REVISION OF *MEMECYLON* L. (MELASTOMATACEAE) FROM THE MALAY PENINSULA

by

J. F. MAXWELL

Botanic Gardens, Singapore

CONTENTS

ABSTRACT

This revision of *Memecylon* of the Malay Peninsula includes twenty-eight species, three varieties, and three imperfectly known taxa. No new taxa are proposed here. However, twenty-two taxa have been reduced to new synonyms, along with one new combination. Separate keys to flowering and fruiting material, critical taxonomic notes, detailed analyses of various organs of taxonomic importance, and an index to collections are included. Simple line drawings of the floral parts and other salient features of each taxon have been prepared to supplement the descriptions.

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INTRODUCTION

King, Gamble, and Ridley's "Materials for a Flora of the Malay Peninsula" (1889-1907), followed by Ridley's "Flora of the Malay Peninsula" (1922-1925) are two monumental works which have served several generations of botanists and foresters well, but are now in need of a thorough revision. With the accumulation of numerous collections from throughout the Malay Peninsula since the end of World War II and better knowledge of the floras of neighbouring areas — especially those of Sumatra and Borneo, a revised flora of the Malay Peninsula is urgently needed. Although excellent revisions of many families have appeared in "Flora Malesiana" (edited by Prof. Dr. C.G.G.J. van Steenis) since 1948, the gigantic scope and high standards of the project will take years (generations ?) to complete. The Melastomataceae, a very large and complex family, was inadequately treated in the earlier floras and now needs to be re-studied. *Memecylon*, one of the larger genera of Melastomataceae from the Malay Peninsula, has perplexed botanists for many years and even with several excellent papers to work with, it is still very difficult to be certain about the identities of many taxa. An effort has been made, therefore, to be as careful and critical as possible in this revision of the genus for the Malay Peninsula. It is hoped that this presentation will clear some of the confusion and misunderstanding that has built up through the years concerning *Memecylon* in the region.

REVIEW OF EARLIER WORK ON *MEMECYLON* FROM THE MALAY PENINSULA

The first species of *Memecylon* described from the Malay Peninsula was *M. acuminatum* Sm. in 1813, followed by *M. caeruleum* Jack in 1820. With the publication of the Wallich Catalogue in 1831 and distribution of specimens collected at Penang and Singapore a few years earlier (about 1822), five more distinct taxa, including what are now known as *M. cinereum* King (*M. umbellatum*, 4109 in part), *M. wallichii* Ridl. (*M. depressum* Benth., 4101 in part) *M. megacarpum* Furtado (4102), and *M. edule* Roxb. var. *ovatum* (Sm.) Cl. (*M. grande* Retz., 4103 in part; *M. umbellatum*, 4109B; *M. laxiflorum* Wall. ex Ridl., 4472) were recorded from the Peninsula. Roxburgh added *M. amplexicaule* Roxb. from Penang, in his "Flora Indica" (II, 260) of 1832. Clarke, in Hooker's "Flora of British India" (II, published in 1879), added *M. elegans* Kurz var. *dichotoma* Cl. (=*M. dichotomum* (Cl.) King var. *dichotomum*), *M. maingayi* Cl. (=*M. excelsum* Bl.), *M microstomum* Cl. (=*M. amplexicaule* Roxb.), *M. campanulatum* Cl., *M. pubescens* (Cl.) King, *M. acuminatum* Sm. var. *flavescens* Cl., *M. grande* Retz. var. *horsfieldii* Cl. (=*M. oleifolium* Bl.), and *M. malaccense* (Cl.) Ridl.

The first systematic treatment of *Memecylon* for the Malay Peninsula was published by King in 1900 with 28 species and 4 varieties included. Four of these taxa (3 species and 1 variety) were described by King from specimens from the Andaman and Nicobar Islands and only one of them (*M. kurzii* King =*M. excelsum* Bl.) is found on the Peninsula.

Ridley (1910–1920) published 9 new species of *Memecylon* from the Malay Peninsula, 7 of which were included in his "Flora of the Malay Peninsula" I (1922). Ridley, however, did not include *M. corticosum* Ridl.; and he also reduced *M. eugeniflora* Ridl. to *M. dichotomum* (Cl.) King var. *eugeniflorum* (Ridl.) Ridl., and *M. pulchellum* Ridl. to *M. pauciflorum* Bl. In his treatment, 31 species and 3 varieties of *Memecylon* are included.

