

# REVISION OF THE SAPOTACEAE OF THE MALAYSIAN AREA IN A WIDER SENSE

XX<sup>1)</sup>. MADHUCA Gmelin

by

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## Introduction

The present study includes the whole genus *Madhuca* and is not restricted to those of the Malaysian area only. The results of this study could not have been obtained without the kind help of the Directors of the herbaria of Berkeley (U. S. A.), Berlin, Bogor, Florence, Jamaica Plain (U. S. A.), Kepong, Kew, Lae, Leiden, London, Manokwari, Paris, Singapore, Utrecht and Washington to whom I express my most sincere thanks.

The abbreviations of the names of herbaria are those proposed in the Index Herbariorum by Lanjouw and Stafleu. The herbarium of the Forest Department in Manokwari, is still indicated by Holl, the original abbreviation.

The scales in the drawings are expressed in millimeters.

<sup>1)</sup> I—III in *Blumea* VI, 3, 1952, 547—595; IV—V in *Blumea* VII, 2, 1953, 364—412; IVa in *Blumea* VII, 3, 1954, 481—483; IIa, IVb, Va, VI—IX in *Blumea* VIII, 2, 1957, 201—513; X—XII in *Nova Guinea* N. S. 8, 1, 87—128; XIII—XVI in *Blumea* IX, 1, 1958, 21—142; XVII, *Blumea*, Lam Jubilee Number, 1958, 263—267; IIb, IXa, XVIII, XIX in *Nova Guinea* N. S. 10, 1, 1959, 131—143; XX—XXII in the present issue.

## GENERAL PART

## Diagnosis of the genus

**Madhuca** Gmelin, Syst., 1791, 799; MacBride, Contr. Gray Herb. Harv. Univ., NS 53, 1918, 16; Merrill, Enum. Phil. Fl. Pl. 3, 3, 1923, 276; Lam, Bull. Jard. Bot. Bzg, sér. 3, 7, 1925, 152; ibidem, 3, 8, 1927, 382 — *Bassia* Koenig in Linnaeus, Mantissa 2, 1771, app. 555, 563, 1343<sup>1)</sup>; Richter, Codex Bot. Linn., 1940, 455; A. DC, Prodr. 8, 1844, 197; Miquel, Fl. Ind. Bat., 1859, 1050; Gras, Bull. Soc. Bot. Fr. 11, 1864, 71; Bentham & Hooker fil., Gen. Pl. 2, 1876, 658; Clarke ex Hooker fil., Fl. Br. Ind. 3, 1882, 543; Burck, Ann. Jard. Bot. Bzg 5, 1886, 43; Koorders & Valetton, Bijdr. Booms. Java, 1, 1894, 153; Trimen, Fl. Ceyl. 3, 1895, 78; King & Gamble, Journ. As. Soc. Beng. 74, 2, Extra, nr. 17, 1905, 176; Merrill, Phil. Journ. Sc., Bot. 10, 1915, 56 — *Azaola* Blanco, Fl. Fil., ed. 1, 1837, 402; A. DC, Prodr. 8, 1844, 196 — *Kakosmanthus* Hasskarl, Retzia 1, 1855, 97; Baillon, Hist. des Pl. 11, 1891, 300; Dubard, Rev. Gén. Bot. 20, 1908, 196 — *Cacosmanthus* de Vriese, Pl. Reinw., 1856, 60; de Vriese, Tuinb. fl. 3, 1856, 228; Miquel, Fl. Ind. Bat. 2, 1859, 1040 — *Dasyaulus* Thwiates, Enum. Pl. Zeyl., 1864, 175; Dubard, l. c., 199 — *Dasillipe* Dubard, Ann. Mus. Col. Mars. 21, 1913, 92 — *Illipe* auctores, F. Mueller, Extra-trop. Pl., 1885, 184; Engler, Bot. Jahrb. 12, 1890, 509; Boerlage, Handl. Fl. Ned.-Ind. 2, 1, 1891, 300; Baillon, l. c. 300; Engler & Prantl, Nat. Pfl. Fam. 4, 1, 1897, 133 and Nachtrag, 1897, 272; Dubard, l. c., 194.

Trees. Stipules small to large, usually soon caducous, rarely persistent for some time. Leaves scattered to conferted at apex of the branchlets which sometimes grow in distinct flushes with flowers and leaves at their tips, secondary nerves archingly joined or diminishing until inconspicuous, tertiary nerves transverse to reticulate and parallel to secondary nerves, in some cases one nerve among the tertiary ones is formed parallel to the secondary nerves and reaches the margin or not. Flowers in axillary fascicles. Sepals 4, in two whorls of two, rarely 5 and the inner whorl with three sepals, very rarely 6 in 2 whorls of 3 (*M. calcicola*), inner sepals usually with glabrous, membranous, fimbriate margin. Corolla gamopetalous, (5—)8(—18)-lobed, usually woolly pubescent between the stamens. Stamens in one, two or three whorls, 16—40, sessile, subsessile or with a distinct filament, inserted in the throat of the corolla. Ovary 8—21-celled, with one ovule in each cell. Fruit a berry, 1—4-seeded, calyx and style persistent. Seeds with narrow, linear scar, hilum apical. Embryo with membranous albumen, which is sometimes only partly developed, cotyledons thick.

Type species: *M. longifolia* (Koenig) MacBride.

Distribution: About 75 species in Southeast Asia and Malaysia.

## Abbreviations of some references

Lam 1925 = H. J. Lam, The Sapotaceae of the Dutch East Indies, Bull. Jard. Bot. Bzg, sér. 3, 7, 1925, 193—218.

Lam 1927 = H. J. Lam, Further Studies, etc., Bull. Jard. Bot. Bzg, sér. 3, 8, 1927, 467—476.

<sup>1)</sup> non Allione, Misc. Taur. 3, 1766, 177, t. 4, Chenopodiaceae.

### Subdivision of the genus

In the last treatment of this genus by Lam in 1925 and 1927 he distinguished the sections *Dasyaulus* and *Kakosmanthus*. With the studies of *Ganua* by van den Assem (*Blumea* 7, 2, 1953, 364—400) and the present study at hand it seems that this subdivision is not any longer justified. For, if we analyse Lam's papers, we find that in the section *Dasyaulus* five species are distinguished, viz *M. kunstleri* (Brace) H. J. Lam, *M. lancifolia* (Burek) H. J. Lam, *M. kingiana* (Brace) H. J. Lam, *M. hirtiflora* (Ridley) H. J. Lam and *M. caudata* (Ridley) H. J. Lam. Of these *M. kingiana* appeared to represent a *Ganua* species (See van den Assem). *M. caudata* is conspecific with *Payena dasyphylla* (Miq.) Pierre (See van Bruggen, *Blumea* 9, 1, 1958, 99) while *M. hirtiflora* according to my study represents a species of *Ganua* and the impression was gained that *M. kunstleri* in fact also belongs to *Ganua* but the floral material is so young that it was not clearly visible whether the ovarial cells were entire or narrowed into the style-canals. For the time being this species is therefore kept in *Madhuca* though in comparing it with *M. kingiana* and *M. hirtiflora* as regards to the foliar details it should be placed in *Ganua*. There remains therefore in the section *Dasyaulus* only *M. lancifolia* and the doubtful *M. kunstleri*.

According to Lam the difference between the sections *Dasyaulus* and *Kakosmanthus* is the presence of a tertiary nerve parallel to the secondary nerves and reaching in § *Dasyaulus* the margin of the leaf and not so in section *Kakosmanthus* if ever such a nerve exists. Apart from this rather doubtful difference it is worthwhile to point out also that it is not a valid one since sometimes in section *Kakosmanthus* (see *M. kort-halsii*) even in the species mentioned by Lam this nerve reaches the margin. Therefore it seems advisable to discard both sections and to return to the subdivisions into groups which have no taxonomic value but rather represent more or less closely related species, as is already carried out in *Planchonella*.

#### Group 1

Species 1 and 2. *Borneo and Malay Peninsula*.

When we start dividing the genus *Madhuca* in this type of groups we can start with *M. kunstleri* and *M. lancifolia* to be placed in one group connecting the genus *Madhuca* with *Ganua*, though as stated before, I doubt whether both species should not after all be placed in *Ganua*. If in future material a better insight is gained about the nature of the ovarial cells and the species turn out to be real *Madhuca* species this group should be dissolved and both species be placed close to *M. pubicalyx* in group 3.

Studying the remainder of the genus we can have the main division of species with leaves with distinct transverse tertiary nerves and those with a reticulate nervation. It appears then, however, that this subdivision is by no means so clear as could be worked out more or less for *Planchonella*. Still it is possible by considering other details as well, viz the

number of stamens, corolla-lobes, ovary-cells etc. to distinguish the following morphologically related four groups:

2. Tertiary nervation transverse and the secondary nerves archingly joined,
3. Tertiary nervation transverse and the secondary nerves diminishing until conspicuous,
4. Tertiary nervation reticulate and the secondary nerves diminishing until conspicuous,
5. Tertiary nervation reticulate and the secondary nerves archingly joined.

#### Group 2

Species 3—15. *Ceylon to Philippines and Borneo.*

This group, which is of all five groups the easiest to recognize by the distinctly archingly joined secondary nerves and the prominent arches, especially at the underside of the leaf, comprises 16 species, viz *M. aristulata*, *M. aspera*, *M. borneensis*, *M. costulata*, *M. elmeri*, *M. fulva*, *M. grandifolia*, *M. macrophylla*, *M. magnifolia*, *M. mindanaensis*, *M. sarawakensis*, *M. sessiliflora* and *M. spectabilis*. In group 3 *M. glabrescens*, *M. pubicalyx* and *M. woodii* represent intermediate steps to group 2 since the secondary nerves sometimes diminish until inconspicuous besides being usually archingly joined.

*M. costulata* and *M. mindanaensis* can be separated from the other species of this group by their close arrangement of the slender, tertiary nerves, while in the other species the nerves, though being transverse, tend to become apart and irregularly connate.

The remaining species can be classified into two parts, one of which is characterized at the upper surface of the leaf by impressed lateral nerves and midrib while the second section includes those species in which these nerves are not impressed and in which the transverse, tertiary nerves are denser and more regular than in the first section.

In the first section *M. aspera*, *M. borneensis*, *M. elmeri*, *M. fulva*, *M. magnifolia*, *M. sarawakensis*, *M. sessiliflora* and *M. spectabilis*, in the second section *M. aristulata*, *M. grandifolia* and *M. macrophylla* are included.

*M. aspera*, *M. magnifolia*, *M. sarawakensis* and *M. sessiliflora* are closely related in the very short or short pedicels, while *M. borneensis*, *M. fulva* and *M. spectabilis* are characterized by long pedicels. The three species, *M. aristulata*, *M. grandifolia* and *M. macrophylla* are very similar to each other and apart from their differing characters little needs to be remarked about them.

#### Group 3

Species 16—71, 73. *Includes the whole area of Madhuca*

The four species *M. glabrescens*, *M. leucodermis*, *M. pubicalyx* and *M. woodii* form an intermediate group of species between group 2 and 3 since in some specimens the secondary nerves are archingly joined while

in others they diminish until inconspicuous near the margin. But in itself this little group is a heterogenous one and each of the species can be placed in one of the different lines to be distinguished in group 3.

The characterizing details of the whole group, apart from what is said above about these four species, are: secondary nerves diminishing until inconspicuous and the tertiary nerves transverse ranging from truly transverse and in a fair number to almost parallel to the secondary nerves and in a small number. Based on this four different sections can be distinguished viz:

a. A group of species in which the number of tertiary nerves is large or are at least better developed than the reticulate nervation in between them, and all the nerves being distinctly transverse to the secondary nerves.

Starting with *M. woodii* in the intermediate group a group of 5 species can be placed resembling that species most, viz *M. betis*, *M. eriobrachyon*, *M. pierrei*, *M. longifolia* and *M. cuneata*, in this order showing a decrease of transverse tertiary nerves while at the same time they become less distinct. The first four are closely related but differ in their number of stamens, apart from other details. In the high number of stamens, 16—36, *M. pierrei* and *M. longifolia* come close to each other compared with the other two species, *M. betis* and *M. eriobrachyon*. *M. cuneata* is an intermediate species to section b.

Another line of similarity in section a. can be traced when we use *M. leucodermis* as our start. Closely related to that species in its foliar details is *M. ridleyi* followed by a group of species all with about the same shape of leaves or this (obovate-)type of leaves gradually changing to elliptic. The obovate-shape is found still in *M. malaccensis* but already in *M. sepilokensis* and *M. laurifolia* the more elliptic leaves are seen. Moreover in these three species the tertiary nerves are hardly reticulately branched but in the other species included in this line, *M. rupicola*, *M. grandiflora*, *M. obtusifolia*, *M. beccarii* and *M. erythrophylla*, the transverse tertiary nerves diminish in number and become more reticulately connate. This last group of five species is intermediate towards section b. and shows that no clear distinction in separate groups is in fact possible.

From the four species mentioned in the beginning as forming an intermediate group of species to group 2, *M. glabrescens* is closely related to *M. laurifolia*, while *M. pubicalyx* is connected with species of section b. of the present group.

b. Taking the previous section as one in which the tertiary nerves are transverse, rather dense and hardly connate mutually, in the present section this number is smaller, the nerves become less straight and mutually they become more interconnected and the interjaacent reticulation becomes more pronounced. The section comprises at least 18 species but perhaps *M. cuprea* should be included here as well, but since I have not seen any material of this species and the description does not give clear evidence of the nature of the tertiary nervation it is only doubtfully inserted here.

Related to *M. betis*, *M. eriobrachyon* and *M. pierrei* we find in the present section *M. alpina*, *M. stipulacea*, *M. moonii*, *M. cuneata*, *M. rufa* and *M. cambodiana*, the former two to be separated from the latter by the much longer pedicels. *M. rufa* stands somewhat apart and forms a link

to the genus *Isonandra*. *M. cuneata* is a link to a group of 5 species, viz *M. endertii*, *M. montana*, *M. firma*, *M. diplostemon* and *M. insignis*, which in this sequence show a decrease of tertiary nerves while these also become more irregular. They have all in common a small number of corolla-lobes, stamens and ovarian cells, these details, however, being unknown in *M. insignis*. But since the latter species resembles *M. diplostemon* rather strikingly, *M. insignis* is inserted beside it.

A group of 11 species, *M. penicillata*, *M. esculenta*, *M. platyphylla*, *M. multiflora*, *M. ovata*, *M. stylosa*, *M. burckiana*, *M. longistyla*, *M. sericea*, *M. sandakanensis* and *M. vulcanica* is related to the species in the previous section by *M. laurifolia*. They can be grouped respectively in a group of species with the tertiary nerves rather dense (*M. penicillata*, *M. platyphylla*, *M. esculenta*, *M. ovata*, *M. stylosa* and *M. burckiana*) and one with these nerves becoming less and more irregular (*M. longistyla*, *M. sericea*, *M. multiflora*, *M. cambodiana*, *M. sandakanensis* and *M. vulcanica*). These species form more or less a series parallel to the series *alpina-stipulacea-rufa* and *cuneata-endertii-montana-firma-diplostemon-insignis*, but the latter series are kept apart by the flowers crowded at the tips of the branchlets (in *M. alpina* and *M. stipulacea*) or the reddish woolly pubescence (*M. rufa*) from the *penicillata* series and from the *longistyla* series by the larger number of stamens (16—24 against 12—18), and the larger number of ovarian cells (7—10 against 6—8). An exception has to be made for *M. vulcanica* and *M. sandakanensis* since these species have only 10—13 stamens and a 6—8-celled ovary, and 12 stamens and an 8-celled ovary respectively. Therefore these last two species have to be regarded as a link connecting this series with the series *endertii-montana-firma-diplostemon-insignis*.

The series *longistyla-sericea ... sandakanensis-vulcanica* is by way of *M. sandakanensis*, *M. rupicola*, *M. grandiflora*, *M. obtusifolia* and *M. beccarii* connected with section 3a.

All that is written above emphasizes the complex reticulate relationship which is so common in the Sapotaceae and is not absent from *Madhuca* and is even more complex than in *Planchonella*.

c. Three species, *M. ligulata*, *M. bourdillonii* and *M. lanuginosa* can be separated immediately from all others in group 3 by the obovate-spatulate leaves with the abruptly acuminate apex and narrowly cuneate base. Apart from these characters they show little affinities to each other but more to some species in the sections 3b and 3c. *M. bourdillonii* is related to the series *betis-eriobrachyon-pierrei-longifolia* (in 3a) — *alpina-stipulacea* (in 3b). *M. ligulata* is related to *M. erythrophylla* in 3a but the long stipules separates it from that species.

*M. lanuginosa* also comes near to *M. erythrophylla* but also near *M. burckiana*, *M. esculenta* and *M. ovata* albeit that the shape of the leaf separates this species from the three mentioned.

d. A group of 5 species (*M. palustris*, *M. tomentosa*, *M. korthalsii*, *M. penangiana*, *M. mirandae*) can be put together in close relationship with the series *penicillata-esculenta-platyphylla .....-stylosa-burckiana*. The tertiary nerves are still transverse but already a number of them, mainly near the midrib, tend to become parallel to the secondary nerves; in some

cases they become very irregularly flexuose and the reticulation between them begins to occupy more space.

e. A tertiary nervation in which hardly a trace of transverse nerves can be found is represented in *M. kerrii*, *M. lobbii*, *M. punctata*, *M. elliptica* and *M. cochinchinensis* but apart from these *M. tubulosa* and *M. calcicola* should be included. The former five species are closely related to *M. alpina* and *M. stipulacea* in 3b. They all are species restricted to Continental Asia and their main characteristic (except for *M. cochinchinensis*) is that flowers and leaves are conferted to subconferted at the apex of the branchlets. The second series of two species (*M. tubulosa* and *M. calcicola*) is more related to *M. endertii* and *M. montana* in section 3b but they still have to be placed here owing to their reticulate tertiary nervation with hardly or no transverse nerves left.

#### Group 4

Species 72—84, 73 excluded. *India and Ceylon to Hainan, Sumatra and Borneo.*

This group consists of species with leaves in which the secondary nerves are archingly joined and the tertiary nerves distinctly reticulate and no transverse nerves are present. In fact there is not a sharp delimitation — as everywhere in the genus *Madhuca* can be observed — between this group and the previous one since *M. tubulosa* and *M. calcicola* have more or less archingly joined nerves but the arches actually are composed by thickened tertiary nerves while in group 4 true arches are formed by the secondary nerves.

The group comprises 12 species and is a rather heterogenous one, with series that are related to different previous groups by different ways. *M. neruifolia* is a somewhat isolated species in this respect as it has no other relatives in this group. It is closely allied to *M. kerrii*, *M. punctata* and *M. elliptica* in section 3e and forms the end of a series of species running from *M. betis*, *M. eriobrachyon*, *M. pierrei* and *M. longifolia* in 3a, to *M. alpina*, *M. stipulacea* in 3b, to *M. bourdillonii* in 3c and *M. kerrii*, *M. lobbii*, *M. punctata* and *M. elliptica* in 3e. This particular series is mainly characterized by the leaves and flowers which are conferted at the tip of the branchlets.

A series of six (perhaps seven) (*M. dubardii*, *M. oblongifolia*, *M. hainanensis*, *M. coriacea*, *M. subquincuncialis* and *M. pasquieri* (and probably also *M. butyrospermoides* of which no material has been seen) is characterized by spatulate, obovate or narrowly lanceolate-obovate leaves and has connections with *M. tubulosa* and *M. calcicola* in section 3e, with *M. cochinchinensis* also in 3e, but also with *M. kerrii*, *M. lobbii*, *M. punctata* and *M. elliptica* in 3e as well. Moreover this group is related to *M. diplostemon* and *M. insignis* in 3b. In fact these six species are the end of a series of species starting with *M. rupicola* in 3a, *M. sericea* and its allies in 3b, running to *M. endertii*, *M. diplostemon* and allies in 3b. The last four species in group 4 are *M. utilis*, *M. crassipes*, *M. microphylla* and *M. thorelii* which all have spatulate or obovate leaves and are closely related to *M. tubulosa* and *M. calcicola* in 3e, in this way increasing the reticulate relationship among the species of group 3 and 4.

### Distribution

The genus *Madhuca* is essentially a western Malaysian genus with its main centre in Borneo and the Malay Peninsula, though from the material coming in it will be likely that Borneo only is the real centre. From the combined centre Borneo/Malay Peninsula the number of species decreases towards Java, Celebes, Moluccas and New Guinea more than towards the Philippines and the areas west of Borneo and the Malay Peninsula. This reduction is well illustrated by the list given below. Between brackets the number of endemics is given.

Borneo 27 (17)	India 4 (2)
Malay Peninsula 25 (15)	Ceylon 5 (3)
Sumatra 13 (5)	SE China 2 (1)
Indo-China 9 (8)	Java 3 (1)
Philippines 9 (5)	Celebes 2 (0)
Siam 8 (7)	Moluccas 2 (0)
Burma 3 (2)	New Guinea 2 (1)

The most striking fact in this list is not only the presence of two species in New Guinea and three in Java, nor the fact that only one endemic species is present on each of these islands, but the fact that since Lam's treatment of 1925, 1927 and 1932 of the Sapotaceae of the Malaysian area and New Guinea respectively, no additional species from New Guinea and from Java one only have come to our knowledge, contrary to what is found in Borneo, the Malay Peninsula and Indo-China. Especially for New Guinea this is remarkable since in *Planchonella*, *Pouteria* and *Burckella* so many species, among them many new ones, have been reported from that island. It only once more emphasizes that *Madhuca* is essentially western Malaysian in origin.

### TAXONOMIC PART

#### Key to the species\*)

- 1.a. Stipules very large, the shortest at least 1.5 cm long . . . . . 2
- b.\*\*) Stipules small to minute, the largest at the utmost 1.5 cm long . . . . . 3
- 2.a. Leaves oblanceolate, oblanceolate-oblong or obovate, (7—)14—27 by (1.5—) 3—9.5 cm. Secondary nerves 15—25 pairs, diminishing until inconspicuous near margin. Corolla-tube glabrous on outside. Stamens 28, anthers glabrous. *Sumatra* 58. *M. ligulata*
- b. Leaves narrowly obovate, 25—48 by 8—12 cm. Secondary nerves (18—)24—30 pairs, archingly joined. Corolla-tube with longitudinal lines of ferruginous hairs on outside. *Borneo* . . . . . 8. *M. spectabilis*
- 3.a. Mature leaves glabrous below, sometimes along midrib with some scattered hairs . . . . . 4
- b. Mature leaves on underside at least distinctly pubescent on midrib and lateral nerves and usually on the entire surface as well . . . . . 83
- 4.a. Secondary nerves archingly joined . . . . . 5

\*) 84. *M. butyrospermoides*, 64. *M. mirandae*, 73. *M. moonii*, and 77. *M. thorelii* not included.

\*\*) Unknown in *M. bourdillonii*, *M. costulata*, *M. cuprea*, *M. fulva*, *M. lanceolata*, *M. lanuginosa*, *M. platyphylla*, *M. vulcanica*, but judging from the scars the stipules are regarded as being small.



- l. Secondary nerves diminishing until inconspicuous near margin or connected by thickened tertiary nerves . . . . . 43
- 5.a. Leaves elliptic, obovate or oblanceolate, 25—65 by 12—18 cm, obtusely acuminate. Secondary nerves 19—22 pairs. Petioles 8—15 cm long. *Siam*
  - 14. *M. grandifolia*
- b. Leaves elliptic or oblong-elliptic, 19—48 by 6.5—19 cm, acute or acutely acuminate at apex. Secondary nerves 19—35 pairs. Petioles 3.5—6 cm. *Malaya*
  - 13. *M. aristulata*
- c. None of the two combinations given above . . . . . 6
- 6.a. Branchlets, leaves, petioles, pedicels and calyx entirely glabrous. *Philippines*
  - 81. *M. coriacea*
- b. At least one of these parts pubescent . . . . . 7
- 7.a. Pedicels 1—1.5 mm long, or flowers sessile. *Malaya* . . . . . 12. *M. sessiliflora*
- b. Pedicels much longer . . . . . 8
- 8.a. Petioles longer than pedicels . . . . . 9
- b. Petioles shorter or as long as pedicels . . . . . 28
- 9.a. Leaves retuse, rounded, obtuse or obtusely acuminate, but if acute then with 18—23 pairs of secondary nerves . . . . . 12
- b. Leaves acute or acutely acuminate . . . . . 10
- 10.a. Secondary nerves 9—14 pairs . . . . . 11
- b. Secondary nerves c. 25 pairs. Leaves oblong or oblong-ovate, 14—21 by 6—9.5 cm. Ovary pubescent. *Borneo* . . . . . 62. *M. heynei*
- 11.a. Secondary nerves 9—11 pairs. Leaves elliptic, 7—11.5 by 1.4—3.4 cm. Sepals ferruginously tomentose on outside. *Indo-China* . . . . . 69. *M. cochinchinensis*
- b. Secondary nerves 13 or 14 pairs. Leaves elliptic, 8—11 by 3—4.5 cm. Sepals greyish sericeous on outside. *Philippines* . . . . . 85. *M. ? lanceolata*
- 12.\*)a. Stamens 30 or more . . . . . 13
- b. Stamens 25 or less, rarely up to 28 . . . . . 14
- 13.a. Corolla-lobes 16. Corolla glabrous on inside. *Malaya, Borneo* . . . . . 1. *M. kunstleri*
- b. Corolla-lobes 8. Corolla densely whitish woolly between the stamens. *Mindanao, Borneo* . . . . . 4. *M. mindanaensis*
- 14.a. Only the apical or some nerves of the leaves archingly joined . . . . . 15
- b. All nerves archingly joined and the arches sometimes irregular . . . . . 19
- 15.a. Leaves spatulate or obovate, 5—10 by 2.5—4 cm, rounded or retuse. Pedicels 0.5—0.7 cm. Corolla ferruginously sericeous on outside except for the margins of the lobes. *Borneo, Sumatra* . . . . . 75. *M. crassipes*
- b. Leaves usually larger, 9—52 by 3.5—20 cm. Pedicels 0.8—2.7 cm. Corolla either entirely glabrous on the outside or ferruginously pubescent on the tube only . . . . . 16
- 16.a. Sepals yellowish tomentose on inside mainly along margin, *Philippines, Celebes, Moluccas, New Guinea* . . . . . 45. *M. burckiana*
- b. Sepals entirely glabrous on inside . . . . . 17
- 17.a. Petioles 2 cm long or more . . . . . 18
- b. Petioles 1.2 cm long or shorter. *India* . . . . . 53. *M. diplostemon*
- 18.a. Leaves narrowly elliptic to lanceolate or ovate-lanceolate, 11—27 by 3—8 cm. Midrib narrowly crested above. Sepals obtusely acuminate. Corolla 8-lobed. Stamens 13—18. *Malaya* . . . . . 63. *M. penangiana*
- b. Leaves obovate, obovate-oblong or elliptic-obovate, 13—33(—52) by 7.5—15 (—20) cm. Midrib rounded above. Sepals subobtusely. Corolla 10—12-lobed. Stamens 20—25. *Siam, Malaya, Sumatra, Bangka, Siantan, Borneo*
  - 24. *M. malaccensis*
- 19.\*\*\*)a. Corolla entirely glabrous on outside . . . . . 20
- b. Corolla pubescent on outside, sometimes only partly so . . . . . 23
- 20.a. Secondary nerves 12—14 pairs . . . . . 21
- b. Secondary nerves 18—24 pairs . . . . . 22

\*) From here onwards also 40. *M. esculenta* should be included but the flowers are unknown. Compare the specimen(s) therefore with the description of that species.

\*\*) The pubescence of the corolla in 3. *M. costulata* and 10. *M. leucodermis* is unknown and the species are included under both items.

- 21.a. Secondary nerves ascending at an angle of c. 60°. Pedicels glabrous, 1.3—1.5 cm long. Stamens 16—18. *Malaya* . . . . . 46. *M. longistyla*  
 b. Secondary nerves ascending at an angle of c. 40°. Pedicels ferruginously sericeous, 0.7—1.1 cm long. Stamens 14. *Borneo* . . . . . 3. *M. costulata*
- 22.a. Leaves 13—29 by 5—10.5 cm. Stamens 16—20, filaments and anthers with ferruginous hairs. Corolla glabrous on outside, ferruginously hirsute between the stamens. *Borneo* . . . . . 6. *M. elmeri*  
 b. Leaves (5—)12—20 by 1.5—6 cm. Stamens 24—23, entirely glabrous. Corolla glabrous on either side. *Siam* . . . . . 28. *M. grandiflora*
- 23.a. Secondary nerves 16—26 pairs and stamens 18—24. Leaves elliptic-obovate, elliptic, oblanceolate or narrowly obovate, 15—42 by 4.5—16.5 cm. Pedicels 2.5—5 cm long. *Borneo* . . . . . 17. *M. pubicalyx*  
 b. Secondary nerves 9—15 pairs, but if up to 19 than stamens 12—16 and pedicels shorter than 2 cm . . . . . 24
- 24.a. Ovary glabrous . . . . . 25  
 b. Ovary pubescent . . . . . 27
- 25.a. Midrib of leaves rounded below. *Borneo* . . . . . 3. *M. costulata*  
 b. Midrib of leaves angular below . . . . . 26
- 26.a. Pedicels 5—7 mm long, ferruginously woolly tomentose. Sepals tomentose on outside. Stamens 17—19, filaments glabrous. *Borneo, Sumatra* 75. *M. crassipes*  
 b. Pedicels 9—18 mm long, light brown tomentose. Sepals woolly pubescent on outside. Stamens 10—16, filaments woolly pubescent. *Malaya, Sumatra, Borneo* 74. *M. utilis*
- 27.a. Style entirely glabrous. Stamens 16. Secondary nerves of leaves 12—19 pairs. Midrib of leaves narrowly crested above. *Java, Sumatra, Malaya, Borneo* 36. *M. cuneata*  
 b. Only the stigmas glabrous, the style ferruginously puberulous. Stamens 10—13. Secondary nerves 9—12 pairs. Midrib of leaves rounded above. *Sumatra* 49. *M. vulcanica*
- 28.(8).a. Sepals pubescent on inside almost over the entire surface . . . . . 29  
 b. Sepals glabrous on inside or slightly pubescent in the apical part only . . . . . 33
- 29.a. Corolla glabrous on either side. Stipules subulate, up to 3 by 1 mm. Stamens glabrous . . . . . 31  
 b. Corolla ferruginously woolly in the throat and inner side of the tube . . . . . 30
- 30.a. Apex of leaf obtusely or acutely acuminate. Anthers glabrous. Tertiary nerves densely reticulate. *Malaya* . . . . . 71. *M. calcicola*  
 b. Apex of leaf rounded or emarginate. Anthers pubescent. Tertiary nerves loosely reticulate, with a few, irregularly shaped, transverse nerves. *Siam* 35. *M. stipulacea*
- 31.a. Secondary nerves 13—26 pairs. Stamen 18—27 . . . . . 32  
 b. Secondary nerves 11—14 pairs. Stamens 16. *SE China, Indo-China* 82. *M. ? subquincuncialis*
- 32.a. Midrib angular below. Corolla-lobes acutish. Leaves spatulate or oblanceolate. Secondary nerves ascending at an angle of 60°. *Hainan* . . . . . 80. *M. hainanensis*  
 b. Midrib rounded below. Corolla-lobes obtuse. Leaves obovate or obovate-oblong. Secondary nerves ascending at an angle of c. 80°. *Indo-China* 83. *M. pasquieri*
- 33.a.\*) Corolla glabrous on outside . . . . . 34  
 b. Corolla pubescent on outside, sometimes only partly so . . . . . 35
- 34.a. Petioles 5—8 mm long. Pedicels 5—8 mm long. Stamens 12—16. Ovary ferruginously tomentose. *Indo-China* . . . . . 38. *M. cambodiana*  
 b. Petioles 12—20 mm long. Pedicels 25—35 mm long. Stamens c. 18. Ovary glabrous. *Burma* . . . . . 68. *M. lobbii*

\*) The corolla in *M. insignis* and *M. leucodermis* is unknown and the specimen(s) should be compared with the description of these species. The two species can be separated as follows:

- a. Secondary nerves 11—13 pairs. Petioles 8—12 mm long. *India* . . . . . 54. *M. insignis*  
 b. Secondary nerves 13—18(—22) pairs. Petioles 1.5—5.5 cm. *New Guinea* 19. *M. leucodermis*

- 35.a. Stamens 18—30 . . . . . 36  
 b. Stamens 10—16 . . . . . 37
- 36.a. Secondary nerves 12—16 pairs. Corolla ferruginously woolly between the stamens, the latter 18—24. Ovary tomentose. *Borneo* . . . . . 17. *M. pubicalyx*  
 b. Secondary nerves 11—17 pairs. Corolla whitish woolly between the stamens, the latter c. 30. Ovary glabrous. *Mindanao, Borneo* . . . . . 4. *M. mindanaensis*
- 37.a. Anthers glabrous . . . . . 38  
 b. Anthers pubescent . . . . . 40
- 38.a. Outer sepals entirely glabrous. Secondary nerves 4—8 pairs. Leaves spatulate, obovate or oblong-obovate, 1—4.5 by 0.5—2 cm. Corolla-lobes 6. Stamens 12. Ovary 6-celled. *Ceylon* . . . . . 76. *M. microphylla*  
 b. Outer sepals densely to sparsely pubescent on outside. Secondary nerves 9—20 pairs. Leaves narrowly lanceolate-elliptic to elliptic, spatulate or obovate, 5—21 by 1.5—5.7 cm. Corolla-lobes 8 or 9. Stamens 10—16. Ovary 8-celled 39
- 39.a. Leaves narrowly lanceolate-elliptic to elliptic, sometimes spatulate, 5—13(—21) by 1.5—2(—4) cm, obtuse. Secondary nerves 15—20 pairs. Stipules linear, up to 7 by 1 mm. Midrib rounded below. Pedicels 2—2.5 cm long. Corolla c. 1.7 cm long, ferruginously woolly on the outside, lobes c. 8 by 3.5 mm. *Ceylon, India* . . . . . 72. *M. nerifolia*  
 b. Leaves obovate or spatulate, 5—8(—18) by 1.7—3.5(—5.7) cm, obtuse, acute, or obtusely acuminate. Secondary nerves 9—12(—15) pairs. Stipules linear, up to 3 by 1 mm. Midrib angular below. Pedicels 9—18 mm long. Corolla 7—8 mm long, whitish woolly on outside, lobes c. 4 by 1 mm. *Malaya, Sumatra, Borneo* . . . . . 74. *M. utilis*
- 40.a. Ovary pubescent. *Sumatra* . . . . . 49. *M. vulcanica*  
 b. Ovary glabrous . . . . . 41
- 41.a. Leaves acutely acuminate or caudate at apex, (7—)10—17 by (2.2—)3.4—6.5 cm, reddish brown below when dry. Secondary nerves 13—17 pairs. Petioles keeled below. Corolla ferruginously woolly between the stamens. *Malaya* . . . . . 60. *M. tomentosa*  
 b. Leaves obtusely acuminate, obtuse or rounded at apex, 3.8—18 by 2.2—7 cm, greyish brown, light brown or brown below. Secondary nerves 6—14 pairs. Petioles rounded below . . . . . 42
- 42.a. Corolla on outside pubescent except for the tube and the extreme tip of the lobes, hirsute between the stamens. Fruits ellipsoid or ovoid, 1.5—2.5 by 1—1.5 cm. *Malaya* . . . . . 70. *M. tubulosa*  
 b. Corolla on outside pubescent except along the margins of the lobes, woolly between the stamens. Fruits ellipsoid, 2.2—4.5 by 0.8—1 cm. *Borneo* . . . . . 50. *M. endertii*
- 43.(4).a. Petioles shorter or as long as pedicels . . . . . 44  
 b. Petioles longer than pedicels . . . . . 54
- 44.a. Secondary nerves of leaves 19—28 pairs. Stamens 22—37. Ovary 11—18-celled 45  
 b. Secondary nerves 6—17 pairs. Stamens 14—16, but if more than secondary nerves 15 or less. Ovary 6—9-celled . . . . . 46
- 45.a. Stamens 22—28, ferruginously woolly. Corolla 8—13-lobed, pubescent on either side. Ovary ferruginously woolly. Stipules triangular, up to 3.5 by 3 mm. *Java* . . . . . 15. *M. macrophylla*  
 b. Stamens 33—37, entirely glabrous. Corolla 16- or 17-lobed, glabrous on either side. Ovary glabrous. Stipules lanceolate, up to 11 by 2 mm. *Malaya* . . . . . 23. *M. ridleyi*
- 46.a. Corolla glabrous on outside . . . . . 47  
 b. Corolla pubescent on outside at least in some parts . . . . . 49
- 47.a. Corolla glabrous on inside . . . . . 48  
 b. Corolla woolly pubescent between the stamens. *Siam* . . . . . 65. *M. kerrii*
- 48.a. Stipules minute. Secondary nerves of leaves ascending at an angle of c. 80°. Tertiary nerves reticulate with a few transverse. Corolla 9—11-lobed. Ovary 7—8-celled. Fruits 2—2.5 by 1—1.2 cm. *Indo-China* . . . . . 34. *M. alpina*  
 b. Stipules linear, up to 12 mm long. Secondary nerves of leaves ascending at an angle of 60°—65°. Tertiary nerves transverse. Corolla 8- or 9-lobed. Ovary 8—11-celled. *India, Ceylon, Burma* . . . . . 32. *M. longifolia*

- 49.a. Leaves acutely acuminate to caudate. Secondary nerves 13—17 pairs. *Malaya*  
60. *M. tomentosa*
- b. Leaves obtusely acuminate, obtuse or rounded. Secondary nerves 6—14 pairs 50
- 50.a. Ovary glabrous . . . . . 51
- b. Ovary ferruginously puberulous, sometimes at base only . . . . . 53
- 51.a. Corolla-tube on outside glabrous. *Malaya* . . . . . 70. *M. tubulosa*
- b. Corolla-tube on outside pubescent . . . . . 52
- 52.a. Pedicels 15—25 mm long, glabrous or subglabrous. Sepals greyish tomentose on outside. Corolla pubescent on outside except along the margins of the lobes. *Borneo* . . . . . 50. *M. endertii*
- b. Pedicels 7—10 mm long, densely sericeous. Sepals ferruginously tomentose at outside. Corolla pubescent on outside only in oppositipetalous lines. *Borneo*  
51. *M. montana*
- 53.a. Petioles greyish or pale ferruginously puberulous. Stamens 10—13. Style passing gradually into ovary, pubescent. Tertiary nervation of leaves transverse. *Sumatra*  
49. *M. vulcanica*
- b. Petioles glabrous. Stamens 16. Style glabrous, distinctly marked against ovary. Tertiary nervation of leaf widely reticulate, with a few irregularly shaped transverse nerves. *Indo-China* . . . . . 68. *M. elliptica*
- 54.(43).a. Petioles 8—15 cm long. *Siam* . . . . . 14. *M. grandifolia*
- b. Petioles less than 7 cm long . . . . . 55
- 55.a.\*) Corolla-lobes 16 or 17. Stamens 33—37. Ovary 18—21-celled. Secondary nerves of leaves 19—28 pairs. *Malaya* . . . . . 23. *M. ridleyi*
- b. Corolla-lobes 6—12. Stamens 4—30. Ovary 6—11-celled. Secondary nerves 4—30 pairs . . . . . 56
- 56.a. Sepals pubescent on either side, but sometimes on inside glabrous in the basal part . . . . . 57
- b. Sepals glabrous within, sometimes pubescent at apex and/or along the margins only . . . . . 62
- 57.a. Corolla glabrous on either side . . . . . 58
- b. Corolla pubescent at least on inside between the stamens . . . . . 59
- 58.a. Secondary nerves 9—18 pairs. Ovary pubescent or glabrous. Pedicels 2.5—7.5 cm long. *India, Ceylon, Burma* . . . . . 32. *M. longifolia*
- b. Secondary nerves 20—30 pairs. Ovary glabrous. Pedicels 1.5—3 cm long. *Philippines, Borneo, Celebes, Muna* . . . . . 20. *M. betis*
- 59.a. Pedicels glabrous. Ovary 6—8-celled. Secondary nerves of leaves 9—12 pairs. *Indo-China* . . . . . 52. *M. firma*
- b. Pedicels pubescent, sometimes only sparsely so. Ovary 8—11-celled. Secondary nerves 11—22 pairs . . . . . 60
- 60.a. Sepals acute or acutish. Tertiary nerves transverse-reticulate and the nerves not strictly parallel . . . . . 61
- b. Sepals obtuse. Tertiary nerves transverse, close together and rather strictly parallel. *Malaya, Sumatra, Santian Island, Borneo* . . . . . 61. *M. korthalsii*
- 61.a. Leaves long obtusely acuminate. Sepals cinnamomously sericeous on outside. Corolla 8-lobed, glabrous on outside. Ovary 8- or 9-celled. *Philippines, Celebes, Moluccas, New Guinea* . . . . . 45. *M. burckiana*
- b. Leaves acutely acuminate. Sepals pale ferruginously woolly on outside. Corolla-lobes 6, with long ferruginous hairs on outside on lobes only. Ovary 10-celled. *Siberut* . . . . . 57. *M. lanuginosa*
- 62.a. Ovary glabrous . . . . . 63
- b. Ovary or base of gynacium pubescent . . . . . 78
- 63.a. Corolla 10—12-lobed. Stamens 20—25. *Siam, Malaya, Sumatra, Bangka, Siantan, Borneo* . . . . . 24. *M. malaccensis*
- b. Corolla 7—9-lobed. Stamens 12—20 . . . . . 64
- 64.\*\*).a. Corolla glabrous on inside. Secondary nerves 4—19 pairs . . . . . 65

\*) Here also 41. *M. platyphylla* of which no flowers are known but differs from *M. ridleyi* by the longer petioles (3—5.5 cm against 2.5—3 cm).

\*\*) The corolla of 44. *M. stylosa* is unknown but this species differs from *M. beccarii* by the larger number of secondary nerves, viz 14—18 against 4—9 pairs.

- b. Corolla pubescent on inside at least between the stamens. Secondary nerves 6—20 pairs . . . . . 66
- 65.a. Secondary nerves 4—9 pairs. *Borneo* . . . . . 30. *M. beccarii*
- b. Secondary nerves 13—19 pairs. *India* . . . . . 53. *M. diplostemon*
- 66.a. Leaves acute or acutely acuminate, base of leaves always acute . . . . . 67
- b. Leaves obtusely acuminate, obtuse, rounded or retuse, but if acutely acuminate base of leaf rounded . . . . . 68
- 67.a. Secondary nerves 9—11 pairs, only the apical ones archingly joined. Petioles 1—2.4 cm long. Leaves 7—11.5 by 1.4—3.4 cm. Pedicels sparsely ferruginously tomentose. Sepals 2.5—4.5 by 2—3.5 mm. Stamens 16. *Indo-China*  
69. *M. cochinchinensis*
- b. Secondary nerves 12—20 pairs, all diminishing until inconspicuous near margin or connate by thickened tertiary nerves. Leaves 11—20 by 4.3—8 cm. Pedicels densely ferruginously woolly-tomentose. Sepals 7—8 by 5.5—6.5 mm. Stamens 20. *Philippines* . . . . . 42. *M. multiflora*
- 68.\*\*a. Corolla glabrous on outside . . . . . 69
- b. At least some parts of the corolla on outside with a pubescence . . . . . 73
- 69.a. Stamen 12. Secondary nerves 6—11 pairs. *Borneo* . . . . . 48. *M. sandakanensis*
- b. Stamens 16—20. Secondary nerves 10 or more pairs . . . . . 70
- 70.a. Filaments of stamens densely woolly pubescent . . . . . 71
- b. Filaments of stamens glabrous. Leaves narrowly cuneate at base, 10—13 cm long. Sepals c. 5 by 3 mm. *Malaya* . . . . . 46. *M. longistyla*
- 71.a. Leaves rounded at base, 11—20 cm long, ovate-lanceolate or elliptic, thick, glossy above. Secondary nerves 12—16(—20) pairs. Midrib stoutly crested above. Pedicels ferruginously woolly tomentose. Sepals 7—8 mm long. *Philippines*  
42. *M. multiflora*
- b. Leaves narrowly cuneate at base . . . . . 72
- 72.a. Leaves 14.5—19 by 4.5—7.6 cm, brown when dry. Secondary nerves 13—16 pairs. All sepals densely sericeous on outside. *Borneo* . . . . . 16. *M. glabrescens*
- b. Leaves 19—27 by 6—9.5 cm, greenish when dry. Secondary nerves 10—13 pairs. The outer sepals very sparsely, the inner ones densely sericeous on outside. *Borneo*  
25. *M. sepilokensis*
- 73.a. Midrib of leaf angular on either side. *Borneo, Sumatra* . . . . . 75. *M. crassipes*
- b. Midrib at least rounded below, often narrowly crested above . . . . . 74
- 74.a. Leaf base rounded. *Malaya* . . . . . 59. *M. palustris*
- b. Leaf base cuneate . . . . . 75
- 75.a. Pedicels woolly pubescent. *Malaya, Sumatra* . . . . . 26. *M. laurifolia*
- b. Pedicels not woolly pubescent . . . . . 76
- 76.a. Pedicels 3—5 mm long, greyish brown sericeous. *Malaya, Siam* 27. *M. rupicola*
- b. Pedicels 8 mm long or longer, ferruginously sericeous or puberulous . . . . . 77
- 77.a. Petioles 2—4.5 cm. Corolla ferruginously sericeous on outside on tube only. Ovary 8—11-celled, entirely glabrous, gradually passing into the style. *Malaya*  
63. *M. penangiana*
- b. Petioles 0.8—1.5 cm. Corolla whitish puberulous on outside along the middle-line of the lobes. Ovary 6—7-celled, greyish tomentose at base, distinctly marked against the style. *Indo-China* . . . . . 68. *M. elliptica*
- 78.(62).\*a. Corolla glabrous on outside or with a few scattered hairs . . . . . 79
- b. Corolla pubescent on outside or at least partly so . . . . . 80
- 79.a. Stamens 12. Secondary nerves 17—20 pairs. *Borneo* . . . . . 18. *M. woodii*
- b. Stamens 16—22. Secondary nerves 10—19 pairs . . . . . 81
- 80.a. Tertiary nervation of leaves widely reticulate with a few, irregularly shaped transverse nerves. *Indo-China* . . . . . 68. *M. elliptica*
- b. Tertiary nervation transverse though sometimes the nerves rather apart . 81

\*\*\*) The corolla of 44. *M. stylosa* is unknown and the material should be compared with that species.

\*) The corolla of 31. *M. erythrophylla*, 62. *M. heynei* and 19. *M. leucodermis* is unknown and the specimen(s) should be compared with the descriptions of these three species.

- 81.a. Secondary nerves of leaf 10—15 pairs. Pedicels 5—8 mm. *Sumatra, Java, Malaya* . . . . . 43. *M. ovata*  
 b. Secondary nerves 11—19 pairs. Pedicels 12—19 mm. *Philippines, Celebes, Moluccas, New Guinea* . . . . . 45. *M. burckiana*
- 82.a. Secondary nerves 12—19 pairs. Petioles glabrous. Corolla-lobes pale ferruginously sericeous. Gynaecium pubescent at base only. Midrib of leaves narrowly crested above. *Java, Sumatra, Malaya, Borneo* . . . . . 36. *M. cuneata*  
 b. Secondary nerves 9—12 pairs. Petioles greyish or pale ferruginously puberulous. Corolla-lobes on inside glabrous. Gynaecium pubescent except for the stigmas. Midrib of leaves rounded above. *Sumatra* . . . . . 49. *M. vulcanica*
- 83.(3).a. Secondary nerves archingly joined . . . . . 84  
 b. Secondary nerves diminishing until inconspicuous near margin of leaf or connected by thickened nerves . . . . . 100
- 84.a. Ovary glabrous . . . . . 85  
 b. Ovary pubescent . . . . . 91
- 85.a. Pedicels 1—1.5 mm long or flowers sessile. *Malaya* . . . . . 12. *M. sessiliflora*  
 b. Pedicels much longer . . . . . 86
- 86.a. Secondary nerves 20—30 pairs . . . . . 87  
 b. Secondary nerves 9—16 pairs . . . . . 88
- 87.a. Stipules lanceolate to shield-like, up to 6 by 2 mm. Tertiary nerves transverse. Secondary nerves 20—24 pairs. Pedicels ferruginously woolly pubescent, 1.3—1.8 cm long. Ovary 10—12-celled. *Borneo* . . . . . 6. *M. elmeri*  
 b. Stipules lanceolate, up to 6.5 by 1.5 mm. Tertiary nerves widely reticulate with a few, transverse nerves. Secondary nerves 22—30 pairs. Pedicels ferruginously sericeous, 2—2.5 cm long. Ovary 8-celled. *Philippines* . . . . . 79. *M. oblongifolia*
- 88.a. Midrib of leaf rounded above. Leaves 13—52 by 7.5—20 cm. *Siam, Malaya, Sumatra, Bangka, Siantan, Borneo* . . . . . 24. *M. malaccensis*  
 b. Midrib crested above. Leaves generally smaller . . . . . 89
- 89.a. Petioles glabrous. Leaves obovate or elliptic-obovate, 5—9 by 2—3.5 cm. All sepals puberulous or sericeous on outside. *Malay* . . . . . 29. *M. obtusifolia*  
 b. Petioles pubescent . . . . . 90
- 90.a. Outer sepals glabrous on outside. *Ceylon* . . . . . 7. *M. fulva*  
 b. Outer sepals pubescent on outside. *Malaya* . . . . . 33. *M. rufa*
- 91.(84).a. Stamens 32. Corolla-lobes 16. *Malaya, Borneo* . . . . . 1. *M. kunstleri*  
 b. Stamens 16—27. Corolla-lobes 8—10 . . . . . 92
- 92.a. Corolla entirely glabrous . . . . . 93  
 b. Corolla at least pubescent between the stamens . . . . . 94
- 93.a. Leaves spatulate to oblanceolate, 7—16 by 1.8—6 cm. Sepals pubescent on inside except for the most basal part. Corolla-lobes acutish. Stamens (18—)27. *Hainan* . . . . . 80. *M. hainanensis*  
 b. Leaves ovate-oblong to ovate-elliptic, 15—35 by 5.5—11 cm. Sepals glabrous on inside. Corolla-lobes obtuse. Stamens 16. *New Guinea* . . . . . 19. *M. leucodermis*
- 94.a. Stipules small, less than 4 mm long . . . . . 95  
 b. Stipules large, over 7 mm long . . . . . 97
- 95.a. Leaves sparsely ferruginously puberulous below. Secondary nerves 13—19 pairs. Pedicels 6—8 mm long. Sepals crested. Petioles ultimately glabrous. *Sumatra* . . . . . 10. *M. aspera*  
 b. Leaves densely cinnamomously or greyish tomentose-sericeous or sericeous below. Secondary nerves 17—30 pairs. Pedicels 1.4—3.5 cm long. Sepals not crested. Petioles remaining pubescent . . . . . 96
- 96.a. Secondary nerves 17—25 pairs. Tertiary nervation reticulate, sometimes with a few, irregular transverse ones near the arches. Pedicels 1.6—2.4 cm long. Corolla 8-lobed, pubescent on outside except along the margin of the lobes. Stamens 16. *Malaya, Sumatra, Borneo* . . . . . 78. *M. dubardii*  
 b. Secondary nerves 23—30 pairs. Tertiary nervation transverse with a distinct reticulation in between, often one nerve more distinctly developed and parallel to the secondary nerves. Pedicels 2.5—3.5 cm long. Corolla 8—10-lobed, glabrous on outside. Stamens 20. *Malaya* . . . . . 39. *M. penicillata*
- 97.a. Secondary nerves 28—35 pairs. Pedicels 4—7 mm long. *Borneo* . . . . . 9. *M. sarawakensis*

- b. Secondary nerves 15—23 pairs. Pedicels 5—28 mm long. Ovary 8-celled . 98
- 98.a. Stipules broadly ovate-elliptic, up to 8 by 5 mm, crested. Leaves brownish woolly below. Secondary nerves ascending at an angle of c. 70°. Petioles 1.2—1.7 cm long. Pedicels 0.5—1.1 cm long. *Sumatra* . . . 11. *M. magnifolia*
- b. Stipules linear, up to 12 by 1.5 mm, not crested. Secondary nerves ascending at an angle of 55°—60°. Petioles 2—4 cm long. Pedicels 1.2—2.8 cm long . 99
- 99.a. Leaves chartaceous, acutely acuminate, secondary nerves 19—22 pairs. Pedicels 2—2.8 cm long, pale yellowish brown tomentose. *Borneo* . . . 5. *M. borneensis*
- b. Leaves coriaceous, obtuse to short obtusely acuminate, secondary nerves c. 16 pairs. Pedicels 1.2—1.7 cm long, brownish woolly-tomentose. *Borneo* . . . 21. *M. eriobrachyon*
- 100.(83).\*)a. Stipules small, up to 5 mm long . . . . . 101
- b. Stipules large, over 7 mm long . . . . . 114
- 101.a. Corolla glabrous on outside or with a few hairs between the bases of the lobes . . . . . 102
- b. Corolla pubescent on outside over the main part . . . . . 110
- 102.a. Corolla glabrous on inside . . . . . 103
- b. Corolla at least on inside pubescent between the stamens . . . . . 106
- 103.a. Corolla 16- or 17-lobed. Stamens 33—37. *Malaya* . . . . . 23. *M. ridleyi*
- b. Corolla up to 12-lobed. Stamens less than 30 . . . . . 104
- 104.a. Petioles 7—10 mm long. Corolla 11- or 12-lobed. Filaments of stamens geniculate at apex. All flowers crowded at tip of branchlets. *Travancore* . . . . . 56. *M. bourdillonii*
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- b. Leaves ovate-oblong to ovate-elliptic, 15—35 by 5.5—11 cm. Petioles and pedicels sericeously pubescent. Stamens 16. Ovary 8-celled. Style 2.4—2.7 cm long. *New Guinea* . . . . . 19. *M. leucodermis*
- 106.a. Secondary nerves 23—30 pairs. Pedicels 2.5—3.5 cm long. Stamens 20. Ovary densely villose. *Malaya* . . . . . 39. *M. penicillata*
- b. Secondary nerves 10—22 pairs. Pedicels 0.6—1.5 cm, but if longer (up to 3.2 cm) then secondary nerves 14—17 pairs, stamens 28 and ovary glabrous . 107
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- b. Stamens 16—28 . . . . . 108
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\*) In 56. *M. bourdillonii* the stipules are unknown but from the scars it is likely that they are smaller than 4 mm.

