairs which probably originated from the bottom of the perianth and not from the stalk itself; pedicels 2–3 mm. thick; bracteole about half as high as the mature flower.

SOLOMONS SAN CRISTOBAL: Wairaha River, 5 miles from the north coast, Whitmore BSIP 4274 (L, LAE, SING).

VERNACULAR NAMES: _Kuku_ (Kwara’ae language).

This species is close to _M. castaneifolia_ in its rather similar male flowers but should be kept separate. The scales on the lower surface of the (young?) leaves, if present, should help as an additional character to distinguish the two. The male flowers differ from those of _castaneifolia_ in their smaller size, finer tomentum, shorter pedicels and absence of a sterile apiculus to the staminal column. How far the last character is constant remains to be seen. The hairs on the flowers of _castaneifolia_ are coarse and shaggy while those of _petiolata_ have, in contrast, a “well-groomed” look as if they had been cut, combed and sleeked back.
Fig. 86. *Myristica petiolata* A. C. Smith.

Map 1. Distribution of the genus Myristica.
Map 2. Distribution of *Maristea* at species level in the separate regions. The digits above the hyphen represent endemics, those below the total number of species.
Map 5. *Myristica chrysophylla* J. Sinclair var. *chrysophylla* = o
*M. chrysophylla* var. *entrecasteauxensis* J. Sinclair = △
Intermediate specimen between the above two vars = →
*M. fusca* Mgr = ●
*M. womersleyi* J. Sinclair = +

var. *elliptica* = ●

var. *celebica* (Miq) J. Sinclair = ringed area.

Sinclair — Myristica

Map 17. *Myristica maxima* Warb = ●

*M. papyracea* J. Sinclair = general area of distribution enclosed by ring.
INDEX

(a) New Taxa and binomials in bold.
(b) Taxonomic synonyms and vernacular names in italics.

Characters for classification of Myristica, 16
Collectors’ numbers of Myristica, 489
Comacum Adans, 127
Geographic distribution of Myristica, 10
Maps, 515
Gymnacranthera lanceolata Merr., 218
negrosensis Elmer, 437
sulphurascens Elmer, 192
urdanetensis Elmer, 437
Habitats of Myristica, 16
Keys to Myristica, 50
Bornean spp., 104
New Guinea spp., 108
Fruiting material, 82
Sterile material, 82
Sections, 54
Series of Sec. Fatua, 64
Sec. Myristica, 54
Spp. of Ser. Castaneifoliae, 80
Cimiciferae, 76
Cinnamomeae, 62
Ellipticae, 60
Fatuae, 68
Fragrantae, 63
Fuscae, 67
Heterophyllae, 78
Hooglandiae, 58
Laurifoliae, 80
Littorales, 63
Maingayae, 59
Malabaricae, 59
Maximae, 57
Subalulatae, 77
Teijsmanniae, 79
Tenuiveniae, 72
Tubiflorae, 73
Uncinatae, 58
Vars. of M. ceylanica, 80
chrysophylla, 68
elliptica, 62
fatua, 69
hypargyreae, 79
lancifolia, 81
Maps of Myristica species distribution, 515