Craib described 3 species and 2 varieties of *Memecylon* from lower Thailand in 1930–31 viz. *M. brandisianum* Craib (=*M. oleifolium* Bl.), *M. constrictum* Craib (q.v. *M. minutiflorum* Miq.), *M. dissitum* Craib (= *M. cantleyi* Ridl.), *M. gracilipes* Ridl. var. *rotundatum* Craib. (=*M. dichotomum* (Cl.) King var. *rotundatum* (Craib) Maxw.), and *M. pauciflorum* Bl. var. *brevifolium* Craib. The last taxon is insufficiently known and is probably synonymous with the typical variety.

Bakhuizen van den Brink's exhaustive study of Melastomataceae (1943–45) included a detailed analysis of *Memecylon* from the Malay Archipelago. He included 36 species (14 of which were described as new) and 3 varieties. A total of 25 of these taxa are found in the Malay Peninsula.

The second edition of Corner's "Wayside Trees of Malaya" (1952) includes brief descriptions of 9 taxa with useful field notes, mostly complied from his own observations.

The latest study of *Memecylon* for the Malay Peninsula was by Furtado in 1963. While not an exhaustive or complete study, eight species of *Memecylon* are discussed critically. *M. acuminatissimum* Bl. (=*M. oleifolium* Bl.), *M. hepaticum* Bl., and *M. multiflorum* Bakh. f. (=*M. campanulatum* Cl.) are included as new records from the Malay Peninsula; and *M. megacarpum* Furtado which is a new name for *M. pulchrum* Cogn.

Salient Morphological Characters of *Memecylon.*

HABIT

All taxa of *Memecylon* from the Malay Peninsula are woody. From the field notes for many collections examined it is apparent that there is considerable variation in the habit of many taxa. *M. malaccense* Ridl. and *M. pauciflorum* Bl. var. *brevifolium* Craib, both rather poorly known taxa, have only been recorded as being shrubs; while 18 other taxa have been collected in flowering or fruiting stages as shrubs and treelets up to 4 m tall, or trees up to about 15 m. *M. caeruleum* Jack, *M. cantleyi* Ridl., *M. cinereum* King, *M. fruticosum* King, *M. garcinioides* Bl., *M. globosum* Bakh. f., *M. hullettii* King, and *M. wallichii* Ridl. have bee noted most commonly as shrubs. Some taxa which have often been collected as treelets are *M. dichotomum* (Cl.) King and *M. corticosum* Ridl. Other taxa which have been recorded as small trees more often than as shrubs or treelets include: *M. megacarpum* Furtado, *M. lilacinum* Z. & M., and *M. oligoneurum* Bl. *M. beccarianum* Cogn. has been recorded as a shrub, but most specimens were collected from trees.

Seven species have been recorded only as small to medium sized trees (10–20 m tall) which, as far as I can determine, have never been collected in flower or fruit as shrubs or treelets. These include: *M. acuminatum* Sm., *M. amplexicaule* Roxb., *M. campanulatum* Cl., *M. excelsum* Bl., *M. floridum* Ridl., *M. kunstleri* King, and *M. oleifolium* Bl. The largest species collected (20–30 m tall with a diameter up to 2 m and often buttressed) are: *M. intermedium* Bl., *M. minutiflorum* Miq., *M. paniculatum* Jack, and *M. pubescens* (Cl.) King.

More field studies are required in order to understand the habit of many taxa of *Memecylon* from the Malay Peninsula. Knowledge of the habits, growth forms, and habitats of many taxa of *Memecylon* is inadequate.

BARK AND WOOD

Unfortunately, only a few specimens of *Memecylon* examined have bark or wood samples attached. During the present work eight taxa of *Memecylon* have been seen in the field and with the notes on several collections it seems that most, if not all, taxa of *Memecylon* have similar bark — at least for those collected as trees. The outer bark is typically thin (1–2 mm thick); with shallow, vertical, closely spaced fissures and cracks, sometimes flaking or peeling off, and of a greyish-brown to blackish colour. The slash inner bark is also thin, and is orange to brown. The wood in larger trees is usually white to brown, very dense, and sinks in water. In many taxa the wood is very durable and is used for house posts, lumber, furniture, and fuel.