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- b. Leaves 7—25 by 2—9 cm. Secondary nerves 9—18 pairs. Corolla-lobes 8 or 9. Stamens 16—30. Pedicels 2.5—7.5 cm long. Petioles 1.3—6 cm long. *India, Ceylon, Burma* . . . . . 32. *M. longifolia*

1. *M. kunstleri* (Brace) H. J. Lam, l. c. 1925, 158; Ridley, Fl. Mal. Pen. 5, 1925, Suppl., 319; Lam, l. c. 1927, 444 — *Bassia kunstleri* Brace in King & Gamble, Journ. As. Soc. Bengal 74, 2, Extra 17, 1905, 178; Ridley, Fl. Mal. Pen. 2, 1923, 267 — Fig. 1.

Trees up to 20 m. Branchlets slender, terete, c. 3 mm in diam., ferruginously sericeous at apex only, otherwise glabrous; terminal cone up to 3 mm long; stipules lanceolate, up to 2 by 1 mm, sericeous on outside, glabrous on inside, caducous. *Leaves* scattered, elliptic or elliptic-oblong, 10—18 by 4—5.5 cm, obtusely acuminate at apex, cuneate at base, decurrent along sides of petiole; thin-coriaceous, glabrous except sometimes for a pubescence on underside of midrib; midrib angular and prominulous above, rounded and prominent below, secondary nerves 15—20 pairs, ascending at an angle of c. 55°, curved, archingly joined at apex and outside the arches forming a second series of arches, inconspicuous above, prominent below, tertiary nerves reticulate but subtransverse near arches, often with one nerve parallel to the secondary nerves, inconspicuous above, distinct below. Petioles 2—3.5 cm long, flat above, rounded below, glabrous, thickened and striate in the basal part. *Flowers* 1—3 in the apical axils of leaves, pedicel terete, 8—15 mm long, dark brown tomentose. *Sepals* suborbicular, 4—6 by 4—6 mm, rounded, brown tomentose on outside, glabrous on inside, inner sepals with membranous, glabrous, fimbriate margins. *Corolla* seen in bud only, c. 2.5 mm long, ferruginously sericeous on outside of lobes, otherwise glabrous, lobes 16, obovate or spatulate, c. 1.5 by 1 mm, obtuse. *Stamens* 32, in 3 whorls, c. 1 mm long, filaments subulate, c. 0.5 mm long, glabrous, anthers sagittate, c. 1 mm, acute, scattered ferruginously hirsute, connective prolonged c. 0.3 mm. *Ovary* disciform-ovoid, c. 0.5 by 1 mm, 8-celled, ferruginously hirsute, style subulate c. 2 mm long, glabrous. *Fruits* ovoid, 2—2.5 by 1—1.5 cm, at apex with a long remnant of style, 1-seeded, pubescent, albumen thin.

Type specimen: *Kunstler s.n.* in SING.

Distribution: Malaya, Borneo.

MALAYA. Perak, Larut: *King's Coll. 6410* (K, L, SING), fl. buds Aug.; ibidem: *King's Coll. 3241 & 3547* (K), fl. & fr.; Taiping Hills: *Kunstler s.n.* (SING), fl. & fr.; Tea Gardens: *Derry & Curtis 3694* (K, SING), fr. Oct.; ibidem: *Ridley 5536* (K), fr. June.

BORNEO. Sarawak, Temengoh Forest Res.: *Egon 980* (SING), incompl. fl. Sept.



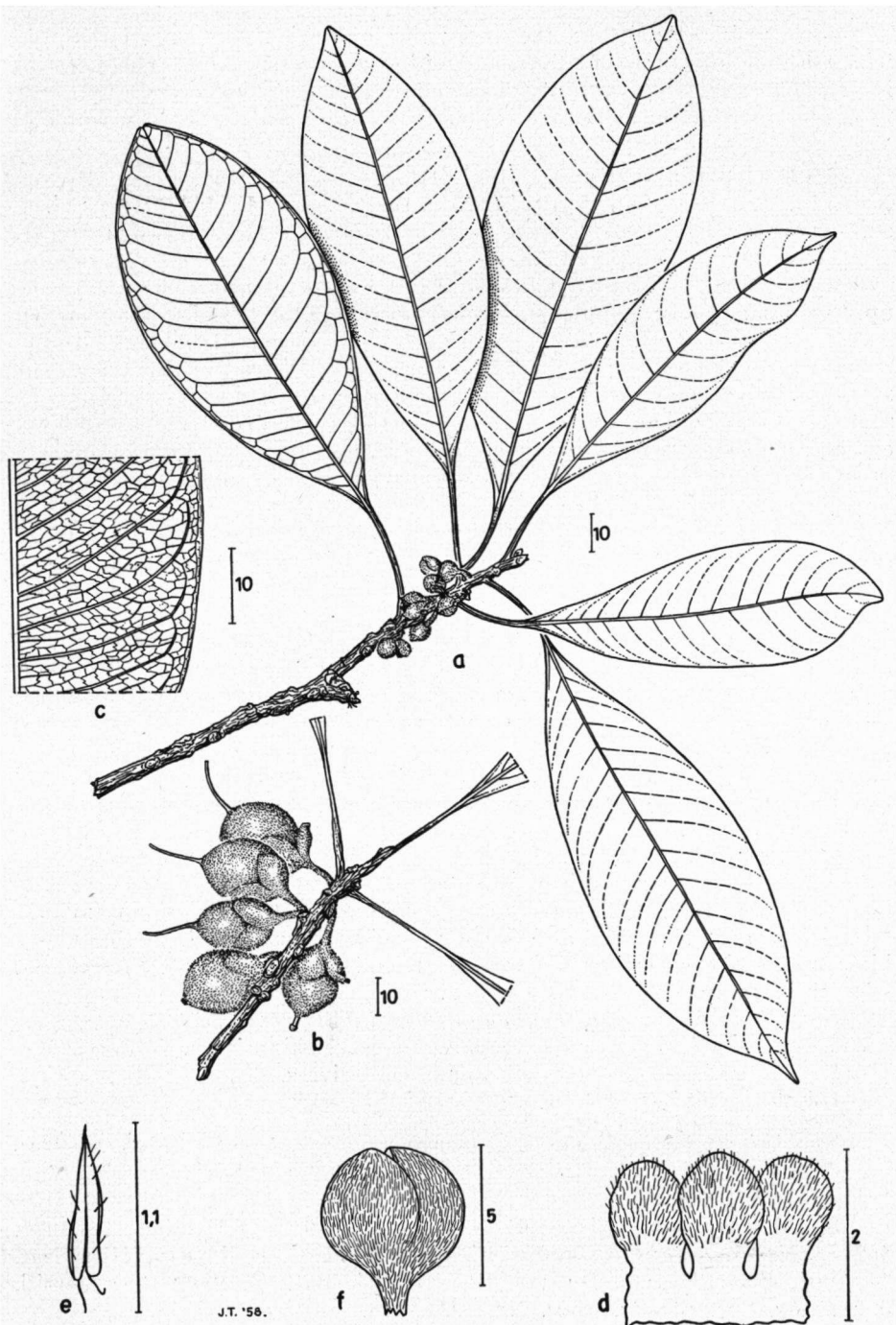


Fig. 1. *M. kunstleri*, a. branchlet with leaves and flowerbuds, b. fruits, c. part of leaf showing tertiary nervation, d. part of corolla, outside, e. stamen, f. flowerbud, (a, d-f after *King's Coll. 6410*, b, c after *Ridley 5536*).

**Remarks.** Analysing the ovary the impression was gained that the cells continue into the style, thus placing the species in *Ganua*. The material is so young that full certainty does not exist about this detail.

The distribution in Borneo is doubtful since the material is incomplete.

**2. *M. lancifolia* (Burck) H. J. Lam, l. c. 1925, 158, f. 42; Heyne, Nutt. Pl. Ned. Ind., ed. 2, 1927, 1231; Lam, l. c. 1927, 444; Heyne, l. c., ed. 3, 1950, 1231 — *Payena lancifolia* Burck, Med. 's Lands Pl. 3, 1886, 41.**

**Trees.** Branchlets stout, 4—8 mm in diam., ferruginously sericeous, pubescence long persistent but branchlets ultimately glabrous; terminal cone up to 10 mm long; stipules lanceolate, up to 9 by 2 mm, sericeous on outside, glabrous on inside, caducous. *Leaves* scattered, oblong, elliptic-oblong, ovate-oblong or obovate, 15—55 by 5.5—15 cm, obtuse, acute or short obtusely acuminate at apex, rounded to broadly cuneate at base, very shortly decurrent along upper surface of petiole; coriaceous, glabrous above, cinnamomously sericeous-tomentose below; midrib broad and shallowly grooved and broadly crested as well, stoutly prominent and rounded below, secondary nerves (22—)30—50 pairs, ascending at an angle of 70°—75°, straight or S-shaped and curved at their tips only, diminishing until inconspicuous near margin, prominent above, stronger so below, tertiary nerves transverse, with one nerve parallel to the secondary nerves but not reaching the margin, prominent on either side. Petioles 3.5—7 cm long, narrowly grooved above, thickened in the basal part, pubescent but ultimately glabrous. *Flowers* in fascicles of 5—10, axillary, pedicels angular, 12—16 mm long, ferruginously sericeous. *Sepals* ovate-triangular, 4—7 by 5—7 mm, acute, inner ones obtuse and broader, outer sepals ferruginously sericeous on outside, puberulous on inside, except for a central part, inner sepals sericeous on outside but with membranous, glabrous and fimbriate margin. *Corolla* 5—7 mm long, glabrous except ferruginously woolly between the stamens, lobes 10—14, oblong, 3.5—4 by c. 1 mm, obtuse. *Stamens* 22—28, in 2 rows, c. 3.5 mm long, filaments subulate, c. 0.5 mm long, ferruginously hirsute, anthers ovate-lanceolate, c. 2 mm long, with scattered ferruginous hairs, connective c. 0.5 mm prolonged past the anther, acute. *Ovary* disciform or conoid, 10—14-celled, ferruginously hirsutulous, style clavate-subulate, 8—9 mm long, glabrous. *Fruit* not seen, according to Burck 1—3-seeded.

**Type specimen:** *Teysmann 8648* in BO.

**Vernacular names:** Arong-arong, kelaki, njatoh.

**Ecology:** On marshy soil along small rivers.

**Distribution:** Borneo.

**Sandakan, Kinabatangan distr., Daramakud: SAN 16864** (L, SAN), tree 10 m, fl. April — **Indonesian Borneo, Sintang: Teysmann 8648** (BO, K, L), tree fl.

**3. *M. costulata* (Pierre) H. J. Lam, l. c. 1925, 181; Lam, l. c. 1927, 462 — *Kakosmanthus costulatus* Pierre in Dubard, Bull. Mus. Hist. Nat. 14, 1908, 406; Pierre in Dubard, Rev. Gén. de Bot. 20, 1908, 198; Merrill, Journ. As. Soc. Straits, Spec. Nr, 1921, 478.**

**Trees?** Branchlets slender, angular, 1.5—3.5 mm in diam., ferruginous-

ly sericeous-tomentose, very soon becoming glabrous; terminal cone up to 2 mm long, ferruginously tomentose; stipules? *Leaves* subconferted at tip of branchlets, elliptic or elliptic-obovate, 11—17 by 2.5—5 cm, obtusely acuminate at apex, narrowly cuneate at base, decurrent along upper side of petioles; thin-coriaceous, glabrous; midrib narrowly crested above, prominent and rounded below, secondary nerves 12—14 pairs, straight or slightly curved, ascending at an angle of c. 40°, archingly joined, impressed above, stoutly prominent below as are the arches, tertiary nerves very slender though distinct, transverse. Petioles 1.6—2.1 cm long, grooved above and narrowly crested in the apical half, the basal half thickened, rugulose and lighter coloured, glabrous. *Flowers* in 4—6-flowered, axillary inflorescences, pedicels angular, 7—11 mm long, pale ferruginously sericeous-tomentose. *Sepals* broadly ovate, 3.5—5 by 4—4.5 mm, obtuse or subobtuse, pale ferruginously sericeous-tomentose on outside, glabrous on inside, inner sepals with membranous, glabrous and fimbriate margins, outer sepals recurved in fruit. *Corolla* 7—9-lobed, 4—5.5 mm long, (pubescence?), lobes linear-oblong, 2.5—3 by 1—1.5 mm, obtuse. *Stamens* 14, 3—3.5 mm long, filaments subulate, 1—1.5 mm long, (pubescence?), anthers linear-oblong, c. 3 mm long, subtruncate or narrowed at apex, obtuse, tomentose, dehiscing laterally. *Ovary* ovoid, c. 2 by 1 mm, 7—8-celled, glabrous, style filiform, 3—6 mm long, glabrous. *Fruits* ellipsoid, 2—2.5 by 0.8—1.3 cm, obtuse at apex and crowned by a short remnant of the style, one-seeded, pericarp fleshy, glabrous, seeds ellipsoid, 1.5—2.2 by 0.5—1 by 0.3—0.5 cm, obtuse at apex, subacute at base, scar linear. Endosperm thin, cotyledons thick.

Type specimen: *Beccari 3000* in P.

Distribution: Borneo (Sarawak).

Sarawak, without known loc.: *Beccari 3000* (FI, K, P), fl. & fr.

4. *M. mindanaensis* (Merrill) Merrill, Enum. Phil. Fl. Pl. 3, 3, 1923, 277; H. J. Lam, l. c. 1925, 175, 264, f. 48; Lam, l. c. 1927, 455 — *Bassia mindanaensis* Merrill, Phil. J. Sc., Bot., 10, 1915, 58.

Trees, up to 15 m high. Branchlets slender, angular, 2—3.5 mm in diam., ferruginously woolly but ultimately glabrous and then whitish; terminal cone up to 4 mm long, woolly; stipules lanceolate, deltoid or ovate, 6—8 by 3—5 mm, acute, sometimes crested on the outside, woolly on the outside but often glabrous along the margins and the latter sometimes fimbriate, glabrous on inside, soon caducous. *Leaves* scattered, elliptic-obovate or obovate, sometimes oblong, 10—28 by 3.6—9.5 cm, obtuse at apex and distinctly obtusely acuminate, base broadly cuneate, shortly decurrent along upper side of petiole, sometimes slightly oblique; subcoriaceous, glabrous on either side; midrib grooved above and minutely obtusely crested, prominent and rounded below, secondary nerves 11—17 pairs, ascending at an angle of 45°—60°, curved or straight and curved at their tips only, distinctly archingly joined, impressed above as are the arches, stoutly prominent below as are the arches, tertiary nerves slender, transverse, above hardly visible, prominulous but distinct below. Petioles 1—3 cm long, shallowly grooved above mainly in the apical part, rounded below, thickened and rugulose in the basal part, sparsely greyish or ferruginously woolly but ultimately glabrous. *Flowers* solitary or in 2—9-

flowered, axillary clusters, sometimes inserted on two warts, pedicels slender, angular, 1—3.5 cm long, whitish, yellowish or ferruginously tomentose-sericeous. Outer *sepals* broadly ovate, 6—8 by 4.5—6.5 mm, acute, pale ferruginously sericeous on outside and with longer ferruginous hairs, glabrous on inside, inner sepals densely pale ferruginously or whitish sericeous on the outside, glabrous on the inside, with glabrous, membranous, fimbriate margins, all sepals with a plumule of darker hairs at the apex. *Corolla* 9—11 mm long, sparsely whitish villose on outside, densely woolly between the stamens, lobes 8, oblong-lanceolate, 5—7 by 1.5—2 mm, obtuse. *Stamens* c. 30, c. 3 mm long, filaments subulate, c. 1 mm long, woolly, anthers lanceolate, 2.5—4 mm long, acuminate, ferruginously hirsute-sericeous, dehiscent extrorsely. *Ovary* disciform, c. 1 by 1.2 mm, 8-celled, glabrous, style filiform, 8—11 mm long, glabrous. *Fruits* fusiform, 2—3.2 by 1—1.2 cm, acute at apex and crowned by a remnant of the style, 1-seeded, pericarp thin, fleshy, glabrous, seeds ellipsoid, laterally compressed, 1.5—2.7 by 0.6—0.8 cm, acute at either end, testa thin, scar narrow, linear, albumen thin, cotyledons thick, fleshy.

Type specimen: *Miranda* FB 17977 in PNH.

Lectotype specimen: *Elmer* 20596 in L.

Vernacular name: antagiras (Sandakan).

Ecology: In primary forests at low altitudes.

Distribution: Mindanao, Borneo.

MINDANAO. Misamis, in primary forests at low altitudes: *Miranda* FB 17977, f. Merrill 1923.

BORNEO. Sandakan, Elphinstone prov., Tawao: *Elmer* 20435 (BM, K, L, P, S, SING, U), 20596 (BM, K, L, P, S, SING, U), 20801 (BM, K, L, P, S, SING, U), fl. Oct./March; Sabah For. Distr., Mempikit, Keningau, swamp, 160 m alt.: *Angian* 10506 (K, L), tree 9 m, fl. June; without known loc.: *Wood* 1969 (SING), fl.; ibidem: *Agama* 586 (K), fl. Aug. — Indonesian Borneo, W. Kutai, L. Puhus, alt. 80 m: *Endert* 2438a & 2455 (BO, L), fl. Aug.; ibidem, alt. 100 m: *Endert* 4936 (BO, K, L), fr. Nov.; ibidem, alt. 80—100 m: *Endert* 4809 (BO, L, P, SING, U), fl. Nov.

Remark. Since the type specimen probably is destroyed and no duplicates of it have been traced another type specimen had to be selected.

5. *M. borneensis* van Royen, n. sp. — *M. betis* (Blanco) Merrill, Lam, l. c. 1925, 161, p.p. — Fig. 2.

Arbor. Ramuli dense pallide luteo-castanei, tomentosi, glabrescentes; stipulae lineares, acutae, caducae. Folia ad ramulorum apices conferta, lanceolata vel obovata, 15—40 × 6—13 cm, acute acuminata, basi cuneata vel subrotundata, novella utrinque pubescentia, supra costa excepta glabrescentia, subtus pallide brunnea, brunnea vel luteo-brunnea, hirsuto-tomentosa; nervi secundarii utroque latere 19—22, anastomosantes, tertiarii transversarii; petioli 2—5 cm longi, dense pubescentes. Pedicellus 2—2.8 cm longus, pallide luteo-brunneo-tomentosus. Sepala 4, oblongo-ovata vel elliptica, obtusa vel subacuta, carinata, extus tomentosolana, intus glabra. Corolla 8-lobata, extus parte longitudinali centrali loborum excepta glabra, ad faucem lanata. Stamina 16—20; filamenta glabra; antherae ferrugineo-pubescentes. Ovarium ovoideum vel globosum, 8-loculare, pubescens; stylus glaber. Fructus ignotus. Typus: Jaheri s.n. in L.

Trees, up to 31 m. Branchlets terete, 5—7 mm in diam., densely pale yellowish brown tomentose, pubescence persisting but ultimately disappearing; terminal cone up to 12 mm long, stipules linear, up to 11 by

1.5 mm, acute, densely tomentose on outside, glabrous on inside, caducous. *Leaves* conferted at tip of branchlets, lanceolate to obovate, 15—40 by 6—13 cm, acutely acuminate, base cuneate to subrotundate; chartaceous, glabrous above except along the midrib but the whole surface pubescent when young, light brown or brownish yellow hirsute-tomentose below but denser so on the midrib; midrib grooved above and minutely crested as well, prominent below, secondary nerves 19—22 pairs, ascending at an angle of 55°—60°, archingly joined near margin, grooved above, prominent below, tertiary nerves transverse, slender and inconspicuous above, prominent and stouter below. *Petioles* 2—5 cm long, flat or grooved above, rounded below, densely pubescent. *Flowers* in 4—7-flowered axillary clusters, pedicels angular, 2—2.8 cm long, thickened towards apex, pale yellowish brown tomentose. *Sepals* oblong-ovate or elliptic, 5—6.5 by 4—6 mm, obtuse or subacute, crested on outside, pale yellowish brown tomentose-woolly on outside, glabrous on inside, inner sepals more obovate and with membranous, glabrous and fimbriate marginal parts. *Corolla* 6—8 mm long, glabrous on outside except for a longitudinal area of ferruginous hairs along the middle-line of the lobes and on inside ferruginously woolly between the stamens, lobes 8, lanceolate or elliptic, 4—5 by 1.5—2.5 mm, obtuse. *Stamens* 16—20, 3—7 mm long, filaments 1.5—3 mm long, glabrous, anthers oblong-ovate, connective prolonged, truncate and shortly bifid at apex, ferruginously hairy. *Ovary* ovoid or globose, c. 2.5 by 2 mm, 8-celled, ferruginously hirsute, at base surrounded by a thick ring of ferruginous hairs. *Style* subulate, 10—13 mm long, glabrous. *Fruits* unknown.

Type specimen: *Jaheri s.n.* in L.

Distribution: Borneo.

BORNEO. Without known loc.: *Jaheri s.n.* (BO, L), fl.

**Remarks.** This species is related to *M. betis* and *M. eriobrachyon*, but differs from the first in the archingly joined secondary nerves, and in the pubescent corolla and ovary. From the second species it differs in the larger leaves, the acutely acuminate apex of these and the broader sepals.

6. *M. elmeri* Merrill ex H. J. Lam, l. c. 1927, 460; Merrill, Pl. Elm. Born. 1929, 239.

Tall trees. Branchlets subterete, 3—5 mm in diam., densely ferruginously woolly but soon glabrous; terminal cone up to 6 mm long; stipules lanceolate to shield-like, up to 6 by 2 mm, acute, glabrous except on outside in the basal part, and sometimes along the middle-line at outside ferruginously sericeous, soon caducous. *Leaves* scattered to subconferted at tip of branchlets, elliptic or obovate-elliptic or elliptic-oblong, 13—29 by 5—10.5 cm, short abruptly obtusely acuminate at apex, cuneate at base and decurrent along upper surface of petiole; chartaceous to subcoriaceous, ultimately glabrous on either side, but scattered pale ferruginously woolly below when young; midrib grooved above and broadly minutely crested as well, prominent and rounded below, secondary nerves 20—24 pairs, ascending at an angle of c. 65°, curved and archingly joined at some distance from the margin, from the middle of the arches a nerve arising, diminishing until inconspicuous near margin, grooved above and minutely

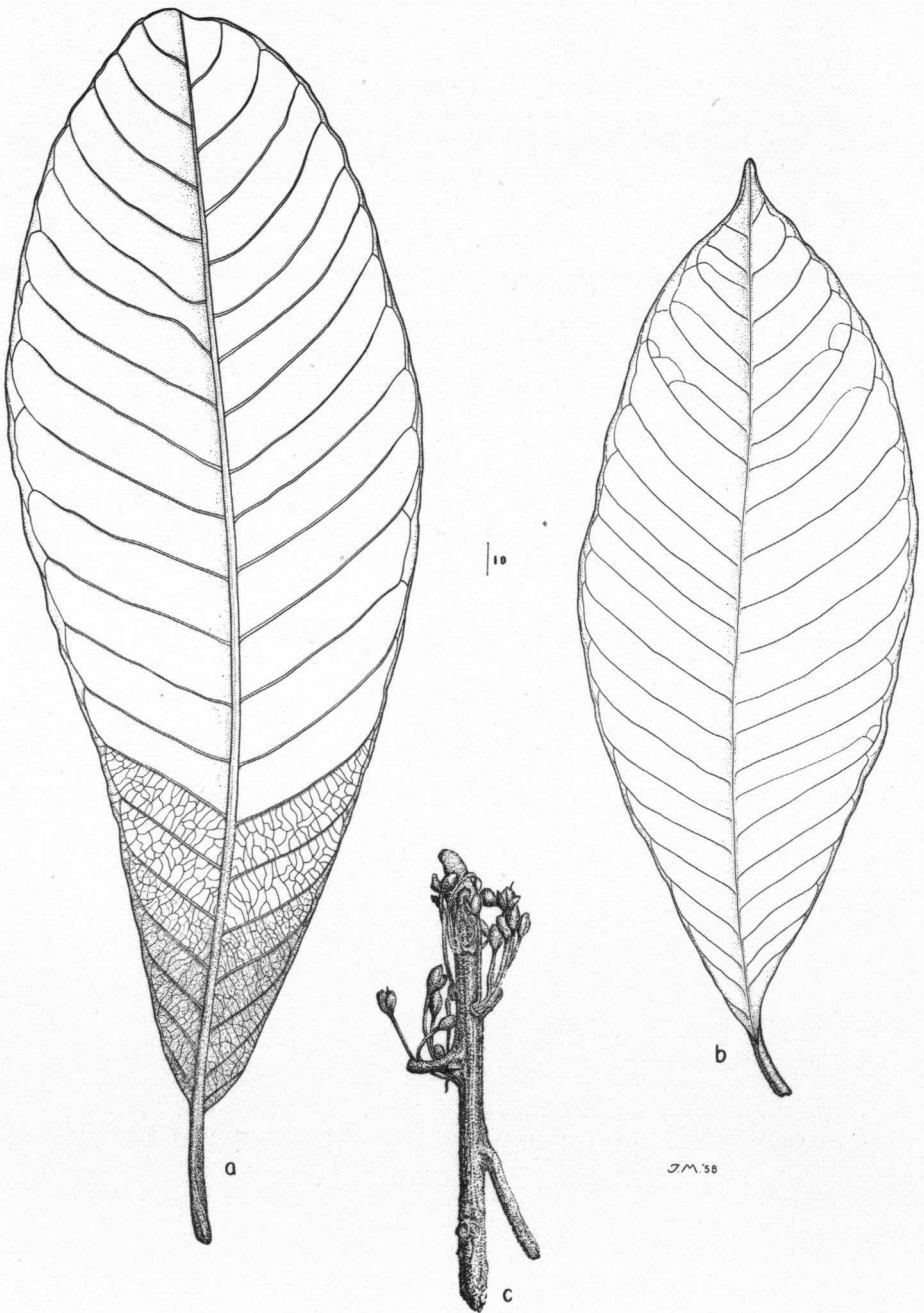


Fig. 2. *M. borneensis*, a, b. two different leaves, c. part of branchlet with incomplete flowers. (*Jaheri s.n.*).

crested as well, stoutly prominent below; tertiary nerves transverse and often one nerve parallel to the secondary nerves either reaching the next lowest secondary nerve or branching into some tertiary nerves, minutely grooved above, prominent below. Petioles 2—3 cm long, grooved above, rounded below, subamplexicaulous, ferruginously woolly below, otherwise glabrous. *Flowers* solitary or in 2—5-flowered bundles, axillary, pedicels angular, 1.3—1.8 cm long, ferruginously woolly. *Sepals* concavate, ovate-triangular, c. 7 by 7—8 mm, rounded and abruptly obtusely apiculate, greyish sericeous on outside, glabrous on inside, inner sepals more rounded at apex than outer sepals and with glabrous, membranous and fimbriate margins, crested on outside. *Corolla* seen in bud only, c. 4 mm long, glabrous but ferruginously hirsute between the stamens, lobes elliptic, c. 3 by 1.5 mm obtuse. *Stamens* 16—20, in 2 whorls, c. 2.5 mm long, filaments subulate, c. 0.5 mm long, with long ferruginous hairs, anthers oblong, c. 1 mm, connective prolonged and acumen also c. 1 mm long, both anther and acumen with long ferruginous hairs. *Ovary* globose, c. 2 mm in diam., 10—12-celled, glabrous, style filiform, 9—11 mm long, glabrous. *Fruits* unknown.

Type specimen: *Elmer 21172* in PNH.

Lectotype specimen: *Elmer 21172* in L.

Ecology: In forest at low altitude.

Distribution: Borneo (Sandakan).

Sandakan, Tawao, Elphinstone river: *Elmer 21172* (BM, BO, G, K, L, S, SING, U), fl. pale yellowish or greenish white.

Remarks. Merrill in *Plantae Elmerianae Borneenses* p. 238 mentions under *Palaquium* sp. the specimen *Elmer 21613*. Considering the leaves and stipules one will not hesitate to include that specimen in the present species but since the available fruits have a 6-lobed calyx, which point to a *Palaquium* species, it will be impossible to follow this course, unless the fruits do not belong to the specimen *Elmer 21613* and the fruits that belong to that specimen are stored somewhere else. The fact that not one single fruit in all the duplicates studied is attached to the branches, might support this view.

7. *M. fulva* (Thwaites) MacBride, *Contrib. Gray Herb. Harv. Univ.*, N. S. 53, 1918, 18 — *M. fulva* (Thwaites) H. J. Lam, l. c. 1925, 182 — *Dasyaulus fulvus* Thwaites, *Enum. Pl. Zeyl.*, 1864, 176; Dubard, *Rev. Gén. Bot.* 20, 1908, 200 — *Bassia fulva* (Thwaites) Beddome, *For. Man.* 1869, 140 — *Illipe fulva* (Thwaites) Engler, *Bot. Jahrb.* 12, 1890, 509.

Trees. Branchlets terete or subangular, 4—6 mm in diam., brown woolly-hirsute, ultimately becoming glabrous; terminal cone and stipules unknown. *Leaves* subconferted at tip of branchlets, broadly oblong-obovate, (8.5—)14—18 by 5—9 cm, rounded at apex, sometimes slightly obtusely or acutely acuminate, broadly cuneate or subrotundate at base, shortly decurrent along sides of petiole, thin-coriaceous, glabrous and bullate above, brown woolly below mainly on midrib and nerves; midrib narrowly crested above, prominent and rounded below, secondary nerves 11—13 pairs, ascending at an angle of 75°—80°, curved, archingly joined, grooved above,

stoutly prominent below, tertiary nerves consisting of one irregularly flexuose nerve parallel to secondary nerves and reaching the arches, from the curves of this tertiary nerves transverse nerves running to the secondary nerves, thus giving a transverse impression of the tertiary nerves, the latter grooved above, stoutly prominent below. Petioles 1.5—2.5 cm, flat above, rounded below, densely brown woolly-hirsute. *Flowers* in 3—7-flowered, axillary clusters, pedicels slender, angular, 2.5—3.5 cm long, glabrous. *Sepals* ovate, 5.5—6.5 by 3.5—5 mm, outer ones obtusely acuminate, inner ones rounded, outer ones glabrous on either side, plumose at apex, inner sepals densely brown woolly-hirsute on outside, glabrous on inside. *Corolla* and *stamens* unknown. *Ovary* oblong, c. 3 by 1 mm, 6-celled, glabrous, style filiform, c. 1.5 cm long, glabrous. *Fruits* unknown.

Type specimen: *Thwaites 3446* in K.

Distribution: Ceylon.

Hewessee, in the Pasdoon Corle: *Thwaites 3446* (BM, K), incomplete fl. May.

Remark. In spite of being incomplete the species is easily to recognize by its broad leaves with the striking pubescence at underside.

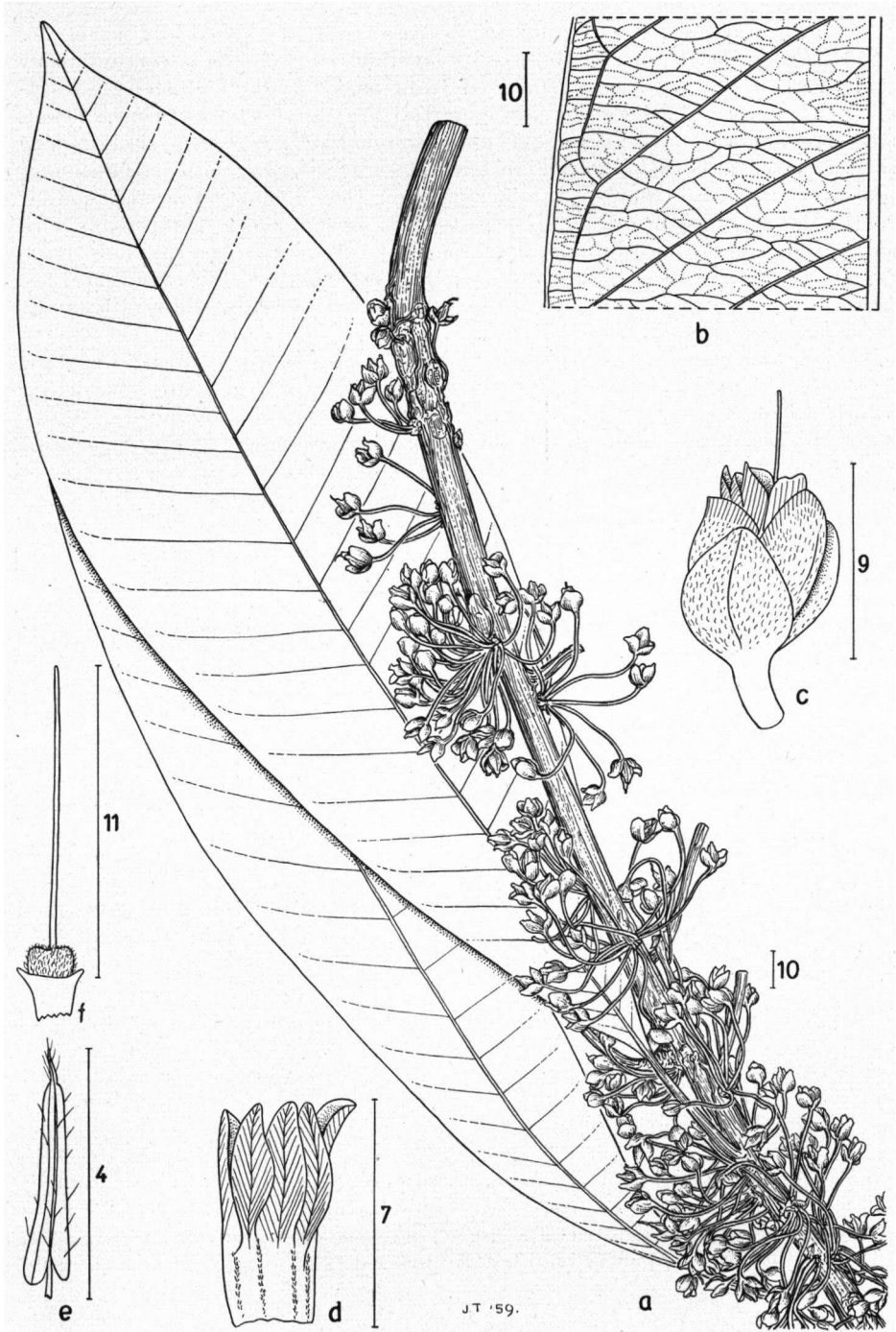
### 8. *M. spectabilis* van Royen, n. sp. — Fig. 3.

Arbor. Ramuli crassi, ferrugineo-tomentosi, glabrescentes; stipulae lanceolatae, acutae, cristatae, longe persistentes, sed ultimo caducae. Folia sparsa, anguste obovata, 25—48 × 8—14 cm, obtuse acuminata, basi angusta cuneata, glabra; nervi secundarii utroque latere 18—30, anastomosantes, tertiarum transversum. Petiolus 3.5—6 cm longus, glaber vel sparsissime ferrugineo-tomentosus. Pedicellus 1.5—4.5 cm longus, sparse ferrugineo-sericeus. Sepala 4, suborbiculari-ovata, rotundata vel subacuta, extus ferrugineo-sericea, intus glabra. Corolla 8- vel 9-lobata, extus linea alterni-petala ferruginea-pubescentia excepta glabra, ad faucem hirsuta. Stamina 18—21; filamenta glabra; antherae sparse ferrugineo-villosae. Ovarium discoideum, 8-loculare, ferrugineo-villosum; stylus glaber. Fructus ignotus. Typus: *NIFS bb 13911* in L.

Trees up to 26 m high. Branchlets stout, terete, 6—10 mm in diam., ferruginously tomentose but soon glabrous; terminal cone up to 25 mm long, stipules lanceolate, 15—20 by 4—6 mm, acute, crested on the outside, glabrous on either side, ciliate along the margin, relatively long persistent but ultimately caducous. *Leaves* scattered, narrowly obovate, 25—48 by 8—14 cm, obtuse and obtusely acuminate at apex, acumen c. 1 cm long, narrowly cuneate at base, decurrent along the upper side of the petiole; subcoriaceous, glabrous on either side; midrib prominulous and crested above, prominent and rounded below, secondary nerves (18—)24—30 pairs, ascending at an angle of c. 65°, curved or straight and curved at their tips only, archingly joined, distinct but hardly prominulous above and sometimes even grooved as are the arches, prominent below as are the arches, tertiary nerves transverse, slender, not distinct above, distinct but prominulous below, often with one nerve parallel to the secondary nerves but not reaching the arches. Petioles 3.5—6 cm long, indistinctly grooved above, rounded

Fig. 3. *M. spectabilis*, a. branchlet with leaves and flowers (upside down), b. part of leaf, showing tertiary nervation, c. flower, d. corolla, e. stamen, f. gynaecium. (*NIFS bb 13911*).





below in the apical part, angular in the basal part, thickened and sometimes rugose in the basal part, glabrous but sometimes very sparsely ferruginously tomentose. *Flowers* in many-flowered (8 or more) axillary clusters, pedicels slender, angular, 1.5—4.5 cm long, sparsely ferruginously sericeous. *Sepals* suborbicular-ovate, 5—7 by 5—7 mm, rounded or subacute, ferruginously sericeous on outside, glabrous on inside, inner sepals with membranous, glabrous, fimbriate margins and crested on the outside, otherwise similar to the outer sepals. *Corolla* hardly exsert, 7—8 mm long, glabrous on outside except for longitudinal, alternipetalous streaks of ferruginous hairs on the tube, on inside hirsute between the stamens but otherwise glabrous, lobes 8 or 9, narrowly and broadly elliptic in the same flower, 5—6 by 1—2.5 mm, obtuse, narrowed or cordate at base. *Stamens* 18—21, in 2 whorls, 3—4 mm long, filaments subulate, c. 0.5 mm long, glabrous, anther sagittate, 3—3.5 mm long, sparsely ferruginously villose, apex acuminate and denser villose, dehiscing laterally. *Ovary* discoid, 8-celled, ferruginously villose, style filiform, c. 10 mm long, glabrous. *Fruits* unknown.

Type specimen: *NIFS* bb 13911 in L.

Vernacular name: natu bulang, kijan (Borneo).

Ecology: A tree of low-lying areas.

Distribution: Borneo (Sandakan, Indonesian Borneo)

Sandakan, Kalibi-Sepilok For. Res.: *Keith* 4382 (SING), tree 8 m, fl. April, white; ibidem: *Otik* 4775 (SING), tree 5 m, fl. April, white.

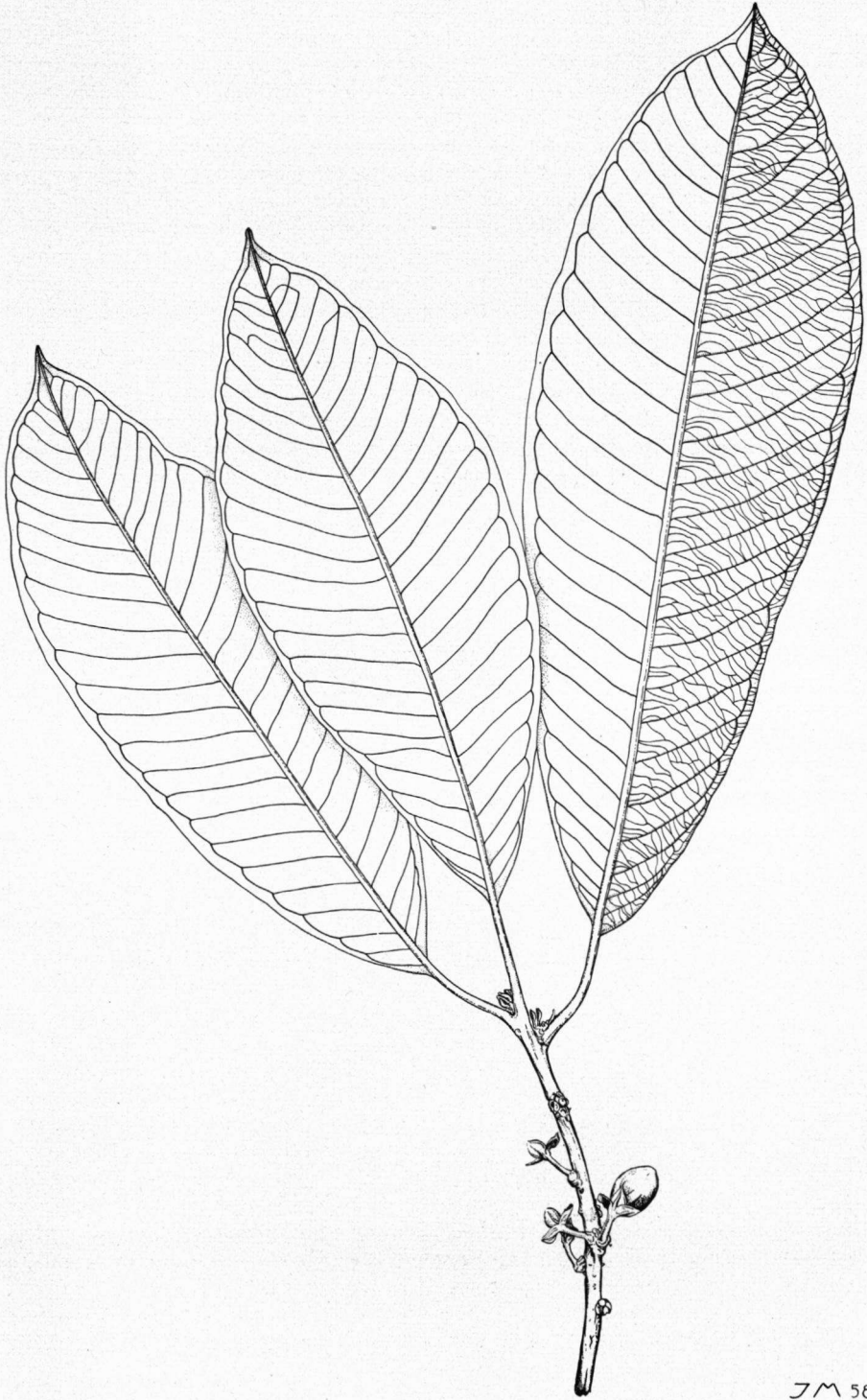
Indonesian Borneo, Balikpapan near Pantailangu Saloluang: *NIFS* bb 13911 (BO, L, SING), tree, fl. Nov.; ibidem: *NIFS* bb 34367 (BO, L), tree 18 m, Oct.; ibidem: *NIFS* bb 34285 (BO, L), tree 26 m, Sept.; W. Kutai, Muang, alt. 40 m: *NIFS* bb 12364 (BO, L), tree, Febr.; E. Kutai, Sg Menubar region, alt. 30 m, on ridge: *Kostermans* 5142 (BO, L), tree 20 m, fl. June, white; Upper Mahakam, Taliba: *NIFS* bb 26598 (A, BO, L, SING), tree 21 m, fl. Dec., yellow, fragrant.

Remark. The specific epithet is derived from the impressive leaves and flowers.

9. *M. sarawakensis* (Pierre) H. J. Lam, l. c. 1925, 180; Lam, l. c. 1927, 462 — *Kakosmanthus sarawakensis* Pierre in Dubard, Bull. Mus. Hist. Nat. 14, 1908, 407; Pierre in Dubard, Rev. Gén. Bot. 20, 1908, 198; Pierre in Fedde Rep. 9, 1911, 335; Merrill, Enum. Born. Pl., 1921, 479 — Fig. 4.

Trees. Branchlets relatively stout, terete or angular, 6—8 mm in diam., ferruginously sericeous but soon glabrous; terminal cone up to 10 mm long, ferruginously sericeous; stipules ovate-lanceolate, 9—11 by 3—4.5 mm, acute, crested, ferruginously sericeous on the outside mainly at the base and along the crest, glabrous on the inside, relatively long persistent but ultimately caducous. *Leaves* conferred at tip of branchlets, obovate or obovate-elliptic, 19—51 by 6—16 cm, short but distinct acutely acuminate at apex, broadly cuneate at base and slightly unequal, shortly decurrent along upper surface of petiole; chartaceous, glabrous above except sometimes sparsely puberulous along midrib, sparsely ferruginously tomentose below but denser so on midrib and lateral nerves; midrib impressed above and broad obtusely

Fig. 4. *M. sarawakensis*, branchlet with leaves and immature fruits. (Beccari 1178).



crested, prominent and rounded below, secondary nerves 28—35 pairs, ascending at an angle of  $60^{\circ}$ — $70^{\circ}$ , slightly curved or straight and curved at their tips only, archingly joined rather far from the margin, impressed above as are the arches, prominent below as are the arches, tertiary nerves slender, transverse, prominulous to impressed above, prominulous to prominent below. Petioles 2.5—5.5 cm long, slightly flattened above, rounded below, thickened in the basal part, ferruginously sericeous but ultimately glabrous. *Flowers* in 7—10-flowered, axillary clusters, pedicels stout, angular, 4—7 mm long, in fruit up to 10 mm long and slightly thickened, ferruginously tomentose-sericeous. *Sepals* ovate-lanceolate, 8—9 by 3.5—5 mm, subacute at apex, all sepals crested, ferruginously sericeous-tomentose on outside, ferruginously puberulous on the inside except for a basal spot, inner sepals with membranous, glabrous, fimbriate margins. *Corolla* seen in bud only, 5.5—6 mm long, outside glabrous, ferruginously woolly on inside, lobes 8 or 9, oblong, c. 4 by 1 mm, obtuse. *Stamens* 13—16, in 2 whorls, c. 4 mm long, filaments subulate, c. 0.3 mm long, ferruginously villous, anthers narrowly sagittiform, c. 4 mm long, ferruginously villose, dehiscing laterally. *Ovary* ovoid, c. 1 by 1.5 mm, 9-celled, ferruginously hirsute, style filiform, c. 3 mm long, glabrous. *Fruits* ellipsoid, 1.5—1.7 by 1.3—1.5 cm, obtuse, one-seeded, pericarp fleshy, densely ferruginously tomentose, seeds incompletely known only.

Lectotype specimen: *Beccari 423* in P.

Distribution: Borneo (Sarawak).

Sarawak, Kuching: *Beccari 423* (FI, L, P), fl. Aug.; ibidem: *Beccari 1178* (FI, K, P), fr. Dec.; Mattang: *Beccari 2069* (FI, P), July.

10. *M. aspera* H. J. Lam, l. c. 1925, 174, f. 47; Heyne. Nutt. Pl. Ned. Ind., ed. 2, 1927, 1230; Lam, l. c. 1927, 453.

Small trees. Branchlets irregularly terete, 4.5—6 mm in diam., ferruginously puberulous but soon glabrous; terminal cone up to 6 mm long, puberulous; stipules ovate-lanceolate, up to 4 by 2.5 mm, obtuse, puberulous on outside, glabrous on inside, caducous. *Leaves* scattered, obovate or elliptic-obovate, 14—23 by 7.5—12.5 cm, obtusely acuminate, acumen up to 5 mm long, rarely obtuse or acutely acuminate, base broadly cuneate or subrotundate, shortly decurrent along upper side of petiole; subcoriaceous, glabrous and bullate above, sparsely ferruginously puberulous below but stronger so on the nerves; midrib grooved above and minutely crested, prominent and rounded below, secondary nerves 13—19 pairs, slightly curved, ascending at an angle of  $60^{\circ}$ — $70^{\circ}$ , archingly joined, grooved above, stoutly prominent below, tertiary nerves transverse, relatively widely spaced, grooved above, prominent below. Petioles 1.5—2.5 cm, thickened in the basal part, ferruginously puberulous but ultimately glabrous. *Flowers* 1 to few, axillary, below the leaves, pedicels 6—8 mm long, densely cinnamously tomentose. Outer *sepals* broadly ovate, 5—6.5 by 5—5.5 mm, subobtuse, inner sepals orbicular, slightly smaller than the outer ones, rounded, all sepals crested and densely cinnamomous-tomentose on outside, glabrous on inside but the outer ones tomentose along the margin, inner ones fimbriate and membranous along margin. *Corolla* 5—8 mm long, almost entirely glabrous on outside except for a few scattered hairs on the tube, ferrugin-

ously hirsute on inside between the stamens, lobes 8, narrowly ovate to spatulate, 3—3.5 by 1.5—2 mm, obtuse or rounded. *Stamens* 16—20, 2.5—3.5 mm, anthers narrow, c. 1.5 mm long, gradually passing into the up to 1 mm prolonged acute connective, ferruginously hirsute, dehiscing laterally, filaments subulate, c. 1 mm long, ferruginously hirsute. *Ovary* disciform, 8-celled, c. 0.5 by 1.5 mm, ferruginously villose, style filiform, 7—9 mm long, glabrous. *Fruits* unknown.

Type specimen: *Lambach 1320* in BO.

Vernacular name: mēdang bambang lanang.

Distribution: Sumatra.

SUMATRA. Palembang, Lematang Ulu, alt. 150 m: *Lambach 1320* (BO, L), fl. Dec.

Remarks. The specimen from Borneo mentioned by Lam in 1927 (*van Romburgh 36*) certainly does not belong to this species as the number of secondary nerves is larger (c. 25), the petioles shorter (up to 1.3 cm) and the pubescence of the branchlets is persistent. Also the leaf is acutely acuminate. This specimen is now included in *Palaquium beccarianum* (Pierre) van Royen.

11. *M. magnifolia* (King) Moore, Journ. of Bot. 64, 1926, Suppl., p. 147 — *Bassia magnifolia* King, Journ. of Bot. 63, 1925, Suppl., p. 60 — *M. magnifolia* (King) H. J. Lam, l. c. 1927, 447.

Trees c. 16 m high. Branchlets stout, angular, 3—8 mm in diam., brownish tomentose, becoming glabrous; terminal cone up to 7 mm long, stipules broadly ovate-elliptic, up to 8 by 5 mm, acute, crested, brownish woolly at the base on outside, glabrous on inside, caducous. *Leaves* scattered, obovate or obovate-oblong, 18—30 by 8—14 cm, rounded and short obtusely acuminate at apex, acumen c. 1 cm long, base broadly cuneate to subrotundate, decurrent along the upper side of the petioles, chartaceous, glabrous above except sometimes along the midrib, brownish woolly below, mainly on the midrib and veins; midrib grooved above and distinctly crested as well, prominent and rounded below, secondary nerves 15—21 (—23) pairs, ascending at an angle of c. 70°, straight but curved at their tips, distinctly archingly joined, impressed above as are the arches, stoutly prominent below as are the arches, tertiary nerves transverse, slender, prominulous above, stoutly prominent below. Petioles 1.2—1.7 cm long, grooved above in the apical half, thickened and sometimes rugulose in the basal half, yellowish brown tomentose mainly in the basal half and below. *Flowers* in axillary fascicles of 2 or 3, or solitary, pendulous, pedicels angular, 5—11 mm long, brownish tomentose. *Sepals* elliptic-ovate or broadly ovate, 5—8 by 4.5—6.5 mm, tomentose on outside, tomentose on inside along the margins only, inner sepals narrower than outer ones, crested, with glabrous and membranous margins, entirely glabrous on inside. *Corolla* c. 8 mm long, 8-lobed, glabrous on outside, pale yellowish woolly on inside between the stamens, lobes oblong, c. 5 by 2 mm, obtuse. *Stamens* 24, in three whorls, 3.5—5 mm long, filaments subulate, c. 1 mm long, yellowish villose, anthers sagittate, 1.5—2 mm long, with a 1 mm long acumen at apex, dehiscing extrorsely, with scattered yellowish hairs. *Ovary*

globose, c. 2 mm in diam., 8-celled, pale brownish yellow villose, style stout, subulate, 8—10 mm long, glabrous. *Fruits* glabrous.

Type specimen: *Forbes 3091* in K.

Distribution: Sumatra.

SUMATRA. Muara Mengkulem, Mt Rawas, alt. 135 m: *Forbes 3091* (K, SING), fl.

## 12. *M. sessiliflora* van Royen, n. sp. — Fig. 5.

Arbor. Ramuli suberassi, lanato-hirsuti, glabrescentes; stipulae lineares, acutae, longe persistentes, sed ultimo glabrescentes. Folia alterna vel apice ramulorum subconferta, elliptica vel elliptico-obovata, 18—32 × 6—10 cm, obtuse vel acute acuminata, basi anguste cuneata, ultimo glabrescentia; nervi secundarii utroque latere 15—20, anastomosantes, tertiarii reticulati cum nervis transversis sparse interspersi. Petiolus 1.5—3 cm longus, initio lanato-hirsutus, demum glabrescens. Pedicellus 1—1.5 mm longus vel brevior, dense brunneo-lanato-hirsutus. Sepala ovata-lanceolata, 6—8 × 2—3 mm, obtusa, extus cinnamomeo-lanato-hirsuta, intus glabra. Corolla 6-lobata, glabra, sed apice loborum fimbriata. Stamina 12, filamenta ferrugineo-lanata; antherae glabrae. Ovarium ovoideum, sensim in stylum contractum, 5- vel 6-loculare, glabrum. Fructus ignotus. *Typus*: *Corner 29024* in SING.