Myristica (L.) Grov., 127
Sections, 41
Sec. Fatua J. Sinclair, 128, 129
Myristica, 128, 129
Series, 45
Ser. Castaneifoliae Warb., 162, 260, 426, 454
Celebicace Warb., 187
Cimiciferae Warb., 315, 368
Cinnamomeae J. Sinclair, 209
Ellipticae Warb., 187
Fatuae Warb., 260
Fragrances Warb., 224
Fuscae J. Sinclair, 244
Heterophyllae Warb., 403
Hooglandiae J. Sinclair, 153
Inutiles Warb., 260, 368, 403
Laurifoliae Warb., 435
Lepidotae Warb., 260
Littorales Warb., 212
Maingayae Warb., 162
Malabarica Warb., 167, 426
Maximae Warb., 130
Montanae Warb., 368, 454
Schleinitziace Warb., 187
Speciosae Warb., 224
Suaves Warb., 209, 368, 426, 435.
Subalulatae Warb., 384
Teijsmanniae Warb., 426
Tenuiveniae J. Sinclair, 315
Tubiflorae Warb., 331
Uncinatae J. Sinclair, 145
Myristica affinis Warb., 275
agusanensis Elmer, 218
amboinensis Gandoger, 226
americana Rottb., 226
amygdalina Thw., 437
anseps Warb., 396
andamanica Hk.f., 427
archboldiana A. C. Smith, 329
argentea Warb., 235
aromatica Lamk, 226
aromatica Swartz, 226
avis paradisaeacae Warb., 480
Myristica baueerlenii Warb., 377
beccarii Warb., 319
beddomei King, 445
bialata Warb., 386
borneensis Gandoger, 311
borneensis Warb., 184
bracteata A.D.C., 138
. bracteata King, 131
brassi A.C. Smith, 245
buchneriana Warb., 321
buchneriana C.T. White, 357
casia Zipp., 305
cagayanensis Merr., 442
calocarpa Miq., 188
carrii J. Sinclair, 160
castaneifolia A. Gray, 473
celubica Gandoger, 275
celubica Miq., 194
cerifera A.C. Smith, 412
.ceylanica A.D.C., 437
.var. cagayanensis (Merr.) J. Sinclair, 442
.chalmersii Warb., 378
cartatea Gillespie, 470
c.chrysophylla J. Sinclair, 254
.var. entrecasteauxensis J. Sinclair, 257
c.cimicifera Soland., 370
c.cinnamomea King, 210
cemetery A.C. Smith, 463
commersonii Bl., 138
c.concinna J. Sinclair, 375
contorta Warb., 445
cookii Warb., 213
cordifolia Zipp., 286, 307
cornutilola J. Sinclair, 348
costata Warb., 386
crassa King, 435
crassipes Warb., 353
cucullata Mgf., 364
cumingii Warb. var. floribunda
.Airy Shaw, 177
cylindrocarpa J. Sinclair, 337
dactyloides J. Gaertn., 445
dactyloides Wall., 168
diospyrifolia A.D.C., 445
discolor Merr., 190
diversifolia Miq., 467
censifolia J. Sinclair, 332
ecliptica Kurz, 427
ecliptica Wall., 188
.var. celebica (Miq.) J. Sinclair, 194
var. elliptica, 188
var. simiarum (A.D.C.) J. Sinclair, 190
eilplitilima Merr., 192
euryocarpa Warb., 405
falax Warb., 177
faroensis Hemsl., 202
fatua Houtt., 268
.var. affinis (Warb.) J. Sinclair, 275
.var. inutilis (Rich.) J. Sinclair, 278
.var. magnifica (Bedd.) J. Sinclair, 282
.var. morindiiiifolia (Bl.) J. Sinclair, 286
.var. morobensis J. Sinclair, 289
.var. morotaiensis J. Sinclair, 292
.var. papuanica Mgf., 294
var. plaiphylla (A.C. Smith) J. Sinclair, 300
.var. quercicarpa J. Sinclair, 302
.var. sangowoensis J. Sinclair, 304
.var. spanogheana (Miq.) J. Sinclair, 304
.var. subcordata (Bl.) Miq., 307
.var. wenzelii (Merr.) J. Sinclair, 309
fatua Miq., 311
finschii Warb., 235, 294, 481
dirmipes J. Sinclair, 355
dosculosA J. Sinclair, 359
fragrans Houtt., 225
fragrans Miq., f. sylvestris Miq., 194
fusca Mgf., 252
garciniifolia Warb., 196
gigantea King, 163
gillespieana A.C. Smith, 418
glaucA Spanoghe, 305
globosa Warb., 378
glomerata (Blanco) Kudo & Masa-
mune, 442
gracilipes J. Sinclair, 334
grandifolia A.D.C., 473
gaudalcanaeis J. Sinclair nom. nud.) 357
guatterifolia A.D.C., 213
guillauminiana A.C. Smith, 420
hackenbergii Diels, 164
heritierifolia Pierre, 177
heterophylla Hayata, 442
heterophylla K. Schum., 386, 405
heyeenea Wall., 445
hollrungi Warb., 405
hooglandii J. Sinclair, 156
horned Warb., 470
hypargyraea A. Gray, 415
.var. gillespieana (A.C. Smith) J. Sinclair, 418
Myristica tomentosa Thunb., 268
tristis Warb., 379
tubiflora Bl., 339
umbellata Elmer, 174
umbrosa J. Sinclair, 147
uncinata J. Sinclair, 150
undulatifolia J. Sinclair, 400
urdanetensis (Elmer) Merr., 437
velutina Mgf., 386
verruculosa Elmer, 192
villosa Warb., 311
vordermanii Warb., 177
wallaceana Warb., 294
warburgii K. Schum., 343
wenzelii Merr., 309
womersleyi J. Sinclair, 249
wyatt-smithii Airy Shaw, 177
Myrmecophily, 394
Nux moschata mas oblongior Lobelius, 268
Nux myristica, 226
Nux myristica mas Clusius, 268
Obituary of J. Sinclair, i
Pala, 226
Pala radja, 239
Palala Rumphius, 127
Panem-Palka Rheede, 169
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