Figure 31 of the trunk of a mature specimen of *Memecylon lilacinum* Z. & M. illustrates the typical nature of the bark in this genus.

BRANCHLETS

The branchlets of *Memecylon* are often very useful in the identification of many species. Basically there are three different types of branchlets: cylindric, grooved, and angled or winged. These branchlets are smooth and glabrous in all taxa, and ultimately become cylindric.

There are 15 taxa with cylindric branchlets, e.g. *M. amplexicaule* Roxb., *M. megacarpum* Furtado, *M. oleifolium* Bl., etc. Many taxa have cylindric branchlets which are often slightly flattened and shallowly grooved on the two flattened faces immediately below the upper node; the branchlets become cylindric below this short flattened region. Some examples include: *M. acuminatum* Sm., *M. caeruleum* Jack, and *M. garcinioides* Bl. In 10 taxa the branchlets are flattened and grooved on the two compressed faces for the entire length of the upper internode. Older branchlets become cylindric, or nearly so, but there is often a trace of the grooves. Several excellent examples are: *M. campanulatum* Cl., *M. cinereum* King, and *M. minutiflorum* Miq. Vegetative specimens of *M. campanulatum* Cl. and *M. caeruleum* Jack can be distinguished on the basis of a groove in the former and cylindric branchlets in the latter. Each groove is bordered by 2 sharp ridges and in many instances the groove is widened (that is the branchlet is less compressed), thus giving the branchlet a 4-angled appearance. *M. edule* Roxb., *M. pauciflorum* Bl., and *M. lilacinum* Z. & M. frequently show this feature. The upper node in *M. campanulatum* Cl. and *M. edule* Roxb. is often angled and tapers to 2 grooves on the upper internode. The grooved branchlets of *M. floridum* Ridl. is a very good distinguishing feature separating it from *M. acuminatum* Sm. which has cylindric branchlets. Also *M. megacarpum* Furtado, with grooved branchlets, can immediately be distinguished from *M. excelsum* Bl. and *M. beccarianum* Cogn. which have cylindric branchlets. The remaining 6 taxa of *Memecylon* have sharply 4-angled to 4-winged branchlets and upper nodes. *M. dichotomum* (Cl.) King var. *dichotomum* and *M. dichotomum* (Cl.) King var. *rotundatum* (Craib) Maxw. have 4 wings below the upper node which tapers to 4 angles. *M. corticosum* Ridl., *M. wallichii* Ridl., and *M. fruticosum* King have distinctly 4-winged internodes. *M. paniculatum* Jack, because of its 4- angled to 4-winged branchlets, is readily distinguished from *M. kunstleri* King which has cylindric internodes.

INTERPETIOLAR RIDGE OR LINE

At first glance it appears that *Memecylon* has stipular scars, however these interpetiolar ridges or lines, best seen on upper nodes, are merely raised zones of articulation at the base of each petiole which appear separated (by a groove) on the upper node and coalesce on the lower nodes to form a connecting ridge or line which becomes indistinct on older branchlets.

The growing tip of each branchlet is distinct and is flanked on each side at the base by a pair of leaves which are never connected by stipules, lines, or ridges.

LEAVES

The leaves of all taxa of *Memecylon* are opposite, simple, entire, and glabrous. The texture may be chartaceous to thick coriaceous and seems to be constant, and often a diagnositc feature, of each taxon. *Memecylon dichotomum* (Cl.) King var. *dichotomum* and *M. dichotomum* (Cl.) King var. *rotundatum* (Craib)

Maxw. have very thin (chartaceous) blades while all other taxa have thicker blades. Among the 12 taxa with sub-coriaceous blades are: *M. corticosum* Ridl., *M. megacarpum* Furtado, *M. paniculatum* Jack, and *M. pubescens* (Cl.) King. Three species have blades which range in texture from sub-coriaceous to coriaceous *viz. M. cantleyi* Ridl., *M. intermedium* Bl., and *M. oleifolium* Bl. The remaining 14 taxa have coriaceous blades and include, for example: *M. edule* Roxb. var. *edule, M. edule* Roxb. var. *ovatum* (Sm.) Cl., *M. globosum* Bakh. f., *M. lilacinum* Z. & M., *M. pauciflorum* Bl., and *M. wallichii* Ridl. Very often the blades of *M. amplexicaule* Roxb., *M. caeruleum* Jack, and *M. campanulatum* Cl. are thick coriaceous.