Small trees, up to 6 m. Branchlets irregularly terete, 3—4 mm in diam., light brown or brown woolly-hirsute, but ultimately glabrous; terminal cone up to 8 mm long, woolly-hirsute; stipules linear, up to 7 by 1 mm, acute at apex, woolly-hirsute on outside, glabrous on inside, relatively long persistent, but ultimately caducous. *Leaves* scattered to subconferted at tip of branchlets, elliptic or elliptic-obovate, 18—32 by 6—10 cm, obtusely or acutely acuminate at apex, narrowly cuneate at base, decurrent along sides of petiole; coriaceous, ultimately entirely glabrous, the underside of the midrib the last to become glabrous; midrib distinctly prominent and often narrowly crested above, stoutly prominent and rounded below, secondary nerves 15—20, ascending at an angle of c. 80°, curved, archingly joined, often grooved above as are the arches but sometimes prominulous, stoutly prominent below as are the arches, tertiary nerves reticulate, with a few, often irregularly formed nerves, prominulous above, more distinct below. Petioles 1.5—3 cm long, flat above, rounded below, thickened and rough in the basal part, when young woolly-hirsute but ultimately glabrous. *Flowers* in 3—6-flowered, axillary clusters, pedicels 1—1.5 mm long or flowers sessile, densely brown woolly-hirsute. *Sepals* ovate-lanceolate, 6—8 by 2—3 mm, obtuse, cinnamomously woolly hirsute on outside, glabrous on inside, inner sepals with membranous, glabrous, fimbriate margins. *Corolla* c. 6.5 mm long, glabrous on either side but fimbriate at tip of lobes, 6-lobed, lobes ovate-lanceolate, c. 5 by 2 mm, obtuse. *Stamens* 12, c. 3.5 mm long, filaments subulate, c. 1.5 mm long, ferruginously woolly, anthers ovate-oblong, c. 2.5 mm long, connective prolonged and acute, dehiscing laterally, glabrous. *Ovary* ovoid, subgradually passing into the style, c. 1 by 1 mm, 5- or 6-celled, glabrous, style filiform, 4—6.5 mm long, glabrous, distinctly stigmatate at apex. *Fruits* unknown.

Type specimen: *Corner 29024* in SING.

Distribution: Malaya (Johore).

Johore, 13½ Mile Mawai-Jemulang Rd, on hillock in swampy forest: *Corner 28994* (BO, SING), tree c. 6 m, fl. Febr.; ibidem: *Corner 29429* (SING), tree 2 m, fl. May; ibidem, 14 Mile: *Corner 29024* (BO, SING), tree c. 6 m, fl. Febr.

Remark. The specific epithet is derived from the sessile flowers.

13. *M. aristulata* (King & Gamble) H. J. Lam, l. c. 1925, 167; Ridley, Fl. Mal. Pen. 5, 1925, Suppl., 319; Lam, l. c. 1927, 449 — *Bassia aristulata* King & Gamble, Journ. As. Soc. Beng. 74, 2, Extra 17, 1905, 177; Ridley, Fl. Mal. Pen. 2, 1923, 266.

Trees up to 15 m. Branchlets terete or subterete, often ribbed in the apical part, 5—8 mm in diam., glabrous; terminal cone up to 9 mm long, stipules lanceolate, up to 7 by 3 mm, acute, crested, cinnamomously sericeous on outside, glabrous on inside, caducous. *Leaves* scattered, elliptic or oblong-

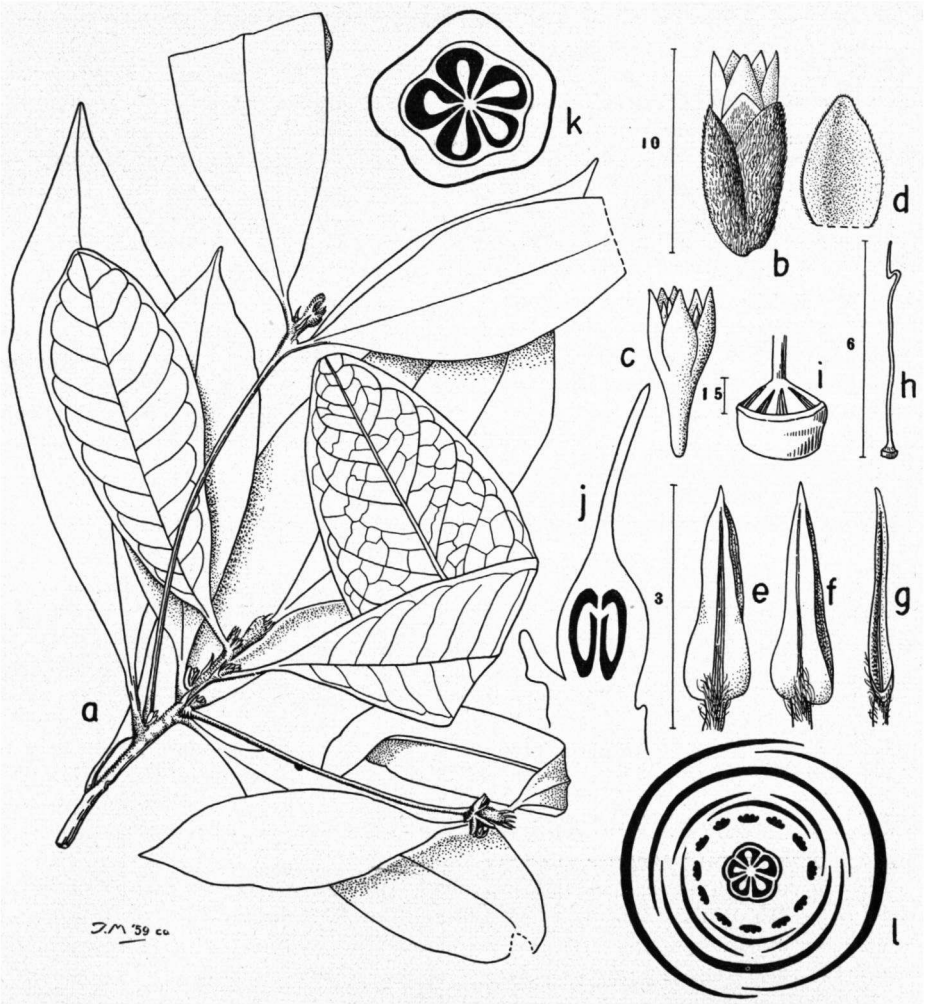


Fig. 5. *M. sessiliflora*, a. branchlet with leaves, b. flower with corolla, c. flowerbud, d. sepal, e, f, g. stamens, h. gynaecium, i. basal part of gynaecium, j. longitudinal section of gynaecium, k. transverse section of ovary, l. flower-diagram. (Corner 28994).

elliptic, 19—48 by 6.5—19 cm, acute or acutely acuminate at apex, base broadly cuneate to almost rounded and abruptly decurrent, sometimes oblique; chartaceous, glabrous; midrib above broadly impressed in the basal part and prominent in the apical part, rounded or angular, below stoutly prominent and rounded, secondary nerves 19—25 pairs (—35 in sterile branches), ascending at an angle of c. 70°, curved but stronger curved at their apex, archingly joined, prominulous to grooved above, stoutly prominent below, tertiary nerves transverse but in the basal part of the leaf more reticulate and often with one more developed nerve starting from midrib and parallel to the secondary nerves, slender above, prominent below. Petioles 3.5—6 cm long, thickened in the basal part, grooved above, ferruginously sericeous but soon becoming glabrous. *Flowers* 2—11 in axillary clusters, pedicels angular, 2—4 cm long (c. 1.5 when in bud), ferruginously or greyish tomentose-sericeous. *Sepals* oblong-ovate, 9—12 by 9—12 mm, subacute or acute, inner ones more ovate and rounded, both series ferruginously tomentose on outside, glabrous on inside. *Corolla* 12—17 mm long, tube ferruginously or cinnamomously sericeous on outside and woolly between the stamens, lobes 8, oblong-obovate, 6—8 by 2.5—4 mm, obtuse or subobtuse, cinnamomously sericeous on outside except along the margins. *Stamens* c. 25, in 3 whorls, 5—8 mm long, the outer whorl longest, the inner whorl shortest, filaments 1.3 mm long, ferruginously woolly, anthers oblong, 3—4 mm long, with a 1.5—2 mm subulate mucro at apex, dehiscing laterally, with scattered ferruginous hairs. *Ovary* broadly disciform, 8—10-celled, 8- or 10-lobed, ferruginously tomentose but at the base of the style with longer hairs, style filiform, 15—20 mm long, glabrous. *Fruits* unknown.

Type specimen: *Scortechini* 1984 in SING.

Distribution: Malaya.

MALAYA. Kedah, Bukit Kuala Ketang, Mt Bitang: *Haniff 21122* (L, SING), fl. April. — Selangor, Kepong: *Hamid CF 1590* (KEP, SING), fl. April; Mt Enggang: *Symington 24101* (KEP, SING), fl. buds March. — Perak, Gapeng (†): *Scortechini 1984, 1984a* (BM, K, SING), fl. — Malacca, Panchor: *Goodenough 1830* (BM, SING), fl. April. — Pahang, Kemansul For. Res.: *Browne 40859* (KEP), Febr., tree 6 m; ibidem: *Hamid 10668* (K, SING), fl. Oct.

#### 14. *M. grandifolia* Fletcher, Kew Bull. 1937, 376—377.

Trees, c. 10 m high. Branchlets very stout, 1—2 cm in diam., ferruginously sericeous, glabrescent; terminal cone up to 7 mm long; stipules? *Leaves* conferted at tip of branchlets, elliptic, obovate or oblanceolate, 25—65 by 12—18 cm, obtusely acuminate at apex, narrowly cuneate at base; chartaceous-coriaceous, glabrous on either side; midrib grooved above, stoutly prominent below, secondary nerves 19—22 pairs, ascending at an angle of c. 45°, straight, archingly joined but in the middle of the leaf sometimes diminishing until inconspicuous or connected by thickened tertiary nerves, tertiary nerves transverse but often reticulately connected, with a distinct reticulation in between. Petioles 8—15 cm long, narrowly grooved above, rounded below, thickened near the base, glabrous. *Inflorescences* and *flowers* unknown. *Fruits* ovoid or ellipsoid, 3—4 by 2—2.5 cm, 1- or 2-seeded, at apex crowned by a remnant of the style, pericarp fleshy,



brownish puberulous, seeds incompletely known. Sepals in fruit ovate, c. 7 by 4 mm, obtuse, ferruginously sericeous on outside, glabrous on inside or ferruginously sericeous near apex, recurved, outer sepals crested, inner sepals with membranous, glabrous, fimbriate margin. Pedicel in fruit c. 2.5 cm long, stout, ferruginously sericeous but partly glabrous as well.

Type specimen: *Kerr 18408* in K.

Distribution: Siam.

SIAM. Pang-nga, Kao Katakwan, alt. c. 400 m, evergreen forest: *Kerr 18408* (BM, K), tree c. 10 m, fr. March.

Remark. This species shows a remarkable resemblance with *Diploknema siamensis* Fletcher but the calyx is 4-merous while in *Diploknema* the calyx is 5-merous.

15. *M. macrophylla* (Hasskarl) H. J. Lam, l. c. 1925, 162; Heyne, Nutt. Pl. Ned. Ind., ed. 2, 1927, 1231; Lam, l. c. 1927, 444; Lam in Backer, Noodflora Java 7, 1948, Fam. 166, p. 7 — *Kakosmanthus mac(k!)rophyllus* Hasskarl, Retzia I, 1855, 98; Hasskarl in Nat. Tijdschr. Nederl. Ind. 1, 1851, 476, referred to as nr 1 'An unknown tree, etc.'; Miquel, Fl. Ind. Bat. 2, 1859, 1040; Beauvisage, Contr. à l'étude Or. bot. Gutta-Percha, 1881, 44; Dubard, Rev. Gén. Bot. 20, 1908, 196 — *Cacosmanthus macrophyllus* de Vriese, Tuinb. Fl. 3, 1856, 229, with ill.; de Vriese, Pl. Reinw., 1856, 61 — *Payena macrophylla* (Hasskarl) Burek, Ann. Jard. bot. Bzg. 5, 1886, 51; Koorders & Valetton, Bijdr. Booms. Java 1, 1894, 151 and Atlas Baumart. 4, 1918, t. 609.

Trees up to 35 m high. Branchlets stout, terete, 8—13 mm in diam., ferruginously puberulous but soon glabrous, when dry distinctly ribbed; terminal cone up to 6 mm long; stipules triangular, up to 3.5 by 3 mm, acute, crested, puberulous on outside, glabrous on inside, soon caducous. Leaves conferted at tip of branchlets, spatulate, obovate, or elliptic-obovate, sometimes pandurate, 15—55 by 6—22 cm, rounded, obtuse or subobtuse, rarely acute at apex, sometimes indistinctly obtusely acuminate, base subcordate, rounded or cuneate, shortly decurrent along upper side of petiole; coriaceous, glabrous above, silvery or pale ferruginously sericeous below, sometimes only sparsely so or glabrous; midrib prominulous above, stoutly prominent and rounded below, secondary nerves 19—26 pairs, ascending at an angle of 65°—75°, straight but curved at their tips and diminishing until inconspicuous near margin, prominulous above and impressed, stoutly prominent below, tertiary nerves slender, transverse, prominulous on either side. Petioles 0.8—3 cm, flat or broadly grooved above, rounded below, thickened in the basal part and sometimes with rugose transverse ridges, ferruginously sericeous but becoming soon glabrous. Flowers erect, on 2 warts axillary to the leafscars, with 10—15 fascicled flowers on each wart, pedicels terete or subangular, slender, 3—5 cm long, in fruit up to 6 cm long and incrassate at apex, sparsely tomentose. Sepals ovate to obovate-suborbicular, 4—6 by 3—5 mm, subacute to rounded, tips often recurved, ferruginously sericeous on outside, ferruginously tomentose on inside mainly along the margins and in the apical part. Corolla 8—13-lobed, 5—6 mm long, densely ferruginously sericeous-tomentose or woolly on either

side, lobes linear-lanceolate, 3.5—4 by 2—3 mm, acuminate at apex, subcordate to narrowed at base. *Stamens* 22—28, in two whorls, 3.5—4 mm long, filaments subulate, c. 0.5 mm long, ferruginously woolly, anthers oblong-lanceolate, 3—3.5 mm long, acute, ferruginously woolly, dehiscing laterally. *Gynaecium* conoid, up to 7 mm long, in fruit prolonged up to 10 mm, ovary 11—18-celled, ferruginously woolly. *Fruits* often two together, pendulous, ellipsoid, 2.5—4 by 1.5—3 cm, glabrous except for a slight pubescence at apex, 1- or 2-seeded, seeds ellipsoid, 1.8—3 by 1—2 by 0.5—0.8 cm, rounded and mucronate at apex, subacute at base, testa thin, crustaceous, pale brown, scar narrow, up to 5 mm broad, albumen none.

Type specimen: *Hasskarl s.n.* in BO.

Vernacular names: karet munding (Sundan.), pasra.

Distribution: Java.

JAVA. Cult. in Hortus Bogor.: *Hasskarl s.n.* (BO), fl.; ibidem: *Beccari s.n.* (FI), fl. & juv. fr.; ibidem: *Teysmann s.n.* (BO, L), fr.; ibidem: *Koorders & Valetton 10161 β & 10163 α* (BO, K, L); ibidem: *Koorders 15642 β* (BO, L), juv. fr.; Tjurug (Djasinga), alt. 140 m, primary forest: *Ja 6159* (BO, L), tree 35 m, Sept.; Mt Wiru, alt. 500 m: *Bakhuizen v. d. Brink s.n.* (BO, L), tree, March; Tjilötoeh, alt. 450 m: *Bakhuizen v. d. Brink s.n.* (BO, L), tree, Dec.; without known loc.: *Teysmann s.n.* (BO, K, L, U); Bantam: *de Vriese s.n.* (BO, L), juv. fr.; ibidem: *Hasskarl s.n.* (BO, L, U), juv. fr.

16. *M. glabrescens* H. J. Lam, l. c. 1925, 180, f. 51; Lam l. c. 1927, 462.

Trees up to 15 m. Branchlets densely ferruginously villose, ultimately becoming glabrous; stipules broadly ovate, 0.5—1.5 by 0.3—0.6 mm, acuminate, pubescent, but becoming glabrous, caducous. *Leaves* scattered at tip of branchlets, oblong or obovate, 14.5—19 by 4.5—7.6 cm, rounded at apex and short to rather long obtusely acuminate, broadly cuneate at base, decurrent along upper side of petiole; coriaceous, glabrous when mature but hispidous-pilose on either side when young; midrib prominent and rounded on either side; secondary nerves 13—16 pairs, ascending at an angle of 60°—70°, curved, diminishing until inconspicuous near margin, tertiary nerves slender, transverse, distinct on either side. Petioles 2.2—3.5 mm, grooved above, rounded below, thickened in the basal part, immature pubescent, mature ones glabrous. *Flowers* in 3—5-flowered, axillary clusters, pedicels 7—15 mm long. *Sepals* broadly ovate, 4—5 by 3.5—5.5 mm, subacute, densely sericeous-pubescent on outside, glabrous on inside, inner sepals with membranous, glabrous, fimbriate margins. *Corolla* 5—6 mm long, 8- or 9-lobed, glabrous on outside, ferruginously woolly on inside between the stamens, lobes ovate-lanceolate, 3.5—4 by c. 1 mm, obtuse or acute. *Stamens* 18, filaments very short, densely woolly, anthers narrowly lanceolate-ovoid, c. 3 mm long, connective acutely prolonged, densely villose. *Ovary* discoid or globose, c. 0.5 by 1 mm, 8-celled, glabrous, style filiform, c. 5 mm long, glabrous. *Fruits* unknown.

Type specimen: *Nieuwenhuis 652* in BO (?).

Vernacular name: maligalas (Rongos dialect, Borneo).

Distribution: Borneo.

Indonesian Borneo, Sungaimagne: *Nieuwenhuis 652* (BO?), fl. buds — Sandakan, distr. Sandakan, Sepilok Forest Rest., 24 km W. of Sandakan: *Wood SAN 16009* (L, SAN, SING), tree c. 8 m, fl. April; Gompa, Kudat: *Balajadia 4057* (SING), tree 15 m, fl. buds Sept.

17. *M. pubicalyx* Ridley, Kew Bull., 1934, 121.

Trees up to 18 m. Branchlets slender or stout, angular or terete, 3—5 (—12) mm in diam., ferruginously puberulous to woolly but ultimately glabrous; terminal cone up to 15 mm long, puberulous; stipules ovate or triangular, 7—12 by 3—7 mm, acutely acuminate, crested, on outside ferruginously puberulous to woolly mainly in the middle, glabrous on inside, relatively long persistent but ultimately caducous. *Leaves* scattered, elliptic-obovate, elliptic, oblanceolate or narrowly obovate, 15—33 (—42) by 4.5—12 (—16.5) cm, apex obtusely acuminate, base cuneate, attenuate, decurrent along upper side of petioles; subcoriaceous, glabrous or finely whitish puberulous above along midrib and below over the entire surface; midrib impressed above and sometimes narrowly crested as well, prominent and rounded below, secondary nerves 16—26 pairs, ascending at an angle of 660°—80°, usually archingly joined rather far from the margin, but sometimes some or most of the nerves diminishing until inconspicuous, prominulous or impressed above, prominent below, as are the arches, tertiary nerves slender, transverse, prominulous or grooved above, prominulous to subprominent below. Petioles 2—6.5 cm long, narrowly grooved above, thickened in the basal part and rugosè, ferruginously woolly when young, but ultimately glabrous. *Flowers* in 2—8-flowered clusters, pedicels slender, angular, 2.5—5 cm long, sparsely whitish, ferruginously or cinnamomously puberulous. *Sepals* ovate-orbicular, 6—9.5 by 6—9.5 mm, acute or obtusely acuminate, greyish or cinnamomously puberulous at the outside, glabrous at the inside, inner sepals with membranous, glabrous and fimbriate margin, all sepals or the inner ones only crested at the outside. *Corolla* 10—16 mm long, ferruginously sericeous on outside on the tube and along the middle-line of the lobes, on the inside ferruginously woolly between the stamens, lobes 8 or 9, elliptic to oblanceolate, 5.5—8 by 2—4 mm, obtuse. *Stamens* 18—24, in two whorls, 3—7.5 mm long, filaments subulate, up to 1 mm long, densely ferruginously woolly, anthers oblong, 3—6.5 mm long, connective much elongate and obtuse, ferruginously villous on back and front, dehiscing laterally. *Ovary* obconoid-discoid, c. 1 by 2.5 mm, 8—11-celled, ferruginously or yellowish tomentose, style subulate-filiform, 10—17 mm long, tomentose at base only. *Fruits* ellipsoid-obovoid, 2—2.5 by 1.2—1.8 cm, 1-seeded, obtuse, at apex with a short remnant of the style, pericarp thin, densely tomentose, seeds slightly smaller than fruit, testa very thin, scar linear, albumen membranous, endosperm copious.

Type specimen: *Creagh s.n.* in K.

Vernacular names: randang jagung, putat paya, nyatoh, kadayan.

Ecology: In primary forests at low altitudes.

Distribution. Borneo (Sandakan).

Sandakan, Kabili, Elopura: *John A 77* (K, KEP, SING), fl. Sept.; *ibidem: Otik 4773* (K, L, SAN, SING), tree 5 m, fl. white, April; Marotai, alt. 6 m: *Maidin 3273* (K, L, SAN), tree 10 m, fl. yellow, May; Sepilok For. Res., alt. 10 m: *Wood & Charington SAN 16182* (A, BO, BRI, K, KEP, L, SING), tree 15 m, fl. May; *ibidem: Castro 4382* (A, BO, K, KEP, L, SING), tree, fl. white, April; *ibidem: SAN 16539* (L, SAN, SING), tree 23 m, fl. May; *ibidem*, lowland forest: *Sinclair, Tassim & Sisiron 9338* (L, SING), tree 13 m, fl. white, June; *ibidem: Wood SAN 15422* (L, SAN), tree 10 m, fl. April; St Lucia, alt. 50 m: *Brown BNB For. Dep. 14* (K, L), tree 18 m,

fl. May; Bongaya: *Wade s.n.* (SING); Sapagaya: *Puasa 1937* (K), tree 3 m, fr. July; Sekong river valley, lowland near river bank: *Sales 4311* (K, L), tree, fl. buds March; without known loc.: *Creagh s.n.* (K), fl. July.

**Remark.** The fruits have been described after *Puasa 1397*.

**18. *M. woodii* van Royen, n. sp. — Fig. 6.**

**Arbor.** Ramuli tenues, ferrugineo-tomentosi, glabrescentes; stipulae ovatae, obtusae, caducae. Folia alterna, elliptica vel elliptico-obovata, 25—30.5 × 7.5—11 cm, longe obtuse acuminata, basi cuneata, glabra, interdum subtus sparse pilosa; nervi secundarii utroque latere 17—20, sursum evanescentes, tertiarii transversi. Petiolus 2—3.5 cm longus, glaber. Pedicellus 1.5—1.8 cm longus, ferrugineo-sericeus. Sepala ovata, obtusa, extus albo-sericea, nitus parte marginali excepta glabra. Corolla 8-lobata, extus glabra, fauce ferrugineo-lanata. Stamina 12; filamenta ferrugineo-lanata; antherae ferrugineo-hirsutae. Ovarium cylindrico-ovoideum, 8-loculare, ferrugineo-tomentosum; stylus glaber. Fructus immaturus conicentis, 1-spermus. **Typus:** *Wood SAN 15215* in L.

Trees c. 20 m. Branchlets flexuose, terete, 3—4.5 mm in diam., ferruginously tomentose at the extreme tip only, soon becoming glabrous; terminal cone up to 3 mm long, stipules ovate, up to 2 by 1 mm, obtuse, puberulous on outside, glabrous on inside, caducous. *Leaves* scattered, elliptic or elliptic-obovate, 25—30.5 by 7.5—11 cm, long obtusely acuminate at apex, cuneate at base; thin-coriaceous, glabrous on either side but sometimes with scattered hairs at the underside; midrib shallowly grooved above, prominent, rounded and indistinctly crested below, secondary nerves 17—20 pairs, ascending at an angle of 40°—45°, curved or straight and curved at their tips only, diminishing until inconspicuous near margin, slightly grooved above, prominent below, tertiary nerves slender, transverse, prominulous but distinct on either side. Petioles 2—3.5 cm long, flat above, rounded below, thickened in the basal part, glabrous. *Flowers* in 3—7-flowered, axillary clusters, pedicels angular, 1.5—1.8 cm long, ferruginously sericeous. *Sepals* ovate, 4.5—6 by 3—3.5 mm, obtuse, whitish sericeous on outside, glabrous on inside except for the marginal parts, inner sepals with membranous, glabrous and fimbriate margins and crested at the outside. *Corolla* 7—8 mm long, 8-lobed, glabrous on outside, ferruginously woolly on inside between the stamens, lobes oblong, 3.5—4.5 by c. 1 mm, rounded or obtuse. *Stamens* 12, 3.5—4.5 mm long, filaments subulate, 1—1.5 mm long, ferruginously woolly, anthers lanceolate, c. 3 mm long, connective acutely prolonged, dehiscing extrorsely, ferruginously hirsute. *Ovary* cylindric-ovoid, 2.5—3 by 1 mm, 8-celled, ferruginously tomentose, style filiform, 1—1.5 cm long, glabrous. *Fruits* known immature only, conoid, 1-seeded (?), truncate at apex and with a short remnant of the style, ferruginously tomentose.

**Type specimen:** *Wood SAN 15215* in L.

**Distribution:** Borneo (Sandakan).

**Sandakan,** Beaufort distr., Pangl, 5 miles WNW of Tenom, alt. 600 m: *Wood SAN 15215* (A, BO, BRI, K, KEP, L, SING), tree c. 20 m, fl. & juv. fr. June.

**Remarks.** Closely related to *M. ovata* but differing in the larger leaves, more numerous secondary nerves, the longer pedicels and the smaller number of stamens. *M. woodii* also differs in the greenish leaves when dry against the reddish brown dry leaves of *M. ovata*.

The specific epithet is given in honour of Mr G. H. S. Wood who died in such an unfortunate way when exploring the Bornean forests.

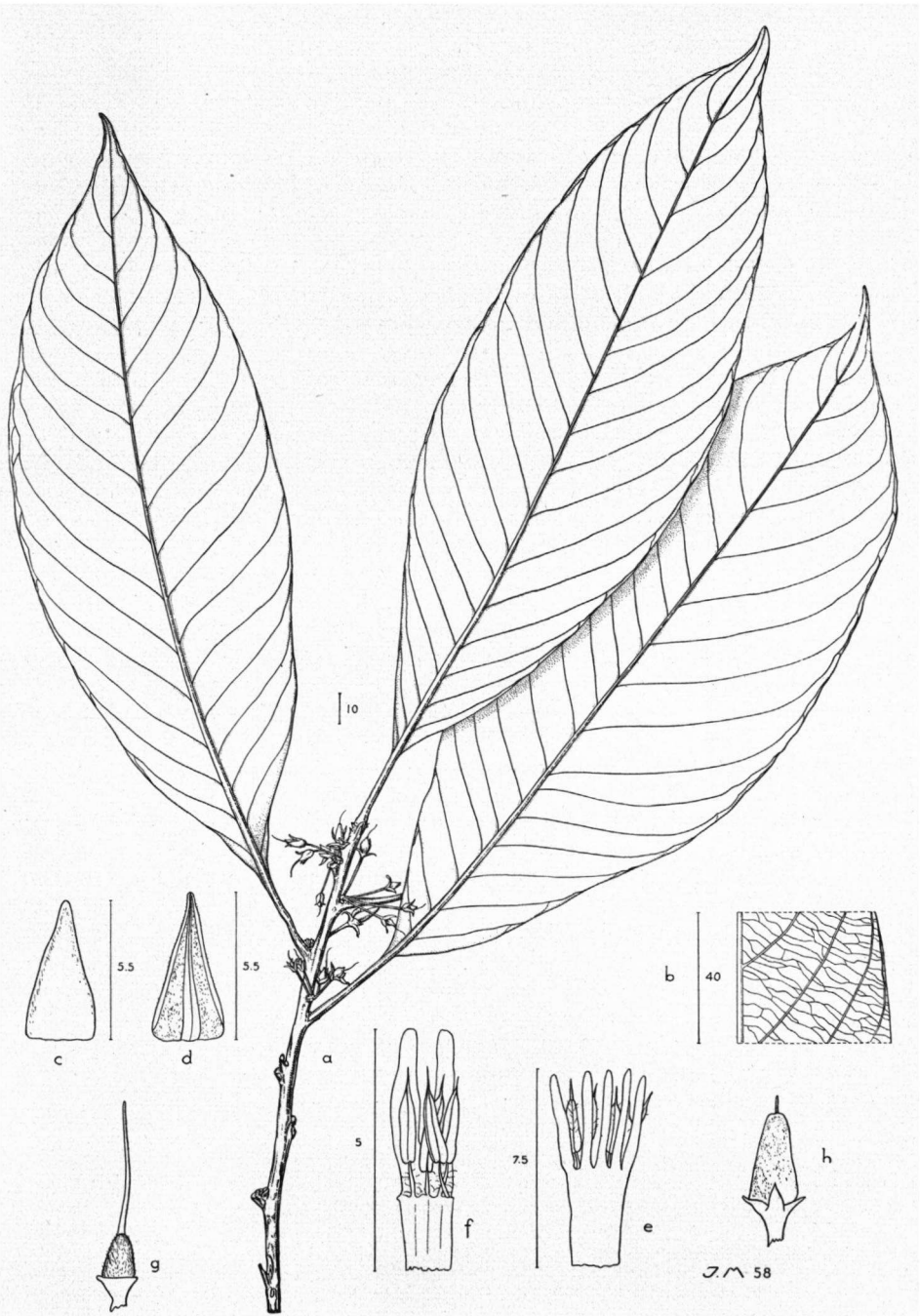


Fig. 6. *M. woodii*, a. branchlet with immature fruits, b. part of leaf showing tertiary nervation, c. outer sepal, outside, d. inner sepal, outside, e. corolla, outside, f. part of corolla, inside, g. gynaecium, h. immature fruit. (Wood SAN 15215).

19. *M. leucodermis* (Krause) H. J. Lam, Nova Guinea 14, 4, 1932, 556, t. 104 — *Illipe leucodermis* Krause, Bot. Jahrb. 58, 1923, 467.

Trees up to 30 m. Branchlets stout, angular or terete, 3—8 mm in diam., pale yellowish brown tomentose but soon glabrous; terminal cone up to 9 mm long, tomentose; stipules lanceolate, up to 5 by 1.5 mm, acute, tomentose on outside, glabrous on inside, caducous. *Leaves* scattered to subconferted at tip of branchlets, ovate-oblong to ovate-elliptic, 15—35 by 5.5—11 cm, obtusely acuminate at apex, cuneate at base, decurrent along upper surface of petioles; coriaceous, scattered pale yellow sericeous below, otherwise glabrous; midrib grooved above and narrowly crested as well, prominent and rounded below, secondary nerves 13—18(—22) pairs, curved, ascending at an angle of c. 75°, archingly joined or diminishing until inconspicuous and connected by thickened tertiary nerves, distinct but prominulous above, very prominent below; tertiary nervation widely placed but with a generally transverse trend, near midrib recurved and reticulate, distinct but prominulous above, prominent below. Petioles (1.5—)2—4.5 (—5.5) cm, narrowly grooved above, rounded below, glabrous, indistinctly thickened in basal part and there sometimes sparsely sericeous pubescent. *Flowers* in 3—7-flowered axillary clusters, pedicels angular, 2—2.5 cm long, sparsely greyish or ferruginously sericeous. *Sepals* ovate-lanceolate, 5—9 by 2.5—4.5 mm, the inner ones smaller than outer ones and often recurved, sparsely ferruginously tomentose on outside but the inner ones with glabrous, membranous, fimbriate margins and otherwise denser tomentose, all sepals glabrous on inside, the inner ones distinctly crested on outside. *Corolla* 8—13.5 mm long, entirely glabrous, lobes 8, oblong, 4—5 by 1.5—2 mm, obtuse. *Stamens* 16, two indistinct whorls, 5—6 mm long, entirely glabrous, filaments subulate, 1.5—2 mm long, anthers oblong, 3—4 mm long, abruptly narrowed into the c. 1 mm prolonged tip of connective. *Ovary* ovoid, c. 2 by 2.5 mm, 8-celled, ferruginously sericeous, style filiform, 2.4—2.7 cm long, glabrous. Pedicels and sepals thickened and enlarged in *fruit*, the latter ellipsoid, c. 2.5 by 1.5 cm, sparsely ferruginously puberulous, crowned by a long remnant of the style, 1-seeded, pericarp fleshy, seeds obovoid to ellipsoid, laterally compressed, 2—2.3 by 1.1—1.3 by 0.6—0.8 cm, short obtusely acuminate at either end, scar up to 4 mm broad, hardly separable from the testa. Embryo without albumen.

Type specimen: *Ledermann 9733* in B.

Lectotype specimen: *Ledermann 9733* in K.

Vernacular names: sannes (Koropa), kusiru (Rawa), oewomie, boemie, mbomie (Manikiong).

Distribution: New Guinea.

Western New Guinea, Modan, alt. c. 30 m: *NIFS bb 22310* (BO, L), Febr.; Oransbari: *NGBW 1132* (HOLL, L), tree 14 m, Sept.; ibidem: *NGBW 1621* (HOLL, L), tree 24 m, Sept.; ibidem: *NGBW 1864, 1878, 1881* (HOLL, L), tree 27 m, Oct.; ibidem: *NGBW 1946* (HOLL, L), tree 30 m, Oct. — Northeastern New Guinea, Madang distr., near Koropa village, Ramu valley: *Hoogland 5075* (CAN, L), tree c. 24 m, juv. fr. Aug.; April river: *Ledermann 9733* (K) — Southeastern New Guinea, Central distr., Sogeri: *Forbes 542* (BM, FI, K, L), fr.; Milne Bay distr., north slopes of Mt Dayman, Maneau Range, alt. 900 m, oak forest: *Brass 23606* (A, L), tree c. 20 m, juv. fr. July.

20. *M. betis* (Blanco) MacBride, Contr. Gray Herb. Univ., N. S. 53, 1918, 18; Lam, l. c. 1927, 444; Valenzuela c. s., Phil. J. Forestry 6, 1, 1949, 51 — *Azola betis* Blanco, Fl. Filip., ed. 1, 1837, 402; ed. 2, 1845, 281; ed. 3, 2, 1878, 157; DeCandolle, Prodr. 8, 1844, 196; Miquel, Fl. Ind. Bat. 2, 1859, 1039; Vidal, Sinopsis, Atlas, 1883, 31, t. 62 F — *M. betis* (Blanco) Merrill, Enum. Phil. Fl. Pl. 3, 3, 1923, 276; Lam, l. c. 1925, 161, p.p. (*M. borneensis* van Royen *pro parte alteriora*, *Jaheri s.n.*) — *Payena betis* (Blanco) F.-Vill., Nov. App., 1880, 125 — *Illipe betis* (Blanco) Merrill, Phil. Gov. Lab. Bur. Bull. 1, 1903, 46 and 25, 1905, 57 — *Bassia betis* (Blanco) Merrill, Phil. J. Sc. 10, 1915, 56; Merrill, Spec. Blancoana, 1918, 300 — *M. philippinensis* Merrill, Phil. J. Sc. 20, 1922, 430; idem, Enum. Phil. Fl. Pl. 3, 3, 1923, 278; Lam, l. c. 1925, 166; Lam, l. c. 1927, 447, f. 19 — *Bassia butyracea* Blanco, Fl. Fil. 4, 1880, 125, *erroneously stated as being Diploknema butyracea* Blanco by van Royen, Blumea 9, 1, 1958, 87.

Trees, up to 43 m. Branchlets terete, 5—7 mm in diam., densely pale yellowish brown tomentose, but soon glabrous; terminal cone up to 12 mm long, stipules linear, up to 12 by 1.5 mm, acute, tomentose on outside, glabrous on inside, caducous. *Leaves* conferted at tip of branchlets, obovate (15—)24—48 by (4.5—)7—14.5 cm, acutely acuminate at apex, base broadly cuneate to subrotundate; subcoriaceous, glabrous or subglabrous above and tomentose on midrib, sometimes also on the nerves or in scattered patches on the surface, densely pale yellowish brown woolly-tomentose below, but sometimes subglabrous or glabrous; midrib grooved above, prominent below, secondary nerves 20—30 pairs, ascending at an angle of 50°—60°, straight or slightly curved, stronger so at their tips, diminishing until inconspicuous near margin and only connected by tertiary nerves, the latter very slender, transverse, grooved above, prominulous below. Petioles 2—4.9 cm, grooved above, rounded below, densely pale yellowish brown tomentose-woolly to glabrous. *Flowers* in 2—4-flowered, axillary clusters forming a terminal inflorescence, pendulous, pedicels 1.5—3 cm long, minutely and densely pubescent. *Sepals* elliptic, narrowed at apex, pale yellowish tomentose on both sides, inner sepals with membranous, glabrous and fimbriate margins. *Corolla* up to 10 mm long, glabrous, lobes 8—11, elliptic, narrowed at apex, 8—10 by 3—4 mm. *Stamens* 16—20, filaments very short, c. 1 mm long, glabrous, anthers 3—4.5 mm long, long acuminate, with stiff hairs on the ventral side, glabrous on back. *Ovary* glabrous, globose, c. 1 mm long, 8-celled, style subulate, c. 1.3 cm long, glabrous. *Fruits* ellipsoid or oblong, 2.5—4 by 1.5—2 cm, 1-seeded, glabrous, testa of seed thin, seed (3—)3.7 by 1.4—1.6 by 1.2—1.3 cm, scar long elliptic, broader in the basal part, c. 2.7 by 0.7 cm, albumen membranous, cotyledons thick.

Lectotype specimen: *Merrill 956* in PNH.

Vernacular names: bakaiaw (Pangasinan), baniti, banitis, hétis (Bikol, Tagalog, Pampangan), manilig (Magindanao), pappagai, pappagan, piaña, piañgan (Ibanag), piaña (Ilocos), puntik (Borneo), lotoö tulu, sulewe, bakalunnag, salëwë, lamanu, polapi (Celebes).

Use: The wood is used for ship and house building, sometimes for illuminating purposes.

Distribution: Philippines (Luzon, Mindoro), Borneo, Celebes, Muna.

PHILIPPINES. Luzon and Mindoro, see Merrill, 1923, and Lam 1925. Luzon, prov. of Tayabas: *Merrill 2601* (BM, K), fr. April/May; Cavite: *Merrill 956* (BM, BO, K, L); prov. Camarines: *Labitag 28399* (K), fr. April, type specimen of *M. philippinensis* Merrill; prov. Isabella: *Vidal 3195* (K), fr. March, type specimen (!) of *Bassia butyracea* Blanco.

BORNEO. See Lam 1927, 444.

CELEBES. Menado, Gorontalo, Bongomeme village, alt. 220 m: *NIFS bb 19422* (BO, L, SING), tree 30 m, Dec.; ibidem, Poso: *NIFS bb 19448* (BO, K), tree 33 m, Dec.; Boalemo near Bilatto: *NIFS bb 15383* and *17198* (BO, L), tree, Oct; ibidem, near Pilihu, alt. 300 m: *NIFS bb 19404* (BO, L), tree 43 m, Dec.; ibidem, near Tabula, alt. 100 m: *NIFS bb 26551* (BO, L, SING), Nov.; Bolaang Mongondow, Dumoga, alt. 150 m: *NIFS bb 33107* (BO, L), tree 31 m, Oct.; Banggai, Pongian village: *NIFS bb 31397* (BO, L), fl. March.

MUNA. Tampo, alt. 20 m: *NIFS bb 23292, 23294* (BO, L), fl. Oct.; ibidem: *NIFS bb 23296* (BO, L), fl. Oct.; Raha, Wasalangka village, alt. 5 m: *NIFS bb 21335* (BO, L), tree 30 m; ibidem: *NIFS bb 32373* (BO, L), tree c. 38 m, fr. Sept.; ibidem, Tobi village: *NIFS bb 21094* (BO), tree 30 m, fr. June; ibidem: *NIFS bb 20249* (BO, L), tree 30 m, Jan.; without known loc.: *Beverluits 1* (BO, L), tree, fr.; Bonea: *NIFS bb 6037* (BO, L), tree, fl. Oct.

## 21. *M. eriobrachyon* van Royen, n. sp. — Fig. 7.

Arbor. Ramuli dense luteo-brunnei, lanati, glabrescentes; stipulae lineares, caducae. Folia ad ramulos subconferta, obovata vel elliptico-obovata, 15–22 × 6–9.5 cm, obtusa vel breviter obtuse acuminata, basi cuneata; supra ad costam et nervos lanata, subtus ferrugineo-vel brunneo-tomentoso-lanata; nervi secundarii utroque latere c. 16, anastomosantes, tertiari transversi. Petiolus 2–2.5 cm longus, dense lanato-tomentosus. Pedicellus 1.2–1.7 cm longus, lanato-tomentosus. Sepala 4, lanceolata, extus luteo-brunnea, lanato-tomentosa, intus glabra. Corolla et stamina ignota. Ovarium ovoideum, 8-loculare, ferrugineo-hirsutum, stylus basi excepta glaber. Fructus ignotus. Typus: *NIFS bb 15248* in L.

Tall trees, c. 25 m. Branchlets terete or angular, 3–7 mm in diam., densely yellowish brown woolly, pubescence rather long persistent but ultimately disappearing; terminal cone up to 1 cm long, pubescent, stipules linear, up to 12 by 1.5 mm, acute, pubescent except on outside along the margins, sometimes long persistent but usually soon caducous. *Leaves* subconferted at tip of branchlets, obovate or elliptic-obovate, 15–22 by 6–9.5 cm, obtuse to short obtusely acuminate, base cuneate; coriaceous, woolly above along midrib and sometimes also along the nerves, ferruginously to brown tomentose-woolly below; midrib grooved above, rounded below, secondary nerves about 16 pairs, ascending at an angle of 55°–60°, slightly curved but more so at their tips, archingly joined, grooved above, prominent below, tertiary nerves transverse, grooved and rather slender above, stout and prominent below. Petioles 2–2.5 cm long, flat above, keeled below, densely woolly-tomentose. *Flowers* in 3–7-flowered axillary clusters, pedicels angular, 12–17 mm long, woolly-tomentose. *Sepals* lanceolate, up to 7.5 by 4 mm, subacute, yellowish brown woolly-tomentose on outside, glabrous on inside, inner sepals slightly smaller and broader, and with glabrous, membranous, fimbriate margins. *Corolla* and *stamens* unknown. *Ovary* ovoid, c. 2 by 2 mm, 8-celled, ferruginously hirsute, at base surrounded by a thick ring of ferruginous hairs, style filiform, up to 20 mm long, glabrous, except at base. *Fruits* unknown.

Type specimen: *NIFS bb 15248* in L.



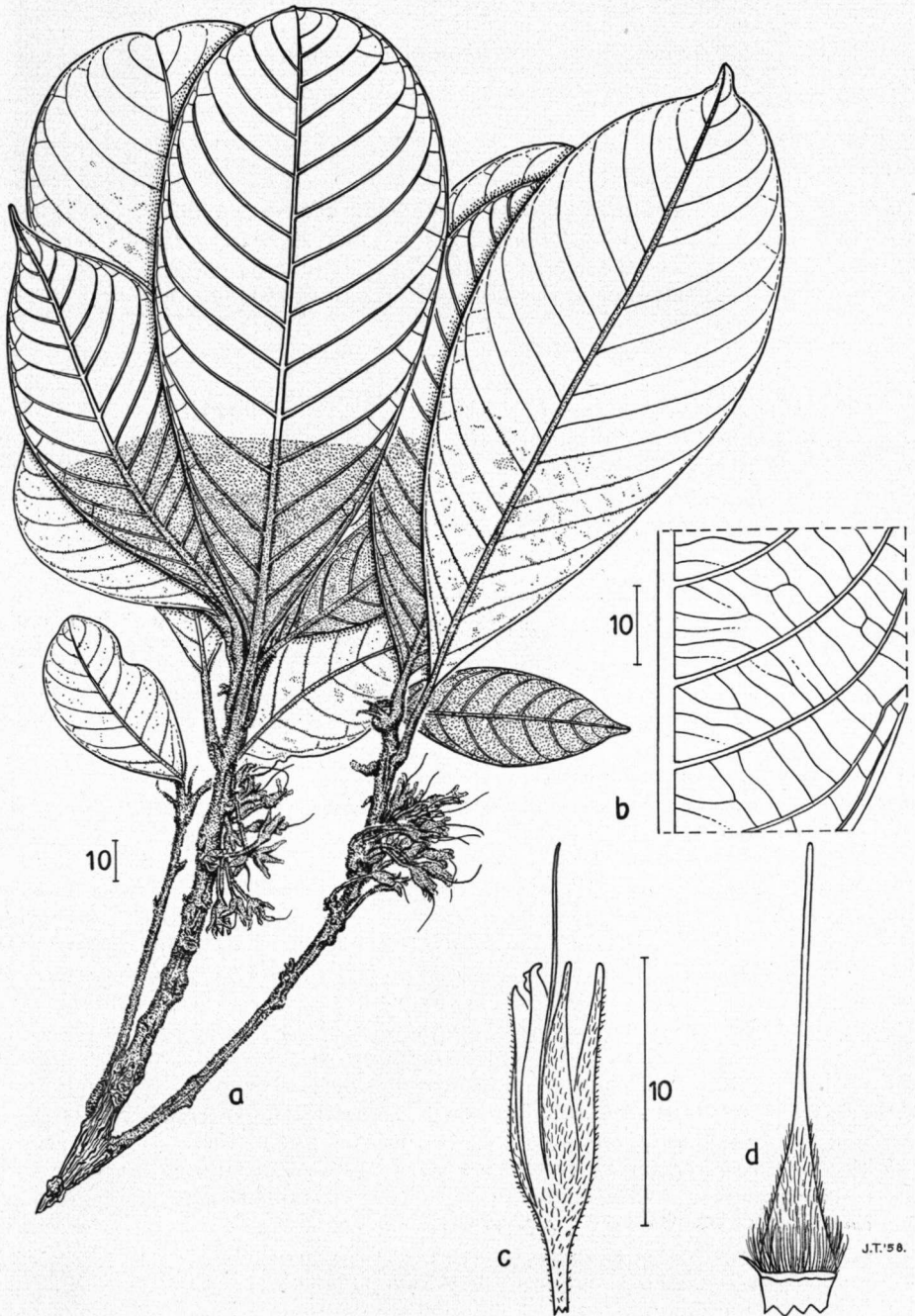


Fig. 7. *M. eriobrachyon*, a. branchlet with leaves and flowers, pubescence only partly drawn, b. part of leaf showing tertiary nervation, c. calyx, d. gynaecium. (NIFS bb 15248).

Vernacular name: njatoh.

Distribution: Borneo (Indonesian Borneo).

Indonesian Borneo, E. Kutai, Rantau Bahan: *NIFS* bb 15248 (BO, L), tree 25 m, incompl. fl., April; Sangkulirang, Palawan Besar, Mt Ketapang, alt. 100 m: *Act* 527 (BO), large tree, May.

Remarks: Close to *M. betis* and *M. borneensis* but differing from the first by the archingly joined secondary nerves which are also less than in the other species. From *M. borneensis* it differs in the smaller leaves with less secondary nerves and in the more rounded tip of the leaves. Moreover the sepals are lanceolate against oblong-ovate or elliptic in *M. borneensis*.

The specific epithet is derived from the woolly pubescent branchlets.

22. *M. pierrei* (Williams) H. J. Lam, l. c. 1925, 182; Lam, l. c. 1927, 463 — *Bassia pierrei* Williams, Bull. Herb. Bois., 2 sér., 5, 1905, 226 — *B. thoreliana* Pierre ex Lecomte, Fl. Gén. Indochine, 3, 1930, 904 — *M. lecomtiana* H. J. Lam, Gard. Bull. Str. Settl. 9, 1, 1935, 102, *nomen novum*.

Trees up to 20 m high. Branchlets stout, slender, 5–10 mm in diam., ferruginously or greyish woolly but soon glabrous; terminal cone up to 6 mm long, woolly pubescent; stipules lanceolate, up to 8 by 3 mm, acute, ferruginously woolly on the outside, glabrous on the inside, caducous. *Leaves* conferted or subconferted at the tip of short periodically formed flushes, obovate, spatulate or pandurate, (13–)17–24 by 6–10 cm, obtuse or short indistinct obtusely acuminate, rounded or cordate and sometimes slightly unequal at base, very shortly decurrent along upper side of petiole; subcoriaceous, glabrous above, except sometimes along midrib, sparsely ferruginously woolly below but more so on the nerves and midrib; midrib impressed above and narrowly crested as well, prominent and rounded below, secondary nerves (10–)15–22 pairs, ascending at an angle of c. 50°, slightly impressed above, prominent below, straight but curved at their tips, diminishing until inconspicuous near margin, impressed above, prominent below, tertiary nervation sparse, transverse, impressed above or sometimes hardly visible above, prominent below. Petioles terete, 1–3.5 cm long, slightly thickened in the basal part, ferruginously, yellowish or greyish woolly. *Flowers* conferted in the axils of the apical leaves, in many-flowered clusters, pedicels stout, angular, 3–4 cm long, in fruit only slightly thickened at apex, densely ferruginously woolly. *Sepals* ovate, 10–20 by 8–11 mm, acute or subacute at apex, ferruginously woolly on either side except on the inside in the basal part, inner sepals sometimes crested, with membranous, glabrous, fimbriate margins but otherwise similar to the outer ones. *Corolla* 22–28 mm long, glabrous on the outside, ferruginously woolly on inside between the stamens and in the upper half of the tube, lobes 11–13, obovate or ovate, 12–15 by 6.5–8 mm, obtuse, slightly fimbriate along the margin. *Stamens* 30–37, in 3 whorls, 6–8 mm long, filaments subulate, 3–4 mm long, glabrous, anthers lanceolate, 4.5–6 mm long, acutely acuminate, dehiscent laterally, glabrous. *Ovary* disciform, c. 1 by 3 mm, 8-celled, glabrous, style filiform, 2.5–3 cm long, glabrous. *Fruits* ellipsoid or ovoid, c. 3 by 2 cm, acute at apex

and crowned by the dried style, 1—3-seeded, pericarp fleshy, glabrous, seeds obovoid-like, 18—22 by 6—8 by 5—7 mm, obtuse at either end, scar linear, c. 2 mm broad, embryo unknown.

Type specimen: *Pierre 3229* in K.

Vernacular names: masang, sarng or ma-sarng, sang.

Use: The fruit is said to be edible.

Ecology: In primary and secondary forests at low altitudes.

Distribution: Siam.

SIAM. Mekong river: *Pierre 3229* (BM, FI, K, L, P), fr. July; ibidem: *Thorel 2381* (P), fl., type specimen of *Bassia thoreliana* Pierre: Phukae: *Williams 17146 & 17150* (L), tree of medium size, fr. March; Nakawn Sritamarat, Cha-Warng: *Thawornmas 1* (L), tree, fr. Jan.; Bangbao, in evergreen forest: *Williams 17222* (L), May; Surat, alt. 30 m: *Saman 30* (BKF), big sized tree, fl. white, Dec.; Surathani, Tha Khanawn, alt. 30 m: *Dinhawn 30* (BKF), tree, fl. white, slightly scented, fr. round green, sweet when ripe, Dec.; Patalung: *For. Dep. Siam 1559* (BKF), tree, fl. March; ibidem, alt. 50 m, in savannah: *Kerr 19261* (BM, K), tree c. 12, fr. May; Petchaburi: *Atam 10998* (K), tree c. 20 m, fl. July; ibidem: *Kerr 11061* (K), tree c. 20 m, fr. Nov.; ibidem: *Marcen 2128* (K), tree 10 m, fl. July; Kao Tamamün, Chairat, alt. c. 100 m: *Kerr 19659* (BM, K), tree c. 20 m, fl. Sept.; Sam Rai Jamt, Prachnap, alt. c. 10 m: *Atam 10944* (BM, K), tree c. 8 m, fl. July; Ban Sai Kao, Pattani, alt. c. 50 m, in temple grounds: *Kerr 15053* (K), tree c. 20 m, fl. April; Taekang, Chantük, Kérät, c. 400 m, evergreen forest: *Kerr 9994* (BM); Bangkok: *Kerr 4352* (BM), tree c. 10 m, fl. July; Kaw Tao, Surat, alt. 100 m, evergreen forest: *Kerr 11124* (K), tree up to 20 m, fl. Dec.

Remarks: In *Saman 30* the leaves are not yet fully developed and the number of secondary nerves is only 8—15 pairs while they are archingly joined near the margin. But some indications point out that these arches merely are formed by the tertiary nerves and the actual secondary nerve is not sufficiently developed to show the gradual diminishing towards the margin as is clear in the mature leaves.

**23. *M. ridleyi*** H. J. Lam, Gard. Bull. Str. Settl. 9, 1, 1935, 105, f. 7.

Stout but not tall trees, c. 13 m. Branchlets very stout, 15—25 mm in diam., ferruginously tomentose but ultimately glabrous, with numerous scars of leaves and flowers; terminal cone up to 12 mm long, greyish puberulous; stipules lanceolate but subulate at apex, up to 11 by 2 mm, in specimens with pubescent underside of leaf up to 6 mm long, crested, greyish puberulous on the outside, glabrous on inside, caducous. Leaves congested at apex of branchlets, obovate or spatulate, 12—26 by 4.5—10.5 cm, obtuse at apex, broadly to narrowly cuneate at base, decurrent along the upper surface of the petiole; coriaceous, entirely glabrous, rarely woolly along midrib on upper surface and ferruginously tomentose below; midrib impressed above and narrowly crested as well, prominent and rounded below, secondary nerves 19—28 pairs, ascending at an angle of 50°—60°, curved or straight and curved at their tips only, diminishing until inconspicuous near margin, prominulous above, prominent below, tertiary nervation slender, transverse, prominulous on either side. Petioles 2.5—3 cm long, narrowly grooved above, rounded below, thickened and sometimes rugulose in the basal part, glabrous or rarely sparsely puberulous. Flowers very numerous together at the tip of the branchlets, axillary, part of them pendulous, pedicels slender, angular, 2—3.5 cm long, pale

ferruginously tomentose, in fruit hardly longer but much stouter. *Sepals* lanceolate-ovate, 8—10 by c. 6 mm, in fruit up to 13 by 7 mm, acute or obtuse, ferruginously tomentose on either side except in a basal spot on the inside, inner sepals smaller and more rounded, crested and with membranous, glabrous and fimbriate margins. *Corolla* 12—16 mm long, glabrous on either side, lobes 16 or 17, spatulate, 6.5—8 by 3—3.5 mm, obtuse, the apex often scarious. *Stamens* 33—37, in three whorls, 5.5—7 mm long, entirely glabrous, filaments subulate, c. 2 mm long, anthers ovate-lanceolate to oblong, 4—5.5 mm long, connective acutely elongate, up to 1.5 mm, dehiscing laterally. *Ovary* disciform, c. 1 by 3 mm, 18—21-celled, glabrous, style filiform, up to 2.5 cm long, glabrous. *Fruits* a few together at apex of branchlets, globose, 2.5—3 cm in diam., 2—4-seeded, pericarp thick, fleshy, ferruginously tomentose, seeds ellipsoid, 14—17 by 5—7 by 3—6 mm, laterally flattened, rounded on either side, blackish scar narrow, linear, albumen none.

Type specimen: *Henderson 25055* in SNG.

Distribution: Malaya.

MALAYA. Pahang, Bukit Serdam, alt. c. 400 m: *Henderson 25055* (K, KEP, L, SING), small but fairly stout tree, fl. Oct. — Perak, Mt Runto, Lenggong, alt. c. 160 m: *Henderson 23834* (K, KEP, L, SING), tree, fr. June — Kedah, Bukit Batu Ayam: *Rahim 12437* (KEP), tree 13 m, fr. April; Bukit Bintang For. Res., alt. 250 m: *Symington 57055* (KEP), tree, fl. June.

Remarks. This species differs from all other in *Madhuca* by the entirely glabrous corolla, the large number of corolla-lobes, stamens and cells of the ovary. Moreover, the ovary being glabrous, the fruits are ferruginously tomentose. The latter have been described after *Henderson 23834*.

In the specimens *Rahim 12437* and *Symington 57055* the leaves are ferruginously tomentose below.

24. *M. malaccensis* (Clarke) H. J. Lam, l. c. 1925, 167; Ridley, Fl. Mal. Pen. 5, 1925, Suppl., 319; Lam, l. c. 1927, 449 — *Payena malaccensis* Clarke in Hooker fil, Fl. Br. Ind. 3, 1882, 547 — *Bassia malaccensis* (Clarke) King & Gamble, Journ. As. Soc. Beng. 74, 2, Extra 17, 1905, 180; Ridley, Fl. Mal. Pen. 2, 1923, 268.

Trees up to 25 m. Branchlets angular or subterete, 3—6 mm in diam., finely ferruginously puberulous at the extreme tip only; terminal cone up to 5 mm long, puberulous; stipules lanceolate, up to 1.5 by 0.5 mm, acute, pubescent on outside, glabrous on inside, soon caducous. *Leaves* scattered along the branchlets, obovate, obovate-oblong or elliptic-obovate, 13—33(—52) by 7.5—15(—20) cm, obtuse or abruptly obtusely acuminate, at base narrowly cuneate to subrotundate, decurrent along sides of petioles; chartaceous to submembranous, glabrous above, sparsely and minutely ferruginously puberulous below mainly on midrib when young but ultimately becoming glabrous; midrib prominent above, but more so below, rounded on either side, secondary nerves (9—)11—16 pairs, ascending at an angle of c. 60°, curved but stronger so at their tips and diminishing until inconspicuous, sometimes the apical nerves archingly joined, prominent on either side, tertiary nerves transverse, slender, widely reticulate,

distinct on either side. Petioles 2—5.5 cm long, flat, broadly grooved or crested above, rounded below, distinctly or indistinctly thickened in the basal part, glabrous. *Flowers* fascicled, 4 to 8 together in the axils of the leaves or their scars, pedicels angular, 0.8—2.7 cm long, widened towards apex, ferruginously or greyish sericeous-tomentose. *Sepals* ovate, 6—7 by 4—6 mm, subobtusely, sparsely ferruginously puberulous on outside, glabrous on inside, inner sepals more orbicular than the outer ones, with glabrous, membranous and fimbriate margins, crested on outside, and more rounded at apex, otherwise similar to the outer sepals. *Corolla* 10—12-lobed, 8—13.5 mm long, sparsely ferruginously sericeous on outside on the tube, ferruginously woolly between the stamens and sparsely ferruginously sericeous in the tube, lobes elliptic-lanceolate or lanceolate, 4.5—5.5 by c. 1.5 mm, obtuse. *Stamens* 20—25, in two whorls, 3.5—5 mm long, filaments subulate, 1—1.5 mm long, anthers sagittate, c. 3 mm long, acuminate, dehiscing extrorsely, ferruginously hirsute on the outside. *Gynaecium* conoid, 4—7 mm long, ovary 8-celled, glabrous. *Fruits* oblong-obovoid, 2—2.7 by 1—1.5 cm, rounded and crowned at apex by the persistent style, at base with the enlarged calyx, 1-seeded, glabrous, seeds oblong, c. 1.5 by 0.8 cm, acute at apex, rounded at base, scar linear, up to 0.5 cm broad, albumen none, cotyledons thick.

Lectotype specimen: *Griffith 3610* in K.

Vernacular names: basong, kamayan, nyatoh (Borneo), sundek (Singapore).

Distribution: Siam, Malaya, Sumatra, Bangka, Siantan, Borneo.

SIAM. Kao Re Chan, Toh Moh, alt. 800 m, evergreen forest: *Lakshmakara 749* (BM, K), fl. white, April; Kao Kalakini, Pattani, alt. 800 m, evergreen forest: *Kerr 14953* (BM, K), fl. April, tree, c. 10 m.

MALAYA. Singapore, Selitar: *Ridley 6132* (BM, SING), fl.; ibidem: *Ridley 6498* (K, SING), imm. fr.; ibidem: *Ridley 6499* (K); Bukit Timah: *Ridley 6133* (BM, K, SING), fl. April; Changi: *Ridley 5643* (BM, SING), fl. white; ibidem: *Ridley 6042* (K), *6043* (BM, SING), fr.; ibidem: *Ridley 2082* (K), fl.; Botanic Gardens: *Ngadiman s.n.* (K, KEP), fl. March; ibidem: *Nur s.n.* (K, KEP), fr. June; ibidem: *Ridley 2753, 2757, 6521*. (BM, K, SING), fl. & fr.; ibidem: *Ngadiman 549* (SING), fl.; Choa Chu Kang: *Ridley 6500* (SING), imm. fr.; Cluny Rd: *Ridley 8078* (K, SING), fr. — Trengganu, Ulu Brang, alt. 100 m: *Moysey & Kiah SFN 33821* (K, SING), fr. July — Kemaman, Bukit Kajang, alt. 160 m: *Corner 30332* (K, KEP, SING), tree 20 m, imm. fr., Nov.; ibidem: *Corner s.n.* (SING), fl. Nov.; ibidem: *Corner 30399* (BM, K, SING), Nov. — Perak, Mat Batu Puteh: *Wray 1229* (K, SING), fl. — Selangor, Weld Hill: *Hamid s.n.* (SING), fl. June — Malacca, without known loc.: *Malvius 1000* (SING), juv. fr.; ibidem: *Griffith 3610* (K), fl. — without known loc.: *Maingay 992* (BM, K, L, SING), fl.; ibidem: *Maingay 1933* (K), fl.; ibidem: *Forbes 3255* (BM, L).

BORNEO. Sandakan, St Lucia: *Orolfo 55480* (KEP), fl. May, yellowish white, tree c. 17 m; Bettotan, alt. 45 m: *Puasa 4549* (K, L), tree 16 m, fl. March; Mile 15, Sandakan, low land: *Castro 4453* (K, L, SING), tree 10 m, fl. white, April.

Dubious specimens:

BANGKA. Lobok Besar, Mt Padang, alt. 20 m: *Anta 161* (BO, K, L), tree 20 m, fl. buds pale green, Sept.; ibidem: *Anta 935* (BO, K, L), tree 10 m, fl. white, Aug.; ibidem: *Anta 197* (BO, L), tree 25 m, fl. white, Aug.; ibidem: *Anta 892* (BO, K, L), tree 15 m, Sept.; ibidem: *Anta 229* (BO, K, L), tree 7 m, fl. Aug.; ibidem: *Anta 426* (BO, K, L), tree 15 m, fl. Sept.; Mt Mangkol, primary forest, alt. 50 m: *Anta 804* (BO, K, L), tree 18 m, buds pale green, Sept.

SIANTAN. E of Terempa, in rainforest on crest of hill, alt. c. 300 m: *Henderson 20193* (K, SING), tree 16 m, fl. April.

**Remarks.** According to King & Gamble the filaments of the outer whorl of stamens is densely pubescent but this is certainly not true in the material studied and it can be supposed that the dense woolly pubescence in the throat of the corolla has been mistakenly regarded as being (partly) attached to these filaments.

**25. *M. sepilokensis* van Royen, n. sp. — Fig. 8.**

**Arbor.** Ramuli tenui, glabri; stipulae ovatae, acutae, caducae. Folia alterna, anguste obovata, 19—27 × 6—9.5 cm, obtuse acuminata, basi anguste cuneata, glabra; nervi secundarii utroque latere 10—13, sursum evanescentes, tertiarum transversim. Petiolus 3—3.5 cm longus, glaber. Pedicellus 0.9—1.3 cm longus, in parte apicali, sparsissime cinero-sericeus. Sepala ovata-lanceolata, 3.5—5 × 2.5—3.5 mm, exteriora extus sparsissime cinero-sericea, intus glabra, interiora extus dense sericea, intus glabra. Corolla 8-lobata, extus glabra, fauce dense ferrugineo-lanata. Stamina 18; filamenta dense ferrugineo-lanata; antherae ferrugineo-hirsutae. Ovarium ovoideum, 8-loculare, glabrum; stylus glaber. Fructus ignotus. **Typus:** Wood SAN 16032 in L.

Trees c. 13 m. Branchlets slender, 2—3 mm in diam., glabrous; terminal cone up to 2 mm long, greyish puberulous, stipules ovate, sometimes oblique, c. 1.5 by 0.5 mm, acute. *Leaves* scattered, narrowly obovate, 19—27 by 6—9.5 cm, obtusely acuminate at apex, narrowly cuneate at base, decurrent along sides of petioles; thinly coriaceous, glabrous; midrib flat or rounded above, prominent and rounded below, secondary nerves 10—13 pairs, ascending at an angle of c. 45°, curved, diminishing until inconspicuous near margin, prominent above, prominent below, tertiary nerves very slender, transverse, inconspicuous above, more distinct below. Petioles 3—3.5 cm long, flat above, rounded below, thickened in the basal part, glabrous. *Flowers* in 3—6-flowered, axillary clusters, pedicels slender, angular, 9—13 mm long, very sparsely greyish sericeous but mainly so in the apical half. *Sepals* ovate-lanceolate, 3.5—5 by 2.5—3.5 mm, obtuse, the outer sepals very sparsely greyish sericeous on outside, glabrous on inside, inner sepals densely greyish sericeous on outside, glabrous on inside, all sepals with dark brown woolly hairs at apex. *Corolla* 8—9 mm long, 8-lobed, glabrous on outside, densely ferruginously woolly on inside between the stamens, lobes oblong, 4—4.5 by 1—1.5 mm, obtuse. *Stamens* 18, 3—3.5 mm long, filaments subulate, c. 1 mm long, densely ferruginously woolly, anthers c. 3 mm long, connective acutely prolonged, dehiscing laterally, ferruginously hirsute. *Ovary* ovoid, 8-celled, c. 2 by 1 mm, glabrous, style filiform, up to 12 mm long, glabrous. *Fruits* unknown.

**Type specimen:** Wood SAN 16032 in L.

**Distribution:** Borneo (Sandakan).

**Sandakan,** distr. Sandakan, Sepilok Forest Reserve, 24 km W of Sandakan, alt. 100 m: Wood SAN 16032 (L, SAN), tree 13 m, fl. April.

**Remarks.** Closely related to *M. sandakanensis* and *M. woodii* but differing from the latter by the smaller number of secondary nerves the more numerous stamens, the shorter pedicels and the marked difference in pubescence of the outside of outer and inner sepals and by the glabrous ovary.

Though very close to *M. sandakanensis*, with which species I first intended to merge the specimens of the present species, it differs by the slightly larger number of secondary nerves, by the more numerous stamens,

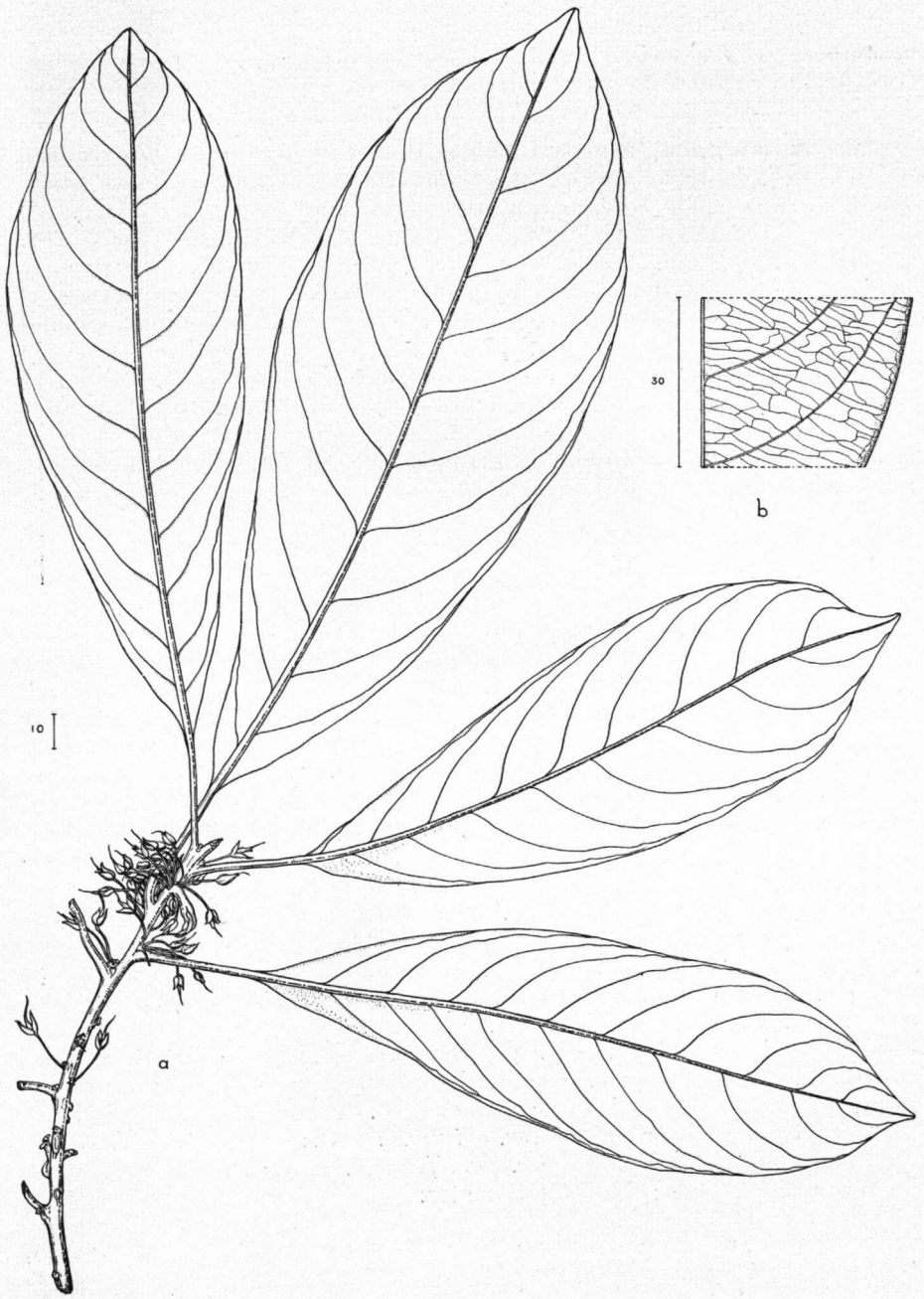


Fig. 8. *M. septilobensis*, a. branchlet with leaves and flowers, b. part of leaf showing tertiary venation. (Wood SAN 16032).

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by the pubescent filaments of the stamens, the less denser pubescence of the anthers, by the smaller sepals, and by the marked difference in pubescence of the outside of outer and inner sepals.

26. *M. laurifolia* (King & Gamble) H. J. Lam, l. c. 1925, 176; Ridley, Fl. Mal. Pen. 5, 1925, Suppl., 319; Lam, l. c. 1927, 456 — *Bassia laurifolia* King & Gamble, and its varieties *obtusa* and *parvifolia*, Journ. As. Soc. Beng. 74, 2, Extra 17, 1905, 182; Ridley, Fl. Mal. Pen. 2, 1923, 269.

Trees up to 20 m. Branchlets terete, 3–6 mm in diam., ferruginously tomentose, long persistent especially in the flowerbearing parts but otherwise soon glabrous; terminal cone up to 8 mm long, tomentose, stipules linear, up to 7 by 1.5 mm, attenuate and acute at apex, ferruginously woolly-tomentose on outside, glabrous on inside, soon caducous. *Leaves* scattered, elliptic to obovate-elliptic or obovate-lanceolate, 10–25 by 6–9 cm, gradually obtusely acuminate at apex, narrowly cuneate at base, decurrent; chartaceous, ultimately glabrous on either side; midrib broadly grooved above and narrowly crested as well, prominent and rounded below, secondary nerves (10–)12–15 pairs, ascending at an angle of c. 50°, curved, diminishing until inconspicuous near margin, grooved above and narrowly crested as well, prominent below, tertiary nerves transverse, slender, distinct on either side. Petioles 2–5 cm long, flat or broadly grooved above, sometimes narrowly crested as well, thickened in the basal part, ferruginously tomentose but becoming glabrous, the pubescence longer persistent on the thickened basal part. *Flowers* pendulous, in 3–6-flowered, axillary clusters, pedicels angular, 5–13 mm long, ferruginously woolly. *Sepals* lanceolate to narrowly ovate, 5–7 by 2.5–3.5 mm, acute, ferruginously woolly hirsute on outside, glabrous on inside. *Corolla* 6–7 mm long, on outside ferruginously sericeous on the middle-line of the lobes and with a bundle of hairs at their tips but otherwise glabrous, on inside ferruginously woolly between the stamens only, lobes 8–10, oblong-spatulate to lanceolate, 4.5–5 by c. 1.5 mm, obtuse. *Stamens* (10–)14–16, in two indistinct whorls or in one whorl, c. 3 mm long, filaments subulate, c. 1 mm long, with long ferruginous hairs, anthers oblong, ferruginously hirsute, c. 2 mm, the connective moreover prolonged up to 0.5 mm. *Ovary* ovoid-conoid, c. 1 by 1 mm, 8-celled, glabrous, style cylindrical, 3.5–4.5 mm long, ribbed. *Fruits* ellipsoid, 1.5–1.8 by c. 1 cm, short obtusely acuminate, 1-seeded, pericarp thin, fleshy, glabrous, seeds ellipsoid, laterally compressed, c. 1.2 by 0.9 by 0.5 cm, dark brown, testa thin, scar ovate.

Lectotype specimen: *King's Coll. 3720* in SING.

'Type specimens' of var. *obtusa* K. & G.: *Curtis 159, 2254, 3589*.

'Type specimen' of var. *parvifolia* K. & G.: *Ridley 5506*.

Distribution: Malaya, Sumatra.

**MALAYA.** Perak, Larut, low open jungle, alt. 100 m: *King's Coll. 3720* (SING), fr. Jan.; ibidem: *King's Coll. 3104, 3718* (see King & Gamble, l. c.) — Penang, Tulloh Bahang: *Curtis 1545* (SING), fl. Jan.; Telok Batung: *Curtis 159* (SING), fl. Jan.; Penang Isl., Batu Ferengi: *Curtis 2254* (BM, SING), fl. March; ibidem: *Curtis 3539* (SING) — Kedah, Kedah Peak: *Ridley 5506* (K, SING), fl.; Bukit Bintang For. Res.: *Sharin 35138* (KEP), tree 11 m, fl. white, March.

**SUMATRA.** Indragiri, Muara Padjanki: *Buwalda 6444* (BO, L), fl. buds April.



27. *M. rupicola* (King & Gamble) H. J. Lam, l. c. 1925, 175; Ridley, Fl. Mal. Pen. 5, 1925, Suppl., 319; Lam, l. c. 1927, 455 — *Bassia rupicola* King & Gamble, Journ. As. Soc. Beng. 74, 2, Extra nr. 17, 1905, 183; Ridley, Fl. Mal. Pen. 2, 1923, 269 — Fig. 9.

Trees up to 18 m. Branchlets angular, 1.5—3 mm in diam., sparsely ferruginously puberulous but very soon glabrous; terminal cone up to 2.5 mm long; stipules ovate-lanceolate, up to 1.5 by 0.5 mm, soon caducous. *Leaves* scattered, elliptic to obovate-elliptic or obovate-oblong, 9.5—21 by 2.5—7.5 cm, indistinctly obtusely acuminate at apex, cuneate at base, decurrent along upper sides of petiole; coriaceous, entirely glabrous; midrib crested above, prominent and rounded below, secondary nerves 8—12 pairs, ascending at an angle of c. 45°, curved, diminishing until inconspicuous near margin, prominulous above, prominent below, tertiary nerves transverse, widely spaced and reticulately connate, slender but distinct on either side. Petioles 1—2.5 cm long, grooved and narrowly crested above, rounded below, glabrous. *Flowers* in 3—5-flowered, axillary clusters, pedicels terete, 3—5 mm long, greyish-brownish sericeous. *Sepals* ovate, 4—5 by 2—3 mm, subacute or obtuse, brown sericeous on outside, glabrous on inside, inner sepals with glabrous, membranous and fimbriate margin, the outer sepals often recurved at apex. *Corolla* 8-lobed, 6—7 mm long, ferruginously sericeous on outside on the tube only, ferruginously woolly between the stamens, lobes oblong, 3—4 by c. 1 mm, obtuse. *Stamens* 16, in two indistinct whorls, 2.5—3 mm long, filaments subulate, c. 1 mm long, pale ferruginously woolly, anthers oblong, c. 2.5 mm, the c. 0.5 mm acumen of the prolonged connective obtuse, sparsely ferruginously hirsute. *Ovary* conoid, gradually passing into the style, 8-celled, glabrous, style filiform, c. 7 mm long, glabrous. *Fruits* unknown.

Type specimen: *King's Collector 7411* in K.

Vernacular names: *puduwa* (Siam).

Distribution: Malaya, Siam.

MALAYA. Perak, Mt Batu, in rocky creeks at 450—600 m alt.: *King's Coll. 7411* (BM, K), fl. cream colour with a pale brown calyx, tree 13—18 m, March.

SIAM. Ban Prakamp, Singala, evergreen forest, alt. 100 m: *Kerr 15836* (BM, K); tree c. 15 m, fl. July.

Remarks. According to King & Gamble the tip of the corolla-lobes is ciliate but I have been unable to confirm this in the type specimen.

Some specimens mentioned by Lam, l. c. 1927, 454—455 (*Endert 4693b*, 3426) certainly do not belong to this species. The specimens belong to *M. korthalsii*.

28. *M. grandiflora* Fletcher, Kew Bull. 1937, 376.

Trees up to 20 m. Branchlets stout, 7—12 mm in diam., pale ferruginously woolly but very soon becoming glabrous; terminal cone up to 8 mm long; stipules linear, up to 9 by 1.5 mm, acute, pale ferruginously woolly at outside, glabrous at inside, soon caducous. *Leaves* conferted at tip of branchlets or flushes, lanceolate or oblanceolate, (5—)12—20 by woolly on outside, glabrous on inside, soon caducous. *Leaves* conferted at base, decurrent along upper surface of petiole; chartaceous, glabrous on either side, when young sometimes golden puberulous below; midrib dis-

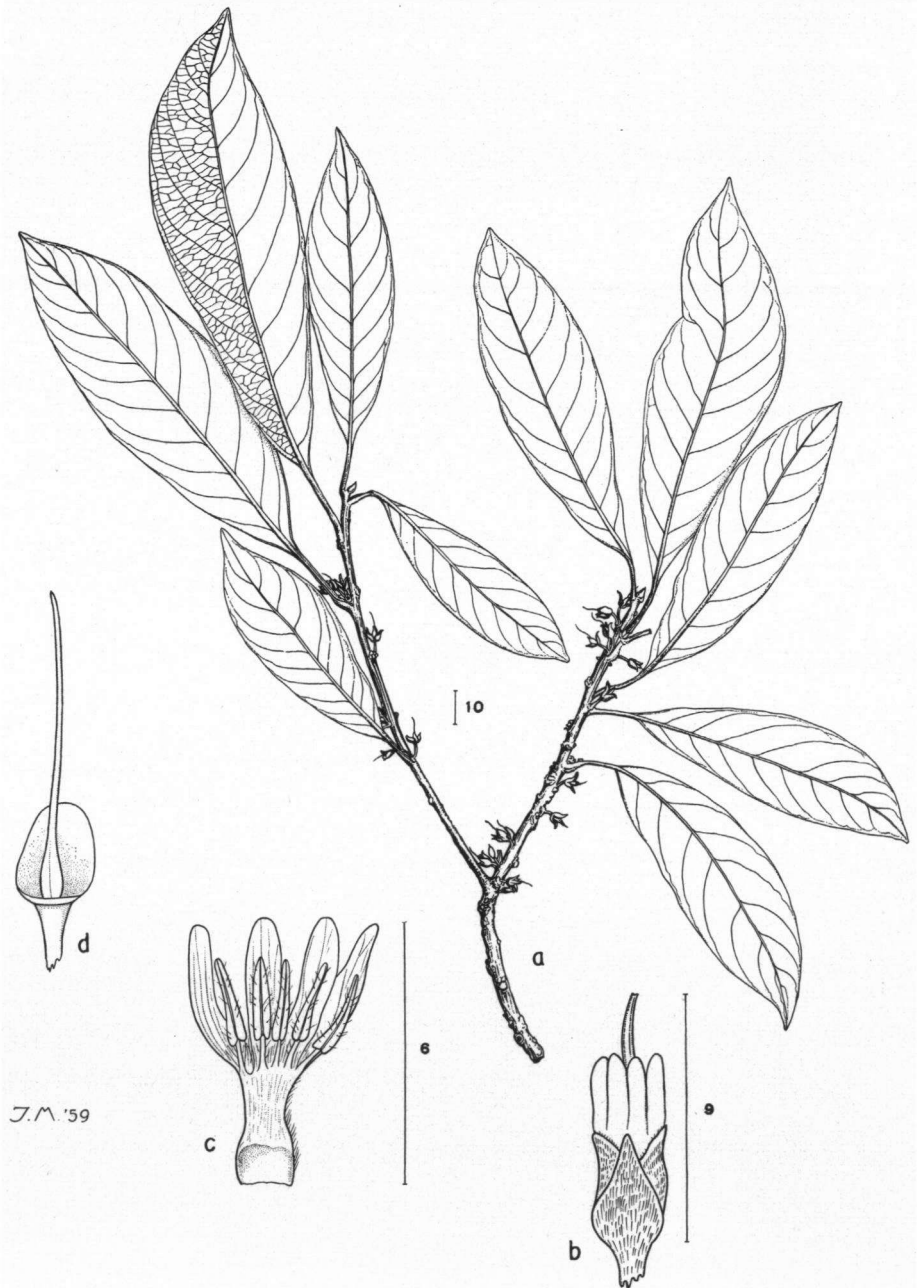


Fig. 9. *M. rupicola*, a. branchlet with leaves and flowers, b. flower, c. corolla, inside, d. calyx partly and gynaeceum. (King's Coll. 7411).

tinctly crested above, prominent and rounded below, secondary nerves slender, 18—23 pairs, ascending at an angle of  $45^{\circ}$ — $70^{\circ}$ , archingly joined, prominulous above and sometimes inconspicuous, more prominent below, tertiary nerves transverse but the nerves reticulately connate and with a distinct reticulate nervation in between. Petioles 2—4.5 cm long, narrowly grooved above, rounded below, sparsely pale greyish yellow woolly mainly in the basal part. *Flowers* in many-flowered, axillary clusters at or slightly below apex of branchlets, pedicels angular, 1.5—2.5 cm long, dark brown woolly-puberulous. *Sepals* broadly ovate to oblong-ovate, 9—12 by 4—7 mm, rounded or obtuse, outer sepals sometimes crested, inner sepals with membranous, glabrous, fimbriate margin, brown or cinnamomously woolly-puberulous on either side, except for a basal central part on inside. *Corolla* 10—12-lobed, (12—)22—25 mm long, glabrous on either side. *Stamens* 24—28, in 3 indistinct whorls, 6.5—7.5 mm long, entirely glabrous, filaments filiform, geniculate at apex, 2.5—4.5 mm long, anthers oblong-sagittate, 3—4 mm long, connective acutely elongate up to c. 1 mm, dehiscing laterally. *Ovary* discoid-globose, c. 1.5 by 2.5 mm, 12-celled, glabrous, style filiform, 15—30 mm long. *Fruits* globose or ellipsoid, 10—13 by c. 10 mm, glabrous, 1- or 2-seeded, seeds incompletely known.

Type specimen: *Kerr 17659* in K.

Vernacular name: ma-sarng.

Ecology: In evergreen or open deciduous forest, sometimes in scrub jungle or secondary forest.

Distribution: Siam.

SIAM. Krat, Kan Chumpan, evergreen forest: *Kerr 17659* (BM, K), fl. & fr.; Krabin, Sakeo, alt. c. 50 m, scrub jungle: *Kerr 9760* (BM, K), fl.; Krabin, Ban Keng, alt. c. 25 m, open deciduous forest: *Kerr 19356* (BM, K), fl.; Chantaburi, Na-arng, alt. c. 100 m, evergreen jungle or secondary forest: *Put 201/397* (L), tree, fl. white, Nov.

29. *M. obtusifolia* (King & Gamble) van Royen, nov. comb. — *M. spec.*, fide van Bruggen, *Blumea* 9, 2, 1958, 137 — *Payena obtusifolia* King & Gamble, *Journ. As. Soc. Beng.* 74, 2, Extra nr. 17, 1905, 175; Ridley, *Fl. Mal. Pen.* 2, 1923, 264; Lam, l. c. 1925, 139; Lam, l. c. 1927, 437.

Trees. Branchlets stout, 3—6 mm in diam., ferruginously puberulous, soon glabrous; terminal cone up to 3 mm long, puberulous; stipules? *Leaves* scattered to conferted at tip of branchlets, obovate or elliptic-obovate, 5—9 by 2—3.5 cm, rounded, obtuse or emarginate, rarely acuminate at apex, base cuneate, decurrent along upper side of petioles; coriaceous, glabrous but sometimes brownish puberulous on midrib below (f. King & Gamble); midrib narrowly crested above, prominent and rounded below, secondary nerves 9—12 pairs, ascending at an angle of  $60^{\circ}$ — $65^{\circ}$ , curved, archingly joined, distinct on either side but more prominent below, tertiary nerves transverse, slender, reticulately connate, distinct on either side. Petioles 9—14 mm long, flat above and narrowly crested, rounded below, thickened in the apical part, glabrous. *Flowers* unknown except for calyx and ovary. *Sepals* lanceolate-ovate, c. 6 by 4 mm, obtuse, greyish puberulous without, glabrous within, inner sepals more rounded and ferruginously sericeous on the outside, with membranous, glabrous and fimbriate margins. *Ovary* ovoid-conoid, c. 1 by 2 mm, 8-celled, glabrous. Style linear, c. 3 mm long, glabrous. *Fruits* unknown.

Type specimen: *Scortechini 340* in SING.

Distribution: Malaya.

PERAK, without known loc.: *Scortechini 340* (K, SING) and *340b* (CAL), incomplete fl.

30. *M. beccarii* (Engler) H. J. Lam, l. c. 1925, 177; Lam, l. c. 1927, 458 — *Payena beccarii* Engler, Bot. Jahrb. 12, 1890, 508 — *P. engleri* Merrill, Enum. Born. Pl., in Journ. As. Soc. Straits, Spec. Nr., 1921, 477.

Trees up to 35 m. Branchlets slender, 1.5–3 mm in diam., ferruginously sericeous-tomentose but soon glabrous; terminal cone up to 3 mm, stipules lanceolate, up to 3 by 1.5 mm, acute, pubescent on outside, glabrous on inside, soon caducous. *Leaves* scattered, elliptic or elliptic-obovate, 11–16 by 3.5–6 cm, obtusely subcaudate at apex, narrowly cuneate at base and decurrent along sides of petiole; chartaceous, glabrous; midrib rounded on either side, prominent above, stronger so below, secondary nerves 4–9 pairs, ascending at an angle of c. 45°, curved, diminishing until inconspicuous near margin, prominulous above, prominent below, tertiary nerves transverse, slender but conspicuous on either side. Petioles 2–3 cm long, flat above, rounded below, conspicuously thickened in basal half, glabrous. *Flowers* solitary, or 2 or 3 together, axillary, pedicels subangular, 4–8 mm long, sparsely ferruginously tomentose. *Sepals* ovate, 4–5 by 3.5–4.5 mm, obtuse, ferruginously puberulous on outside, glabrous on inside, inner sepals broader and larger and with glabrous, membranous, fimbriate margins. *Corolla* seen in bud only, c. 5 mm long, on outside ferruginously sericeous in the basal half, on inside glabrous, lobes 7 or 8, oblong, c. 3.5 by 1 mm, obtuse. *Stamens* 13–16, in 2 whorls, c. 3 mm long, filaments subulate, c. 0.7 mm long, with long ferruginous hairs, anther oblong, c. 2 mm long, with a c. 0.7 mm long, obtuse acumen, ferruginously hirsute. *Ovary* discoid, c. 1 by 1.5 mm, 6–8-celled, glabrous, style filiform, c. 5 mm long, glabrous. *Fruits* ellipsoid-obovoid, 2–2.5 by 0.8–1.5 cm, obtuse, one-seeded, pericarp thin, glabrous, seeds incompletely known.

Type specimen: *Beccari 1598* in FI.

Vernacular names: njatoh padi, njatoh putih.

Distribution: Borneo (Sarawak).

Sarawak, near Kuching: *Beccari 1589* (FI, P), *1598* (FI, K, P), fl.; Sungei Semengoh For. Res.: *Egon 1024* (SAN), tree, fr. Dec.; ibidem: *Carroll 215* (SAN), tree 35 m, juv. fr. Febr.

Remark. The fruit has been described from *Egon 1024*.

31. *M. erythrophylla* (King & Gamble) H. J. Lam, l. c. 1925, 170; Ridley, Fl. Mal. Pen. 5, 1925, Suppl., 320; Lam, l. c. 1927, 170 — *Bassia erythrophylla* King & Gamble, J. As. Soc. Beng. 74, 2, Extra 17, 1905, 188; Ridley, Fl. Mal. Pen. 2, 1923, 272.

Trees up to 20 m. Branchlets irregularly angular, 3–6 mm in diam., ferruginously woolly-tomentose, glabrescent; terminal cone up to 10 mm long, ferruginously pubescent, stipules linear, up to 10 by 1 mm, hirsute on outside, glabrous on inside, caducous. *Leaves* subconferted or conferted at tip of branchlets, elliptic, oblong, oblanceolate or obovate, (11–)16–26 by 5–7.5 cm, rounded to (usually) obtusely acuminate, broadly cuneate at base, decurrent along upper side of petiole; coriaceous, glabrous; midrib

broadly grooved and minutely crested as well, prominent and rounded below, secondary nerves 10—13 pairs, stout, curved, ascending at an angle of 60°—80°, diminishing until inconspicuous near margin, prominent on either side, tertiary nerves stout, transverse, reticulately connate, prominent above, less so below. Petioles 3.5—6.5 cm long, grooved above in the apical half, rounded below, thickened in the basal part, sparsely greyish or ferruginously woolly below in the basal part or entirely glabrous. *Flowers* in 5- or 6-flowered fascicles. *Corolla* and *stamens* unknown. *Fruits* globose, c. 1.2 cm in diam., 1-seeded, ferruginously woolly on outside, glabrous on inside except along the apical margin, at apex with a short remnant of the style, seeds unknown. Pedicels stout, 1.5—2.5 cm long, ferruginously woolly-hirsute, sepals orbicular-ovate, 5—7 by 5—7 mm, rounded or obtuse, hirsute on outside, glabrous on inside, inner sepals more orbicular, crested.

Type specimen: *Curtis 3652* in SING.

Distribution: Malaya, Lingga.

MALAYA. Penang Isl.: *Curtis 3652* (K, SING), tree 13—16 m, fr. May.

LINGGA. Santel: *NIFS bb 31655* (BO, L, SING), tree, Dec.

32. *M. longifolia* (Koenig) MacBride, Contr. Gray Herb. Harv. Univ. NS 53, 1918, 17; Lam, l. c. 1927, 463; Chevalier, Revue Bot. Appl. 23, 1943, 149 — *M. longifolia* (Koenig) H. J. Lam, l. c. 1925, 182 — *Bassia longifolia* Koenig in Linnaeus, Mantissa 2, 1771, App. 563; Gardner, Fruct. 2, 1791, 104, t. 104 f. 2; Lamarek, Illustr., 1793, t. 398; Moon, Cat. Ceylon, 1824, 36; Wallich, Cat., 1828, 4162; Roxburgh, Fl. Ind. 2, 1832, 523; De Candolle, Prodr. 8, 1844, 197; Wight, Illustr., 1850, t. 147; Thwaites, Enum. 3, 1860, 175; Dalzell & Gibson, Bombay Fl., 1861, 139; Beddome, Fl. Sylv., 1869, t. 42; Gamble, Man. Indian Timbers, 1881, 244; Hooker, Fl. Br. India 3, 1882, 544; Watt, Dict. Econ. Prod. 1, 1889, 415; Trimen, Fl. Ceyl. 3, 1895, 79; Woodrow, Journ. Bomb. Nat. 12, 1898, 163; Talbot, Trees Bombay, ed. 2, 1902, 207; idem, ed. 3, 1949, 308; Cooke, Fl. Bombay 2, 1908, 92 — *Illipe malabrorum* Koenig ex Engler, Bot. Jahrb. 12, 1890, 509; Dubard, Bull. Mus. Hist. Nat. 13, 1907, 453; Dubard, Rev. Gén. Bot. 20, 1908, 195 — *I. malabrorum* ssp. *longifolia* (Koenig) Dubard, l. c., 1907, 455 — *I. malabrorum* ssp. *alphonsae* Dubard, l. c. 1907, 456 — *M. indica* Gmelin, Syst., 1791, 799 — *Bassia villosa* Wallich, Cat., 1828, 4165; De Candolle, Prodr. 8, 1844, 198 — *Mahwah* or *Madhuca*, Hamilton, As. Research 1, 1788, 300—308, with fgs — \* — *M. latifolia* (Roxburgh) MacBride, l. c., 17 — *Bassia latifolia* Roxburgh, Pl. Coast Corom. 1, 1795, 20, t. 19; Wallich, Cat., 1828, 4163; Roxburgh, Fl. Indica 2, 1832, 526; Graham, Cat., 1839, 107; De Candolle, Prodr. 8, 1844, 197; Dalzell & Gibson, l. c. 1861, t. 41; Brandis, For. Fl., 1874, 289; Gamble, Man. Indian Timbers, 1881, 243; Hooker, Fl. Br. Ind. 3, 1882, 544; Watt, Dict. Econ. Prod. 1, 1889, 406; Woodrow, Journ. Bomb. Nat. 12, 1898, 163; Talbot, Trees Bombay, ed. 2, 1902, 206; idem, ed. 3, 1949, 308; Cooke, Fl. Bombay 2, 1908, 92; Haines, Bot. Bihari and Orissa 4, 1922, 511 — *Illipe latifolia* (Roxburgh) Dubard, l. c. 1907, 452 — *Illipe malabrorum* (Koenig) Dubard, ssp. *latifolia* Dubard, l. c. 1907, 455.

Trees up to 45 m. Branchlets slender, often thickened in the nodes,

2—10 mm in diam., pale cinnamomously to ferruginously sericeous, tomentose or woolly or greyish brown woolly hirsute, glabrescent; terminal cone up to 12 mm long; stipules linear, up to 12 by 2.5 mm, acute, margins often involute and apex sometimes recurved, pubescent on outside, glabrous on inside, caducous. *Leaves* conferred at apex of branchlets, sometimes seemingly in whorls, broadly elliptic, elliptic-obovate, oblong, lanceolate or oblanceolate, sometimes ovate-elliptic, 7—25 by 2—9 cm, obtuse to obtusely acuminate at apex, sometimes acute, base narrowly to broadly cuneate or rounded, but close to the petiole abruptly narrowed and decurrent, densely woolly on either side when young, but becoming entirely glabrous ultimately, coriaceous; midrib grooved or not, sometimes prominent above and narrowly to broadly crested as well, prominent below and rounded, secondary nerves 9—18 pairs, ascending at an angle of 60°—65°, curved or straight and curved at their tips only, diminishing until conspicuous near margin, sometimes archingly joined or connected by thickened tertiary nerves, slender, distinct on either side but less prominent above than below, tertiary nerves transverse, slender but conspicuous on either side. Petioles 1.3—6 cm long, flat or grooved above and minutely crested as well, woolly tomentose when young but ultimately glabrous, thickened in the basal part. *Flowers* in 3- to many-flowered axillary clusters, forming a terminal tuft between or immediately below the leaves, erect when young, later becoming pendulous, pedicels slender, irregularly angular, 2.5—7.5 cm long, brownish to yellowish woolly tomentose but becoming glabrous or subglabrous. *Sepals* ovate, ovate-lanceolate or elliptic-ovate, 1.2—1.7 by 0.6—0.9 cm, obtuse or acute, woolly pubescent on either side except for a basal, central part on inside, inner sepals with membranous, glabrous, fimbriate margins. *Corolla* 1—2 cm long, 8- or 9-lobed, glabrous on either side, lobes elliptic or ovate-elliptic, rather apart, 5.5—13 by 2—4.5 mm, obtuse, often irregularly serrate at apex, attenuate at base. *Stamens* 16—30, in two or three whorls, 4.5—9.5 mm long, filaments subulate, c. 1 mm long or shorter, glabrous, anthers ovate-lanceolate, 5—7.5 mm long, connective acutely prolonged with 1—3 teeth, either glabrous or with white hairs on outside. *Ovary* ovoid to globose, 2—3 by 2—3 mm, 8—11-celled, glabrous or ferruginously hirsute, style filiform, 1.5—3.5 cm long, glabrous. *Fruits* ellipsoid, obovoid, ovoid or subglobose, sometimes oblique, 2.5—5.5 by 2—4.5 cm, with a long remnant of the style at apex, 1—4-seeded, ferruginously woolly but ultimately glabrous, pericarp fleshy, seeds ellipsoid, 2—3.5 by 1.2—1.5 by 0.9—1.4 cm, obtuse or subobtuse at either end, scar ovate, greyish, albumen none.

Lectotype specimen: *Wight 1743* in L.

Distribution: India, Ceylon, Burma.

Var. *longifolia* — See for synonymy under the synonymy of the species up to — \* —.

*Leaves* 7—25 by 2—5.7 cm, obtuse or acute at apex, secondary nerves 11—18 pairs. Petioles 1.3—2.5 cm long. *Flowers* in many-flowered, axillary clusters. *Corolla*-lobes about the same length as the tube. *Stamens* 16—20, filaments almost nil.

Lectotype specimen: *Wight 1743* in L.

Vernacular names: mohâ, mohuâ (Hindi), mohuvâ (Bengal).

móhâ (Ouk.), madhúka (Sanskrit), darakhte-gulchakán (Persian), mahwa, mohi (Bombay), mahuda (Cutch), môhácha-jháda, ippicha-jháda (Mar.), mahudá, mová-nujháda (Gujerati), illupi, elupa, illupai, iruppai (Tamil), uppi, yeppa, uppechettu, pinna-ippa, ippa, ipea-pú (Tel.), hippe, ippigida (Kandala), ellupi, irippa (Malabar), gam-mi, mi (Singh.).

Use: The wood is used for carts, furniture and boat building.

Distribution: Southern parts of India, Ceylon.

INDIA. Hassan and Mysore: *Meebold 8898* (S), fl. — Mangalor: *Hohenacker 759* (BM, G, K, L), fl.; idem: *Wight 1748* (BM, K, L, S), fl. & fr.; Parasnath, Chota Naspore: *Clarke 14063* (BM), fl. April; Seypur hills: *Beddome 4879* (BM), fl.; Annamallay: *Beddome 4880, 4881* (BM), fl., juv. fr.; Pondicherry: *Commerson s.n.* (BM), fl.; without known loc.: *Wallich s.n., 4162* (BM, K), fl.; *Storks s.n.* (BM), fr.; *Campbell s.n.* (BM), fr. — Sikkim, between Kuweong and Pankabari, alt. 1000 m: *Lacaita s.n.* (BM), juv. fr., April.

Otherwise found in many areas up to the line Bombay-Burma in the north and Ceylon and the Southern Provinces in the south.

CEYLON. Na-Ela, W of Ritigala: *Worthington 5154, 5185, 5369* (BM), tree, fl. March.

Var. *latifolia* (Roxburgh) Chevalier, Rev. Bot. Appl. 23, 1943, 149 — See for synonymy under the synonymy of the species after — \* —.

Leaves 13—25 by 4.5—9 cm, obtusely acuminate at apex, secondary nerves 9—12 pairs, Petioles 2—6 cm long. Flowers in 3—5-flowered, axillary clusters. Corolla-lobes more than half the length of the entire corolla. Stamens 20—30, filaments c. 1 mm long.

Type specimen: *Roxburgh s.n.* in K.

Vernacular names: mahwaá, banmahuva, mahúla, maul (Bengal), moha (Uriya), mandukum (Kól.), mohul (Bhumij and Malabar), matkom (Santal.), mahurá (Bhil), mahu (Baigas), irúp, irrip, irhu (Gond.), mohu (Kurku), mhowa (Central Prov.), mová, mahua, mohâ (Bombay), jangli, móhá, moha (Duk.), mahuda, mahura (Gujer.), mowda, ránácha-móhácha-jháda, ránácha-ippécha-jháda, moho, mora, maha (Mar.), illupi, elupa, kat illipi, káthi-illupai, káttuiluppai, káttuirrupai (Tamil), ippi, ippa, yeppa, adavi-ippe-chettu (Tel.), hogne, hippe, kádu-ippegida (Kanala), poonam, káttirippa boanm (Malabar), madhuka, atavi madhuka vriksha (Sanskrit), darakhte-gulchakane-sahrâi (Persian), kansan (Burma), butter or mahua tree (English), mohá, mhová, mahwá, mahulá, maul, jangli-mohá, jangli-mohvá, mowá (Hindi, Oudh).

Use: Oil extracted from seeds is eaten and used for soap-making. Flowers eaten raw or cooked and a spirit is distilled from them. Wood very hard and strong, proper for naves of wheels.

Distribution: India to Burma.

INDIA. Siwalik & Jaunsar Divisions, Dehra Dun: *unknown coll. 82* (S), fl. & immature fr., March, desp. July; Bombay, Kanar: *Ratnagar s.n.* (SING), fl. & fr. — without known loc.: *Roxburgh s.n.* (BM, K), fl.

Remark. According to several reports this variety is found also in Burma though I have not seen any material to confirm these.

33. *M. rufa* (King & Gamble) van Royen, nov. comb. — *Isonandra* (?) *rufa* King & Gamble, Journ. Ac. Soc. Beng. 74, 2, Extra nr. 17, 1906, 166; Ridley, Fl. Mal. Pen. II, 1923, 261; Lam, Bull. Jard. Bot. Buit.,

Sér. III, Vol. 1—2, 1925, 109 and Vol. VIII, 4, 1927, 421 — *Madhuca* sp., Jeuken, Blumea 6, 3, 1952, 578 — Fig. 10.

Small tree, up to 3 m. Branchlets angular, ribbed, 2—3 mm in diam., ferruginously hirsute or woolly, pubescence persisting over a long time; terminal cone up to 3 mm long, pubescent, stipules lanceolate-ovate, up to 5 by 1 mm, acute, whitish woolly on outside, glabrous on inside, caducous. *Leaves* scattered along branchlets, obovate or elliptic, 7.5—13.5 by 3.5—6 cm, obtusely acuminate at apex, rounded or broadly cuneate at base, decurrent along upper side of petiole; subcoriaceous, glabrous above, ferruginously woolly-hirsute below mainly along midrib and nerves, sparsely so on the surface; midrib narrowly crested above, stoutly prominent and rounded below, secondary nerves 9—11 pairs, ascending at an angle of c. 70°, curved, archingly joined, slightly impressed above or prominent, stoutly prominent below, tertiary nervation reticulate, with a small number of irregularly shaped transverse nerves, hardly visible above, prominent below. Petioles 5—8 mm long, grooved above, rounded below, ferruginously hirsute. *Flowers* in 3—6-flowered, axillary clusters, pedicels terete, 7—10 mm long, brownish woolly or hirsute. *Sepals* orbicular-ovate, c. 3 by 3 mm, the outer ones subobtusate, the inner ones rounded, brown sericeous-hirsute on outside, glabrous on inside, inner sepals with membranous, glabrous and fimbriate margin. *Corolla* known in bud only, c. 3.5 mm long, 7-lobed, greyish yellow sericeous on outside, on inside ferruginously hirsute between the stamens only. *Stamens* 12, c. 3 mm long, filaments subulate, c. 0.5 mm long, whitish hirsute at their tips only, anthers narrowly sagittate, c. 2.5 mm long, glabrous except for a plumule of hairs at the tip of the prolonged connective, dehiscing laterally. *Ovary* discoid, c. 0.5 by 1 mm, 5-celled, glabrous, style filiform, 3—6 mm long, glabrous. *Fruits* fusiform, 1.5—1.8 by 0.6—0.8 cm, acutely acuminate at apex and mucronate by a short remnant of the style, one-seeded (?), pericarp thin, glabrous, seeds very imperfectly known.

Type specimen: *King's Collector 4550* in SING.

Distribution: Malaya (Perak).

Perak, Parit For. Res., Kinta: *Symington 39457* (KEP), fl. buds April; Ketedang Saiang Res.: *Saw 33624* (KEP), tree 2.5 m, fr. Febr.; Goping: *Scortechnini 1591?* (CAL), incompl. fl.; ibidem: *King's Collector 4550* (CAL, SING), tree c. 10 m, fl. July.

34. *M. alpina* (A. Chev.) A. Chev., Rev. Bot. Appl. 23, 1943, 150 — *Bassia alpina* A. Chevalier ex Lecomte, Fl. Gén. Indo-Chine 3, 1930, 907.