The shape of the blades varies from lanceolate (e.g. *M. corticosum* Ridl.) to sub-orbicular (e.g. the limestone form of *M. dichotomum* (Cl.) King). Blade tips vary from broadly rounded (e.g. *M. amplexicaule* Roxb. and *M. caeruleum* Jack) to acuminate-caudate (*M. acuminatum* Sm.). Cordate blade bases are found in several taxa, e.g. *M. amplexicaule* Roxb., *M. caeruleum* Jack, *M. wallichii* Ridl., etc.; while in others it is often broadly rounded, e.g. *M. cinereum* King and *M. fruticosum* King; or decurrent, e.g. *M. floridum* Ridl. and *M. oleifolium* Bl. The blades of all taxa of *Memecylon* from the Malay Peninsula (except *M. oligoneurum* Bl. which is trinerved) have a single main nerve which, in all taxa (including the three main nerves of *M. oligoneurum* Bl.), is sunken on the dorsal surface and raised below where it is thickest near the petiole and tapers to the apex. The secondary veins range in number from about 6 to about 25 pairs which frequently parallel the mid-nerve for a few mm before bending sharply at 45° towards the intramarginal nerve. In most taxa where the venation is visible the distal end of each secondary nerve tends to curve towards the apex of the blade before merging with the intramarginal nerve. The intramarginal nerve parallels the margin (generally at a distance from 1–5 mm) in a nearly straight (e.g. *M. garcinioides* Bl. and *M. pubescens* (Cl.) King) or broadly looping line (e.g. *M. dichotomum* (Cl.) King, *M. excelsum* Bl., and *M. wallichii* Ridl.). The intramarginal nerve is usually of the same thickness and degree of prominence as the secondary veins.

For covenience the venation types are grouped into five general categories in this paper: invisible, invisible to obscure, obscure, distict, and prominent. The veins are typically invisible in 5 taxa — all of which have thick blades viz. *M. amplexicaule* Roxb., *M. caeruleum* Jack, *M. campanulatum* Cl., *M. pauciflorum* Bl. var. *pauciflorum*, and *M. pauciflorum* Bl. var. *brevifolium* Craib. There are 9 taxa which have invisible to obscure venation, e.g. *M. acuminatum* Sm., *M. edule* Roxb. var. *edule, M. edule* Roxb. var. *ovatum* (Sm.) Cl., *M. globosum* Bakh. f., *M. malaccense* (Cl.) Ridl., *M. lilacinum* Z. & M., etc. *M. cantleyi* Ridl., *M. floridum* Ridl., *M. garcinioides* Bl., and *M. intermedium* Bl. have obscure venation; while 5 taxa have distinct (that is, slightly more prominent) venation, e.g. *M. dichotomum* (Cl.) King and *M. hullettii* King. Prominet venation is common in 8 taxa where the secondary veins are often raised below, e.g. *M. corticosum* Ridl., *M. excelsum* Bl.,*M. paniculatum* Jack, and *M. wallichii* Ridl.

The leaves of *Memecylon* have been a source of confusion in many taxa and in numerous instances new species have been distinguished on this basis alone. With detailed analyses of other characteristics of various species it is obvious that many taxa have similar inflorescences, flowers, and fruits; therefore with variable leaf morphologies it has often been difficult to determine some species solely on this characteristic. *Memecylon caeruleum* Jack, *M. dichotomum* (Cl.) King, *M. lilacinum* Z. & M., and *M. oleifolium* Bl. are examples where

the leaves are variable and in many instances intermediate specimens can be shown to link some of the new synonyms proposed here to the accepted species. Among the most striking examples include the reduction of *M. floribundum* Bl. to a new synonym of *M. caeruleum* Jack, and the numerous new synonyms under *M. oleifolium* Bl.

The branches and leaves of many species of *Eugenia* L. (Myrtaceae) (e.g. *E. polyantha* Wight and *E. scortechinii* King) often resemble those of several species of *Memecylon*. Aside from obvious differences in the inflorescences, flowers, and fruit, *Eugenia* blades often have closer secondary venation, and dark glandular dots — the latter being absent in *Memecylon* and affording the most reliable distinction in vegetative specimens.