Trees up to 15 m. Branchlets stout, growing in flushes, 5—15 mm in diam., thickened at apex and with numerous scars of leaves and flowers, ferruginously woolly but soon glabrous; terminal cone up to 5 mm long, woolly pubescent; stipules minute, caducous. *Leaves* conferted at tip of branchlets, oblanceolate, spatulate or oblong, 5—12 by 2.5—5 cm, obtuse or retuse at apex, narrowly cuneate at base, decurrent along sides of petiole; coriaceous, glabrous but sometimes with scattered hairs at underside of lateral nerves and midrib; midrib with two narrow crests above, prominent and rounded below, secondary nerves (10—)12—15 pairs, ascending at an angle of c. 80°, curved or straight and curved at their tips, diminishing until inconspicuous but connate by thickened tertiary nerves, inconspicuous above, prominent below, tertiary nerves reticulate, with a



few irregular, transverse ones, inconspicuous above, distinct below. Petioles 2—3 cm long, grooved above, prominent below, thickened in the basal part, ferruginously woolly but partly glabrous. *Flowers* in clusters at tip of branchlets, pendulous, pedicels angular, 4—5.5 cm long, ferruginously woolly-sericeous. *Sepals* ovate, 10—13 by 8—11 mm, subacute, reddish ferruginously woolly-sericeous on outside, glabrous on inside but woolly near

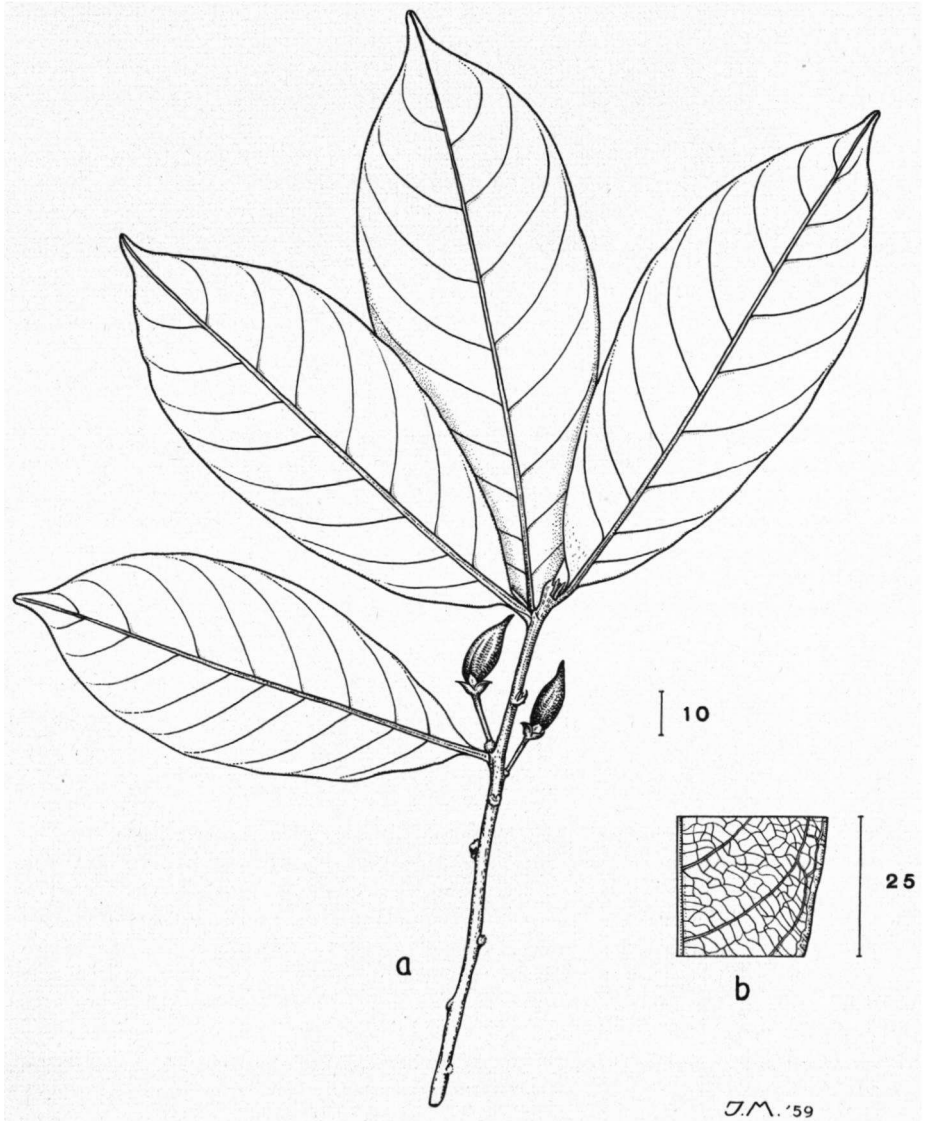


Fig. 10. *M. rufa*, a. branchlet with leaves and fruits, b. part of leaf showing tertiary nervation. (Saw 35624).

apical part of margin, inner sepals crested on outside and with membranous, glabrous and fimbriate margins. *Corolla* 11—15 mm long, 9—11-lobed, glabrous, lobes elliptic or elliptic-obovate, obtuse, edge scarious. *Stamens* 18—21, in 2 whorls, 4.5—5.5 mm, entirely glabrous, filaments subulate, 1.5—2 mm long, anthers oblong, c. 3 mm long, moreover the connective acutely prolonged up to 1 mm, dehiscing laterally. *Ovary* globose, 7- or 8-celled and lobed, glabrous, but at base surrounded by ferruginous hairs, style subulate-filiform, 15—18 mm long, glabrous. *Fruits* ovoid-ellipsoid, 2—2.5 by 1—1.2 cm, 1-seeded, subacute at apex, pericarp thick, glabrous, seeds oblong, 12—15 by 0.7—0.9 by 0.4—0.6 cm, acute at tip, rounded at base, scar linear.

Type specimen: *Chevalier 38885* in P.

Vernacular name: xikia (Moi), srá kom-domrey (Cambodia).

Distribution: Indo-China (Annam, Cambodia).

Annam, Honba Massif, near Nhatrang, alt. 1200—1500 m: *Chevalier 38885 & 38886* (P), fl. Sept.

Cambodia, Prov. Kompong, Chhang, Kauk-longéang: *Chevalier 36942* (P), fl. & fr. March.

Remarks. The description of the fruits has been derived from Chevalier's description since the material could not be traced in the Paris herbarium.

### 35. *M. stipulacea* Fletcher, Kew Bull. 1937, 378.

Trees up to 8 m. Branchlets stout, 3—6 mm in diam., pale ferruginously puberulous, but very soon glabrous, at apex with numerous scars of leaves; terminal cone up to 15 mm long; stipules linear-lanceolate, up to 10 by 3 mm, acute, cinnamomously sericeous on the outside, sometimes the margins glabrous and scarious, glabrous on the inside, crested, caducous. *Leaves* conferred at the tip of the branchlets, obovate, oblong-obovate, or spatulate, 6—16 by 2.5—8 cm, rounded at apex, sometimes emarginate, cuneate at base, shortly decurrent along upper side of petiole; subcoriaceous or coriaceous, glabrous; midrib grooved above, prominent and rounded below, secondary nerves 9—17 pairs, ascending at an angle of 50°—60°, curved, archingly joined, prominulous above, prominent below, tertiary nerves reticulate but with a few, irregularly formed, transverse nerves. Petioles 1.4—2.5 cm, narrowly grooved above in the most apical part only, otherwise flat, rounded below, thickened in the basal part, glabrous or sparsely whitish sericeous. *Flowers* many together between the leaves at the tip of the branchlets, pedicels stout, terete or angular, thickened at apex, 3—4 cm long, greyish sericeous, sometimes sparsely so. *Sepals* ovate, 7—9 by 6.5—8 mm, subacute, pale ferruginously puberulous on either side, inner sepals more orbicular, with membranous, glabrous and fimbriate margins, slightly crested, rounded at apex. *Corolla* 10—12 mm long, glabrous on the outside, ferruginously woolly in the throat and tube, lobes 14—16, oblong or oblong-ovate, 6—8 by c. 2 mm, obtuse or rounded at apex. *Stamens* 24—28, in 3 indistinct whorls, c. 6 mm long, filaments subulate, c. 0.7 mm long, ferruginously woolly, anthers ovoid, 4.5—5.5 mm long, connective prolonged and acute, sparsely ferruginously villous, dehiscing laterally. *Ovary* ovoid, c. 1 by 3 mm, 10-celled, glabrous, at

base surrounded by a lobed, annular disk, style filiform, 12—15 mm long, glabrous. *Fruits* globose or ovoid-globose, c. 1.5 cm in diam., glabrous, 1- or 2-seeded, pericarp fleshy, seeds ovoid-ellipsoid, up to 1 by 0.7 by 0.5 cm, obtuse at either end, tests very thin, scar linear, up to 7 mm broad; endosperm abundant, cotyledons foliaceous.

Type specimen: *Winit 1295* in K.

Vernacular names: paw-lê-do, kik, kăbawng kaung (Karen dialect), ma-sarng.

Distribution: Siam.

Chiengmai, Me Kang, alt. c. 420 m, in p̄ forest: *Winit 1295* (BKF, K), fl. March, pinkish white; Lampun, Me Li, alt. 270 m, p̄ forest: *Winit 1562* (K), small tree, fr. Nov.; Lampang, Che Sawn, alt. c. 400 m, dry deciduous forest: *Kerr 4772* (BM, K), tree 6 m, fl. Febr.; Utaradit, alt. c. 100 m, by side of dry stream in deciduous forest, alt. c. 100 m: *Kerr 5898* (BM, K), tree 7—8 m, fr. April; Phrae, Soong Men, Mae-chua, alt. 200 m, deciduous forest: *Wannikul 48* (L), tree, fl. March.

36. *M. cuneata* (Bl.) MacBride, Contrib. Herb. Harv. Univ., N. S. 53, 1918, 18; Lam, l. c. 1927, 453, f. 22; Lam in Backer, Noodfl. Java 7, 1948, Fam. 166, 8 — *M. cuneata* (Bl.) H. J. Lam, l. c. 1925, 173, 264; Ridley, Fl. Mal. Pen. 5, 1925, Suppl., 320; Heyne, Nutt. Pl. Ned. Ind., ed. 2, 1927, 1230 — *Bassia cuneata* Blume — Bijdr., 1825, 675; De Candolle, Prodr. 8, 1844, 199; de Vriese, Tuinb. Fl. 3, 1856, 233; de Vriese, Pl. Reinw., 1856, 62; Miquel, Fl. Ind. Bat. 2, 1859, 1041; Clarke in Hooker f., Fl. Brit. Ind. 3, 1882, 546; Burek, Ann. Jard. bot. Bzg. 5, 1886, 45; Koorders & Valeton, Bijdr. Booms. 1, 1894, 154; King & Gamble, Journ. As. Soc. Beng. 74, 2, Extra 17, 1905, 187; Hallier, Rec. Trav. Bot. Néerl. 15, 1, 1918, 70—71; Ridley, Fl. Mal. Pen. 2, 1923, 272 — *Dichopsis cuneata* (Bl.) F.-Vill., Nov. App., 1880, 124 — *Palaquium cuneatum* (Bl.) Vidal, Synops. Atl. 1883, tab. 62, f. K. — *Illipe cuneata* (Bl.) Engler, Bot. Jahrb. 12, 1890, 509 — *Kakosmanthus cuneatus* (Bl.) Pierre ex Dubard, Rev. Gén. Bot. 20, 1908, 197 — *P. javense* Koorders, Gedenkb. Junghuhn, 1910, 186.

Tall trees up to 30 m. Branchlets irregularly terete, 2—5 mm in diam., almost immediately glabrous; terminal cone up to 5 mm long, pubescent, stipules lanceolate, up to 2 by 0.5 mm, acute, pubescent on outside, glabrous on inside, soon caducous. *Leaves* scattered to subconferted at tip of branchlets, obovate or elliptic-obovate, 7—11.5 by 2.2—4.8 cm, indistinctly obtusely acuminate, base narrowly cuneate, decurrent along upper side of petiole; subcoriaceous, glabrous on either side; midrib grooved above and crested as well, rounded below, secondary nerves 12—19 pairs, ascending at an angle of 55°—60°, archingly joined or diminishing until inconspicuous near margin and connected by thickened tertiary nerves, prominulous above, prominent below, tertiary nerves slender, transverse, few, prominulous above, more conspicuous below. Petioles (0.8—)1.2—3.3 cm, grooved above, rounded below, glabrous. *Flowers* in 4—7-flowered, axillary clusters, pedicels angular, 0.9—1.8 cm, ferruginously sericeous. *Sepals* conchate, elliptic, 5.5—7 by 3.5—4.5 mm, obtusely acuminate, crested on outside, pale ferruginously sericeous on outside, glabrous on inside, marginal parts of inner sepals thinner than those of the outer ones and fimbriate. *Corolla* seen in bud only, c. 5 mm long, ferruginously sericeous

at outside, densely hirsute within in the throat, and paler so on inside of lobes, lobes 8, oblong, c. 3 by 0.7 mm, obtuse. *Stamens* 16, in 2 whorls, c. 3 mm long, filaments subulate, densely ferruginously hirsute, anthers narrowly ovoid, c. 2 mm long, densely hirsute, connective prolonged, acute, gynaeceum conoid, 8-celled, ferruginously sericeous in the basal part, style c. 1.5 mm long, glabrous, gradually passing into the ovary. *Fruits* ovoid-ellipsoid, c. 2.7 by 1.2 by 0.9 cm, one-seeded, acute by the remnant of the style, attenuate to rounded at base, pericarp thin, glabrous, seeds ovoid-ellipsoid, c. 1.9 by 1 by 0.7 cm, rounded at either end, brown, scar linear, yellowish brown, albumen thin.

Type specimen: *Blume 1972* in L.

Vernacular names: majang batu, njatuh sudu-sudu (Sumatra), merading (Borneo).

Ecology: In coastal and mountainous regions in primary forests, sometimes in periodically flooded areas.

Distribution: Java, Sumatra, Malaya, Borneo.

JAVA. Mt Salak: *Blume 1972* (L, U), fl. & fr.; Sindangbara: *Junghuhn 395* (BO, L), juv. fr.

SUMATRA. f. Lam 1925, 173; 1927, 453.

MALAYA. f. Lam 1925, 173.

BORNEO. f. Lam 1927, 453.

37. *M. moonii* (Thwaites) H. J. Lam, l. c. 1925, 182; Lam, l. c. 1927, 462 — *Dasyaulus moonii* Thwaites, Enum. Pl. Zeyl., 1864, 175 — *Bassia moonii* (Thwaites) Beddome, Flor. Sylv., 1869, 140.

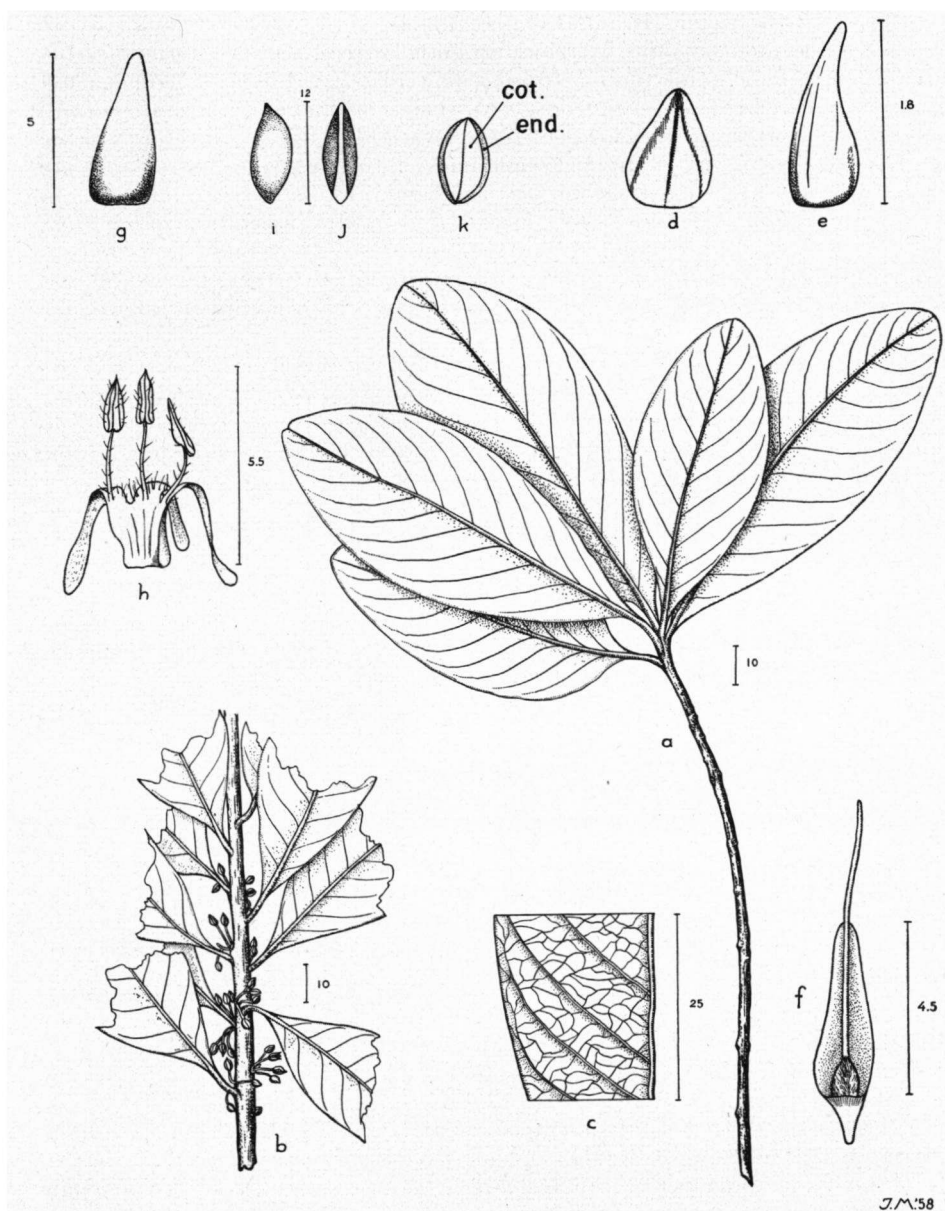
Trees. Branchlets slender, 2—3.5 mm in diam., ferruginously woolly-tomentose at apex, but soon glabrous; terminal cone up to 5 mm long, stipules lanceolate, up to 3 by 1.5 mm, acute, caducous. *Leaves* scattered, elliptic or elliptic-obovate, obtusely acuminate, base narrowly cuneate, decurrent along sides of petiole; chartaceous, glabrous on either side or sparsely tomentose below in basal part of midrib; midrib narrowly crested above, prominent and rounded below, secondary nerves 10—13 pairs, ascending at an angle of c. 60°, curved, diminishing until inconspicuous near margin, sometimes archingly joined by thickened tertiary nerves, prominent or inconspicuous above, prominent below, tertiary nerves widely transverse with a reticulate nervation in between. Petioles 1.2 cm long, flat or broad and shallowly grooved above, sometimes indistinctly crested above, thickened in the basal part, glabrous. *Flowers* unknown. Pedicels of fruit 1.2—1.7 cm long, glabrous; sepals oblong or oblong-ovate, 5—7 by 3.5—5 mm, obtuse, outer sepals glabrous on either side, inner sepals pale greyish sericeous on outside, except along the glabrous and membranous margins, glabrous on inside. *Fruits* obliquely (always?) ovoid, c. 2.8 by 1 by 1 cm, attenuate at apex and obtuse, 1-seeded, pericarp thin, glabrous, seeds unknown.

Type specimen: *Thwaites 3434* in K.

Distribution: Ceylon.

Without known loc.: *Thwaites 3434* (K), incomplete fruits.

38. *M. cambodiana* (Lec.) Li, Journ. Arn. Arb. 24, 1943, 368 — *M. cambodiana* (Lec.) van Bruggen, Blumea 9, 1, 1958, 133 — *Payena cambodiana* Lecomte, Fl. Gén. Indo-Chine 3, 1930, 909 — Fig. 11.



J.M.'58

Fig. 11. *M. cambodiana*, a. branchlet with leaves, b. idem, showing flowerbuds, c. part of leaf showing tertiary nervation, d. inner sepal, outside, e. fruit, f. calyx partly, and gynaecium, g. outer sepal, outside, h. part of corolla, inside, i. seed from aside, j. seed showing scar, k. transverse section of embryo, end. endosperm, cot. cotyledons. (Poilane 14095).

Trees up to 15 m. Branchlets irregularly terete, 2—4.5 mm in diam., greyish puberulous at the extreme tip, otherwise glabrous; terminal cone up to 3 mm long, puberulous; stipules lanceolate, c. 1.5 by 0.5 mm, acute, glabrous on either side, caducous, but sometimes long persistent. *Leaves* subconferted at apex of branchlets, obovate, elliptic-obovate or elliptic, 6—11 by 3—5.5 cm, rounded, sometimes obtuse at apex, base cuneate, shortly decurrent; subcoriaceous, entirely glabrous; midrib prominent and rounded on either side, secondary nerves 7—14 pairs, ascending at an angle of 55°—60° (—70°), curved, archingly joined at 2—3 mm from margin, prominulous above, but sometimes grooved, prominent below, tertiary nerves reticulate with a few, scattered transverse nerves, prominulous above, but sometimes grooved, prominent below. Petioles 5—8 mm long, flat above, rounded below, sparsely greyish puberulous but ultimately glabrous. *Flowers* 4—8 in axillary clusters between and below the leaves, pedicels angular, 5—8 mm long, ferruginously sericeous. *Sepals* ovate-lanceolate, 4.5—5.5 by 2.5—3.5 mm, obtuse, greyish or ferruginously puberulous on outside, glabrous on inside, inner sepals broader, more obtuse and with glabrous, membranous, fimbriate margins. *Corolla* 5.5—7.5 mm long, glabrous but woolly between the stamens, lobes 8, narrowly linear or oblanceolate, 3—3.5 by 1—1.5 mm, obtuse, reflexed in anthesis. *Stamens* 12—16, in 2 whorls, 3—4 mm long, filaments filiform, 1.5—2 mm, with long hairs, anthers oblong, c. 2 mm long with a c. 0.5 mm long acute acumen, dehiscing laterally, ferruginously hirsute. *Ovary* ovoid, c. 1.5 by 1 mm, 8-celled, 8-lobed, ferruginously tomentose, style 6—10 mm long, tomentose at base only, otherwise glabrous. *Fruits* ovoid, c. 1.8 by 0.7 cm, one-seeded, obtusely acuminate, and with a short remnant of the style at apex, glabrous, seeds obliquely ellipsoid, c. 12 by 6 by 4 mm, acute at apex, subacute at base, brown, nitidous, scar linear.

Type specimen: *Poilane 14095* in P.

Use: The fruit seems to be edible.

Distribution: Indo-China (Cambodia).

Cambodia, between Oulong Veng and Mek Krei: *Poilane 14095* (P), tree 15 m, fl. Nov.; Dangrek Range between Phun tho mãy and Anglong Veng: *Poilane 13927* (P), tree 4 m, fl. Nov.; Chongkal prov., N. of Samrong, Sreïn Réap: *Poilane 14992* (P), fr. March.

39. *M. penicillata* (King & Gamble) H. J. Lam, l. c. 1925, 166; Ridley, Fl. Mal. Pen. 5, 1925, Suppl., 319; Lam, l. c. 1927, 447 — *Bassia penicillata* King & Gamble, Journ. As. Soc. Beng. 74, 2, Extra 17, 1905, 179; Ridley, Fl. Mal. Pen. 2, 1923, 268 — Fig. 12.

Trees up to 20 m. Branchlets relatively stout, 3—6 mm in diam., ferruginously tomentose at the tip but soon glabrous; terminal cone up to 9 mm long, pubescent; stipules minute, lanceolate, up to 1 by 0.5 mm, acute, puberulous at outside, glabrous at inside, caducous. *Leaves* conferted, subconferted or scattered, elliptic-oblong, or obovate-oblong, 15—30 by 4.5—9.5 cm, rounded and short obtusely acuminate at apex, broadly cuneate at base and slightly unequal; coriaceous, glabrous above except along the midrib, densely cinnamomously or greyish tomentose-sericeous below; midrib impressed above and narrowly crested as well, prominent and rounded below, secondary nerves 23—30 pairs, ascending at an angle of

80°—90°, straight and slightly curved at apex, archingly joined and diminishing until inconspicuous near margins but then connected by thickened tertiary nerves, the latter sparse, transverse and with a distinct reticulation in between and often one nerve more distinctly developed and parallel to the secondary nerves but not reaching the margins. Petioles 2.2—4 cm,

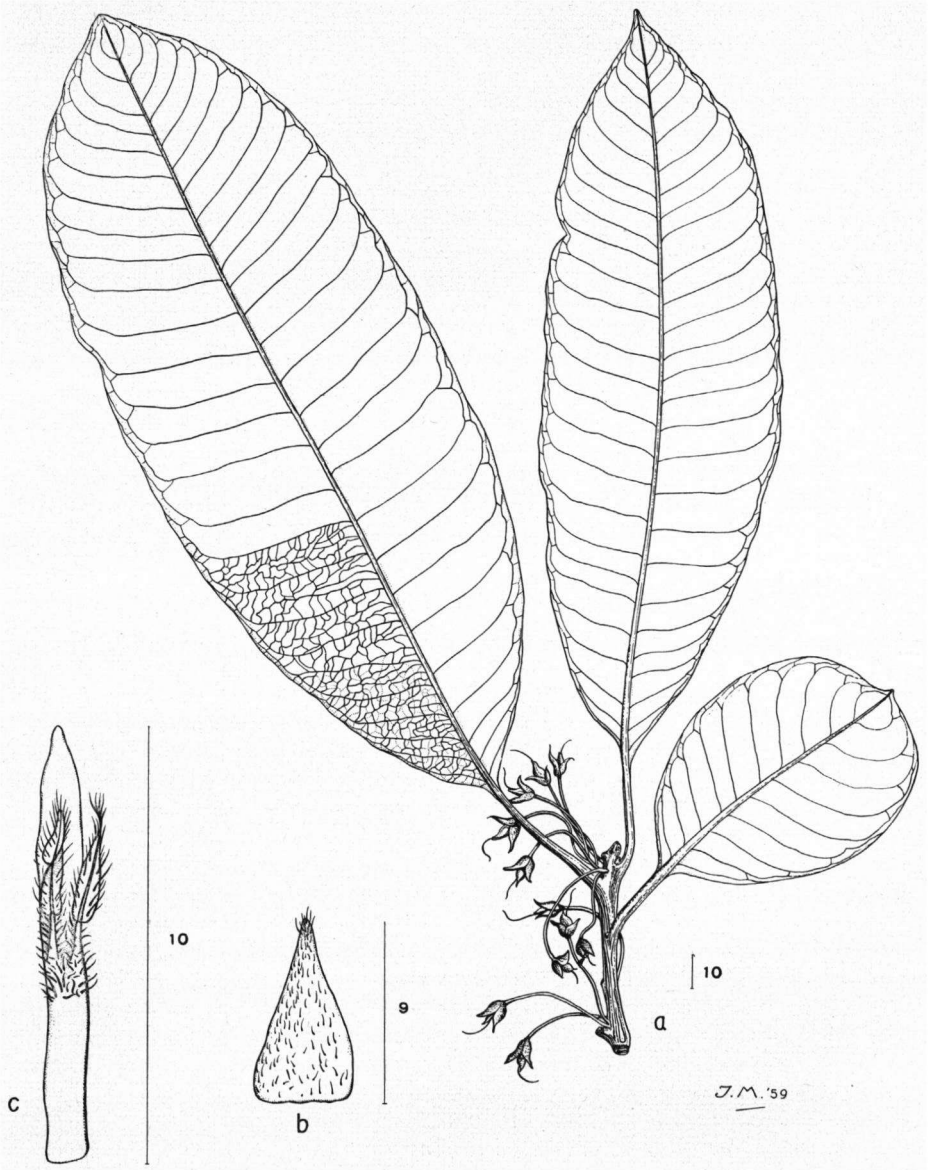


Fig. 12. *M. penicillata*. a. branchlet with leaves and flowers, b. outer sepal, outside, c. part of corolla, inside. (Curtis 3737).

very narrowly grooved above, rounded below and with transverse corky ridges, thickened in the basal part, ferruginously or greyish puberulous. *Flowers* in 2—7-flowered clusters or solitary, axillary to the uppermost leaves, pedicels angular, 2.5—3.5 cm long, sparsely ferruginously sericeous. *Sepals* ovate-lanceolate, 8.5—10 by 4.5—6 mm, acuminate, pale ferruginously puberulous on outside, glabrous on inside, on outside of apex with a plumule of darker hairs, inner sepals 2 or 3, slightly longer than the outer ones, with membranous, glabrous, fimbriate. *Corolla* 9—10.5 mm long, glabrous on the outside, on inside densely ferruginously woolly between and below the stamens only, otherwise glabrous, lobes 8—10, lanceolate, 3.5—5 by c. 1 mm, obtuse. *Stamens* 20, in two indistinct whorls, 5.5—6.5 mm long, filaments subulate, 1—1.5 mm long, ferruginously woolly, anthers lanceolate, 4.5—5.5 mm long, apex acuminate and with a plumule of hairs, dehiscing laterally, ferruginously villose, often twisted. *Ovary* ovoid, c. 2 by 2.5 mm, 10-celled, densely villose, style filiform, up to 15 mm long, ferruginously villose in the basal half, otherwise glabrous. *Fruits* unknown.

Type specimen: *Curtis 3737* in SING.

Vernacular name: minjato (Wellesley), melawis (Selangor).

Distribution: Malaya.

MALAYA. Wellesley, Tassek Glugor: *Curtis 3737* (K, SING), tree 16—20 m, fl. March — Selangor, Sungei Buloh: *Hamid CF 1580* (SING), tree 13 m, fl. April.

#### 40. *M. esculenta* Fletcher, Kew Bull. 1937, 375.

Trees c. 8 m. Branchlets slender, angular, 3—4 mm in diam., glabrous; terminal cone up to 3 mm long, ferruginously hirsute; stipules ovate-lanceolate, up to 2.5 by 1 mm, acute, glabrous. *Leaves* scattered, elliptic or elliptic-obovate, 12—21 by 4—7 cm, indistinctly obtusely acuminate at apex, narrowly cuneate at base, decurrent along sides of petioles; chartaceous, glabrous; midrib narrowly crested above, prominent and rounded below, secondary nerves 14—18 pairs, ascending at an angle of c. 70°, curved, irregularly archingly joined, prominulous above, prominent below, tertiary nervation reticulate with some irregularly shaped transverse nerves, sometimes with some regular transverse nerves which are reticulately connate and with a reticulate nervation in between, inconspicuous above, stronger prominent below. Petioles 1.5—3 cm long, flat above, rounded below, slightly thickened in the basal part and irregularly rugulose, glabrous or sparsely greyish puberulous mainly in the basal part. Inflorescences probably 2—4-flowered axillary clusters, pedicels slender, terete, 10—15 mm long, sparsely greyish or ferruginously puberulous. *Sepals* broadly ovate, c. 4 by 3 mm, obtuse, the outer two greyish sericeous, the two inner ones pale ferruginously sericeous on outside, all sepals glabrous on inside, inner sepals with membranous, glabrous, fimbriate margin. *Corolla*, *stamens* and *ovary* unknown. *Fruits* ovoid, 2.6—3 by 1.4—1.8 cm, 1- or 2-seeded, acute at apex, pericarp fleshy, glabrous, seeds obovoid but laterally flattened, 1.5—2 by 0.7—0.9 by 0.2—0.3 cm, obtuse at apex, acutish at base, scar linear, embryo with little albumen and thick cotyledons.

Type specimen: *Kerr 6931* in K.

Vernacular name: samut sidū.



**Distribution:** Siam.

SIAM. Kaw Chang, Klawang Mayom, alt. c. 100 m, evergreen forest: *Kerr 6931* (BM, K), tree c. 8 m, fr. edible, very sweet, April; Pitsanulok, Panak, alt. c. 300 m, by stream in deciduous forest: *Kerr 8911* (K), tree c. 8 m, fr. April.

**41. *M. platyphylla*** (Merrill) Merrill, Enum. Phil. Fl. Pl. 3, 3, 1923, 278; H. J. Lam, l. c. 1925, 167; Lam l. c. 1927, 449 — *Bassia platyphylla* Merrill, Phil. J. Sc., Bot. 10, 1915, 58.

Trees up to 20 m. Branchlets angular, 3—5 mm in diam., glabrous; terminal cone?; stipules? *Leaves* scattered, broadly elliptic-oblong, 21—30 by 8—13 cm, rounded or very shortly, broadly, obtusely acuminate, base broadly cuneate, decurrent along upper side of petiole; coriaceous, glabrous, bullate above; midrib prominent and rounded above, strongly prominent below and rounded, secondary nerves 19—23 pairs, ascending at an angle of c. 75°, curved, diminishing until inconspicuous near margin, prominulous above, prominent below, tertiary nervation slender, transverse but reticulately connate, distinct on either side. Petioles 3—3.5 cm long, grooved in the apical part, otherwise flat, thickened and rugulose in the basal part, glabrous. Inflorescence, flowers and fruits not seen but according to Merrill: "*Flowers* axillary, about 5 in each axil, the pedicels glabrous or very slightly pubescent, nearly 3 cm long. *Calyx-lobes* four, 2-seriate, coriaceous, broady ovate, obtuse, about 8 mm long, 7 mm wide. *Corolla* and *stamens* not seen. *Fruit* "green, globose" (not seen), seeds "brown, shining, about 18 mm long, 10 mm wide, slightly compressed, acute."

Type specimen: *Villamil 21873* in PNH.

Lectotype specimen: *Villamil 21873* in K.

**Distribution:** Mindanao.

Distr. of Zamboanga, Margosatubig, alt. 70 m: *Villamil 21873* (K), tree.

**42. *M. multiflora*** (Merrill) MacBride, Contr. Gray Herb. Harv. Univ., NGS 53, 1918, 18; Lam, l. c. 1927, 449 — *Illipe multiflora* Merrill, Phil. Gov. Bur. Lab. Bull. 17, 1904, 41 — *Bassia multiflora* (Merrill) Merrill, Phil. J. Sc., Bot. 10, 1915, 56 — *M. multiflora* (Merrill) Merrill, Enum. Phil. Flow. Pl. 3, 3, 1923, 277; Lam, l. c. 1925, 167.

Trees, 8 m high (or more?). Branchlets slender, 2.5—4 mm in diam., ferruginously sericeous or woolly, but soon glabrous; terminal cone up to 5 mm long, woolly pubescent; stipules ovate-lanceolate, up to 3.5 by 1.5 mm, acute, woolly on outside, glabrous on inside, caducous. *Leaves* scattered, ovate-lanceolate or elliptic, 11—20 by 4.3—8 cm, obtuse or acutely acuminate at apex, rounded at base and sometimes unequal, shortly decurrent along sides of petiole; coriaceous, entirely glabrous when mature, minutely silvery pubescent below when young; midrib crested above, sometimes impressed, rounded and prominent below, secondary nerves slender, 12—16(—20) pairs, ascending at an angle of 60°—70°, slightly curved or straight and curved at their tips only, diminishing until inconspicuous but also connected by thickened tertiary nerves with each other, prominulous above, prominent below, tertiary nervation slender, sparse, transverse, but towards the margin of the leaf becoming reticulate, sometimes one nerve more distinctly though often irregularly developed parallel to the secondary nerves. Petioles 2—2.5 cm long, shallowly grooved above in the apical part,

glabrous. *Flowers* in 2—8-flowered, axillary clusters, rarely solitary, pedicels angular, 8—13 mm long, in fruit up to 25 mm, densely ferruginously woolly-tomentose. *Sepals* broadly ovate, 7—8 by 5.5—6.5 mm, obtusely acuminate, densely yellowish sericeous on outside mixed with darker, longer hairs and a plumule of long hairs at apex, glabrous on inside, inner sepals naviculate, with membranous, glabrous, fimbriate margins and crested, otherwise similar to the inner ones. *Corolla* 7—10 mm long, glabrous at outside, densely ferruginously villose on inside between the stamens, lobes 8, spatulate or obovate, 5—7 by 2—3.5 mm, obtuse. *Stamens* 20, in 3 whorls, 3.5—4.5 mm long, filaments subulate, c. 1 mm long, ferruginously villose anthers oblong, 3—4 mm long, ferruginously villose, dehiscing laterally, connective prolonged and acute. *Ovary* ovoid, c. 1 by 1.5 mm, 9-celled glabrous, style filiform, c. 11 mm long, glabrous, immediately above the ovary slightly constricted. *Fruits* ovoid, 2.5—3.2 by 0.9—1.5 cm, 1- or 2-seeded, obtuse at apex and crowned by the persistent style, seeds incompletely known.

Type specimen: *Ahern's Coll. 411* in PNH.

Lectotype specimen: *Ahern's Coll. 411* in K.

Vernacular names: kalamíanes, tagatoi (Tagalog).

Ecology: In primary forests at low altitudes.

Distribution: Philippines.

LUZON. Prov. Rizal, Antipolo: *Ahern's Coll. 411* (BM, K, SING), fl. Febr.; prov. Bataan: *Borden s.n.* (L), fr. Febr.; prov. Bosoboso, Morong: *Loher 393* (BM, K), fl. March.

POLILLO. Anibawan, 70 m alt., forest: *Castro 6531* (A, K, L), tree 8 m, fr. green, Dec.

PANAY. Prov. Capiz, Mt Timbaban: *Edaño 42428* (L), tree, fl. May.

MINDANAO. Lanao, f. Merrill 1923.

Remark. The fruit has been described from *Borden s.n.* and *Castro 6531*, both in the Leiden Rijksherbarium.

43. *M. ovata* H. J. Lam, l. c. 1925 (Febr.), 170, f. 46; Lam, l. c. 1927, 451 — *Bassia forbesii* King, Journ. of Bot. 63, 1925 (May), Suppl., 60 — *M. forbesii* (King) Moore, Journ. of Bot. 64, 1926, Suppl., 147.

Trees up to 23 m. Branchlets slender, angular, 2—3.5 mm in diam., ferruginously puberulous at the extreme tip but soon glabrous; terminal cone up to 4 mm long, puberulous; stipules lanceolate, up to 4 by 1 mm, acute, puberulous on outside, glabrous on the inside, soon caducous. *Leaves* scattered, oblong-obovate, broadly elliptic or ovate, 8.5—22 by 3.5—8 cm, obtusely acuminate at apex, broadly cuneate at base, decurrent along upper side of petioles; subcoriaceous, glabrous; midrib narrowly crested above, prominent and rounded below, secondary nerves slender, 10—15 pairs, ascending at an angle of 60°—70°, curved, diminishing until inconspicuous near margin, prominulous above, more prominent below, tertiary nerves slender, transverse, distinct on either side but more so below. Petioles 1—3 cm long, narrowly grooved above mainly in the apical half, rounded below, thickened in the basal part, glabrous. *Flowers* in 3—8-flowered, axillary clusters, pedicels angular, 5—8 mm long, thickened at apex, greyish ferruginously sericeous. *Sepals* ovate, 3.5—4 by 1.5—2.5 mm, indistinctly obtusely acuminate, greyish-ferruginously sericeous on the outside, glabrous

on inside, tips of outer ones subrecurved, inner sepals usually longer than the outer ones, with membranous, glabrous and fimbriate margins and the tips sometimes recurved, otherwise similar to the outer ones, all sepals with a plumule of darker hairs at apex. *Corolla* 5—6 mm long, glabrous on the outside, light ferruginously woolly on inside between the stamens, lobes 8—10, oblong, 4—4.5 by c. 0.8 mm, obtuse. *Stamens* 16—20, in 2 indistinct whorls, 3—3.5 mm long, filaments subulate, c. 1 mm long, greyish-ferruginously velutinous, anthers sagittate, 2.5—3.5 mm, acuminate at apex, dehiscing laterally, sparsely greyish villose. *Ovary* ovoid-discoid, c. 1 by 1.5 mm, 8—10-celled, ferruginously villose, style filiform, 8—9 mm long, pubescent at base, subcapitate at apex. *Fruits* narrowly fusiform-ovoid or obovoid, c. 2 by 0.5 cm, truncate at apex and with a short remnant of the style, 1-seeded, ferruginously puberulous, seeds ellipsoid-fusiform, c. 1.5 by 0.8 cm, acute at apex, rounded at base, testa thick, scar linear, up to 3 mm broad, embryo unknown.

Type specimen: *NIFS 136 T 3 P 377* in BO.

Vernacular names: regis itam, balam sudu (Sumatra), njatoh balong kayam (Malaya).

Distribution: Sumatra, Java, Malaya.

SUMATRA. Mt Trang: *Forbes 1578* (BM, FI, K, L, SING), fl.; Pemanggoengan, alt. 170 m: *Forbes 1784* (BM, K, L, SING), fr.; ibidem: *Forbes 1639* (BM, FI, K, L, SING), fl.; ibidem: *Forbes 1727* (FI, K, L, SING), fl., type specimen of *Bassia forbesii* King; Lematang Iir, alt. 75 m: *NIFS 136 T 3 P 377* (BO, K, L, SING), fl. Oct.

JAVA. E. Java, Besuki, Mt Raung, S. slope above Gunungsari village, alt. 500—600 m: *Jacobs 4816* (A, BO, K, L, LAE, NY, PNH, SING), tree 12—15 m, fl. May.

Doubtful specimens:

SUMATRA. Indragirian Uplands, Belimbing, alt. 6 m: *NIFS bb 28527* (BO, L); ibidem, Pageroembei, Tjenako river, alt. 8 m: *NIFS bb 25762* (BO, L), Oct.; Ophir, Air Bangis, alt. 15 m: *NIFS bb 19854* (BO, L), June; ibidem: *NIFS bb 19839* (BO, L), June.

MALAYA. Pahang, Belung For. Res.: *Hamid 5448* (KEP), tree 22 m, fr. Dec.; Kempus State Land: *Mahamud 40307* (KEP), tree 19 m, fr. April — Kedah, Bukit Balut Katumbah: *Meh 8918* (KEP), tree 21 m, fr. Febr.

#### 44. *M. stylosa* H. J. Lam, l. c. 1927, 450, f. 20.

Trees, c. 15 m high (or more?). Branchlets slender, angular, 2—3 mm in diam., greyish puberulous but soon glabrous; terminal cone up to 6 mm long, puberulous; stipules lanceolate, sometimes falcate, up to 2 by 1 mm, acute, crested, puberulous on the outside, glabrous on the inside, scariosus along the margins, caducous. *Leaves* scattered along the branchlets, oblong or oblong-obovate, 6—16 by 2.6—5.5 cm, obtuse or obtusely acuminate at apex, broadly cuneate at the base; chartaceous, glabrous or sometimes sparsely brownish puberulous on the midrib below; midrib narrowly crested above, prominent and rounded below, secondary nerves 14—18 pairs, ascending at an angle of c. 60°, curved, diminishing until inconspicuous near margin, prominulous above, prominent below, tertiary nerves slender, transverse, inconspicuous above. Petioles 9—13 mm long, narrowly grooved above, rounded below, greyish brown puberulous. *Flowers* in c. 5-flowered, axillary clusters, pedicels angular, 6—10 mm long, pale ferruginously sericeous. *Sepals* ovate-orbicular, up to 3 by 3 mm, outer ones obtuse or subacute, inner one subtruncate, all sepals sparsely pale ferruginously

sericeous on the outside, glabrous on the inside. *Gynaecium* narrowly conoid, 9—13 mm long, glabrous, ovary 7- or 8-celled, styler part subulate.

Type specimen: *Ender* 3575 in BO.

Distribution: Borneo.

BORNEO. Indonesian Borneo, W. Kutai near Mt Kemul, alt. 1200 m: *Ender* 3575 (BO, L), incompl. fl. Sept.

45. *M. burckiana* (Koorders) H. J. Lam, l. c. 1925, 172; Lam, l. c. 1927, 453, f. 21; Lam, l. c. 1932, 556, tab. 103 — *Bassia burckiana* Koorders, Med. 's Lands Pl. Bzg. 19, 1898, 518, 640 — *Illipe burckiana* Pierre ex Dubard, Rev. Gén. Bot. 20, 1908, 195 and Bull. Mus. Hist. Nat. 14, 1908, 406 — *Payena fusicarpa* Elmer, Leaf. Phil. Bot. 8, 1915, 2820 — *Bassia cagayanensis* Merrill, Phil. J. Sc., Bot. 13, 1918, 48 — *M. fusicarpa* (Elmer) Merrill, Enum. Phil. Fl. Pl. 3, 3, 1923, 276 — *Illipe schlechteri* Krause, Bot. Jahrb. 58, 1923, 467.

Trees up to 35 m. Branchlets subterete, 2.5—5 mm in diam., sparsely ferruginously tomentose at apex but very soon glabrous; terminal cone up to 4 mm long, tomentose; stipules lanceolate, up to 3 by 1.5 mm, acute, tomentose on outside, glabrous on inside, caducous. *Leaves* scattered, elliptic or elliptic-obovate, 9—29 by 3.5—9 cm, long obtusely acuminate, sometimes shortly so or even obtuse or rounded at apex, narrowly cuneate at base but sometimes broadly so or even subrotundate, slightly decurrent along upper side of petiole; subcoriaceous or chartaceous, glabrous on either side; midrib grooved above and minutely crested as well, prominent and rounded below, secondary nerves 11—19 pairs, slender, ascending at an angle of 50°—60°, curved, diminishing until inconspicuous near margin, the apical ones archingly joined, prominulous above, prominent below, tertiary nerves transverse, but in the basal part of leaf irregularly transverse-reticulate, slender but distinct on either side. Petioles 1.2—4.8 cm long, slightly grooved above in the apical half, thickened in the basal part, slightly ferruginously puberulous but ultimately glabrous. *Flowers* 3—10 in axillary clusters, pedicels angular, slender, 1.2—1.9 cm long, sparsely whitish or yellowish tomentose. *Sepals* ovate, 5—6 by 3.5—4.5 mm, acute, crested, cinnamomously sericeous on outside, sparsely yellowish tomentose on inside mainly along the margins, otherwise glabrous, inner sepals sometimes much narrower than outer ones, membranous and glabrous along margin, fimbriate, less distinctly crested. *Corolla* 6—7 mm, glabrous on outside but sometimes with a few scattered hairs, on inside woolly between the stamens, lobes 8, oblong, 3.5—4 by 1—1.5 mm, obtuse, reflexed in anthesis. *Stamens* 16—22, in 2 whorls, 3.5—4.5 mm long, filaments subulate, c. 1.5 mm long, glabrous, anthers lanceolate-ovate, c. 2.5 mm, connective c. 0.5 mm prolonged, acute, dehiscing laterally, ferruginously hirsute. *Ovary* disciform, c. 0.5 by 1.5 mm, 8- or 9-celled, ferruginously tomentose, style filiform, 1.2—1.6 cm long, tomentose near base, otherwise glabrous. *Fruits* ovoid-fusiform, 1.8—2.4 by 0.8—1 cm, 1-seeded, acutish, at apex often with a remnant of the style, ferruginously pubescent but soon becoming glabrous, seeds similar in shape to the fruit, brownish, embryo unknown.

Type specimen: *Koorders 18883*  $\beta$  in BO.

Vernacular names: kumé motutu, pupulut, bokan (Celebes), bakambi (Muna), sada hura (Sumbawa), arupa puti (Amboina), malobon, marobon, silanangsan (Philippines).

Ecology: A species of low areas up to 1000 m alt.

Distribution: Philippines, Celebes, Moluccas, New Guinea.

PHILIPPINES. Mindanao, Mt Urdaneta: *Elmer 13390* (BM, Fl, G, K, L, U), fr. Sept., & *14085* (BM, Fl, L, U), fr. Oct., 'type specimens' of *Payena fusicarpa* Elmer — Luzon, f. Lam, 1925, 172; prov. Cagayan: *Bernardo 26883* (K), fr. June, type specimen of *M. cagayanensis* Merrill — Dinagat, Merrill, 1923, 276 — Surigao: *Wenzel 3489* (BO, G), fl. July.

CELEBES. Minahassa, Pakulama, 450 m: *Koorders 18883*  $\beta$  (BO, L), tree, fl. April; ibidem, Ratatotok, alt. 200 m: *Koorders 18889*  $\beta$  (BO, K, L), tree, fl. March; Malili, near Usu: *NIFS Cel/II-376* (BO, L), tree, fl. Nov.

MUNA. Without known loc., alt. 20 m: *NIFS bb 3922* (BO, K, L, U), fl. Aug.

SUMBAWA. Bima, near Otanpusu, alt. 600 m: *NIFS bb 6923* (BO), tree 15 m.

BORNEO. E. Borneo, E. Kutei, Menubar river region, alt. 60 m: *Kostermans 5387* (BO, L), tree 28 m, fl. June.

AMBOINA. Waai: *NIFS bb 10105* (BO), tree 25 m.

NEW GUINEA. Albo, in forests, 150 m: *Schlechter 16698* (SING), fl. Oct., type specimen of *Illipe schlechteri* Krause.

46. *M. longistyla* (King & Gamble) H. J. Lam, l. c. 1925, 177; Ridley, Fl. Mal. Pen. 5, 1925, Suppl., 320; Lam, l. c. 1927, 460 — *Bassia longistyla* King & Gamble, Journ. As. Soc. Beng. 74, 2, Extra 17, 1905, 185; Ridley, Fl. Mal. Pen. 2, 1923, 270.

Trees up to 30 m. Branchlets slender, angular and grooved, 2.5—5 mm in diam., ferruginously sericeous, but soon glabrous; terminal cone up to 5 mm long, sericeously pubescent; stipules minute, lanceolate, up to 2 by 1 mm, acute, pubescent on outside, glabrous on inside, caducous. *Leaves* scattered along branchlets, elliptic, 10—13 by 3—5 cm, short obtusely acuminate at apex, narrowly cuneate at base, decurrent along upper surface of petiole; chartaceous, glabrous on either side; midrib broadly grooved above in the basal part, for the rest prominent and angular, prominent and rounded below, secondary nerves 12—14 pairs, ascending at an angle of 60°, curved, archingly joined near margin or diminishing until inconspicuous and connected by thickened tertiary nerves, the latter transverse, but recurved near midrib, sometimes one nerve more distinctly developed and parallel to the secondary nerves but not reaching the margin, distinct on either side of the leaf. Petioles 1.5—2 cm long, grooved above, rounded below, thickened in the basal half, glabrous. *Flowers* in up to 10-flowered, axillary clusters, pedicels angular, 13—15 mm long, glabrous or subglabrous. *Sepals* ovate, c. 5 by 3 mm, obtuse, sparsely puberulous on outside, glabrous on inside, inner sepals with membranous, glabrous and fimbriate margin. *Corolla* c. 6 mm long, glabrous on outside, fimbriate on tip of lobes, sparsely woolly between the stamens, lobes 8 or 9, oblong or oblong-lanceolate, c. 4 by 1 mm, obtuse or emarginate. *Stamens* 16—18, in 2 indistinct whorls, 3.5—4.5 mm, filaments subulate, 2—2.5 mm long, glabrous, anthers ovate-oblong, 1.5—2 mm long, apiculate, glabrous. *Ovary* cylindrical, c. 0.5 by 1 mm, glabrous, 8-celled, style filiform but slightly conoid at base, 11—14 mm long, glabrous. *Fruits* unknown.

Type specimen: *King's Coll. 2680* (SING).

Distribution: Malaya (Perak).

Perak, Larut: *King's Coll. 2680* (SING), fl. Jan.

47. *M. sericea* (Miquel) H. J. Lam, l. c. 1925, 163, 264, f. 44; Ridley, Fl. Mal. Pen. 5, 1925, Suppl., 319; Heyne, Nutt. Pl. Ned. Ind., ed. 2, 1927, 1231; Lam, l. c. 1927, 446 — *Payena? sericea* Miquel, Fl. Ind. Bot. 2, 1859, 1039; Burek, Ann. Jard. Bot. Bzg 5, 1886, 59 — *Bassia argentea* Clarke in Hooker fil., Fl. Br. Ind. 3, 1882, 545; King & Gamble, Journ. As. Soc. Beng. 74, 2, Extra 17, 1905, 184; Ridley, Fl. Mal. Pen. 2, 1923, 270 — *Kakosmanthus argenteus* Pierre ex Dubard, Rev. Gén. Bot. 20, 1908, 198 — *Bassia sericea* King, Journ. of Bot. 63, 1925, Suppl., p. 61 — *M. sericea* (King) Moore, Journ. of Bot. 64, 1926, Suppl., p. 147.

Trees up to 33 m. Branchlets slender, angular or terete, 3–6 mm in diam., ferruginously, cinnamomously or greyish tomentose; terminal cone 2–4 mm long, tomentose; stipules ovate, up to 1.5 by 1 mm, acute, tomentose on the outside, glabrous on inside, relatively long persistent but ultimately caducous. *Leaves* elliptic, elliptic-oblong, obovate, or elliptic-obovate, sometimes slightly oblique, 6.5–18.5(–25) by 3.5–8.7(–10) cm, obtuse and short obtusely acuminate at apex, cuneate at base, decurrent along upper side of petiole; chartaceous to coriaceous, glabrous above or sparsely tomentose along the midrib, ferruginously, golden or silvery sericeous below; midrib impressed above and narrowly crested, prominent and rounded below, secondary nerves (10–)13–16(–20) pairs, ascending at an angle of c. 60°, curved or straight and curved at their tips only, diminishing until inconspicuous near margin, tertiary nerves slender, transverse, prominulous on either side but more distinct above. *Petioles* 1.3–3 cm long, flat or narrowly grooved above, sometimes narrowly crested, rounded below, thickened in the basal part, sericeously pubescent. *Flowers* in 3–10-flowered, axillary clusters, pedicels terete or angular, 7–14 mm long, in fruit up to 16 mm long, ferruginously, cinnamomously or greyish sericeous. *Sepals* ovate-triangular, 3.5–4.5 by 3.5–4 mm, subacute at apex, outside ferruginously or greyish sericeous, inside ferruginously tomentose except for a basal-central spot, inner sepals more rounded at apex, slightly keeled, with membranous, glabrous and fimbriate margin, entirely glabrous on inside. *Corolla* 5–6.5 mm long, outside glabrous except for a few hairs between the base of the lobes, inside whitish villose between the stamens, lobes 8 or 9, oblong, 4–5 by c. 1 mm, obtuse. *Stamens* 18–24, in 2 or 3 rows, c. 3 mm long, filaments 1–1.5 mm long, whitish villose, anthers narrowly sagittiform, c. 2 mm long, whitish villose, connective acutely prolonged, dehiscing laterally. *Ovary* ovoid or disciform, c. 0.5 by 1.5 mm, 8–10-celled, ferruginously hirsutulous, style filiform, 7–8.5 mm long, whitish villose in the basal half or entirely glabrous (f. Lam, 1925, 166). *Fruits* globose, obovoid, ellipsoid, or ovoid, 2–3.5 by 1–1.5 cm, acute, crowned at apex by the remnant of the style, 1- or 2-seeded, pericarp woody, greyish puberulous when young, glabrous when mature, seeds ellipsoid, 1–1.5 by 0.7–0.8 by 0.6–0.8 cm, subapiculate at apex, subacute at base, scar linear, 4–5.5 mm broad; albumen very thin, cotyledons fleshy.

Type specimen: *Horsfield s.n.* in BO.

**Vernacular names:** uhang, majam pertjah, kemodan, melikuran, ketiau, balam merah, semaram balam abang (Sumatra), balam édépa (Enggano), natu bura, katiu gunung, njato tarong, merading (Borneo), natu daun lebar, njatu, njatu kelep, kayu gugading (Malacca).

**Use:** Timber used for construction purposes.

**Ecology:** In marshy forests and primary forests at low and medium altitudes.

**Distribution:** Malaya, Sumatra, Lingga, Enggano, Bangka, Borneo.

**Collections not mentioned by Lam:**

**MALAYA.** Selangor, Weld Hill Res.: *Hamid CF 972* (SING), fl. April — Malacca, Merliman: *Derry 405* (SING), fl. April; ibidem: *Derry 941* (SING), fl.; ibidem: *Malvius s.n.* (SING), tree 33 m, fl. April; Sungei Udang: *Derry 937* (SING), fl. — Johore, 7th mile, Kota Tinggi-Mawei Ltd: *Corner s.n.* (SING), tree, fl. Febr.

**SUMATRA.** Padang, Batu Busuk, alt. 670 m: *NIFS bb 20854* (BO, K, L), tree 27 m, Febr.; Bengkulu, Lais, Talong Benal, alt. 250 m: *NIFS bb 8803* (BO, L), March; Palembang, Lematang Ilir, Semangus, alt. 100 m: *NIFS bb 32199* (BO, L), July; Asahan, Masihi For. Res.: *Krukoff 4144* (A, BO, L, SING), tree 33 m, Oct./Nov.

**ENGGANO.** Bua-Bua, alt. 100 m: *Lütjeharms 4263* (K, L), tree 16 m, June.

**BANGKA.** Without known loc.: *Horsfield s.n.* (BO, K), fl.

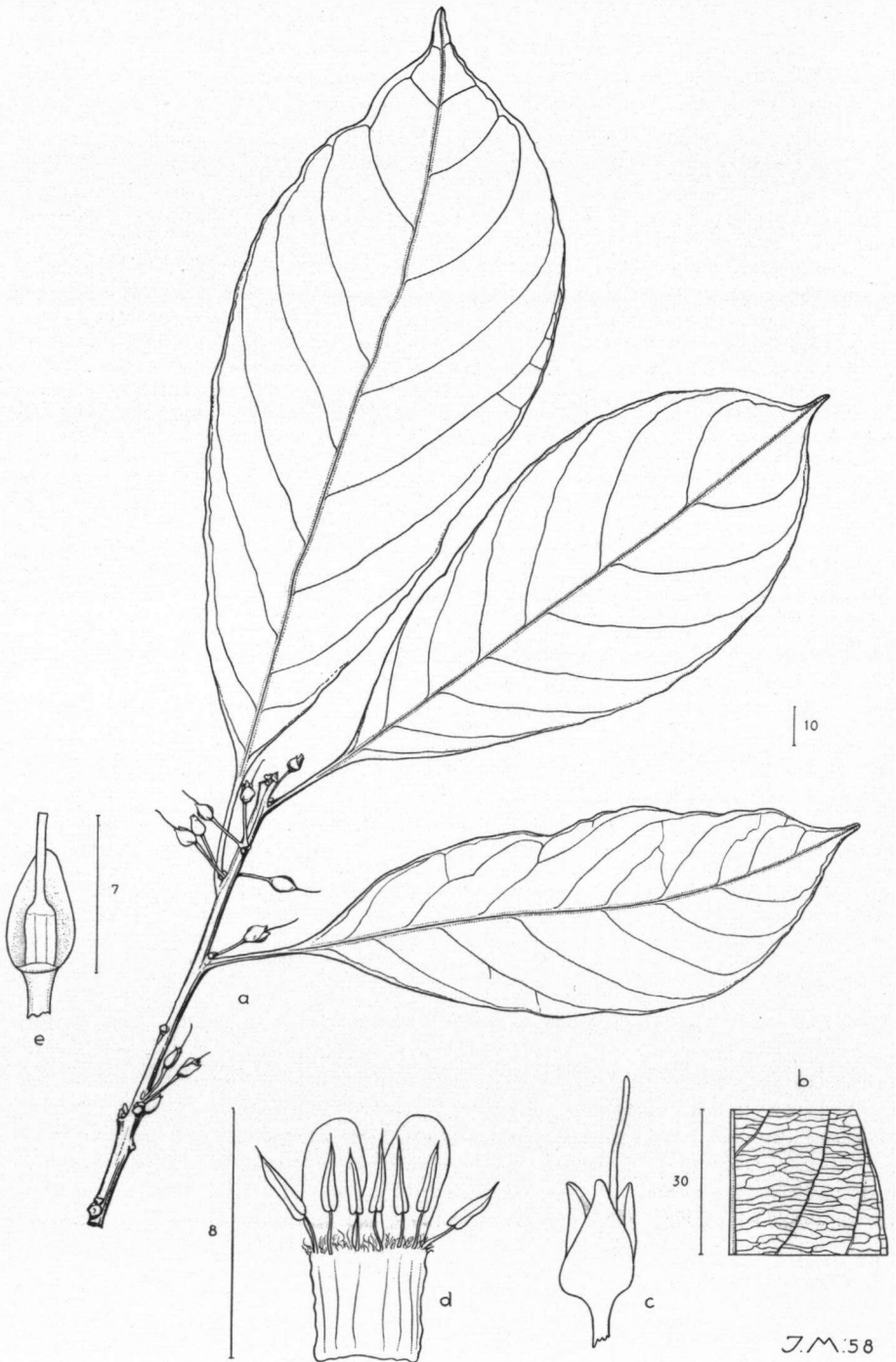
**LINGGA.** Fide Lam, l. c. 1925, 165.

**BORNEO.** Indonesian Borneo, Smitan, Bungkung, B. Taguk, alt. 115 m: *NIFS bb 32285* (BO, L), May; Balikpapan, Pemaluan, alt. 50 m: *NIFS bb 13827* (BO, L), juv. fr. Oct.; Loa Djanan, W. of Samarinda, sandy loamsoil ridge, alt. 30 m: *Kostermans 6538* (BO, L), tree 20 m, fl. & fr. April; ibidem: *Kostermans 6675* (BO, L), tree 20 m, fl. April; Puruk Tjahu, Tahudja, alt. 75 m: *NIFS bb 21180* (BO, K, L), tree 24 m, July; Balikpapan, Sungei Wain, alt. 50 m: *NIFS bb 34258* (BO, L), tree 17 m, Aug.; ibidem: *NIFS bb 34231* (BO, L), tree, Sept. — Sandakan, Sipitang, Ulu Mendalong, alt. 80 m: *Wood SAN 16787* (A, BO, BRI, K, KEP, L, SING), tree 17 m, fr. Sept.; Northern slopes of Bukit Batanga, S. of Malamen, alt. c. 100 m: *Wood SAN 16647* (A, BO, BRI, K, KEP, SING), tree c. 20 m, fr. Sept.

#### 48. *M. sandakanensis* van Royen, n. sp. — Fig. 13.

Arbor. Ramuli subcrassi, pallide lutei, sericei, glabrescentes; stipulae lanceolatae, acutae, caducae. Folia alterna, obovata vel elliptico-obovata, 11–23.5 × 5.8–8.3 cm, obtuse acuminata, basi cuneata, glabra; nervi secundarii latere utroque 6–9, sursum inconspicui, tertiarii transversi. Petiolus 1–3 cm longus, glaber. Pedicellus 0.8–1.2 cm longus, cinnamomeo-sericeus. Sepala ovata, extus cinnamomeo-sericea, intus glabra. Corolla 8-lobata, extus glabra, ad faucem ferrugineo-lanata. Stamina 12; filamenta glabra; antherae dense ferrugineo-hirsutae. Ovarium cylindricum, 8-loculare, glabrum; stylus glaber. Fructus ignotus. Typus: *Wood SAN 16908* in L.

Trees c. 17 m. Branchlets angular, 2.5–8.5 mm in diam., pale yellowish sericeous but soon becoming glabrous; terminal cone up to 2.5 mm long, stipules lanceolate, up to 2 by 0.5 mm, acute, puberulous on outside, glabrous on inside, caducous. *Leaves* scattered, obovate or elliptic-obovate, 11–23.5 by 5.8–8.3 cm, obtusely acuminate at apex, cuneate at base, decurrent along sides of petiole; thin-coriaceous, glabrous; midrib flat above and narrowly crested as well, prominent and rounded below, secondary nerves 6–11 pairs, ascending at an angle of c. 50°, curved, diminishing until inconspicuous near margin, prominulous above, prominent below, tertiary nerves slender, transverse, distinct on either side. Petioles 1–3 cm long, flat above and narrowly crested, rounded below, thickened in the basal part, glabrous. *Flowers* in 2- or 5-flowered, axillary clusters or solitary, pedicels angular, 8–12 mm long, cinnamomously sericeous. *Sepals*





ovate, 5—6 by 3.5—4.5 mm, subobtusely, cinnamomously sericeous on outside, glabrous on inside, inner sepals with membranous, glabrous and fimbriate margins. *Corolla* 7—8 mm long, 8-lobed, glabrous on outside, ferruginously woolly between the stamens, lobes obovate-spatulate, 4—4.5 by 2—2.5 mm, rounded at apex. *Stamens* 12, 3—3.5 mm long, filaments filiform, 1—1.5 mm long, glabrous, anthers oblong, c. 2.5 mm long, connective acutely prolonged, dehiscing laterally, densely ferruginously hirsute. *Ovary* cylindric, c. 3 by 1 mm, 8-celled, glabrous, style stout, cylindric, c. 7 mm long, glabrous, in (immature) fruit up to 12 mm long, glabrous. *Fruits* unknown.

Type specimen: *Wood SAN 16908* in L.

Distribution: Borneo (Sandakan).

Sandakan, Beaufort distr., Pangi 5 miles WNW of Tenom on North Borneo Railway, alt. 250 m: *Wood SAN 16908* (L, SAN), tree 17 m, fl. June; Kinabatangan distr., Bukit Garam, N of Kinabatangan river, alt. 20 m: *Wood SAN A 4669* (L, SAN), tree 15 m, fl. June.

Remark. A species which in its leaves resembles *M. pubicalyx* and *M. woodii* but is immediately to be recognized by the smaller number of secondary nerves.

49. *M. vulcanica* (Ridley) van Royen, comb. nov. — *Payena vulcanica* Ridley, Journ. As. Soc. Mal. Br. 1, 1923, 77; Lam, l. c. 1925, 139; Lam, l. c. 1927, 437 — Fig. 14.

Trees up to 16 m. Branchlets stout, irregularly terete, 3—6 mm in diam., ferruginously sericeous but soon glabrous; terminal cone up to 5 mm long, ferruginously sericeous; stipules? *Leaves* scattered along the branchlets, oblong-obovate, 7—12 by 3—5.5 cm, obtuse or subobtusely at apex, narrowly cuneate at base, decurrent along upper side of petiole; coriaceous, glabrous on either side; midrib prominulous above, prominent and rounded below, secondary nerves 9—12 pairs, ascending at an angle of c. 65°, straight, but curved at their tips, often archingly joined but sometimes diminishing until inconspicuous along the margin, prominent on either side, but usually stronger so above, tertiary nerves transverse, distinct on either side. Petioles 1—1.8 cm long, grooved above, thickened in the basal half, greyish or pale ferruginously puberulous. *Flowers* in 2—5-flowered, axillary clusters, pedicels terete, 1—1.5 cm, greyish puberulous. Outer *sepals* oblong, 4—4.5 by c. 3 mm, rounded, fimbriate along margin, ferruginously puberulous on outside, glabrous on inside except near apex, inner sepals slightly broader, with membranous margins and crested on the outside, otherwise similar to the outer ones. *Corolla* 8-lobed, 4.5—6 mm long, puberulous on the outside, glabrous on the inside but puberulous in the throat, lobes oblong or oblong-obovate, 2.5—3 by c. 1.5 mm, rounded at apex but often irregularly toothed. *Stamens* 10—13, in two whorls, 3—3.5 mm, filaments subulate, c. 1.5 mm long, ferruginously woolly, anthers oblong-ovoid, acute, dehiscing extrorsely, ferruginously puberulous. *Gynaecium* conoid, c. 7 mm

Fig. 13. *M. sandakanensis*, a. branchlet with flowers, b. part of leaf showing tertiary nervation, c. calyx, d. part of corolla, inside, e. part of calyx with gynaecium. (*Wood SAN 16908*).

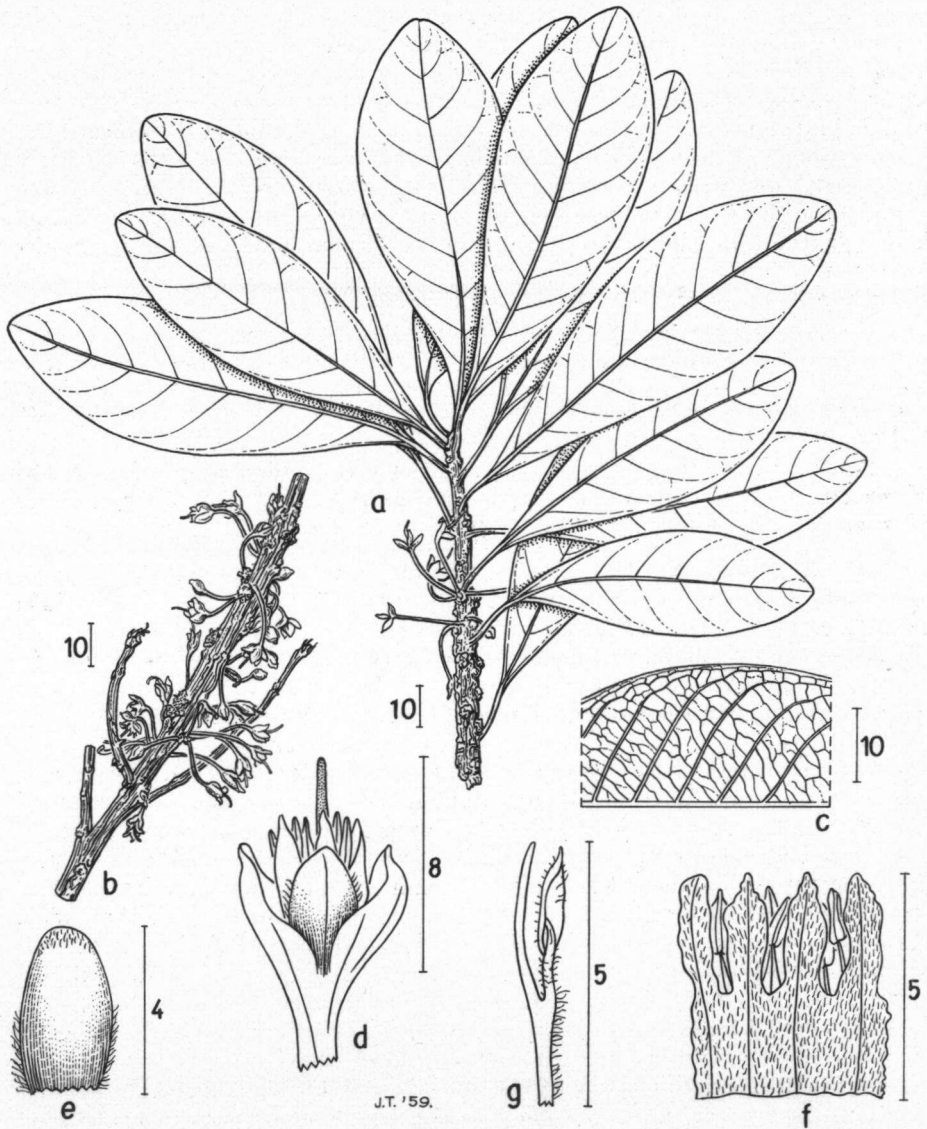


Fig. 14. *M. vulcanica*, a. branchlet with leaves and flowers, b. branchlet with flowers, c. part of leaf showing tertiary venation, d. flower, e. outer sepal, inside, f. part of corolla, outside, g. corolla seen from aside. (Nur 7326).

long, 6—8-celled, ferruginously puberulous but the stigmas glabrous. *Fruits* unknown.

Type specimen: Nur 7326 in SING.

Distribution: Sumatra.

SUMATRA. Bandar Baru, Mt Sibajak: Nur 7326 (K, SING), fl. Aug., tree 13—16 m.

Remark: Very much resembles *M. cuneata* (Bl.) MacBride and one might wonder whether not an underdeveloped specimen is at hand.

50. *M. endertii* H. J. Lam, l. c. 1927, 458, f. 24.

Trees up to 30 m. Branchlets slender, angular to terete, 2—4 mm in diam., ferruginously sericeous but soon glabrous; terminal cone up to 4 mm, pubescent, stipules ovate-lanceolate, c. 2 by 1 mm, acute pubescent on outside, glabrous on inside, caducous. Leaves scattered, ovate, or ovate-elliptic, sometimes obovate, spatulate or obovate-elliptic, 5—13(—18) by 2—6 cm, usually obtusely acuminate, sometimes obtuse or rounded, base cuneate, decurrent along upper surface; coriaceous, glabrous; midrib stoutly prominent on either side, sometimes above with a broad shallow groove, angular above, rounded below, secondary nerves 6—11 pairs, ascending at an angle of 45°—55°, curved, archingly joined some distance from the margin, sometimes connected by thickened tertiary nerves and pseudo-arching, prominent on either side, tertiary nerves transverse, widely reticulate, slender, but distinct on either side. Petioles 0.5—2 cm, flat above and sometimes crested above, rounded below, glabrous. *Flowers* solitary or in 2- or 3-flowered fascicles, axillary, pedicels slender, angular, 1.5—2.5 cm long, with scattered ferruginous hairs or glabrous. *Sepals* rotundate-ovate, 2.5—4(—7) by 2.5—3.5(—5) mm, indistinctly obtusely acuminate, greyish tomentose on outside, glabrous on inside, inner sepals more ovate than the outer ones, obtuse, crested, with glabrous, membranous, fimbriate margins, sometimes longer and acute. *Corolla* 7—10 mm long, 6—8-lobed, greyish sericeous on outside except along the margins of the lobes, ferruginously woolly on inside between the stamens, otherwise glabrous, lobes oblong, 5.5—7.5 by 2—2.5 mm, obtuse, fimbriate at apex. *Stamens* (12—)16, in 2 whorls, 4—5 mm long, filaments subulate, 0.5—2 mm long, villose, anthers subulate, c. 2 mm long, the acute, prolonged connective moreover 1.5—2 mm long, anthers and connective with scattered, ferruginous hairs, sometimes anthers more or less reduced and the connective broadened, and irregularly lacinate at apex. *Ovary* globose, c. 1 by 1 mm, 6- or 7-celled, glabrous, style subulate, 1—1.2 cm long. *Fruits* ellipsoid, 2.2—4.5 by 0.8—1 cm, including the up to 2 cm long remnant of the style, caudate at apex, rounded or attenuate at base, one-seeded, seeds incompletely known.

Type specimen: *Ender* 4455 in BO.

Distribution: Borneo.

BORNEO. Indonesian Borneo, W. Kutai, Mt Kong Kemul, alt. 1800 m: *Ender* 4455 (BO, K, L), tree 30 m, fl. Oct. — Sandakan, Mt Kinabalu, Marai Parai, alt. c. 1600 m: *Clemens & Clemens* 32354 (BO, BM, K, L), tree, fr. dark purple, May; ibidem: *Clemens & Clemens* 32994 (BM, BO, K, L), tree, fr. green, April; ibidem: *Clemens & Clemens* 33199 (BM, BO, K, L), tree, fl. May; ibidem: *Clemens & Clemens* 33406 (B, BM, BO, K, L), tree, fl. March; Colombon Basin, alt. c. 1600 m: *Clemens & Clemens* 40099 (BM, BO, K, L), tree, Aug.; ibidem: *Clemens & Clemens* 34405 (BM, BO, K, L), tree, fl. Aug.; Panataran river, alt. c. 1500 m: *Clemens & Clemens* 32593 (BM, BO, K, L), tree, fl. June, cream; ibidem: *Clemens & Clemens* 34240 (BM, BO, K, L), tree fl. July; Upper Kinabalu, alt. c. 2800—3700 m: *Clemens & Clemens* 27921 (B, BM, BO, K, L), tree 25 m, (said to bear fruits but these not present); Tenompok, alt. 1600 m: *Clemens & Clemens* 28569 (BM, BO, K, L), tree, fl. Febr. & 29379 (K), fl. April; ibidem: *Clemens & Clemens* 28699 (B, BM, BO, K, L), tree, fl. cream, March; ibidem: *Clemens & Clemens* 29428 (B, BM, BO, K, L), tree, fl. buds, April; ibidem:

*Clemens & Clemens*. 29433 (BM, BO, K, L), tree, fl. buds green, May; Mt Nunkok, alt. c. 1600 m: *Clemens & Clemens* 32328 (BM, BO, K, L), tree, fl. April; Tuaran: *Clemens* 11258 (BM), fl. Dec.; Upper Kinabalu, Penibukan, W. ridge: *Clemens & Clemens* 40411 (B, BM, BO, K, L), tree, fl. cream, Sept.; ibidem: *Clemens & Clemens* 40778 (BM, BO, G, K, L), tree 25 m, fl. cream-reddish Oct.

**Remark.** The fruit has been described after *Clemens & Clemens* 32354 in L.

**51. *M. montana* van Royen, n. sp. — Fig. 15.**

Arbor. Ramuli tenues, brunneo-sericei, glabrescentes; stipulae lanceolato-ovatae, caducae. Folia sparsa, elliptica vel elliptico-obovata, 7–8.5 × 3–4 cm, obtusa vel obtuse-acuminata, basi cuneata, matura glabra; nervi secundarii utroque latere 8–10, superne evanescentes, tertiarii transversi. Petiolus 0.7–1 cm longus, glaber. Pedicellus 0.7–1 cm longus, glaber. Sepala 4, late ovata, acuta vel subacuta, extus dense ferrugineo-tomentosa, intus glabra. Corolla 8-lobata, extus linea epipetala loborum et ferrugineo pubescente tuborum excepta glabra, ad faucem ferrugineo-villosa. Stamina 16; filamenta ferrugineo-villosa; antherae sparse ferrugineo-villosae. Ovarium disciforme, 7- vel 8-loculare, glabrum; stylus glaber. Fructus ignotus. T y p u s: *Clemens & Clemens* 30861 in L.

Small or medium sized tree. Branchlets slender, 3–5 mm in diam., brownish sericeous but soon glabrescent; terminal cone up to 3 mm long, sericeous; stipples lanceolate-ovate, up to 2.5 by 1 mm, acute, crested, brownish sericeous on outside, glabrous on inside, caducous. *Leaves* scattered, elliptic to elliptico-obovate, 7–8.5 by 3–4 cm, obtuse or short obtusely acuminate at apex, cuneate at base and decurrent along sides of petiole; coriaceous, glabrous, only densely pubescent on either side when extremely young; midrib prominent above and with 2 longitudinal crests, less prominent below and rounded, secondary nerves 8–10 pairs, ascending at an angle of c. 50°, curved, diminishing until inconspicuous near margin, prominulous above, prominent below, tertiary nerves transverse, sparse, usually more distinct above than below. Petioles 7–10 mm long, flat above, rounded below, with transverse corky ridges, glabrous when mature. *Flowers* solitary or 2 or 3 together in the axils of the uppermost leaves, pedicels angular, 7–10 mm long, densely dark greyish or ferruginously sericeous. *Sepals* broadly ovate, c. 3 by 3 mm, acute or subacute, densely ferruginously tomentose on the outside, glabrous on the inside, inner sepals more obtuse at apex and with glabrous, membranous and fimbriate margins. *Corolla* seen in bud only, c. 1.5 mm long, glabrous on the outside except for a ferruginous pubescence on the middle-line of the lobes and the continuation on the tube, on the inside ferruginously villose between the stamens, lobes 8, oblong or elliptic, c. 1.5 by 1 mm, obtuse, some of them narrowed at the base. *Stamens* 16, c. 0.8 mm long, filaments subulate, c. 0.2 mm long, ferruginously villose, anthers oblong-ovoid, c. 0.6 mm long, connective prolonged and irregularly truncate, sparsely ferruginously villose, but more so at the apex, dehiscing laterally. *Ovary* disciform, c. 0.5 by 1 mm, glabrous, 7-(or 8?)celled, style stout, c. 1 mm long, glabrous. *Fruits* unknown.

**Type specimen:** *Clemens & Clemens* 30861 in L.

**Distribution:** Borneo (Sandakan).

Mt Kinabalu, Penibukan, 1300–1600 m: *Clemens & Clemens* 30861 (BM, K, L), small tree, fl. buds pinkish, Jan.

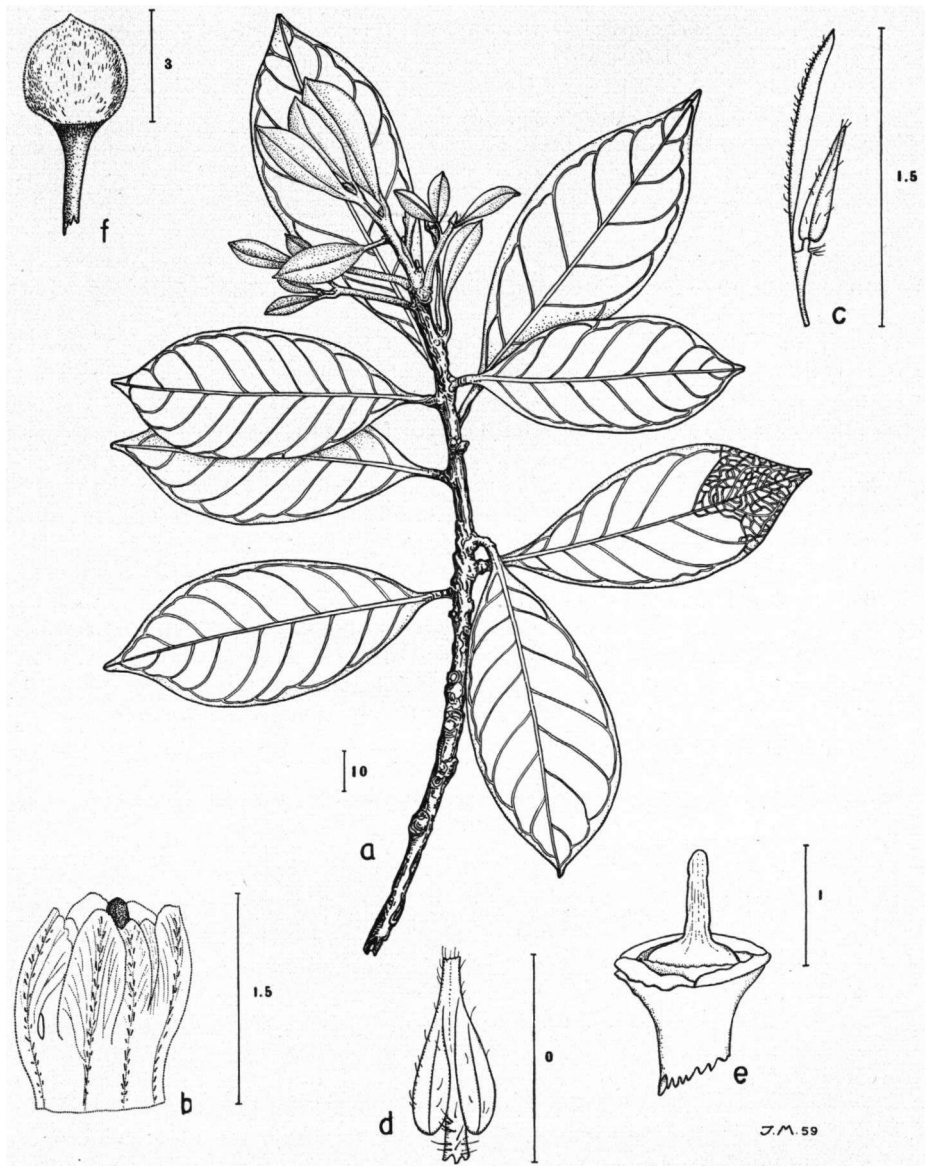


Fig. 15. *M. montana*, a. branchlet, b. corolla, c. lateral view of corolla-lobe and stamen, d. stamen, e. gynaecium, f. flowerbud. (Clemens & Clemens 30361).

**Remarks.** This species, though not completely known, is easy to recognize by the thick, glossy leaves and the sparse tertiary nervation.

The specific epithet is derived from the mountainous habitat of this species.

52. *M. firma* (Pierre ex Dubard) H. J. Lam, l. c. 1925, 182; Lam, l. c. 1927, 463 — *Dasyaulus firmus* Pierre ex Dubard, Bull. Mus. Hist. Nat. 13, 1907, 459 — *Payena firma* (Pierre ex Dubard) Lecomte, Fl. Gén. Indo-Chine 3, 7, 1930, 913.

Trees c. 30 m tall. Branchlets angular, 2.5–4 mm in diam., ferruginously tomentose but soon glabrous; terminal cone up to 2.5 mm long, stipules minute, triangular-lanceolate, c. 1 by 0.5 mm, acute, pubescent on outside, glabrous on inside, caducous. *Leaves* scattered, elliptic or ovate-elliptic, 9–11.5 by 2.8–4 cm, obtusely acuminate, base narrowly cuneate, decurrent along upper surface of petiole; subcoriaceous, entirely glabrous; midrib prominulous and angular above, prominent and rounded below, secondary nerves 9–12 pairs, slender, ascending at an angle of c. 45°, curved, diminishing until inconspicuous near margin, prominulous or grooved above, slightly stronger prominent below, tertiary nerves reticulate with a few irregular transverse nerves in between, slender, grooved or prominulous above, stronger prominent below. Petioles 1.4–2 cm long, flat above and minutely crested, rounded below, thickened and rugulose in the basal part, glabrous or subglabrous mainly in the basal part. *Flowers* in few-flowered, axillary clusters, pedicels angular, 10–15 mm long, glabrous. *Sepals* ovate, 3.5–4.5 by 3–4 mm, subacute, sparsely puberulous on either side, inner sepals oblong-ovate, with glabrous, membranous, fimbriate margin. *Corolla* up to 4 mm long, glabrous on outside or with a few hairs at base of lobes, inside woolly between the stamens, lobes 7–10, elliptic-obovate, 3–3.5 by 1–1.5 mm, obtuse. *Stamens* (14–)16(–18), in 2 whorls, c. 2.5 mm long, filaments subulate, c. 0.5 mm long, glabrous, anthers ovate-lanceolate, c. 1.5 mm long, with a c. 0.5 mm long acute acumen, ferruginously hirsute. *Gynaecium* ovoid, c. 6 mm long, glabrous, ovary 6–8-celled. *Fruits* unknown.

Type specimen: *Pierre 3272* in P.

Vernacular name: viêt (Annamese language).

Distribution: Indo-China (Annam).

Annam, Dinh Mts, near Baria: *Pierre 3272* (K, L, P), fl. Oct.

53. *M. diplostemon* (Clarke) van Royen, comb. nov. — *Isonandra diplostemon* Clarke in Hooker f., Fl. Br. Ind. 3, 1882, 540; Dubard, Bull. Mus. Hist. Nat. 15, 1909, 29 — *Diospyros obovata* Wight, Ic. Pl. As. Or., 1226 — Fig. 16.

Trees? Branchlets angular, 2–4 mm in diam., glabrous; terminal cone up to 3 mm long, ferruginously puberulous, stipules minute, lanceolate, up to 1 by 0.5 mm, acute, puberulous on outside, glabrous on inside, caducous. *Leaves* subconferted at tips of branchlets, obovate or suborbicular-obovate, 7.5–13.5 by 4.5–7.5 cm, rounded, obtuse or indistinct obtusely acuminate at apex, rounded at base and abruptly narrowed and decurrent along upper sides of petiole; coriaceous, glabrous; midrib crested above, prominent and rounded below, secondary nerves 13–19 pairs, ascending at an angle of c. 65°, curved, diminishing until inconspicuous near margin or archingly joined, sometimes both types in one leaf, prominulous above, prominent below, tertiary nerves widely reticulate but near the margin a few transverse ones, often one nerve more developed and parallel to the secondary nerves, distinct on either side but more prominent below than above.

Petioles 7—12 mm long, flat above, rounded below. *Flowers* in 4—7-flowered, axillary clusters, seen in bud only, pedicels 1—3 mm long, ferruginously sericeous. *Sepals* ovate-orbicular, c. 2.5 by 2 mm, obtusely acuminate, ferruginously sericeous on outside, glabrous on inside, inner sepals with membranous, glabrous, fimbriate margins. *Corolla* c. 1.5 mm long, 7- or 8-lobed, glabrous on either side, lobes oblong, c. 1 by 1 mm, rounded. *Stamens* 17, c. 1 mm long, filaments subulate, c. 0.3 mm long, glabrous,

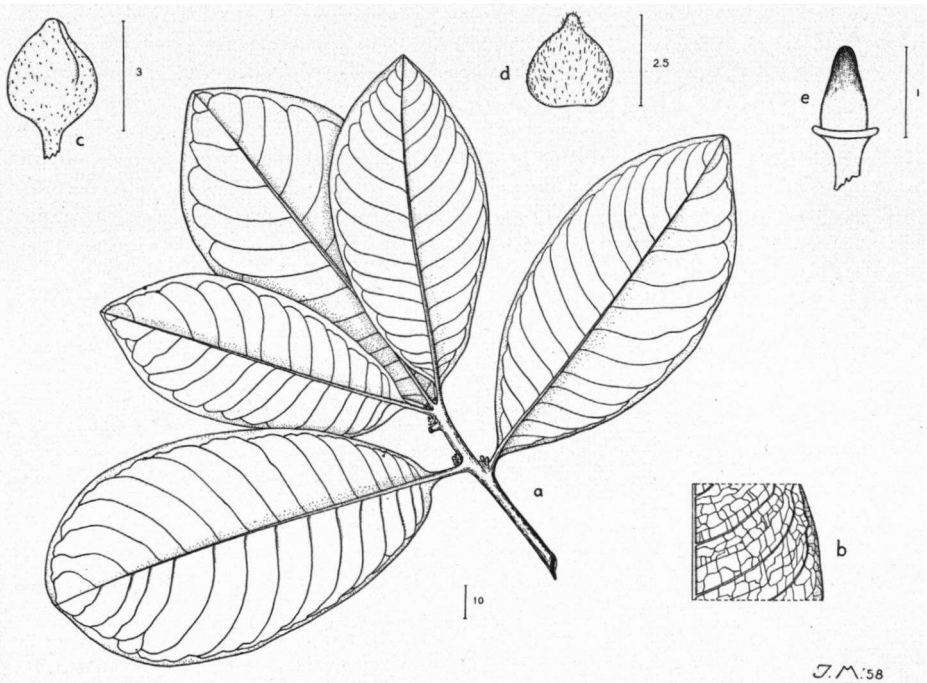


Fig. 16. *M. diplostemon*, a. branchlet with leaves, b. part of leaf showing tertiary nervation, c. flowerbud, d. outer sepal, outside, e. gynaecium. (Wight 583).

anthers sagittate, c. 0.7 mm long, connective acutely prolonged, glabrous. *Gynaecium* sterile, conoid, c. 1 mm long, glabrous. *Fruits* unknown.

Type specimen: Wight 583 in K.

Distribution: India.

Without known loc.: Wight 583 (E, K), fl. buds.

Remark. Though the ovary seems to be absent one has to take into account that the flowers are only known from immature buds and it might well be that later the ovary will be formed quite normally.

54. *M. insignis* (Radlkofer) H. J. Lam, l. c. 1925, 182; Lam, l. c. 1927, 462 — *Bassia insignis* Radlkofer, Sitz. Ber. Akad. Wissensch. München 12, 1882, 309 — *Illipe insignis* (Radlk.) Engler, Bot. Jahrb. 12, 1890, 509 — *Payena nanil* Pierre, msc.

Trees. Branchlets stout, 3—5 mm in diam., cinnamomously sericeous at the extreme tip only, otherwise glabrous; terminal cone up to 3 mm long; stipules lanceolate-subulate, c. 1.5 by 0.5 mm, sericeous on outside, glabrous on inside, soon caducous. *Leaves* scattered, obovate, 9—13 by 4—6 cm, rounded or retuse at apex, cuneate at base, subabruptly narrowed towards petiole, decurrent; subcoriaceous, glabrous; midrib shallowly grooved above and crested as well (sometimes with 2 crests), prominent and rounded below, secondary nerves 11—13 pairs, ascending at an angle of c. 75°, curved, sometimes straight and curved at apex only, archingly joined at apex; grooved above, prominent below, tertiary nerves sparse, reticulate with a few irregular transverse nerves, grooved above, prominulous below. Petioles 0.8—1.2 cm, grooved above, rounded below, thickened and sometimes rugulose in the basal part, glabrous. *Flowers* unknown. Pedicels of fruit 2—2.8 cm long, glabrous, calyx up to 10 mm long, sepals ovate-lanceolate, 6—8 by 4—6 mm, obtuse, pale cinnamomously sericeous on outside, glabrous on inside, inner sepals crested and with glabrous, membranous, fimbriate margins. *Fruits* fusiform-ovoid, 2.7—3 by 0.8—1.2 cm, sometimes slightly oblique, one-seeded, at apex with the up to 1.7 cm prolonged style, pericarp thin, glabrous, seed similar in shape to the fruit, truncate at either end, brown, scar narrow, albumen copious.

Type specimen: *Hohenacker 397* in G.

Vernacular name: nanil.

Distribution: India.

INDIA. Mangalor: *Hohenacker 397* (G, L), fr. resp. fl.; ibidem: *without known coll. 2373* (BM), fr. Sept.

55. *M. cuprea* (King & Gamble) H. J. Lam, l. c. 1925, 177; Ridley, Fl. Mal. Pen. 5, 1925, Suppl., 320; Lam, l. c. 1927, 458 — *Bassia cupred* King & Gamble, Journ. As. Soc. Beng. 74, 2, Extra nr 17, 1905, 186, 396; Ridley, Fl. Mal. Pen. 2, 1923, 270.

Trees up to 23 m. Branchlets thick, slightly angular; terminal cone and stipules? *Leaves* oblong, 11—15 by 6—7.5 cm, obtuse or emarginate at apex, narrowed and suboblique at base, decurrent; coriaceous, glabrous above, sparsely hairy on the nerves beneath; midrib very thick and prominent, secondary nerves 10—12 pairs, ascending at an angle of c. 50°, curved, diminishing until inconspicuous near margin, tertiary nervation? Petioles thick, 1.8—2.5 cm long. *Flowers* in 2—5 (or more)-flowered, axillary clusters, pedicels c. 12 mm long, pubescent. Outer *sepals* broadly ovate, c. 6 mm long, shortly pubescent on either side, inner *sepals* rounded concave, shallowly emarginate and with membranous, glabrous and ciliate margins, otherwise similar to the outer ones. *Corolla* c. 10 mm long, 8- or 9-lobed, lobes oblong, c. 7 mm long, rounded, brown sericeous on the back, strigosely hairy within, throat densely brown-hirsute. *Stamens* 18—22, c. 6 mm long, filaments c. 2.5 mm long, hairy, anthers ovate-acuminate, c. 3.5 mm long, the connective produced in a long usually curved acumen, strigosely hirsute. *Ovary* oblong, 8—10-celled, glabrous, style c. 15 mm long, stigma 9—10-lobed. *Fruits* unknown.

Type specimen: *Scortechini 1879* in ?

Distribution: Malaya (Perak).



**Remarks.** The description given above is adapted after King & Gamble's description since I have not seen any material of this species. In the Rijksherbarium and Herbarium Bogoriense a sterile specimen collected by *Teysmann* (*s.n.*!) shows some details of this species but as it much resembles an Euphorbiaceous species that specimen is not included here as representing this species.

**56. *M. bourdillonii*** (Gamble) H. J. Lam, l.c. 1927, 463 — *M. bourdillonii* (Gamble) Raizada, Indian Forester 74, 1948, 335 — *Bassia bourdillonii* Gamble, Kew Bull. 1921, 121 — *Bassia fulva* Bourdillon, Forest Trees of Travancore, 1908, 238.

Trees up to 20 m. Branchlets stout, 8–10 mm in diam., densely brownish woolly, but soon becoming glabrous; terminal cone up to 7 mm long; stipules lanceolate? *Leaves* conferted at tip of branchlets, spatulate-obovate, 20–32 by 6–10.5 cm, acutely acuminate at apex, tapering from the middle towards the broadly cuneate or rounded base; membranous, glabrous, below reddish or greyish brown woolly along midrib; midrib grooved above, prominent and rounded below, secondary nerves 20–27 pairs, ascending at an angle of c. 60°, slightly curved, diminishing until inconspicuous near margin or connate by thickened tertiary nerves, prominent above, prominent below, the latter slender and transverse with a distinct reticulate nervation in between, inconspicuous above, more distinct below. *Petioles* stout, 7–10 mm long, flat above, rounded below, brownish woolly. *Flowers* in axillary many-flowered clusters at the end of branches, appearing before the leaves, pedicels angular, 2–2.5 cm long, thickened towards apex, cinnamomously tomentose. *Sepals* ovate, 7–10 by c. 6 mm, acute, cinnamomously tomentose on either side, except for the glabrous, basal part at inside. *Corolla* 11- or 12-lobed, 12–14 mm long, entirely glabrous, lobes lanceolate to oblong, 6.5–7.5 by c. 2 mm, obtuse, sometimes irregularly scarious. *Stamens* 24, in 2 indistinct whorls, 5.5–6 mm long, entirely glabrous, filaments filiform, 2.5–3 mm long, geniculate at apex, anthers ovoid-sagittate, 3.5–4 mm long, connective acutely prolonged up to 1 mm. *Ovary* broadly ovoid, c. 1 by 3 mm, 11- or 12-celled, glabrous. *Style* filiform, up to 2 cm long, glabrous. *Fruits* ovoid, 3–4 cm long, 1-seeded, glabrous, seeds unknown.

Type specimen: *Bourdillon 386* in K.

Distribution: Travancore.

Ariankavu and Shendurni valley, alt. c. 300 m: *Bourdillon 386* (K), tree of medium size, fl. Sept.; ibidem: *Bourdillon 533* (K), tree, March; ibidem: *Bourdillon 842* (K), tree, fr.

**57. *M. lanuginosa*** Ridley, Kew Bull. 1926, 72.

Tall trees. Branchlets angular, 4–5.5 mm in diam., ferruginously woolly but soon becoming glabrous; terminal cone up to 3 mm long; stipules? *Leaves* subconferted at tip of branchlets, obovate or oblanceolate, 15–20.5 by 5–7 cm, acutely acuminate at apex, narrowly cuneate at base, decurrent along upper side of petiole; thin-coriaceous, glabrous; midrib narrowly crested above, rounded and prominent below, secondary nerves 18–20 pairs, ascending at an angle of c. 60°, curved, diminishing until inconspicuous

near margin, prominulous above, prominent below; tertiary nerves transverse-reticulate, often with an irregular, flexuose nerve parallel to the secondary nerves and sometimes reaching the secondary nerves near the margin. Petioles 1—2.5 cm, grooved in the apical half, thickened, rugulose and ferruginously woolly in the basal part but becoming ultimately glabrous. *Flowers* in 4—9-flowered, axillary clusters, pedicels angular, 0.8—1.4 cm long, pale ferruginously woolly. *Sepals* broadly ovate, 6—7 by 6—7 mm, acutish, pale ferruginously woolly on outside and on inside except for a central-basal part, inner sepals slightly narrower than the outer ones. *Corolla* 6-lobed, 4—5 mm long, with long ferruginous hairs on outside on the lobes only, and on inside between the stamens only, lobes oblong, 3—4 by 1.5—2 mm, rounded. *Stamens* 20—30, in 2 distinct whorls, c. 2.5 mm long, filaments subulate, 0—0.5 mm long, anthers oblong, 1.5—2 mm long, bifid at apex, with long ferruginous hairs on sides and inside, dehiscing laterally. *Gynaecium* long-conoid, 6—7 mm long, ferruginously hirsute at base, ovary 10-celled. *Fruits* unknown.

Type specimen: *Boden Kloss 10600* in K.

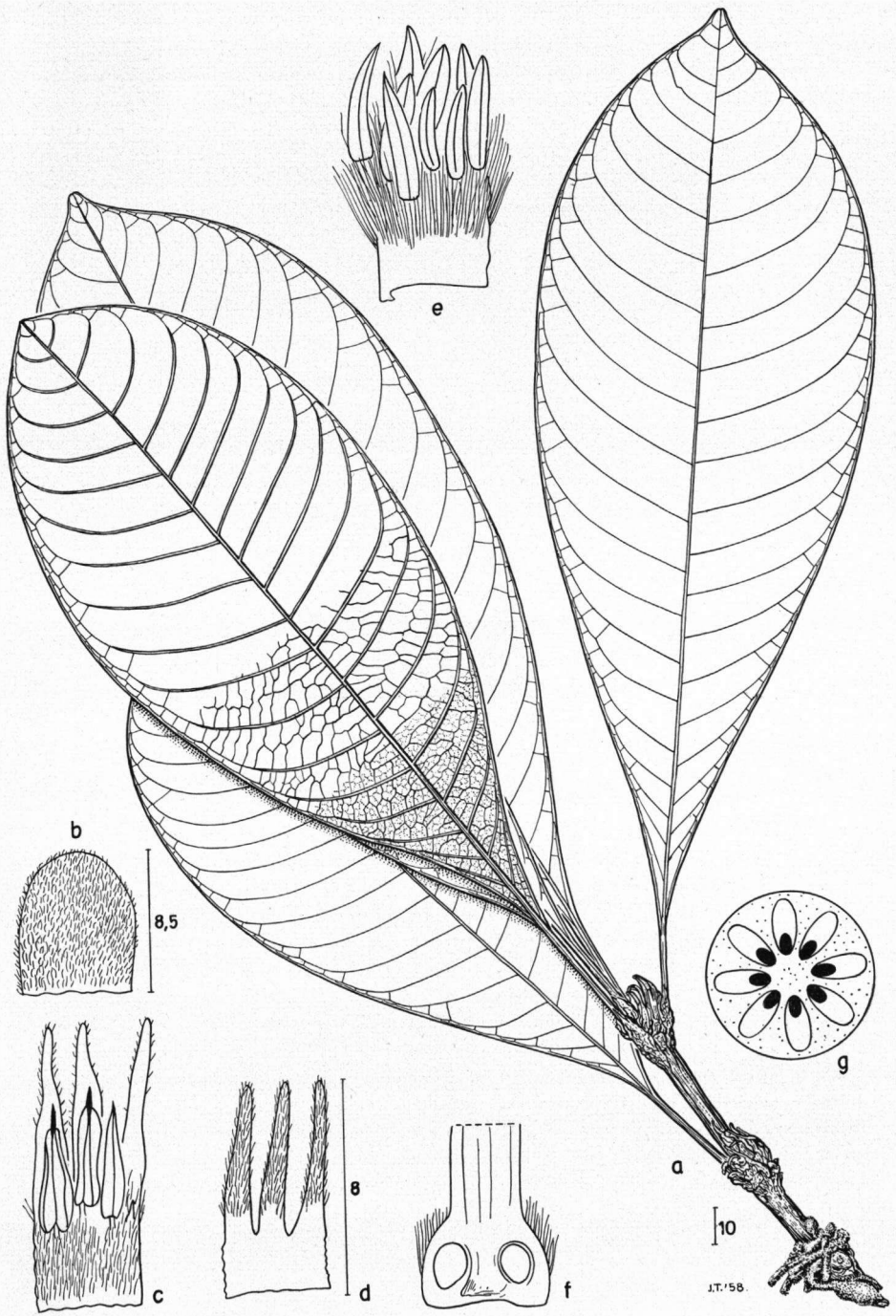
Distribution: Siberut.

MENTAWI ISL. Siberut, without known loc.: *Boden Kloss 10600* (K), large tree, fl. Sept.

58. *M. ligulata* (H. J. Lam) H. J. Lam in van den Assem, *Blumea* 7, 2, 1953, 399 — *Ganua ligulata* H. J. Lam, l. c. 1927, 426, f. 10 — Fig. 17.

Trees. Branchlets irregularly terete, c. 5 mm in diam., densely brownish woolly but becoming glabrous except at the insertion of petioles; terminal cone up to 7 mm long, brownish woolly; stipules linear or narrowly triangular, up to 2.2 by 0.3 cm, acute, woolly on outside, glabrous on inside, very long persistent. *Leaves* conferted at apex of branchlets and a few ones scattered lower down, oblanceolate, oblanceolate-oblong, or obovate, (7—)14—27 by (1.5—)3—9.5 cm, obtusely acuminate at apex, narrowly cuneate at base, decurrent; coriaceous, glabrous above, brownish puberulous below along midrib but ultimately becoming glabrous; midrib prominent above, stoutly prominent and rounded below, secondary nerves 15—25 pairs, ascending at an angle of 70°—90°, straight but curved at their tip, diminishing until inconspicuous near margin, sometimes connected by a few thickened tertiary nerves, prominulous above, prominent below, tertiary nerves transverse, but recurved near midrib, with a reticulate nervation in between. Petioles (1—)2.5—3.5 cm, flat above, rounded below, thickened in the basal part, brownish woolly but later only on the thickened part. *Flowers* in 3—5-flowered, axillary clusters, pedicels 10—16 mm long, dark greyish brown woolly. *Sepals* broadly ovate, 7.5—9 by 6.5—7.5 mm, rounded at apex, densely brownish woolly on outside, glabrous on inside, inner sepals subacutish or obtuse and with glabrous, membranous and fimbriate margins. *Corolla* seen in bud only, up to 8 mm long, with long soft hairs on outside

Fig. 17. *M. ligulata*, a. branchlet with leaves, b. outer sepal, outside, c. part of corolla, inside, d. part of corolla, outside, e. part of corolla, inside, with the full pubescence, f. longitudinal section of ovary, g. transverse section of ovary. (*Rahmat S; Bocea 10027*).



of lobes, glabrous on the tube, lobes on inside glabrous, throat densely dark brown hirsute, tube adpressedly hirsute on inside, lobes 8, lanceolate, obtuse to subacute. *Stamens* c. 28, in 3 whorls, 3—4 mm long, filaments subulate, c. 0.5 mm long, with long hairs, anthers narrowly lanceolate, 2—3 mm long, glabrous, the acutely prolonged part of connective c. 0.5 mm long. *Ovary* ovoid, c. 2 by 2 mm long, gradually passing into the style, 8-celled, ferruginously hirsute, style filiform, c. 7 mm long, glabrous. *Fruits* unknown.

Type specimen: *NIFS bb 9257* in BO.

Vernacular names: susah kambing, kaju si roek-roek tali (Indonesian language).

Distribution: Sumatra.

SUMATRA. Lankat, Bukit Kuhu: *NIFS bb 9257* (BO, L); Asahan, Tomuan Dolok, alt. 1000 m: *Rahmat Si Boeea 10027* (A, MI), fl. Aug.

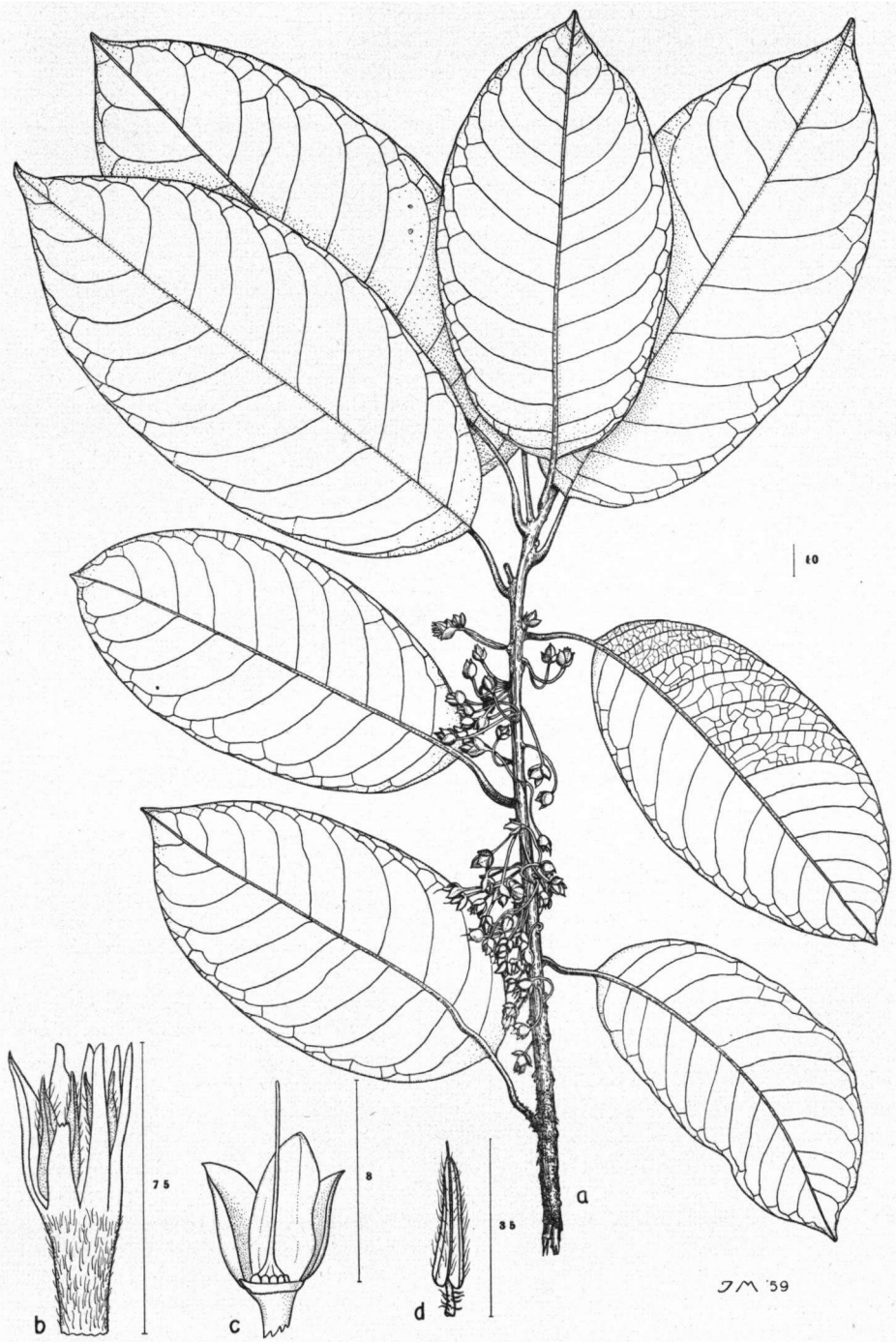
Remarks. This species is easy to recognize by its large, persistent stipules. The flowers have been described after *Rahmat Si Boeea 10027*.