Memecylon oligoneurum Bl., the only species of *Memecylon* from the Malay Peninsula with trinerved blades, is easily confused with *Pternandra* Jack. In addition to well defined floral differences, the secondary veins in *Pternandra* are generally more distinct and reticulate, and the branchlets usually have a darker epidermis which tends to peel off. *Strychnos* L. (Loganiacaae) is in several ways similar vegetatively to *M. oligoneurum* Bl. and *Pternandra;* however its climbing habit immediately distinguishes it from these two genera.

The petioles of *Memecylon* generally range from 2–6 mm in length, 1–3 mm in width, and are usually grooved on the upper surface. *M. edule* Roxb. var. *edule*, with petioles typically shorter than *M. edule* Roxb. var. *ovatum* (Sm.) Cl. is perhaps the only example seen presently where petioles are used to distinguish taxa. Aside from their relative lengths, the petioles have few characteristics which can be used to distinguish Malayan taxa.

INFLORESCENCE

The basic structure of the inflorescence in *Memecylon* is cymose. From this arrangement there are many variations ranging from a panicle of cymes to sessile glomerules. The most complex inflorescences in some species have distinct 3rd and 4th order axes, in addition to the pedicels (e.g. *M. oleifolium* Bl. and *M. paniculatum* Jack). Contraction of the ultimate axes has led to more compact inflorescences where the 4th or 3rd order axes are reduced yielding glomerules on the tips of lower axes (e.g. *M. edule* Roxb. and *M. pubescens* (Cl.) King); or umbels (*M. hulletti* King) due to the flattening of the nodes. Further reduction has resulted in the shortening of the secondary axes so that they appear glomerulate or up to c. 1 mm long on the tips of the primary axes (e.g. *M. intermedium* Bl. and *M. minutiflorum* Miq.). With the shortening of the primary axes the inflorescence becomes very compact (e.g. *M. cinereum* King. *M. oligoneurum* Bl., and *M. lilacinum* Z. & M.). Finally, in several species (e.g. *M. amplexicaule* Roxb. and *M. campanulatum* Cl.) the primary axes are indistinct and the pedicels are clustered on a tubercle.

A pair of bracts, is present at the base of each axis and these are situated at 90° to the axis below them. They are usually of an ovate shape (lanceolate in *M. garcinioides* Bl.), acute at the tip, usually less than 1 mm long, and are either persistent (e.g. *M. caeruleum* Jack and *M. dichotomum* (Cl.) King) or, as in most taxa, fall off before the petals mature. Fallen bracts and bracteoles leave distinct scars at the base of each axis. The bracts and bracteoles have not been very useful taxonomic aids except in those few taxa in which they are persistent.

The nodes of the inflorescence are typically flattened, laterally expanded, and often reflexed at the sides. This feature is most readily seen in taxa with large inflorescences (e.g. *M. oleifolium* Bl. and *M. hullettii* King). Subsequent axes are arranged at right angles to lower axes with the central axis being longer than the lateral ones.

The pedicels are usually in clusters, but sometimes reduced to one on the tip of each ultimate axis. *M. caeruleum* Jack and *M. dichotomum* (Cl.) King are good examples. Many authors have erroneously interpreted this as a pedicel with a pair of bracts near the middle. The primary axis is typically flattened, usually with 2 distinct grooves or 4-angled, and arranged so that the flattened surfaces face the branch and petiole. The axes are glabrous except in *M. beccarianum* Cogn., *M. hullettii* King, and *M. pubescens* (Cl.) King. The inflorescences arise from leafy nodes in most species, however in a few taxa (e.g. *M. edule* Roxb. var. *ovatum* (Sm.) Cl., *M. excelsum* Bl., and *M. corticosum* Ridl., the inflorescence originates from leafless nodes or from older branches. The position, size, and structure of the inflorescence is of paramount importance in the classification and identification of all taxa *Memecylon*.