### 59. *M. palustris* van Royen, nov. sp. — Fig. 18.

Arbor, interdum arbuscula. Ramuli tenues, glabri; stipulae lanceolato-ovatae, acutae, caducae. Folia alterna, elliptica vel elliptica-oblonga, (7—)15—22 × (4—)6—9 cm, obtuse vel acute-acuminata, basi rotundata, glabra; nervi secundarii utroque latere 10—16, superne evanescentes, tertiarii reticulati, cum nervis transversis pauci alternantes. Petiolus 1.8—2.5 cm longus, glaber. Pedicellus 1.6—2 cm longus, sparse ferrugineo-sericeus. Sepala ovata, extus sericeo-pubescentia, intus glabra. Corolla 7- vel 8-lobata, tubo extus pubescente, fauce ferrugineo-lanato. Stamina 15 vel 16; filamenta dense ferrugineo-lanata; antherae ferrugineo-hirsutae. Ovarium ovoideum, 8-loculare, glabrum; stylus glaber. Fructus ignotus. Typus: *Corner 21330* in SING.

Small trees, up to 10 m, sometimes almost a shrub. Branchlets irregularly terete, 3—5 mm in diam., glabrous; terminal cone up to 3 mm long, pubescent; stipules lanceolate-ovate, up to 2 by 1 mm, very soon caducous. *Leaves* scattered along the branchlets, elliptic, or elliptic-oblong, (7—)15—22 by (4—)6—9 cm, obtusely or acutely acuminate at apex, rounded at base, decurrent along upper surface of petiole; coriaceous, glabrous on either side; midrib impressed and narrowly crested above, prominent and rounded below, secondary nerves 10—16 pairs, ascending at an angle of c. 70°, curved, diminishing until inconspicuous near margin, but the apical nerves often archingly joined, grooved or prominulous above, tertiary nervation reticulate with a few, sometimes irregularly shaped, transverse nerves, impressed above, prominent below. Petioles 1.8—2.5 cm long, narrowly grooved in the upper half, thickened and rough in the basal part, glabrous. *Flowers* in 3—7-flowered, axillary clusters, pedicels slender, angular, 1.6—2 cm long, sparsely ferruginously sericeous. *Sepals* ovate, 4.5—5.5 by 5—6 mm, subobtuse, outer sepals greyish sericeous, inner sepals pale ferruginously sericeous on outside, all sepals glabrous on inside, inner sepals crested on outside and with membranous, glabrous, fimbriate margin. *Corolla* 6.5—8 mm long, 7- or 8-lobed, mature ones ferruginously sericeous on outside on tube only, but in bud the entire outer surface pubescent, ferruginously woolly on inside between the stamens, lobes linear-lanceolate,

Fig. 18. *M. palustris*, a. branchlet with leaves and flowers, b. corolla, c. part of calyx, and gynaecium, d. stamen. (*Corner 21330*).



4—5 by c. 1 mm, subacute. *Stamens* 15 or 16, in 2 whorls, 3—4 mm long, filaments very short, subulate, c. 0.5 mm long, densely ferruginously woolly, anthers narrowly lanceolate, 2.5—3.5 mm long, connective acutely prolonged, dehiscing laterally, ferruginously hirsute. *Ovary* ovoid, c. 0.5 by 1 mm, 8-celled, glabrous, style filiform, c. 7 mm long, glabrous. *Fruits* unknown.

Type specimen: *Corner 21330* in SING.

Vernacular name: nyatoh.

Ecology: In drier parts of swampforests.

Distribution: Malaya (Johore).

Johore, 17th mile Mawai-Temulang Rd: *Corner 21330* (BO, SING), tree up to 6 m, sometimes almost a shrub, fl. Febr.; Sungei Kayu, in swamps: *Kiah 32129* (SING), tree 10 m, fl. buds, Oct.

Remarks. This species is easily to recognize by the reddish colour of the dried leaves and the rounded base of the latter. It is related to *M. rupicola*, *M. ovata* and *M. tomentosa* but the rounded base of the leaves distinguishes it immediately from these species.

The specific epithet is derived from the swamps in which this species is said to grow.

60. *M. tomentosa* H. J. Lam, l. c. 1925, 177, f. 49; Ridley, Fl. Mal. Pen. 5, 1925, Suppl., 342; Lam, l. c. 1927, 460.

Trees, c. 6 m (or more?). Branchlets slender, terete or angular, 2—3 mm in diam., pale yellowish sericeous-puberulous but soon glabrous; terminal cone up to 2 mm long, puberulous; stipules minute, lanceolate, up to 1 by 0.5 mm, acute, adpressedly puberulous without, glabrous on the inside, caducous. *Leaves* scattered, elliptic, elliptic-obovate, or oblong, (7—)10—17 by (2.2—)3.4—6.5 cm, acutely acuminate to caudate at apex, broadly cuneate to rounded at base and slightly decurrent along upper surface of petiole; subcoriaceous, glabrous; midrib narrowly crested above, prominent and angular below in the basal part but rounded in the more apical parts, secondary nerves 13—17 pairs, ascending at an angle of 60°—70°, curved or straight and curved at their tips only, archingly joined or diminishing until inconspicuously near margin or connected by thickened tertiary nerves, prominulous above, prominent below, tertiary nervation sparse, transverse, alternating with a distinct reticulate nervation, sometimes one more or less irregular nerve stronger developed than the others and parallel to the secondary nerves, prominulous above, prominent below. Petioles 9—24 mm long, narrowly grooved above, keeled below, thickened, rugulose and black in the basal part, glabrous. *Flowers* in 3-flowered, axillary clusters mainly below the leaves, pedicels slender, 1.5—2.5 cm, sparsely brownish or greyish puberulous. *Sepals* ovate, 5—6 by 3—4 mm, subacute, outer ones sparsely greyish puberulous without, glabrous within, inner ones with membranous, glabrous, fimbriate margin and densely, ferruginously puberulous sericeous without, glabrous within. *Corolla* 7—8 mm long, outside ferruginously sericeous, inside glabrous except for a woolly pubescence between and below the stamens, lobes 8, oblanceolate, 4.5—5 by c. 1.5 mm, obtusely acuminate at apex. *Stamens* 15 or 16, in one or two whorls, c. 3 mm long, filaments subulate, c. 1 mm long, ferruginously woolly, anthers oblong, c. 2.5 mm long, ferruginously villose, connective acutely prolonged. *Ovary* conoid,

c. 0.8 by 1.2 mm, 8-celled, glabrous, style filiform, 6—7 mm long, glabrous. *Fruits* unknown.

Type specimen: *Hamid 4790* in SING.

Vernacular name: nyatoh balok.

Distribution: Malaya.

MALAYA. Pahang, Temerloh: *Hamid 4790* (K, SING), tree, fl. Sept.; ibidem: *Henderson 10409* (SING), tree, fl. March. — Johore, Panti For. Res.: *Smith 30202* (KEP), tree c. 6 m, fl. Febr.; Sungei Kayu, in swampy forest: *Kiah SF 31996* (SING), tree c. 5 m, fl. Oct.; ibidem: *Kiah SF 32390* (SING), tree c. 8 m, fl. March.

61. *M. korthalsii* (Pierre) H. J. Lam, l. c. 1925, 168, 264; Ridley, Fl. Mal. Pen. 5, 1925, Suppl., 320; Lam, l. c. 1927, 449 — *Bassia korthalsii* (Pierre) Engler, Bot. Jahrb. 12, 1890, 509 — *Bassia braceana* King & Gamble, Journ. As. Soc. Beng. 74, 2, Extra 17, 1905, 184, including var. *lanceolata* King & Gamble, l. c. 185; Ridley, Fl. Mal. Pen. 2, 1923, 270 — *Kakosmanthus korthalsii* (Pierre) Pierre ex Dubard, Rev. Gén. Bot. 20, 1908, 198.

Trees up to 35 m. Branchlets slender, angular, 2—5 mm in diam., ferruginously or greyish puberulous but soon glabrous; terminal cone up to 5 mm long; stipules lanceolate, up to 2.5 by 1 mm, acute, ferruginously sericeous at outside, glabrous at inside, soon caducous. *Leaves* scattered, obovate, elliptic, oblong, ovate or lanceolate or oblong-lanceolate, (9—)15—21 by (2.7—)6—10 cm, rounded and subabruptly obtusely acuminate at apex, cuneate at base, decurrent along upper side of petioles; chartaceous, glabrous when mature, sparsely ferruginously puberulous below on midrib and lateral nerves when young; midrib broadly grooved above and minutely crested sometimes, prominent and rounded below, secondary nerves (9—)12—18(—22) pairs, curved, ascending at an angle of 60°—65°(—70°), diminishing until inconspicuous near margin, prominulous above, prominent below, tertiary nerves slender, transverse, usually inconspicuous above and more distinct below. Petioles 1—3.2(—4) cm, grooved above, scattered ferruginously puberulous mainly in the basal part. *Flowers* in 2—5-flowered axillary clusters, pedicels angular, 6—15 mm long, sparsely ferruginously puberulous. *Sepals* ovate, 5—6 by 4—5 mm, obtuse, ferruginously sericeous on outside, woolly on inside except for the central area, inner sepals with glabrous, membranous, fimbriate margin. *Corolla* c. 6 mm long, glabrous on outside, ferruginously woolly on inside between the stamens, lobes 8, ovate, c. 4 by 1.5 mm, obtuse. *Stamens* 16, in two whorls, 3.5—4 mm long, filaments linear, c. 1.5 mm long, ferruginously hirsute, anthers lanceolate, c. 2 mm long, acuminate, acumen c. 1 mm long, both anthers and acumen hirsute. *Ovary* ovoid, 8—11-celled, sparsely chinnamomously hirsutulous or glabrous, style filiform, c. 10 mm long, glabrous. Immature *fruits* narrowly ovoid, c. 1.4 by 0.5 cm, ferruginously puberulous, 1-seeded but seeds incompletely known, pedicel thickened, sepals up to 7 mm long. Ripe *fruits* ovoid-ellipsoid, 1.5—2.5 by c. 0.9 cm, one-seeded, obtuse, with a remnant of the style, glabrous, seeds incompletely known.

Type specimen: *Korthals s.n.* in L.

Vernacular names: kosal (Sumatra), katiou senaman, k. tanduk, k. gunung, liliran (Borneo).

Ecology: In primary forests at low altitudes.

**Remark.** The description of the corolla has been derived from the specimen *King's Collector 7594*, the immature fruit from *NIFS bb 9460* and the mature fruit from *Curtis 3063*.

Var. *korthalsii* — *M. korthalsii* var. *typica* H. J. Lam, l. c. 1925, 168, 264; Lam l. c. 1927, 449.

*Leaves* oblong or elliptic-oblong, obovate, elliptic or ovate, 9—21 by 4.2—10 cm. *Petioles* 1—3 cm. *Secondary nerves* (9—)12—18 pairs.

*Type specimen:* *Korthals s.n.* in L.

*Distribution:* Malaya, Sumatra, Siantan, Borneo.

**MALAYA.** Perak, Nelay Tujor: *Wray 2613* (K), fr. Aug.; Larut: *King's Collector 6447* (BM, K, L, SING), fl. Aug., *type specimen of Bassia braceana* King & Gamble; ibidem: *King's Collector 7594* (K, L, SING), fl. May; without known loc.: *Scortechini 314b* (SING), fr.; *King's Collector 10412 & 10417* (SING), fl., juv. fr. July; Kelau Tujoi: *Wray 1775* (SING), fl. April; Larut: *King's Collector 3195* (SING), juv. fr. Aug.; ibidem, dense jungle at 100 m: *King's Collector 3740* (SING), juv. fr. Jan.; Tanjong Pondok: *Burkill & Hamiff 13228* (SING), fl. March — Selangor, Gombak: *Ridley 157* (SING), fr. Dec.

**SUMATRA**, without known loc.: *Korthals s.n.* (BO, L), fl.; Padang: *Beccari 613 & 687* (BO, BM, FI), fl. Aug.

**SIANTAN.** E. of Terempa: *van Steenis 906* (BO, L, U), fl. April, tree 8 m.

**BORNEO.** Sarawak, Baram distr., Mt Irekan, alt. 660 m: *Hose 631* (BM, K, SING); Mt Dulit, Ulu Tinjar, alt. 600 m: *Richards 1563* (BM, K, KEP, L, SING), tree, fl. Aug. — Sandakan, Kalabakan, WNW of Tawau, alt. 60 m: *Wood San A 3974* (A, BRI, KEP, L, SING), tree 25 m, fl. Nov.; ibidem, alt. 60 m: *Wood San A 3974* (A, BRI, KEP, L, SING), fl. Nov. — Lumanggas Isl., Lahad Datu: *Harvey A 119* (K, SING), fr. May — Indonesian Borneo, Lower Dajak river, Ma Murui, alt. 10 m: *NIFS bb 9460* (BO, K, L), juv. fr., Oct.; Martapura: *NIFS bb 12032* (BO, L), Oct.; ibidem, Kalaän: *NIFS bb 12045* (BO, L), Oct.; calyces only; W. Kutai, Djembajan: *NIFS bb 25141* (BO, L), tree, June; L. Petak: *Endert 3426* (BO, L), fl. Sept.; ibidem: *Endert 4693b* (BO, L), fl. Oct.; Nunukan Isl.: *Kostermans 8769* (BO, L), tree 5 m, fl. white, Nov.; E. Kutai, Mt Tepian Lobang on Menubar river, alt. 60 m: *Kostermans 5270* (BO, L), tree, fl. white, June.

**Remark.** The specimen *Schlechter 13745* mentioned by Lam to belong to this species represents *Palaquium tenuifolium* Krause.

Var. *lanceolata* (King & Gamble) H. J. Lam, l. c. 1925, 168; Lam, l. c. 1927, 449 — *Bassia braceana* var. *lanceolata* King & Gamble, l. c. 185.

*Leaves* lanceolate-oblong or lanceolate, 9—13 by 2.7—4.5 cm. *Petioles* 1.8—2.3 cm. *Secondary nerves* 18—22 pairs.

*Type specimen:* *Wray 1248* in SING.

*Distribution:* Malaya.

Perak, Topa: *Wray 1248* (BM, K, SING), fl.; Batang Padang: *Wray 189* (SING), fl. — Malacca, Weld Hill Res.: *Omar 8522* (SING), fl. & fr. Sept.; Residency: *Hamid CF 590* (KEP), fr. June — Penang, *Curtis 3063* (SING), fr.

62. *M. heynei* H. J. Lam, l. c. 1925, 169, f. 45; Lam, l. c. 1927, 451.

Trees? Branchlets glabrous; terminal cone?; stipules densely pubescent, caducous. *Leaves* subconferted at tip of branchlets, oblong or oblong-ovate, 14—21 by 6—9.5 cm, acute or short acutely acuminate at apex, broadly cuneate at base; chartaceous, glabrous; midrib prominent below, secondary nerves c. 24 pairs, ascending at an angle of c. 70°, curved, diminishing until inconspicuous near margin, prominent below, tertiary nervation transverse but the nerves reticulate connate, often with one nerve parallel to the secondary nerves but not reaching the margin. *Petioles* 2—4 cm long,



glabrous. *Flowers* in 4—8-flowered, axillary clusters; pedicels c. 7 mm long, sparsely pubescent, becoming glabrous. *Sepals* ovate, 6—7 by 2.5—3 mm, acute, outer ones sparsely pubescent on outside, inner ones denser so but glabrous along the membranous margin, all sepals glabrous on inside. *Corolla* and *stamens* unknown. *Ovary* globose or ovoid, 8-celled, densely pubescent, style 8—10 mm long after flowering, pubescent at base. *Fruits* unknown.

Type specimen: *Heyne s.n.* in BO (?).

Vernacular name: ketiau.

Distribution: Borneo.

Indonesian Borneo, Sampit: *Heyne s.n.* (BO†), incompl. fl.

Remark. The description given above is derived from Lam's Latin diagnosis and the accompanying figure since I have not seen any material of this species.

63. *M. penangiana* (King & Gamble) H. J. Lam, l. c. 1925, 168; Ridley, Fl. Mal. Pen. 5, 1925, Suppl., 319; Lam, l. c. 1927, 449 — *Bassia penangiana* King & Gamble, Journ. As. Soc. Beng. 74, 2, Extra 17, 1905, 188; Ridley, Fl. Mal. Pen. 2, 1923, 269.

Trees up to 16 m high. Branchlets slender, terete, 2—4 mm in diam., sparsely ferruginously puberulous but soon glabrous; terminal cone up to 6 mm long, puberulous; stipules lanceolate, up to 2 by 0.7 mm, acute, puberulous on the outside, glabrous on the inside, caducous. *Leaves* scattered, narrowly elliptic to lanceolate or ovate-lanceolate, 11—27 by 3—8 cm, gradually or subabruptly narrowed towards apex and obtuse or obtusely acuminate, base narrowly cuneate, decurrent along the sides of the petioles; chartaceous, glabrous; midrib impressed above and narrowly crested as well, stoutly prominent and rounded below, secondary nerves slender, 10—14 pairs, ascending at an angle of 50°—60°, curved, diminishing until inconspicuous near margin but the apical nerves sometimes archingly joined, prominulous above, prominent below, tertiary nerves slender, transverse but the reticulate nervation between these nerves often obscuring this fact. Petioles 2—4.5 cm long, grooved above and narrowly crested as well, rounded below, thickened in the basal part and there sometimes rugose on the underside, glabrous. *Flowers* in fascicles of 5—8 in the axils of the leaves, pedicels angular, 8—11 mm long, in fruit slightly longer and thicker, thickened towards apex, sparsely ferruginously sericeous. *Sepals* oblong-ovate, c. 4.5 by 3.5—4.5 mm, obtusely acuminate, ferruginously sericeous mixed with darker hairs on the outside, glabrous on the inside, inner sepals slightly shorter and with membranous, glabrous and fimbriate margins. *Corolla* 8-lobed, narrowly tubular, 7—8 mm long, on outside ferruginously sericeous on the tube, on inside ferruginously woolly between the stamens, oblong-spatulate, 3.5—4.5 by c. 1.5 mm, obtuse. *Stamens* 13—18, in two indistinct whorls, 2.5—3 mm long, filaments subulate, c. 1 mm long, sparsely whitish puberulous, anthers oblong-ovoid, c. 1.5 mm long, acuminate at apex, dehiscing laterally, sparsely ferruginously villose. *Ovary* conoid, 8—11-celled, glabrous, at apex gradually passing into the 9—12 mm long, filiform, glabrous style. *Fruits* known young only, ovoid-ellipsoid, 10—13 by 5—7 mm, rounded at apex, narrowed at base, glabrous, one-seeded, seeds known very immature only.

Type specimen: *Curtis 1450* in SING.

Vernacular names: benku (Penang).

Distribution: Malaya.

MALAYA. Penang, Penaru Bukit: *Curtis 1450* (K, SING), fl. March; Sungei Ujong: *Bidley s.n.* (BM), fl.; Mac Pherson Rd to the Cray Hotel: *Haniff s.n.* (BM, K), fl. March; Penang Hill, alt. 400 m: *Kiah 35354* (K, KEP, SING), juv. fr. May; Tanjung Tokong: *Haniff 21123* (BM, L, SING), tree 10—13 m, fl. Febr.; Waterfall: *Haniff & Nur 3405* (K, SING), tree 10—16 m, fl. April — P a h a n g, Bukit Susop: *Jaamat 16528* (KEP, SING), fl. buds Febr. — J o h o r e, Bukit Tinjau: *Ngadiman SF 36934* (SING), tree 3 m, juv. fr. Aug.

Remark. As is already stated by Lam, 1925, the throat is not glabrous as described by King & Gamble. Contrary to Lam, however, and in agreement with the original authors of the species the corolla on the outside has a pubescence on the tube.

64. *M. mirandae* (Merrill) Merrill, Enum. Phil. Fl. Pl. 3, 3, 1923, 277; Lam, l. c. 1925, 174; Lam, l. c. 1927, 460 — *Bassia mirandae* Merrill, Phil. J. Sc., Bot. 13, 1918, 324.

Trees c. 18 m high. Branchlets angular, 5—8 mm in diam., glabrous; terminal cone up to 9 mm long; stipules lanceolate, up to 6 by 2 mm, acute, glabrous, caducous. *Leaves* oblong-obovate, 16—26 by 5.5—9.5 cm, rounded, obtuse or indistinctly obtusely acuminate at apex, cuneate at base; coriaceous, entirely glabrous; midrib broadly, shallowly impressed and narrowly crested as well, prominent and rounded below, secondary nerves 12—15 pairs, ascending at an angle of c. 50°, curved, diminishing until inconspicuous near margin, prominulous above, prominent below, tertiary nerves reticulate with some straight or irregularly shaped transverse nerves, prominulous above, prominent below. Petioles 2—3.5 cm long, flat above, rounded below, glabrous. *Flowers* unknown. *Fruits* (not seen by me) immature, ovoid-ellipsoid, c. 3 by 2 cm, apiculate, glabrous, one-seeded. *Sepals* in fruit broadly ovate, 5 mm long, the outer ones up to 8 mm broad, obtuse or rounded, entirely glabrous.

Type specimen: *Miranda 24161* in PNH.

Lectotype specimen: *Miranda 24161* in K.

Distribution: Mindanao.

Distr. of Zamboanga, Mt Kaladis, alt. c. 100 m, on forested ridges: *Miranda 24161* (K), June/July.

Remark. Since the type specimen is destroyed a new one had to be chosen.

65. *M. kerrii* Fletcher, Kew Bull. 1937, 377 — Fig. 19.

Tree up to 6 m. Branchlets angular, 2.5—3.5 mm in diam., greyish puberulous at apex but very soon glabrous; terminal cone up to 2.5 mm long, puberulous; stipules lanceolate, up to 2 by 1 mm, acute, pubescent on outside, glabrous on inside, soon caducous. *Leaves* scattered to sub-conferted at tip of branchlets, elliptic, obovate or spatulate, 4—10 by 2—5 cm, rounded, and sometimes retuse at apex, broadly cuneate and shortly decurrent along sides of petiole, subcoriaceous or chartaceous, entirely glabrous; midrib narrowly crested above, sometimes grooved, prominent and rounded below, secondary nerves 9—12 pairs, ascending at an angle of

45°—50°, curved, irregularly archingly joined by thickened tertiary nerves, grooved or slightly prominent above, prominent below, tertiary nerves slender, irregularly transverse, but the nerves reticulately connected, grooved to very inconspicuous above, distinct below. Petioles 4—12 mm

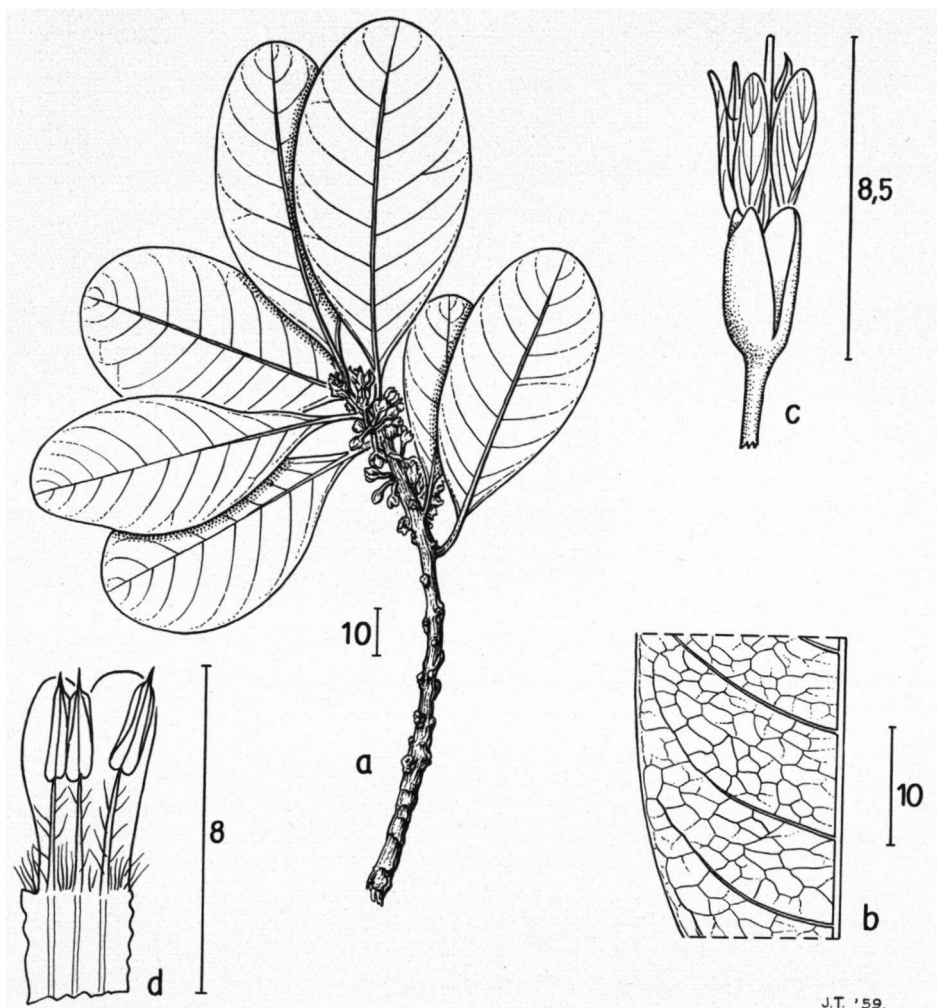


Fig. 19. *M. kerrii*, a. branchlet with leaves and flowers, b. part of leaf showing tertiary nervation, c. flower, d. part of corolla, inside, pubescence of anthers left out. (Kerr 8317).

long, flat or narrowly crested above, rounded below, glabrous. *Flowers* in 3—6-flowered clusters in the axils of the apical leaves or their scars, pedicels angular, (3—)6—12 mm long, greyish and ferruginously sericeous-tomentose. *Sepals* elliptic-ovate, 5—6 by c. 3 mm, obtuse, brown-tomentose on outside, glabrous on inside but sometimes puberulous along the apical

margin, inner sepals more elliptic than outer ones, slightly crested, with membranous, glabrous, fimbriate margins. *Corolla* 8-lobed, 6—8 mm long, glabrous on the outside, pale brown woolly between the stamens, lobes oblong or obovate, 4—5 by c. 2 mm, obtuse. *Stamens* 14—16, in two indistinct whorls or in one only, 5—6 mm long, filaments filiform, 3.5—4.5 mm long, sparsely yellowish woolly, anthers oblong-ovoid, c. 2 mm long, acutely acuminate, glabrous. *Ovary* ovoid, 6—8-celled, c. 1 by 1 mm, ferruginously hirsute, style filiform, 6.5—9 mm long, glabrous. *Fruits* unknown.

Type specimen: *Kerr 8317* in K.

Distribution: Siam.

Surin, Songka, alt. c. 100 m, open deciduous forest: *Kerr 8317* (BM, K), tree c. 3 m, fl. white, fragrant, Jan.; ibidem, light evergreen forest: *Kerr 8261* (BM, K), tree c. 6 m, fl. Jan.

Remark. According to Fletcher the petiole is sometimes 'longo puberulo' but I cannot confirm this, even not in the type specimen.

66. *M. lobbii* (Clarke) H. J. Lam, l. c. 1925, 265; l. c. 1927, 463

*Bassia lobbii* Clarke in Hooker, Fl. Br. Ind. 3, 1882, 546 — Fig. 20.

Trees? Branchlets slender, angular, 1.5—3 mm in diam., pale ferruginously tomentose, but soon becoming glabrous; terminal cone up to 3 mm long; stipules lanceolate, up to 2 by 0.5 mm, acute, puberulous on outside, glabrous on inside, caducous. *Leaves* subconferted at tip of branchlets, obovate, elliptic-obovate or elliptic, 6.5—9.5 by 3—4.5 cm, obtusely or acutely acuminate at apex and sometimes mucronulate, base cuneate, decurrent along upper side of petiole; chartaceous, glabrous; midrib grooved above, prominent and rounded below, secondary nerves 9—11 pairs, ascending at an angle of c. 50°, straight or curved, archingly joined, prominulous above, prominent below, tertiary nerves reticulate with an occasional, irregular transverse one, sometimes with an irregular, flexuose nerve parallel to the secondary nerves, prominulous but distinct on either side. Petioles 12—20 mm long, narrowly grooved above, rounded below, sparsely greyish puberulous in the basal part but ultimately glabrous. *Flowers* in 2—4-flowered, axillary clusters in the apical part of the branchlet, pedicel slender, angular, 2.5—3.5 cm long, greyish tomentose. *Sepals* ovate, 6—7 by 2.5—3.5 mm, obtuse, the inner sepals more oblong, greyish puberulous on the outside, ferruginously puberulous on inside in the apical part only, inner sepals with glabrous, membranous, fimbriate margin, outer sepals recurved when older. *Corolla* 10—12-lobed, 5—6 mm long, glabrous on the outside, ferruginously woolly on inside, lobes ovate-lanceolate or lanceolate, c. 5 by 1.5 mm, obtuse, recurved. *Stamens* c. 18, in 2 indistinct whorls, 4—4.5 mm long, filaments subulate, 1—1.5 mm long, ferruginously woolly, anthers oblong, c. 4 mm long, connective acutely prolonged, ferruginously woolly on one side of the connective only. *Ovary* ovoid, c. 1.5 by 3 mm, 8- or 9-celled, glabrous, style filiform, up to 15 mm long, glabrous. *Fruits* unknown.

Type specimen: *Lobb s.n.* in K.

Distribution: Burma.

Moulmein, banks of the Atrau river: *Lobb s.n.* (K), fl.

67. *M. punctata* Fletcher, Kew Bull. 1937, 378.

Tree c. 7 m high. Branchlets stout, 5—8 mm in diam., pale brownish

and yellowish tomentose, glabrescent; terminal cone up to 4 mm long, woolly-tomentose; stipules lanceolate, up to 2 by 1 mm, acute, woolly on the outside, glabrous on inside, caducous. *Leaves* scattered to subconferted at tip of branchlets, spatulate-obovate or obovate, 10–15 by 5–8 cm, rounded and retuse at apex, cuneate at base, decurrent along upper side of petiole; coriaceous, glabrous above except sometimes along the midrib pale yellowish brown woolly, sparsely yellowish brown woolly below but slightly more so along midrib; midrib grooved above and with 2 longitudinal crests, pro-

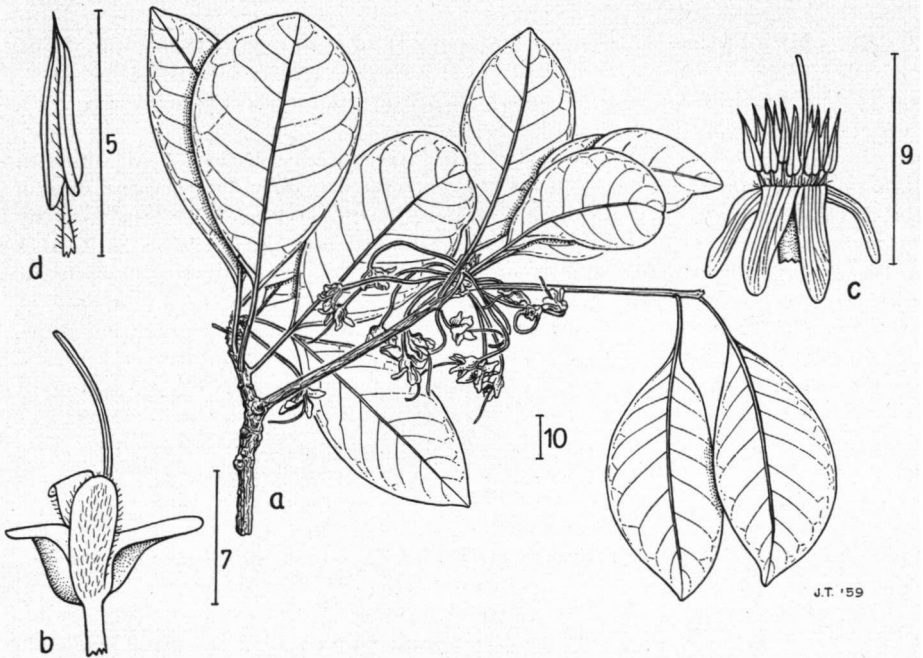


Fig. 20. *M. lobbi*, a. branchlet with leaves and flowers, b. calyx, c. corolla, d. stamen. (Lobb s.n.).

minent and rounded below, secondary nerves 14–17 pairs, ascending at an angle of c.  $70^\circ$ , straight or slightly curved, diminishing until inconspicuous near margin, prominulous above, prominent below, tertiary nerves reticulate, sometimes one nerve more developed, parallel to the secondary nerves, starting from midrib but not reaching the margin. Petioles 2.5–3.5 cm long, grooved above, rounded below, pale yellowish brown woolly. *Flowers* in 3–7-flowered, clusters in the apical axils of leaves and their scars, pedicels angular, 1.5–3.2 cm, pale yellowish brown woolly. *Sepals* elliptic-lanceolate or ovate, 7.5–9 by 5.5–7 mm, obtuse, pale yellowish brown woolly on outside, darker so on inside except for the basal part, inner sepals crested on outside, more elliptic than outer ones, with membranous, fimbriate margins and inside glabrous near base only. *Corolla* 8–10-lobed, 10–11 mm long, entirely glabrous except for a very few hairs between the stamens and for the dark brown pubescence on the outside of the outermost petal,

lobes ovate-elliptic or elliptic, 5—6 by 2.5—4.5 mm, obtuse or rounded. *Stamens* 28, in two irregular whorls, 5.5—7 mm long, entirely glabrous, filaments lanceolate, 2—3.5 mm long, anthers sagittate, c. 4 mm long, acuminate with a c. 1 mm long mucro, dehiscing extrorsely, with numerous black points. *Ovary* ovoid, c. 1.5 by 2 mm, 10-celled, glabrous, style filiform, 12—14.5 mm long, pale yellowish sericeous in the basal part. *Fruits* unknown.

Type specimen: *Kerr 3153* in K.

Distribution: Siam.

Lampun, alt. 330 m, in deciduous jungle: *Kerr 3153* (BM, K), fl. March.

68. *M. elliptica* (Pierre ex Dubard) H. J. Lam, l. c. 1925, 182; Lam, l. c. 1927, 463 — *Dasyaulus ellipticus* Pierre ex Dubard, Bull. Mus. Hist. Nat. Paris 13, 1907, 458 — *Payena elliptica* (Pierre ex Dubard) Lec., Fl. Gén. Indo-Chine 3, 7, 1930, 913.

Trees, 20—30 m. Branchlets slender, irregularly terete, 2—3.5 mm in diam., ferruginously puberulous at the extreme tip only but becoming soon glabrous; terminal cone up to 3 mm long; stipules lanceolate, up to 2 by 1 mm, acute, puberulous on outside, glabrous on inside, soon caducous. *Leaves* scattered to subconferted at tip of branchlets, obovate-elliptic, obovate or spatulate, 8—10.5 by 3.5—5.5 cm, obtuse or rounded at apex, cuneate at base, decurrent along sides of petioles; coriaceous, glabrous on either side; midrib grooved above and provided with one or two longitudinal crests, prominent and rounded below, secondary nerves 9—13 pairs, ascending at an angle of c. 70°, straight or curved, diminishing until inconspicuous near margin or irregularly archingly joined by thickened tertiary nerves, prominulous to grooved above, prominent below, tertiary nerves widely reticulate with a few, irregularly shaped, transverse nerves, sometimes with one nerve more or less stronger developed and more or less parallel to the secondary nerves, grooved to prominulous above, subprominent below. Petioles 0.8—1.5 cm, flat above, rounded below, thickened in the basal part, glabrous. *Flowers* in 3—6-flowered, axillary clusters, pedicels angular, 9—12 mm long, sparsely ferruginously puberulous, in fruit up to 18 mm long. *Sepals* lanceolate, 4—5 by 2.5—3.5 mm, obtuse, ferruginously puberulous on outside, glabrous on inside, inner sepals with membranous, glabrous and fimbriate margins. *Corolla* 8-lobed, 4—5 mm long, whitish puberulous on outside along the middle-line of the lobes and whitish woolly on inside between the stamens, lobes oblong, c. 2 by 1 mm, obtuse. *Stamens* 16, 2.5—3.5 mm long, filaments subulate, 1—1.5 mm long, whitish woolly, anthers oblong, 1.5—2 mm long, connective c. 0.5 mm acutely prolonged, dehiscing laterally, sparsely whitish woolly. *Ovary* subglobose to cylindrical, c. 2 by 1 mm, 6- or 7-celled, greyish tomentose at base only, style filiform, 5—7 mm long, glabrous. *Fruits* ovoid to fusiform, slightly oblique, 1.8—3.5 by 0.8—1.5 cm, acuminate at apex and provided with the persisting style, one-seeded, pericarp thin, glabrous, seeds obliquely ellipsoid, laterally compressed, 1.5—3.5 by 0.7—1.4 by 0.4—0.8 cm, acutish at either end, testa thin, scar linear, c. 1.5 mm broad; albumen forming a thin layer, cotyledons thick.

Type specimen: *Pierre 6084* in P.

Vernacular name: sra kôm (Viêt language).

Distribution: Indo-China (Cambodia and Cochin-China).

Cochin-China, near Titink: *Pierre 3273 & 6084* (P, resp. K, P), fl.

Cambodia, near Pnom-penh: *Chevalier s.n.* (P), fr.; Mung Treng, Ta Trau north

69. *M. cochinchinensis* (Pierre ex Dubard) H. J. Lam, l. c. 1925, 182, non p. 265; Lam, l. c. 1927, 463; Chevalier, Rev. Bot. Appl. 23, 1943, 149 — *Dasyaulus cochinchinensis* Pierre ex Dubard, Bull. Mus. Hist. Nat. 13, 1907, 458.

Trees up to 35 m. Branchlets subterete, 2.5—4 mm in diam., sparsely whitish puberulous at the utmost tip, otherwise glabrous; terminal cone c. 2.5 mm long, puberulous; stipules lanceolate, c. 1.5 by 1 mm, acute, puberulous on outside, glabrous an inside, soon caducous. *Leaves* subconferted at apex of branchlets, elliptic, 7—11.5 by 1.4—3.4 cm, acutely acuminate (often indistinct) at apex, narrowly cuneate at base, decurrent, subcoriaceous, glabrous on either side; midrib prominulous and rounded, prominent and rounded below, secondary nerves 9—11 pairs, ascending at an angle of 55°—65°, diminishing until inconspicuous near margin but archingly joined in the apical part of leaf, prominent above, hardly visible below, tertiary nerves transverse, prominent above, inconspicuous below. Petioles 1—2.4 cm, grooved above and minutely crested as well, rounded below, glabrous. *Flowers* in 1 or 2, axillary, up to 8-flowered clusters below the leaves, pendulous, pedicels angular, 8—12 mm long, sparsely ferruginously tomentose. Outer *sepals* lanceolate, or lanceolate-ovate, 4—4.5 by 2—3 mm, obtusish, ferruginously tomentose on outside, glabrous on inside, inner sepals ovate, 2.5—3.5 by 2.5—3.5 mm, obtuse, ferruginously tomentose on outside, glabrous on inside and on outside along the margin, fimbriate, thinner than the outer sepals. *Corolla* 5—6.5 mm long, sparsely ferruginously hirsute on outside on tube but soon glabrous, ferruginously woolly on inside between the stamens, lobes 8, lanceolate, 2.5—3 by 0.5—1.5 mm, obtuse. *Stamens* 16, in 2 whorls, 3—5 mm long, filaments subulate, 1.5—2.5 mm long, glabrous, anthers oblong-lanceolate, c. 2.5 mm, connective acutely prolonged, dehiscing laterally, with a few scattered ferruginous hairs. *Ovary* cylindrical-ovoid, c. 0.5 by 0.5 mm, 8-celled, 8-lobed, glabrous, style filiform, semiglobose, 5—7 mm long. *Fruits* unknown.

Type specimen: *Pierre 1806* in P.

Vernacular names: cây viét (Annam), srocum (Kmer).

Distribution: Indo-China (Phu-Quoc Island).

Phu-Quoc Island, without known loc.: *Pierre 1806* (BM, L, P), fl.; ibidem: *Pierre 3268, 3269* (BM, K, L, P).

Remark. *Pierre 3268* is a specimen attacked by fungi and has abnormal flowers.

70. *M. tubulosa* H. J. Lam, l. c. 1927, 456, f. 23.

Trees up to 6 m. Branchlets slender, greyish when dry, 1.5—3 mm in diam., greyish brown tomentose but soon glabrous; terminal cone up to 3 mm long, puberulous; stipules minute, lanceolate, c. 1 by 0.5 mm, acute, puberulous without, glabrous within, soon caducous. *Leaves* scattered, elliptic or elliptic-obovate, 3.8—12 by 2.2—5.7 cm, obtusely acuminate at apex, cuneate at base, decurrent along upper side of petioles; chartaceous

of subcoriaceous, glabrous; midrib flat or narrowly crested above, prominent and rounded below, secondary nerves slender, 8—10(—14) pairs, ascending at an angle of 45°—55°, curved or straight and curved at their tips only, irregularly archingly joined or diminishing until inconspicuous near margin and connected by thickened tertiary nerves, distinct but prominulous on either side, tertiary nerves slender, sparse, transverse but the nerves loosely reticulate, prominulous on either side. Petioles 5—15 mm long, narrowly grooved above in the apical part, thickened and rugulose in the basal part, rounded below, glabrous. *Flowers* 1 or 2 in the axils of leaves or their scars, pedicels angular, slender, 12—25 mm long, sparsely ferruginously puberulous-sericeous. *Sepals* ovate or elliptic-ovate, 5—6.5 by 4—5 mm, slightly larger in fruit, subacute, sparsely greyish puberulous without, glabrous on the inside, inner sepals crested, with membranous, glabrous and fimbriate margins and at apex with a plumule of darker hairs. *Corolla* 6—10 mm long, ferruginously greyish sericeous on the outside except on the tube and the extreme tip of the lobes, ferruginously woolly within between the stamens, lobes 6—8, oblong-obovate, 3.5—6 by 1.5—2 mm, acute or obtuse at apex. *Stamens* 12—14, in 2 indistinct whorls, 3.5—5 mm long, filaments subulate, c. 1 mm long, pale ferruginously villose, anthers oblong, c. 2—2.5 mm long, connective prolonged and obtuse or acute, pale ferruginously sericeous-villose and the apex slightly denser so, dehiscing laterally. *Ovary* conoid, c. 1.5 by 1 mm, 7- or 8-celled, at base surrounded by an annular, lobed disk, glabrous, style filiform, 4—7 mm long, ribbed, glabrous. *Fruits* ellipsoid or ovoid, 1.5—2.5 by 1—1.5 cm, obtuse or rounded and with a short remnant of the style at apex, 1-seeded, pericarp fleshy, glabrous, seeds incompletely known, scar linear, up to 5 mm broad.

Type specimen: *Hashim (Foxworthy) CF 1184* in SING.

Vernacular name: sundik (Johore).

Distribution: Malaya (Johore, Trengganu).

Johore. Buyabong: *Hashim (Foxworthy) CF 1184* (KEP, SING), fl. May; Panti: *Bain 5998* (KEP), fr. July.

Trengganu. Without known loc.: *Vesterdal 105* (C, SING), fl. Nov./Dec.

Remarks. The type material in the Singapore herbarium is indicated as being collected by Foxworthy but the material in the Kepong herbarium as being collected by Hashim. It is difficult to ascertain the true collector since both collected in the same area.

#### 71. *M. calcicola* van Royen, n. sp. — Fig. 21.

Arbor. Ramuli tenues, ferrugineo-puberuli, glabrescentes; stipulae lanceolatae, acutae, caducae. Folia apice ramulorum subconferta, elliptica vel elliptico-obovata, 7—12.5 × 2.5—4 cm, obtuse, vel rarius subacute acuminata, basi cuneata, glabra; nervi secundarii utroque latere 10—13, anastomosantes, tertiarii reticulati. Petiolus 1.5—2.5 cm longus, glaber. Pedicellus 2.5—3 cm longus, cinereo-puberulus. Sepala 4, 5 vel 6, ovata, utrinque puberula. Corolla 9- vel 10-lobata, extus glabra, fauce ferrugineo-lanata. Stamina 21—26; filamenta ferrugineo-lanata; antherae glabrae. Ovarium ovoideum, 9-loculare, glabrum; stylus glaber. Fructus ignotus. Typus: Corner s.n. in SING.

Trees. Branchlets slender, 2—3 mm in diam., ferruginously puberulous but soon glabrous; terminal cone up to 3 mm long, puberulous; stipules lanceolate, up to 2 by 1 mm, pubescent on outside, glabrous on inside, soon caducous. *Leaves* subconferted at tip of branchlets, elliptic or elliptic-



obovate, 7—12.5 by 2.5—4 cm, obtusely, rarely subacutely acuminate at apex, cuneate at base, decurrent along sides of petiole; coriaceous, glabrous on either side; midrib impressed above, prominent and rounded below,

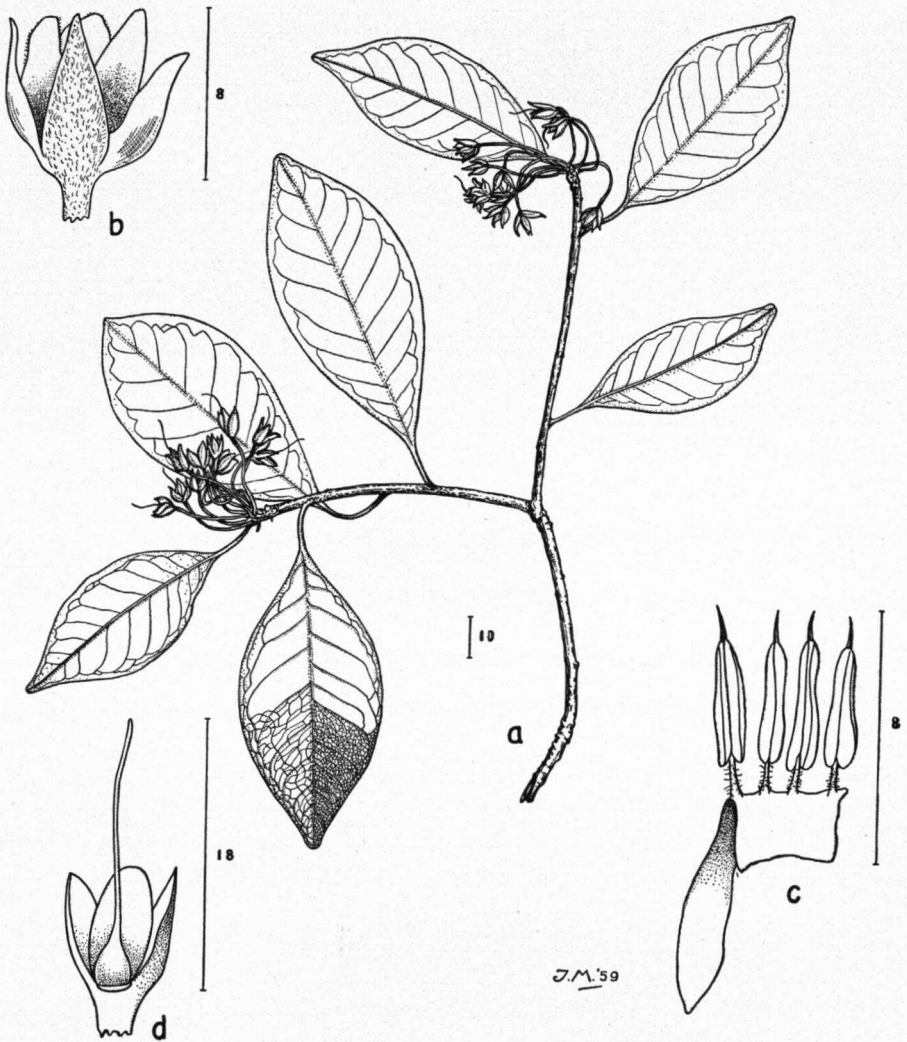


Fig. 21. *M. calciola*, a. branchlet with leaves and flowers, b. flower, c. part of corolla, inside, d. part of calyx with gynaecium. (Corner s.n.).

secondary nerves 10—13 pairs, ascending at an angle of c. 50°, straight, but curved at their tips and archingly joined, inconspicuous above, prominent below, tertiary nerves reticulate, inconspicuous above, prominent below. Petioles 1.5—2.5 cm long, flat above, rounded below, glabrous. *Flowers* in a terminal cluster, pedicels slender, filiform, 2.5—3 cm long,

greyish puberulous. *Sepals* 4, 5, or 6, ovate, 6—8 by 3.5—5 mm, subacute, greyish puberulous on outside but the inner ones more yellowish puberulous, all sepals ferruginously puberulous on inside over the entire surface. *Corolla* 8—11 mm long, 9- or 10-lobed, glabrous on outside, ferruginously woolly on inside between the stamens, otherwise glabrous, lobes obovate-spatulate, 6.5—9 by 2—3 mm, acute. *Stamens* 21—26, 5.5—6.5 mm long, filaments subulate, 1.5—2 mm long, ferruginously woolly, anthers oblong, 4—5 mm long, connective prolonged and acute, dehiscing laterally, glabrous. *Ovary* ovoid, c. 2 by 2 mm, 9-celled, glabrous; style filiform, 1.5—2 cm long, glabrous. *Fruits* unknown.

Type specimen: *Corner s.n.* in SING.

Distribution: Malaya (Kedah).

Kedah, Langbani, Pasek Dajang Bunting, on limestone: *Corner s.n.* (SING), tree fl. Nov.

Remarks. Since most of the flowers are 4-merous this species is inserted in *Madhuca* though the variability in sepals, corolla-lobes and stamens brings it entirely within the delimitation of the genus *Diploknema*. The reticulate tertiary nervation, however, excludes it from that genus. This species resembles very much *Palaquium ridleyi* in its leaves. In the genus *Madhuca*, however, it occupies a rather isolated place by the dense reticulate nervation. It is related to *M. firma* but differs in the larger number of stamens and the longer pedicels.

The specific epithet is derived from the limestone on which this tree was found growing.

72. *M. neriifolia* (Moon) H. J. Lam, l. c. 1925, 182, 265, p.p. (*M. microphylla pro parte alteriora*); Lam, l. c. 1927, 462 — *Bassia neriifolia* Moon, Cat. Pl. Ceylon, 1824, 36; Beddome, For. Man., 1870, 140 — *Dasyaulus neriifolius* (Moon) Thwaites, Enum. Pl. Zeyl., 1824, 36 — *B. malabarica* Beddome, l. c., 140 — *Illipe malabarica* (Bedd.) Engler, Bot. Jahrb. 12, 1890, 509 — *D. malabaricus* (Bedd.) Pierre ex Dubard, Rev. Gén. Bot. 22, 1908, 200 — *Payena malabarica* (Bedd.) Pierre ex Dubard, l. c., 200 — *M. malabarica* (Bedd.) R. N. Parker, Indian Forester 57, 1931, 489 — *Payena insignis* Radlkofer, *in sched.*

Small trees. Branchlets angular, 2—4 mm in diam., ferruginously or greyish sericeous-tomentose, soon glabrous; terminal cone up to 1 cm long, tomentose; stipules linear, up to 7 by 1 mm, acute, tomentose on outside, glabrous on inside, rather long persistent but ultimately caducous. *Leaves* scattered, narrowly lanceolate-elliptic to elliptic, sometimes spatulate, 5—13(—21) by 1.5—2(—4) cm, obtuse at apex, narrowly cuneate at base, decurrent; thin-coriaceous, entirely glabrous; midrib prominulous and angular above, prominent and rounded below; secondary nerves slender, 15—20 pairs, ascending at an angle of c. 50°, straight but curved at their tips, archingly joined, with a distinct nervation outside the arches, tertiary nervation widely reticulate. Petioles 0.4—1.4 cm, flat above, rounded below, glabrous, sometimes rugulose below. *Flowers* in 2—4-flowered clusters or solitary, pedicels angular, 2—2.5 cm long, gradually thickened towards apex, glabrous. *Sepals* ovate, 8.5—9.7 by 5—6 mm, outer ones indistinctly obtusely acuminate, inner ones obtuse, outer ones sparsely whitish or

brownish tomentose on outside, inner ones sericeous except along the membranous, glabrous, fimbriate margin, all sepals glabrous on inside. *Corolla* c. 17 mm long, ferruginously tomentose on outside of the tube and along middle-line of the lobes, densely woolly on inside between the stamens and less so in the tube, lobes 8, ovate-oblong, c. 8 by 3.5 mm, obtuse, narrowed at base. *Stamens* 16, in 2 indistinct whorls or in one only, 4—5 mm long, filaments subulate, c. 1 mm long, yellowish hirsute, anthers sagittiform, c. 3 mm long, with a c. 1 mm long acumen which abruptly broadens into tip of anther, glabrous. *Ovary* ovoid, c. 1.5 by 2 mm, 8-celled, glabrous, style filiform, c. 2.5 cm long, glabrous. *Fruits* known immature only, ovoid, c. 2.5 by 0.8 cm, attenuate in the apical part and with a long remnant of the style, glabrous, one-seeded, seeds incompletely known.

Type specimen: *Thwaites 235* in BM.

Vernacular name: gam-mi (Ceylon).

Distribution: Ceylon and India.

CEYLON. Kalugammane river side, alt. 800 m: *Silva 44* (BM, K), fr. May; Ratnapoora: *Thwaites 235* (BM, G, K, L), fl. & fr.: without known loc.: *Macrae 346* (BM), fl.; ibidem: *Walker s.n.* (K), fl.

INDIA. South Canara, Anamallay Hills, 1000 m: *Beddome 253* (K); ibidem: *Beddome 4876, 4877* (B), fl.; ibidem, Donemulla: *Talbot 248* (K), fl. Dec.; without known loc.: *Stocks s.n.* (K), juv. fr.; Mangalore: *Wight 1744, 1745, 1748* (K), fl. & juv. fr.; Bombay, Nkassara distr., Nilkund: *Talbot 3502* (K) fl. Dec.; ibidem: *Dalzell s.n.* (K), juv. fr.; Madras, Wyroad: *Lawson s.n.* (K), fl.

73. *M. moonii* (Thwaites) H. J. Lam, l. c. 1925, 182; Lam l. c. 1927, 462 — *Dasyaulus moonii* Thwaites, Enum. Pl. Zeyl., 1864, 176; Dubard, Rev. Gen. Not. 20, 1908, 200 — *Bassia moonii* (Thwaites) Beddome, For. Man., 1869, 140.

No reliable material nor the type specimen of this species could be traced and therefore only the original description is given below:

*D. (asyaulus) moonii* Thw.; folii coriaceis, oblongis, acuminatis, basi rotundatis, superne glabris, costa petioloque canaliculatis, subtus sparse pilosulis; calyce fere ad medium 5-partito; lobis triangularibus acutis; ovario 10-loculari; nuculanis sphaericis, subglabris.

Arbor mediocris. Ramuli teretes, pilosuli, cito glabri, cortice fisso, nigro-cinerascente. Folia 5—12 poll. longa, 1½—4 poll. lata, petiole 3 lin. longo. Inflorescentia axillaris, et quoque in axilis foliorum delapsorum, fulvo-pilosa. Masc. Capitulo 6—10-flora. Calyx 2 lin. longus. Corolla circiter 4 lin. longa. Flor. fem. 1—2-ni. Calyx crassus, 3 lin. longus, margine revoluto. Corolla calyce subaequilonga. Stigma obscure 5-lobum. Nuculania sesquipollicaria, 6—10-sperma, calyce aucto suffulta. Semina oblonga, compressa, transverse rugosa, nigrescentia, 7 lin. longa, 4 lin. lata, albumine ruminato.

Type specimen: *Thwaites 2833* in ?

Distribution: Ceylon.

CEYLON. Galle: *Pierre 3265* (P), tree, March, doubtful specimen.

74. *M. utilis* (Ridley) H. J. Lam in Heyne, Nutt. Pl. Ned. Ind., ed. 2, 1927, 1231; Lam, l. c. 1927, 460, f. 25 — *Payena utilis* Ridley, Journ. As. Soc. Straits, Branch. nr. 79, Sept. 1918, 94; Ridley, Fl. Mal. Pen. 2, 1923, 265; Lam, l. c. 1925, 150 — *M. stenophylla* H. J. Lam, l. c. 1925, 179, f. 50; Ridley, Fl. Mal. Pen. 5, 1925, Suppl. 342.

Trees up to 40 m. Branchlets slender, 2.5—4 mm in diam., ferruginously tomentose but very soon glabrous; terminal cone up to 2 mm long, tomentose; stipules linear, up to 3 by 1 mm, acute, ferruginously sericeous-tomentose on the outside, glabrous on the inside, soon caducous. *Leaves* conferted at apex of short flushes, obovate or spatulate, 5—8(—18) by 1.7—3.5(—5.7) cm, obtuse, sometimes acute or acuminate at apex, narrowly cuneate at base and decurrent along sides of petioles; membranous to subchartaceous, glabrous; midrib narrowly crested above, prominent and angular below, secondary nerves slender, 9—12(—15) pairs, ascending at an angle of 55°, irregularly archingly joined near margin, prominulous on either side but slightly more so below, tertiary nerves slender, sparse, transverse with a reticulate nervation in between, prominulous on either side. Petioles slender, 7—20 mm long, flat above and often with two narrow crests, angular below, glabrous. *Flowers* in 2—5-flowered, axillary clusters, conferted at tip of branchlets, pedicels slender, angular, 9—18 mm long, light brown tomentose, in fruit up to 25 mm long and much thicker. *Sepals* elliptic or ovate-elliptic, 5—6.5 by 2—4 mm, obtuse or rounded, pale ferruginous-yellow woolly on the outside and on the inside only near the tip, otherwise glabrous within, all sepals with darker hairs at apex, inner sepals with membranous, fimbriate margins. *Corolla* 7—8 mm long, sparsely whitish woolly on the outside, woolly at the tips of the lobes, glabrous on the inside except for a woolly pubescence between the stamens, lobes 8 or 9, oblong, c. 4 by 1 mm, obtuse. *Stamens* 10—16, c. 7 mm long, filaments filiform, c. 5 mm long, inflexed in the apical part, light ferruginously woolly in the basal part, anthers oblong, 1.5—2 mm long, obtuse (connective not prolonged), dehiscing laterally, glabrous. *Ovary* depressedly globose, c. 1 by 1.5 mm, 8-celled, glabrous, not sharply marked against the stout, 5—7 mm, grooved, glabrous style. *Fruits* ellipsoid or fusiform, 3.5—5.5 by 1.5—2.5 cm, rounded or acuminate at apex, narrowed at base, 1-seeded, pericarp woody or fleshy, glabrous. Seeds ellipsoid, laterally flattened, 3.5 by 1.3—2.2 by 1—1.5 cm, obtuse or rounded on either side, scar greyish,  $\frac{3}{4}$  the length of the seed, covering about  $\frac{1}{3}$  of the surface of the seed; testa thin, brown, albumen membranous, cotyledons thick.

Type specimen: *Hashim CF 477* in K.

Vernacular names: betis, semina, belian (Malaya).

Ecology: In swampy forests or in primary forests at low altitudes.

Distribution: Malaya, Sumatra, Borneo.

**MALAYA.** Malacca, Ayer Hitam Reserve, Kajang: *Somerville 26380* (KEP), tree, fl. Febr. — Johore, Marsing Rd: *Watson 5822* (KEP, SING), tree 33 m, fr. May, type specimen of *M. stenophylla* H. J. Lam; Mawai-Temaluang Rd: *Corner SF 32392* (BM, K, SING), tree, fr. June; Sungai Kayu: *Kiah SF 32019* (BM, SING), fl. Oct.; ibidem: *Corner s.n.* (SING), April — Selangor, Ulu Klang Catchment area: *Hamid & Jaamat 10257* (KEP, L, SING), tree 28 m, fl. May; Bukit Cheraka Reserve: *Strugnell 13017* (KEP, SING), tree 25 m, fr. July; Ulu Selangor: *Hashim CF 477* (K), fr.; ibidem: *Stephens s.n.* (SING), fr. — Pahang, Sawak Res., Ulu Rompin: *Soh 15483* (KEP, SING), tree 40 m, fr. Aug.; Baloh For. Res.: *Arip 17210* (K), fr. July — Perak, Sungkai: *Harun 7408* (KEP, SING), tree, fr. March; without known loc.: *CF 2873* (KEP, SING), tree, fr. Febr.; Ayer Kuning: *Hashim 9* (SING), tree, fl. & juv. fr. Febr. — Kuantan, Menjail Res.: *Lambak CF 2747* (SING), tree, fr. June.

SUMATRA. fide Lam, l. c. 1925, 180.

BORNEO. fide Lam, l. c. 1927, 461, moreover: Kuching: *Hewitt s.n.* (SING), fr.

75. *M. crassipes* (Pierre) H. J. Lam, l. c. 1925, 180; Lam, l. c. 1927, 462 — *Bassia crassipes* Pierre ex Beccari, Nelle For. di Borneo, ed. 1 1902, 580; Merrill, Journ. As. Soc. Straits, Spec. Nr., Sept. 1921, 478 — *Illipe crassipes* (Pierre) Dubard, Bull. Mus. Hist. Nat. 14, 1908, 405 — Fig. 22.

Trees. Branchlets terete, 2.5—7 mm, ferruginously tomentose but almost immediately glabrous; long branchlets alternating with short shoots with numerous scars of leaves and leaves conferted at tip of branchlets, usually these short shoots with 2 or 3 growth-periods; terminal cone up to 7 mm long, ferruginously woolly, stipules linear, up to 4 by 1 mm, obtuse, woolly on outside, glabrous on inside, caducous. *Leaves* spatulate or obovate, 5—10 by 2.5—4 cm, rounded or retuse, sometimes very slightly obtusely acuminate, narrowly cuneate at base, decurrent; coriaceous, glabrous, often glaucous above; midrib prominent and angular on either side, secondary nerves 10—12 pairs, ascending at an angle of 55°—60°, curved, diminishing until inconspicuous near margin and connected by thickened tertiary nerves, rarely indistinctly archingly joined; tertiary nerves reticulate-tessellate with a few transverse nerves. Petioles 1.5—2 cm, angular on either side, sparsely ferruginously woolly or glabrous. *Flowers* fragrant, brownish, at apex of branchlets between the leaves, pedicels angular, 5—7 mm long, ferruginously woolly-tomentose. *Sepals* ovate, 5—6 by 2.5 mm, obtuse, ferruginously tomentose on outside, glabrous on inside, inner ones smaller and on outside with membranous, glabrous, and fimbriate marginal parts. *Corolla* 6—8 mm, ferruginously sericeous on outside except for the margins of the lobes, woolly in the throat between the stamens, lobes 8 or 9, oblong, 3—4 mm by c. 1 mm, obtuse and narrowed at apex, reflexed in anthesis. *Stamens* 17—19, 4.5—5 mm long, filaments filiform, glabrous, anthers oblong, 1.5—2 mm long, glabrous when mature, with long hairs when in bud, connective prolonged, acute. *Ovary* ovoid, 8- or 9-celled, c. 1 by 1 mm, glabrous, style 5—8 mm long, ribbed, with 8 or 9 distinct stigmas at apex. *Fruits* obliquely and laterally compressed, ellipsoid or obovoid-ellipsoid, 4—5.5 by 1.9—3.3 by 1—2 cm, 1-seeded, acute at apex, attenuate at base, pericarp fleshy, glabrous, seeds ellipsoid, laterally compressed, 2.2—3.3 by 1.5—2 by 0.6—0.9 cm, testa thin, reddish brown, scar narrow, albumen thin. Pedicel of fruit stout, 3—3.5 cm long, glabrous.

Type specimen: *Beccari 904* in P.

Vernacular names: djematuk, papungu putih (Borneo).

Distribution: Borneo, Sumatra.

BORNEO. Sarawak, Kuching: *Beccari 904* (FI, L, P), tree, fl. and fr. Oct.; Mattang: *Beccari 2061* (FI, K, L, P), tree, fl. & fr. — Indonesian Borneo, W. Kutai, Long Bleh, alt. 50 m: *NIFS bb 29602* (BO, L, SING), Oct.; Bulungan, 150 m: *NIFS bb 11265* (BO, L), April; Mujup, 60 m: *NIFS bb 16334* (BO, L), April; ibidem: *NIFS bb 16798* (BO, L), tree, April.

SUMATRA. Kuantan, Tjerenti, alt. 50 m: *NIFS bb 25240* (BO, L), Aug.; Kedondong Island: *NIFS bb 24803* (BO, L), tree, June; ibidem: *NIFS bb 24805* (BO, L), June; Indragirian Uplands, Muara Pedjanki, 60 m: *NIFS bb 27470* (BO, L, SING), fl. April; ibidem, Sungei Akar: *NIFS bb 28631* (BO, L), July; ibidem: *Buwalda 6468* (BO, L, PNH, SING); Rokan river: *without coll. s.n.* (H.L.B. 924.343-238), fl. April.

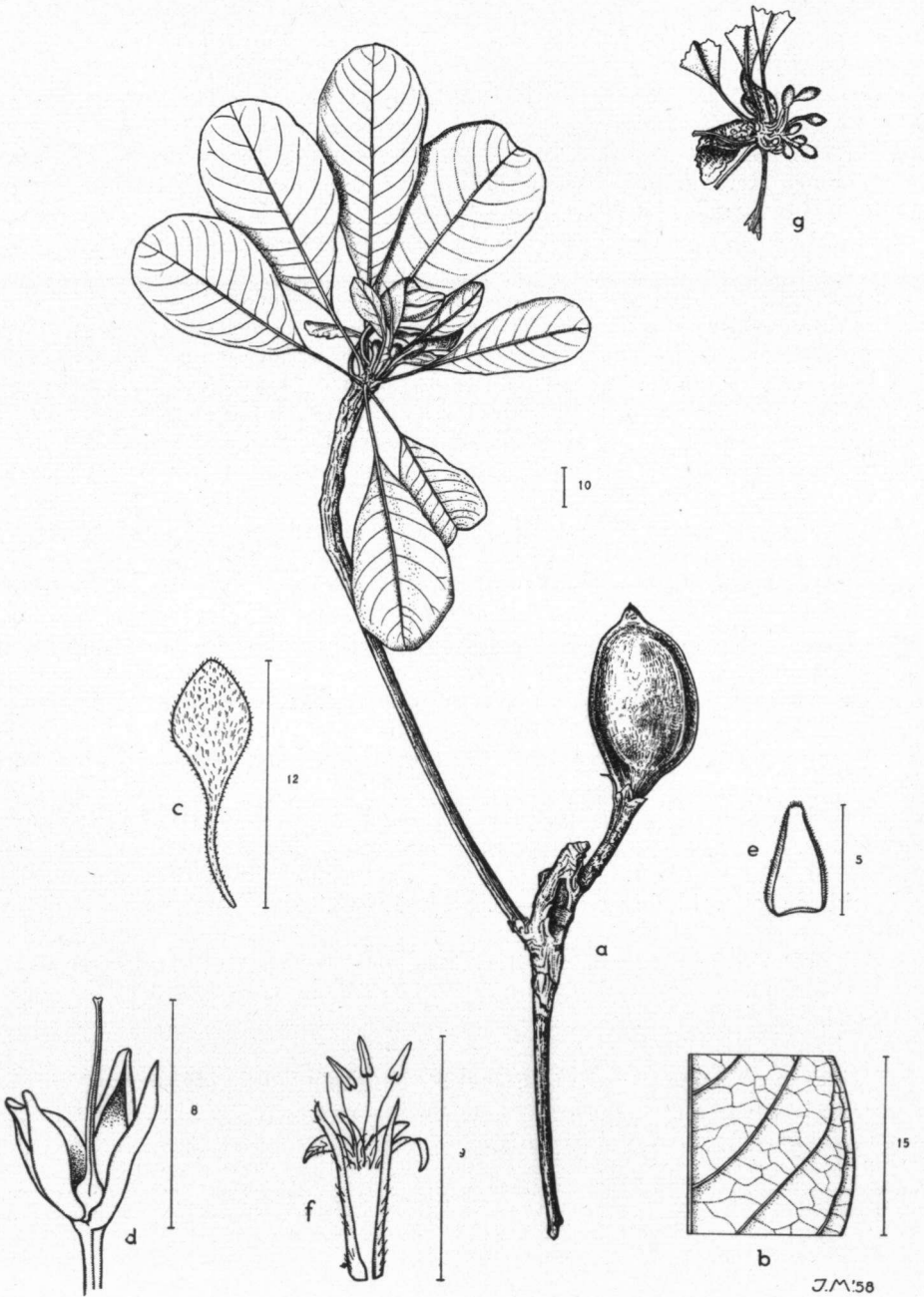


Fig. 22. *M. crassipes*, a. branch with leaves and fruit, b. part of leaf showing tertiary nervation, c. flowerbud, d. calyx and gynaecium, e. sepal, inside, f. part of corolla, inside, g. tip of branchlets, with flowerbuds. (Beccari 904).

76. *M. microphylla* (Hooker) Alston in Trimen, Handb. Fl. Ceyl. 6, Suppl., 1931, 179 — *M. microphylla* (Hooker) Raizada, Indian For. 74, 1948, 335 — *Bassia microphylla* Hooker, Ic. Pl. 1, 1837, t. 74; Beddome, For. Man., 1870, 140; C. B. Clarke in Hooker, Fl. Br. India 3, 1882, 545 — *Dasyaulus microphyllus* (Hooker) Thwaites, Enum. Pl. Zeyl., 1864, 176; Dubard, Rev. Gén. Bot. 20, 1908, 200 — *Bassia parvifolia* DC, Prodr. 8, 1844, 198 — *M. nerifolia* (Moon) H. J. Lam, l. c. 1925, 182, 265, p.p.

Trees. Branchlets slender, 1.5–5 mm in diam., ferruginously puberulous at the extreme tip only; terminal cone up to 2 mm long; stipules lanceolate, up to 1.5 by 0.5 mm, acute, puberulous on outside, glabrous on inside, soon caducous. *Leaves* scattered, spatulate, obovate or oblong-obovate, 1–4.5 by 0.5–2 cm, rounded or obtuse at apex, broadly cuneate to subrotundate at base, decurrent along upper side of petiole; coriaceous, glabrous; midrib narrowly crested above, prominent and rounded below, secondary nerves 4–8 pairs, ascending at an angle of c. 55°, straight or slightly curved, archingly joined, grooved above, prominent below, tertiary nerves slender, widely reticulate, sometimes one nerve stronger but irregularly developed parallel to the secondary nerves, grooved above and inconspicuous, prominulous below. Petioles 3–7 mm long, broadly grooved above and narrowly crested as well, rounded below, glabrous. *Flowers* in 2–4-flowered, axillary clusters or solitary, pedicels angular, 6–8 mm long, very sparsely ferruginously sericeous. *Sepals* elliptic-ovate or ovate, 4–5 by 2–3 mm, obtuse or subacute, outer sepals entirely glabrous, inner sepals densely ferruginously sericeous on the outside, glabrous on the inside, with membranous, glabrous, fimbriate margins. *Corolla* 6-lobed, 4.5–5 mm long, ferruginously hirsute on the outside along alternipetalous lines, on inside ferruginously woolly between the stamens and in the tube, lobes oblong or obovate, 3–3.5 by 1–1.5 mm, obtuse or rounded. *Stamens* 12, 2.5–3 mm long, filaments subulate, c. 0.5 mm long, with long ferruginous hairs, anthers sagittate, c. 2.5 mm long, connective acutely prolonged, dehiscing laterally, glabrous. *Ovary* ovoid, gradually passing into the style, 6-celled, c. 1 by 0.5 mm, glabrous, style filiform, up to 4 mm long, glabrous. *Fruits* unknown.

Type specimen: *Walker s.n.* in K.

Distribution: Ceylon.

Near Galle: *Gardner s.n.* (K), fl.; without known loc.: *Walker s.n.* (K), fl.; ibidem: *Thwaites 2648* (K), fl.

Remarks. Lam in his treatment of the Sapotaceae in 1925 and 1927, united this species with *Bassia nerifolia* Moon to one species, *Madhuca nerifolia* (Moon) H. J. Lam, but this seems to be hardly justified since *Bassia nerifolia* Moon has 5–21 cm long, elliptic leaves with 15–20 pairs of secondary nerves and the pedicels being 2–2.5 cm. Moreover the corolla is c. 17 mm long while in the present species this is only c. 6 mm long.

By the 6 lobes of the corolla, 12 stamens and 6-celled ovary, this species has many details in common with the genus *Palaquium*, but the 4 calyx-lobes exclude it from that genus.

77. *M. thorelii* (Dubard) H. J. Lam, l. c. 1925, 182 — *Dasyaulus thorelii* Dubard, Bull. Mus. Hist. Nat. 13, 1907, 458.

Trees? Branchlets stout. *Leaves* obovate, c. 4.5 by 2 cm, obtuse at

apex, cuneate at base; coriaceous; secondary nerves 6—12 pairs, archingly joined, tertiary nerves reticulate-transverse. Petioles c. 4 mm long. *Flowers* conferted (?); pedicels c. 12 mm long, pubescent. *Sepals* oblong, c. 5 mm long, obtuse, pubescent on outside. *Corolla* and *stamens* unknown. *Ovary* 7-celled, pubescent, style c. 14 mm long, glabrous. *Fruits* unknown.

Type specimen: *Thorel 2755* in P.

Distribution: Cambodia.

Remarks. According to Dubard this species, of which I have been unable to trace the material, shows some details similar to *M. microphylla*.

78. *M. dubardii* H. J. Lam, l. c. 1925, 162, f. 43; Lam, l. c. 1927, 444, f. 18.

Trees c. 16 m tall. Branchlets slender, terete, 2—4 mm in diam., dark ferruginously tomentose, pubescence long persistent but ultimately entirely caducous; terminal cone up to 3 mm long, pubescent, stipules minute, triangular, c. 1 by 0.5 mm, acute, pubescent on outside, glabrous on inside, very soon caducous. *Leaves* scattered, lanceolate, obovate-lanceolate or obovate, 17—28 by 2.2—7 cm, acute or obtusely or acutely acuminate, cuneate at base, the two margins either confluent or decurrent along upper side of petiole; coriaceous, glabrous above but often greyish puberulous-sericeous along midrib, cinnamomously or greyish sericeous below; midrib usually broadly grooved above and narrowly minutely crested as well, prominent and rounded below, secondary nerves 17—25 pairs, ascending at an angle of 70°—80°, straight, slightly curved or rather markedly curved, diminishing until inconspicuous near margin or archingly joined at some distance from the margin, conspicuous on either side, tertiary nerves reticulate, sometimes with a few irregular transverse ones near the arches of the secondary nerves, conspicuous on either side. Petioles 1.4—2.8 cm, thickened and rugose in the basal half, grooved or flat above, rounded below, cinnamomously puberulous-sericeous, sometimes in the basal half only. *Flowers* in fascicles of 2—4, axillary; pedicels angular, 1.6—2.4 cm long, thickened at apex, cinnamomously sericeous. *Sepals* ovate or ovate-rotundate, but the inner ones more orbicular, 6—7 by 4—5 mm, acutish, the inner ones obtuse, cinnamomously sericeous on outside, glabrous on inside, inner ones with glabrous, membranous, fimbriate margins. *Corolla* 8-lobed, 10—12 mm long, ferruginously sericeous on outside except for the marginal parts of the lobes, ferruginously sericeous in the throat and woolly between the stamens, otherwise glabrous on inside, lobes lanceolate or lanceolate-ovate, 4—5 by 1.5—2 mm, obtuse. *Stamens* 16, in 2 whorls, c. 3.5 mm long, filaments subulate, c. 1 mm long, hirsute, anthers sagittate, c. 2.5 mm long, connective prolonged, obtuse, ferruginously hirsute on either side. *Ovary* 8—11-celled, ovoid, c. 2 by 1.5 mm, ferruginously hirsute, style filiform, c. 8 mm long, glabrous. *Fruits* oblong or ellipsoid, 2.3—3 by 1.2—1.5 cm, 1-seeded, short obtusely acuminate at apex, narrowed at base, pericarp fleshy, thin, ferruginously sericeous, seeds ellipsoid, slightly laterally compressed, c. 1.5 by 0.8 by 0.6 cm, brown, scar narrow, c. 2 mm broad, embryo almost exalbuminous. Pedicels thickened at apex and sepals up to 9 by 5 mm enlarged.

Type specimen: *Agama 538* in BO.



Ecology: A species of low lying areas.

Distribution: Malaya, Sumatra, Borneo.

Var. *dubardii* — *M. dubardii* H. J. Lam, var. *typica* H. J. Lam, l. c. 1927, 445, f. 18, right hand drawing.

Leaves obovate or obovate-lanceolate, 3.1—5.9 cm broad, apex obtusely or acutely acuminate, secondary nerves diminishing until inconspicuous near margin or archingly joined.

Type specimen: *Agama 538* in BO.

Vernacular names: taban mangis, manatu, getah hilang (Malaya).

Distribution: Borneo, Malaya.

BORNEO. Sarawak, Suan Lamba river: *Agama 538* (BO, K), tree 9 m, fr. Aug. — Sandakan, Kinabatangan, Supu Forest Res.: *Puasa 48850* (KEP), fl. buds Oct.; ibidem: *Puasa BNB For. Res. 10076* (K, L), tree 6 m, fl. Oct.; ibidem, Kori Timber Camp: *Cuadra A 2148* (KEP, SING), tree, fl. Oct.; Kalibi Forest Res.: *Puasa 49004* (KEP), tree 10 m, Dec.

MALAYA. Selangor, Bukit Tunggul For. Res.: *Strong 11115* (BM, BO, K, KEP, L, SING), tree, fl. March; ibidem: *Strugnell 11116* (BM, BO, K, KEP, SING), tree 16 m, fl. March; Ampang For. Res.: *Symington 20200* (KEP, SING), tree 13 m, fr. July. — Pahang, Raub: *Strugnell 20203* (BO, K, KEP, SING), tree, fr. Febr. — Negri Sembilan, Serembang: *Kinsey 9524* (KEP), Oct. — Penang, Penang Island, Batu Ferengy: *Paul s.n.* (SING), May.

Var. *lanceolata* H. J. Lam, l. c. 1927, 446, f. 18, left hand drawing  
Leaves lanceolate, 2.2—3 cm broad, acute at apex, secondary nerves archingly joined.

Type specimen: *Abdul Rachman 10527* in SING.

Vernacular names: jantan taban, mentua taban (Malaya), balam tembago (Sumatra).

Distribution: Malaya, Sumatra.

MALAYA. Selangor, Ayer Hitam Res.: *Abdul Rachman 10527* (KEP, SING), tree, fl. Oct.; Sungai Lelang: *Symington 24097* (SING), tree, fl. March; Catchment Area, Ampang: *Hamid 9981* (KEP, SING), tree 16 m, Febr.

SUMATRA. West Coast, Painan near Barung and Balantai: *NIFS SWK/I-14* and *36* (BO, L), tree, fr. Oct.

79. *M. oblongifolia* (Merrill) Merrill, Enum. Phil. Fl. Pl. 3, 3, 1923, 277; Lam, l. c. 1925, 166; Lam, l. c. 1927, 447 — *Bassia oblongifolia* Merrill, Phil. J. Sc. 13, 1918, 323.

Trees up to 18 m. Branchlets stout, terete to angular, 6—12 mm in diam., slightly ferruginously or pale cinnamomously pubescent but soon glabrous, terminal cone up to 7 mm long, pubescent; stipules lanceolate, up to 6.5 by 2.5 mm, acute, ferruginously puberulous on outside at base only, glabrous on inside, persisting for some time but ultimately caducous. Leaves subconferted at tip of branchlets, oblong to narrowly elliptic, 15—21 by 4—7 cm, indistinctly obtusely acuminate at apex, cuneate at base and decurrent along upper surface of petiole; coriaceous, glabrous above, pale ferruginously appressed tomentose below; midrib impressed above and narrowly crested as well, prominent and rounded below, secondary nerves slender, 22—30 pairs, ascending at an angle of c. 60°, straight or curved, irregularly archingly joined, prominulous above, more prominent below, tertiary nervation widely reticulate with a few, irregular transverse nerves and with one nerve more distinctly developed parallel to the secondary

nerves and reaching the arches. Petioles 2.5—5 cm long, grooved above in the apical half, otherwise flat, rounded below, ultimately glabrous. *Flowers* 2—5 together in axillary clusters, pedicels angular, 2—2.5 cm long, thickened towards apex, ferruginously sericeous. *Sepals* broadly ovate, 7—11 by 7—10 mm, subacuminate, densely ferruginously sericeous on the outside, glabrous on the inside, inner sepals fimbriate, crested, with membranous, glabrous, fimbriate margins but otherwise similar to the outer sepals. *Corolla* and *stamens* unknown. *Ovary* conoid, c. 2 by 1 mm, 8-celled, glabrous, style subulate, c. 5 mm long, glabrous. *Fruits* known immature only, subglobose, c. 0.9 by 0.7 cm, glabrous, with a short remnant of the style, one-seeded, seeds incompletely known.

Type specimen: *Alambra* FB 27101 in PNH.

Lectotype specimen: *Alambra* FB 27101 in K.

Vernacular name: calcalachuche (Tagalog).

Ecology: In primary forests at low altitudes.

Distribution: Philippines.

LUZON. Camarines prov., Paracale: *Alambra* FB 27101 (K), juv. fr.; Quezon prov., Llavac, Infante: *Lagrimas* 34737 (L, PNH), tree 15 m, juv. fr. Oct.

80. *M. hainanensis* Chun & How, Acta Phyt. Sinica 7, 1, Febr. 1958, 71, pl. 22, 2 — *M. pasquieri* Merr. & Chun in Sunyatsenia 5, 1940, 158 — Fig. 23.

Trees up to 14 m. Branchlets slender, 2—5 mm in diam., ferruginously tomentose when young but soon glabrous; terminal cone up to 3 mm long, tomentose; stipules subulate, up to 3 by 1 mm, tomentose, caducous. *Leaves* subconferted at apex of branchlets, spatulate to oblanceolate, 7—10(—16) by 1.8—2.5(—6) cm, retuse, rounded or short obtusely acuminate at apex, narrowly cuneate at base, decurrent; coriaceous, reddish sericeous tomentose on either side when young, but ultimately entirely glabrous; midrib crested above, prominent and angular below; secondary nerves c. 20 pairs, slender, ascending at an angle of c. 60°, straight, archingly joined, grooved above, prominulous below; tertiary nerves loosely reticulate, inconspicuous above, slightly more distinct below. Petioles 0.8—2.5 cm, flat or grooved above, reddish tomentose. *Flowers* solitary or in fascicles of 2—4, axillary, pedicels stout, angular, 1.5—2.5 cm long, brownish tomentose. *Sepals* ovate-triangular, 6.5—8 by 5.5—6.5 mm, subacute or obtuse, brownish woolly on outside, ferruginously sericeous on inside except for the most basal part, inner sepals only slightly smaller than the outer ones and with a narrow, membranous, glabrous, fimbriate marginal part. *Corolla* c. 10 mm long, entirely glabrous, lobes 8, panduriform, c. 6.5 by 3 mm, acutish. *Stamens* (18—) 27, in 3 indistinct rows, c. 4 mm long, entirely glabrous, filaments filiform, 1.5—2 mm long, very unequal, anthers sagittiform, 2—3 mm long, the acute, prolonged connective passing gradually in the anther cells. *Ovary* ovoid, c. 2 by 3 mm, 6—8-celled, ferruginously sericeous, style filiform, c. 11 mm long, sericeous in the basal half. *Fruits* ovoid to subglobose, 2.5—3 by 2—2.5 cm, at apex with a remnant of the style, 1—5-seeded, seeds ellipsoid, laterally compressed, 2—2.5 by 0.8—1.3 by 0.6—0.8 cm, pointed at base, scar elliptic, albumen none.

Type specimen: *How* 71030 in Hainan.

Distribution: Hainan.

HAINAN. In thin woods: *Wang 34373* (A, NY, S), fl. buds Sept.; Yaichow, in woods: *How 71030* (A, B, NY), tree 14 m, fl. March, white; ibidem: *How & Chun 70151* (A, K, NY) tree 9 m, fr. Febr.

81. *M. coriacea* (Merrill) Merrill, Enum. Phil. Fl. Pl. 3, 3, 1923, 276; Lam, l.c. 1925, 180, 264; Lam, l.c. 1927, 462 — *Illipe coriacea* Merrill, Philip. Gvt Lab. Publ. 17, 1904, 41 — *Bassia coriacea* (Merrill) Merrill, Phil. J. Sc. Bot. 10, 1915, 56.

Trees. Branchlets angular, sometimes irregularly so, 3—4 mm in diam., glabrous; terminal cone up to 3 mm long, glabrous; stipules obliquely lanceolate, c. 2.5 by 1 mm, acute, glabrous, caducous. *Leaves* scattered,

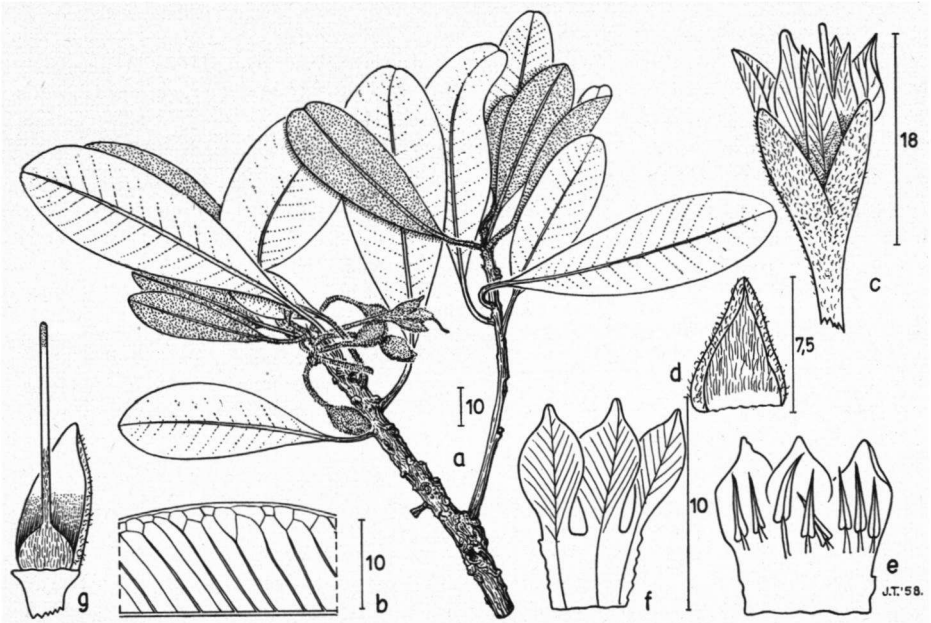


Fig. 23. *M. hainanensis*, a. branchlet with leaves and flowers, b. part of leaf showing tertiary nervation, c. flower, d. outer sepal, inside, e. part of corolla, inside, f. idem, outside, g. part of calyx and gynaecium. (*How 71030*).

oblanceolate, 8—15 by 2.5—4 cm, obtuse or obtusely acuminate at apex, narrowly cuneate at base and decurrent along sides of petioles; coriaceous, entirely glabrous; midrib prominulous above, prominent below, rounded on either side, secondary nerves 13—15 pairs, ascending at an angle of c. 55°, straight, irregular archingly joined, prominulous above, stronger so below. Petioles 1—2 cm long, flat or rounded above, rounded below, glabrous. *Flowers* unknown. *Fruits* solitary, axillary, pedicel stout, c. 2 mm long, slightly thickened at apex, sepals ovate, up to 5 by 5 mm, obtuse, entirely glabrous, the inner sepals slightly thinner than the outer ones, ovary according to the remnants 7-celled. Fruits obovoid, 2—4 by 1.2—1.5 cm, rounded at apex and carrying a stout remnant of the style, one-seeded, pericarp thin and dry, glabrous, seeds obovoid, laterally compressed, 1.8—3 by 1.1—

2 cm, apiculate or rounded at apex, acutish at base, scar linear, c. 2.5 mm broad, endosperm thin, cotyledons thick.

Type specimen: *Merrill 1008* in PNH.

Neotype specimen: *Wenzel 1111* in BM.

Vernacular name: *lisong insik* (Tagalog).

Ecology: In primary forests at low altitudes.

Distribution: Luzon, Samar, Leyte.

LUZON and SAMAR, f. *Merrill 1904, 1923.*

LEYTE, without known loc.: *Wenzel 1111* (BM), fr.

Remark. Since the type specimen has been destroyed a neotype was chosen from the material cited by Merrill in 1923.

82. *M. ? subquincuncialis* (Lam in Meded. Bot. Mus. Herb. Rijksuniv. Utrecht 65, 1939, 514, *nomen nudum*) H. J. Lam & D. A. Kerpel, *Blumea* 3, 1939, 255, f. 1, *descr.*; Chun & How, *Acta Phyt. Sinica* 7, 1, Febr. 1958, 73 — *M. tsangii* Li, *Journ. Arn. Arb.* 24, 1943, 368.

Trees up to 15 m. Branchlets slender, angular, 2—4 mm in diam., ferruginously sericeous but ultimately glabrous; terminal cone up to 4 mm long, sericeous; stipules subulate, c. 2 by 0.5 mm, acute, ferruginously sericeous, caducous. *Leaves* scattered, oblanceolate, obovate, 5—10 by 2.5—4.5 cm, rounded, obtuse or obtusely acuminate at apex, cuneate at base, decurrent along upper surface of petioles; subcoriaceous, glabrous but the underside pale ferruginously tomentose below when young; midrib narrowly crested above, rounded and prominent below, secondary nerves 11—14 pairs, ascending at an angle of 65°—75°, curved, irregularly archingly joined, inconspicuous above, prominulous below, tertiary nervation reticulate with a few or without nerves parallel to the secondary nerves near the midrib, inconspicuous above, prominulous below. Petioles 13—20 mm long, grooved above, rounded below, slightly thickened in the basal part, pale ferruginously or greyish tomentose. *Flowers* solitary or two together in the axils of the leaves of their scars, pedicels slender, filiform, angular, 2—3.5 cm long, greyish or pale ferruginously puberulous. *Sepals* 4 in 2 whorls or rarely 5 and subquincuncial, ovate or ovate-elliptic, 5—7 by 3.5—5 mm, pale ferruginously or greyish villose without, tomentose within, inner sepals with membranous, glabrous, and fimbriate margins. *Corolla* 6—8 mm long, glabrous, lobes 8, oblong, 4.5—5 by 1—1.5 mm, obtuse. *Stamens* 16, 3—4 mm long; entirely glabrous, filaments subulate, c. 1 mm long, anthers lanceolate, 2.5—3 mm long, connective prolonged and acute, dehiscing extrorsely. *Ovary* subglobose, 1—1.5 by 1—2 mm, 6- or 7-celled, ferruginously tomentose, style subulate, 8—10 mm long, ferruginously tomentose in the basal part, otherwise glabrous. *Fruits* ellipsoid, sometimes slightly oblique, 2—2.5 by 1.2—1.6 cm, obtuse and with a long remnant of the style at apex, 1-seeded, pericarp fleshy, ferruginously tomentose, seeds incompletely known.

Type specimen: *Wang 38801* in L.

Distribution: SE China and Indo-China.

CHINA. Kwantung prov., Yang-Ch'un, in light woods: *Wang 38801* (L, SYS), tree up to 15 m, fr. green, brown glaucous, Nov.; ibidem: *Wang 38820* (L, SYS), tree

15 m, fl. white, Oct.; Ts'ing-yuen, in forest: *How 74147* (L, SYS), tree up to 7 m, immature fr. Sept.

INDO-CHINA. Tonkin, Hsiuangmo Shan: *Tsang 30271* (A), fl., type specimen of *M. tsangii* Li.

**Remarks.** Owing to the nervation of the leaves, the corolla-lobes, 16 stamens and the shape of the fruits one is inclined to insert this species in *Payena*. Since, however, no ripe seeds are available there is no possibility to effect this change with reasonable certainty and therefore this species is provisionally inserted in *Madhuca* as a doubtful species.

83. *M. pasquieri* (Dubard) H. J. Lam, l. c. 1925, 182; Lam, l. c. 1927, 462; Chevalier, *Rev. Bot. Appl.* 23, 1943, 15 — *Dasillipe pasquieri* Dubard, *Ann. Mus. Col. Mars.* 21, 1913, 92 — *Bassia pasquieri* (Dubard) H. Lecomte, *Fl. Gén. Indo-Chine* 3, 7, 1930, 907 — *Illipe tonkinensis* Pierre, in ms.

Tall trees. Branchlets slender, 2–4 mm in diam., glabrous; terminal cone up to 3 mm long, greyish sericeous, stipules lanceolate-linear, up to 1 mm long, caducous. *Leaves* scattered or subconferted at tip of branchlets, obovate or oblong-obovate, 8–16 by 3–6 cm, short long obtusely acuminate, base cuneate, decurrent along sides of petioles; coriaceous, glabrous; midrib narrowly crested above, prominent and rounded below, secondary nerves 13–22(–26) pairs, ascending at an angle of c. 80°, straight, archingly joined, inconspicuous above, distinct below, tertiary nerves reticulate, parallel to secondary nerves, usually with one nerve more distinctly developed and parallel to the secondary nerves, inconspicuous above, more distinct below. Petioles 1.5–3 cm long, grooved above, rounded below, thickened in the basal part, glabrous. *Flowers* in few-flowered, axillary clusters, pedicels angular, 1.5–3.5 cm long, greyish puberulous. *Sepals* 4 or 5, ovate, 3–4 by 2–3 mm, obtuse, greyish or ferruginously puberulous on outside and on inside except for a basal part but the inner sepals entirely glabrous on inside and with membranous, glabrous and fimbriate margins. *Corolla* 6–7.5 mm long, glabrous, 8-lobed, the lobes oblong, 4–5 by 2–2.5 mm, obtuse. *Stamens* 18–22, glabrous, filaments subulate, c. 1 mm long, anthers ovoid, 2–2.5 mm long, the connective acutely prolonged, dehiscing laterally. *Ovary* ovoid, 6–8-celled, densely ferruginously tomentose, style 8–10 mm long, glabrous. *Fruits* ellipsoid, sometimes obliquely so, 2–2.5 by c. 1.5 cm, 1–5-seeded, apiculate at apex and sometimes with a long remnant of the style; pericarp thin, ferruginously tomentose but becoming glabrous, seeds ellipsoid, on one side flattened if more than 1 seed in the fruit, c. 1.8 by 1.3 by 1 cm, obtuse on either side, scar linear, up to 3 mm broad, testa cartilaginous, albumen none, cotyledons thick. Pedicel of fruit up to 3 cm long.

Type specimen: *Pasquier s.n.* in P.

Vernacular names: cây sen, sen dua, chên (Annam).

Use: The seeds contain c. 30% of edible fat.

Ecology: Flowering in January to March, fruiting in May to January.

Distribution: Indo-China (Tonkin, Annam).

Tonkin, Mt. Bavi: *Balansa 4336* (P), tree, fr. Jan.; ibidem: *Bon 5057* (P), tree,

fr.; Tien Yen: *Fleury 38022* (P), July; ibidem: *Chevalier 37942* (P), fl.; Hoa-Binh: *Brillet s.n.* (P); Thanh-hoa: *Pasquier s.n.* (P), fl.

ANNAM, Dolen For. Res.: *Fleury* in Herb. Chev. 30205 (P); Nhu-Xuan: *Chevalier 36276* (P), fl.

**84. *M. butyrospermoides*** A. Chevalier, Rev. Bot. Appl. 23, 1943, 150.

Small trees, up to 2.5 m. Branchlets slender; stipules small, less than 1 mm long, caducous. *Leaves* conferted at tip of branchlets narrowly oblong-lanceolate or lanceolate-linear, 10—12 by 1.5—2 cm, rounded, obtuse or acute at apex, narrowly cuneate at base, decurrent; subcoriaceous, entirely glabrous; midrib prominent on either side, secondary nerves slender, 12—14 pairs. Petioles slender, 1.5—2 cm long, glabrous. *Flowers* in 3—5-flowered, axillary clusters, pedicels 1—1.3 cm long, glabrous or subglabrous. *Sepals* 4 or 5, lanceolate, 10—13 by 5—7 mm, subobtuse, pubescent on outside, glabrous on inside. *Corolla* 8—10-lobed. *Stamens* 16—20 pubescent, anthers aristulate. *Ovary* ovoid, 8—10-celled, glabrous. Style filiform, glabrous. *Fruits* unknown.

Type specimen: *Chevalier s.n.* in P.

Vernacular names: cây mocua, mucua (Annam), srakom (Cambodia).

Distribution: Indo-China (Annam, Cambodia).

ANNAM, Bienhoa: *Chevalier 36274* (P), fl. Jan.

CAMBODIANA, Kampot region, Kamchay and Mont de l'Éléphant: *Chevalier s.n.* (P), fl.

Remark. The description given above is extracted from Chevalier's description since I did not see any material of this species.

**Doubtful species**

**85. *M. ? lanceolata*** (Merrill) Merrill, Enum. Phil. Fl. Pl. 3, 3, 1923, 276; Lam, l. c. 1925, 182; Lam, l. c. 1925, 182; Lam, l. c. 1927, 462 — *Payena lanceolata* Merrill, Phil. Bur. Gov. Lab. Bull. 17, 1904, 42.

Trees. Branchlets rusty pubescent, becoming glabrous; terminal cone, stipules ovate-lanceolate, c. 2 mm long, acute, densely ferruginously sericeous, caducous. *Leaves* elliptic 8—11 by 3—4.5 cm, acuminate at apex, acute at base; thinly coriaceous, glabrous; secondary nerves 13 or 14 pairs, diminishing until inconspicuous near margin (or archingly joined?), not prominent, tertiary nervation? Petioles 2—2.5 cm long, glabrous or sparsely ferruginously appressedly pubescent. *Flowers* in 2—6-flowered, axillary clusters, pedicels 10—12 mm long, scattered pubescent with greyish hairs. Outer *sepals* broadly triangular-ovate, c. 5 by 4 mm, acute, on outside pubescent with scattered appressed greyish hairs, inner sepals slightly narrower than outer ones, with membranous, glabrous, fimbriate margins, all sepals glabrous on inside (?) *Corolla* 10-lobed, known in bud only, lobes linear-lanceolate, c. 2.5 by 1 mm, obtuse. *Stamens* 18, anthers lanceolate-acuminate, c. 2 mm long, with very long (1 mm) scattered appressed, rusty hairs. *Ovary* and style unknown. *Fruits* unknown.

Type specimen: *Ahern 493* in ?

Vernacular name: lono-lono (Cébu, Bisaya).

Distribution: Philippines (Dinagat Island).

Remark. The description given above is extracted from Merrill's description since I could not obtain any specimens of this species.

## Excluded species

1. *M. amicorum* (A. Gray) MacBride, Contr. Gray Herb. N.S. 53, 1918, 18 — *Bassia amicorum* A. Gray, Proc. Am. Ac. Sc. 5, 1861/62, 327; Lam, l.c. 1927, 265 — *Burckella amicorum* (A. Gray) H. J. Lam, Blumea 5, 1, 1942, 41 = a mixture of *Planchonella costata* (Endl.) Pierre and a *Palaquium* sp.

Type specimen: *Gray s.n.* in P.

Distribution: Tonga.

2. *M. butyracea* (Roxb.) MacBride, l.c., 18 — *Bassia butyracea* Roxburgh, As. Res. 8, 1908, 499 = *Diploknema butyracea* (Roxb.) H. J. Lam, l.c. 1925, 186; van Royen, Blumea 9, 1, 1958, 82.

Type specimen: *Roxburgh s.n.* in BR.

Distribution: India, Tibet, Bhotan, Nepal, Assam, Andamans.

3. *M. caloneura* (Kurz) H. J. Lam, l.c. 1927, 265 — *Bassia caloneura* Kurz, Rep. Veg. Andamans, 1870, 41; Clarke in Hooker fil., Fl. Br. Ind. 3, 1882, 546 — *Isonandra* ? *caloneura* (Kurz) Kurz, For. Fl. Br. Burma 2, 1877, 119; Kurz, Journ. As. Soc. 2, 1877, 229 — *Dichopsis caloneura* (Kurz) Hooker fil., Gen. Pl. 2, 1876, 658 (the combination as such is in fact not made, but since it is included in *Dichopsis* this generic name is used here) — *Isonandra calophylla* Kurz, Journ. As. Soc. Beng. 40, 1871, 69; idem, vol. 42, 1873, 88 — *Palaquium calophyllum* Pierre in Dubard, Bull. Soc. bot. Fr. 56, 1909, Mém. 16, p. 18, in synonym = *Cleistanthus* sp. (Euphorbiaceae).

Type specimen: *Kurz s.n.* in K.

Distribution: Andamans.

4. *M. caudata* (Ridley) H. J. Lam, l.c. 1925, 161; Ridley, Fl. Mal. Pen. 5, 1925, Suppl. 319 — *Bassia caudata* Ridley, Fl. Mal. Pen. 2, 1923, 267 = *Payena dasphylla* (Miquel) Pierre, Bull. Mens. Soc. Linn. Paris, 1885, 527; van Bruggen, Blumea 9, 1, 1958, 99.

Type specimen: *Yeop Mal. FD 3650* in SING.

Distribution: Malaya, Sumatra.

5. *M. chrysocarpa* (Pierre) Ridley, Fl. Mal. Pen. 5, 1925, Suppl., 342 — *Ganua chrysocarpa* Pierre ex Dubard, Bull. Mus. Hist. nat. 14, 1908, 407 = *Ganua curtisii* (King & Gamble) H. J. Lam, l.c. 1925, 126; van den Assem, Blumea 7, 2, 1953, 388, f. 10.

Type specimen: *de la Croix 62* in P.

Distribution: Malaya, Borneo.

6. *M. curtisii* (King & Gamble) Ridley, l.c., 1925, 319 — *Bassia curtisii* King & Gamble, J. As. Soc. Beng. 74, 2, Extra 17, 1905, 181 = *Ganua curtisii* (K. & G.) H. J. Lam, l.c. 1925, 126; van den Assem, l.c., 388, f. 10.

Type specimen: *Curtis 1451* in SING.

Distribution: Malaya, Borneo.

7. *M. elongata* (Miquel) Ridley, l.c., 1925, 320 — *Bassia elongata* Miquel, Fl. Ind. Bat., Suppl., 1860, 582 = *Trigonostemon* sp. (Euphorbiaceae).

Type specimen: *Teysmann 3989* in BO.

Distribution: Sumatra.

8. *M. floribunda* (Pierre) H. J. Lam, l. c. 1925, 182 — *Dasyaulus floribundus* Pierre ex Dubard, Bull. Mus. Hist. nat. 13, 1907, 457 = *Payena floribunda* (Pierre) Lecomte, Fl. Gén. Indo-Chine 3, 7, 1930, 910.

Type specimen: *Pierre 3266* in P.

Distribution: Indo-China.

9. *M. glaberrima* H. J. Lam, l. c. 1925, 263 = *Ganua kingiana* (Brace) van den Assem, l. c., 373, f. 3.

Type specimen: *NIFS bb 6341* in L.

Distribution: Sumatra, Malaya, Borneo.

10. *M. hirtiflora* (Ridley) H. J. Lam, l. c. 1925, 160; Ridley, Fl. Mal. Pen. 5, 1925, Suppl., 319; Lam, l. c. 1927, 444 — *Bassia hirtiflora* Ridley, Fl. Mal. Pen. 2, 1923, 266 = *Ganua hirtiflora* (Ridley) van Royen, nov. comb.

Type specimen: *Haniff & Nur 6949* in SING.

Distribution: Malaya, Sumatra.

11. *M. kingiana* (Brace) H. J. Lam, l. c. 1925, 159; Ridley, l. c., 1925, 319 — *Bassia kingiana* Brace in King & Gamble, J. As. Soc. Beng. 74, 2, Extra 17, 1905, 178 = *Ganua kingiana* (Brace) van den Assem, l. c., 373.

Type specimen: *King's Collector 3314* in SING.

Distribution: Sumatra, Malaya, Borneo.

12. *M. leerii* (Teysmann & Binnendijk) Merrill, Enum. Phil. Fl. Pl. 3, 1923, 277 — *Azaola leerii* T. & B., Natuurk. Tijdschr. Ned.-Indië 6, 1854, 116 = *Payena leerii* (T. & B.) Kurz, J. As. Soc. Beng. 40, 2, 1871, 69; van Bruggen, Blumea 9, 1, 1958, 121, f. 8.

Neotype specimen: *Teysmann s.n.* in BM.

Distribution: Malaya, Riau, Bangka, Sumatra, Borneo, Philippines. Often cultivated in tropical Asia, Africa and South America.

13. *M. monticola* (Merrill) Merrill, l. c., 277; Lam, l. c. 1925, 180 — *Bassia monticola* Merrill, Phil. J. Sc., Bot. 10, 1915, 56 = *Ganua monticola* (Merrill) H. J. Lam ex van den Assem, l. c., 379, f. 6.

Lectotype specimen: *Merrill 9622* in L.

Distribution: Philippines and Borneo.

14. *M. motleyana* (de Vriese) MacBride, l. c., 18; Ridley, Fl. Mal. Pen. 5, 1925, Suppl., 319 — *Isonandra motleyana* de Vriese, Nat. Tijdschr. Ned.-Indië 21, 1860, 308 = *Ganua motleyana* (de Vriese) Pierre ex Dubard, Rev. Gén. Bot. 20, 1908, 202; Lam, l. c. 1925, 122; van den Assem, l. c., 382, f. 8.

Type specimen: *Motley 857* in P.

Distribution: Malaya, Sumatra, Riau, Belitung, Borneo.

15. *M. obovata* (Forster) MacBride, l. c., 18 — *Bassia obovata* Forster, Fl. Ins. Austr. Prodr., 1786, 35, no 200 = *Burckella obovata* (Forster) Pierre, Not. Bot. Sapot., 1890, 4; van Royen, Blumea 6, 3, 1952, 588.

Type specimen: *Forster s.n.* in K.

Distribution: Moluccas to Bismarck Archipelago and New Hebrides.



16. *M. obovatifolia* (Merrill) Merrill, l. c., 1923, 277; Lam, l. c. 1925, 180; Lam, l. c. 1927, 462 — *Bassia obovatifolia* Merrill, Ph. J. Sc. Bot. 10, 1915, 57 = *Ganua obovatifolia* (Merrill) van den Assem, l. c., 390, f. 11.  
Lectotype specimen: *Alvarez 21426* in PNH.

Distribution: Philippines.

17. *M. perakensis* (King & Gamble) Ridley, l. c., 1925, 319 — *Bassia perakensis* K. & G., J. As. Soc. Beng. 74, 2, Extra 17, 1905, 183 = *Ganua curtisii* (K. & G.) H. J. Lam, l. c. 1925, 126; van den Assem, l. c., 388, f. 10.

Type specimen: *Derry & Curtis 3695* in SING.

Distribution: Malaya, Borneo.

18. *M. ramiflora* (Merrill) Merrill, l. c., 1923, 278 — *Illipe ramiflora* Merrill, Bur. Gov. Lab. Bull. 17, 1904, 42 = *Diploknema ramiflora* (Merrill) H. J. Lam, l. c., 1925, 184, f. 52; van Royen, *Blumea* 9, 1, 1958, 78, f. 3.

Type specimen: *Barnes 189* in PNH.

Distribution: Philippines.

19. *M. watsonii* (Ridley) H. J. Lam, l. c. 1925, 179; Lam, l. c. 1927, 462 — *Bassia watsonii* Ridley, Fl. Mal. Pen. 2, 1923, 267 = *Palaquium stellatum* King & Gamble, J. As. Soc. 74, 2, Extra nr 17, 1905, 198.

Type specimen: *Foxworthy & Watson s.n.* in SING.

Distribution: Malaya.

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