CALYX

In addition to the anthers, the morphology of the calyx in all taxa of *Memecylon* offers one of the most useful aids in identification. *Memecylon* flowers are all pedicelled and in many taxa there is a distinct constriction above the ovary which flares out to form a funnelform or campanulate calyx tube. *M. amplexicaule* Roxb., *M. intermedium* Bl., and especially *M. minutiflorum* Miq. are some species which have prominent ovaries. Entirely campanulate calyces without a noticeable ovary externally are less frequent within the genus, but are typical for *M. excelsum* Bl. and *M. oleifolium* Bl.

All taxa of *Memecylon* from the Malay Peninsula have glabrous flowers, however 3 taxa (viz. *M. dichotomum* (Cl.) King, *M. dichotomum* (Cl.) King var. *rotundatum* (Craib) Maxw. and *M. minutiflorum* Miq.) have a papillose (or almost muricate) calyx. Sometimes *M. cinereum* King and *M. beccarianum* Cogn. (from Borneo) also have a papillose calyx. The margin of the calyx also provides another feature which serves as a useful aid in identification. It ranges from entirely truncate, with 4 minute cusps or undulations, to distinctly 4-lobed. There are 9 taxa with an entirely truncate calyx margin, e.g. *M. caeruleum* Jack, *M. campanulatum* Cl., *M. excelsum* Bl., *M. dichotomum* (Cl.) King, etc. Generally speaking, the taxa in this group have a thickened calyx tube, while those taxa with cusps or lobes have thinner tubes. In 7 taxa the margin varies from truncate to cuspidate or undulate. Very often the young calyx in several taxa has 4 cusps which become very obscure when the calyx tube matures. Some examples are: *M. edule* Roxb. var. *edule*, *M. edule* Roxb. var. *ovatum* (Sm.) Cl., and *M. pubescens* (Cl.) King (truncate to cuspidate); *M. globosum* Bakh. f. and *M. megacarpum* Furtado (truncate to undulate).

There are 8 taxa which have 4 distinct cusps on the margin of the calyx tube, e.g. *M. garcinioides*, Bl., *M. minutiflorum* Miq., and *M. paniculatum* Jack. Finally, 5 taxa have 4 often acuminate calyx lobes, e.g. *M. cinereum* King, and *M. lilacinum* Z. & M. *M. acuminatum* Sm. var. *acuminatum*, with a 4-lobed calyx margin, is easily separated from *M. acuminatum* Sm. var. *flavescens* Cl. which has a truncate margin.

The internal septa found in all taxa of *Memecylon* are a vestige of the extraovarial chambers which are more highly developed in other genera of Melastomataceae, e.g. the tribe Dissochaeteae (Naud.) Triana. Most taxa have 8 distinct septa and 8 grooves in addition to a thinner line dividing each groove (initially between the anther locules). In several taxa (e.g. *M. cantleyi* Ridl.) the septa dividing the anther locules are almost as prominent as the ones separating the anthers, thus the calyx has 16 septa and 16 grooves. The septa and grooves in all taxa do not extend below the ovary and the manner in which the anthers fit into these structures is most readily seen in mature buds. Aside from *M. oligoneurum* Bl., which has very faint ridges and shallow grooves, the septa and grooves have not proven to be very useful for identification purposes.

PETALS

There are 4 equal, symmetric, and glabrous petals in all taxa of *Memecylon* from the Malay Peninsula. Their shapes range from oblong to sub-orbicular and they are often reflexed at maturity. The tips are broadly rounded to obtuse, or acute; the bases clawed or truncate. Texture ranges from thin to thick coriaceous, and in thicker petals the midrib is often thickened or dorsally keeled There is some variation in petal morphology and colour (white, pink, blue, purple) but these are not always reliable for identification purposes since, in comparison to numerous vegetative and other floral characteristics, they are not as easy to distinguish taxonomically as these other structures. Therefore, the petals have not been referred to very often in the key to flowering material.

STAMENS

The stamens of *Memecylon* are relatively small and simple, and along with those of *Astronia* and *Pternandra* are the least specialised anthers within the family. All species of *Memecylon* have 8 equal, glabrous stamens with flattened filaments and variously shaped, 2-locular, medifixed anthers which open by a vertical slit. The connective, in most species, is well developed and in most taxa there is also a crateriform gland. The anthers are usually described as being dolabriform (axe-shaped), but this term is inadequate for comparative studies. In many species the anthers in bud are not sufficiently developed to provide recognizable distinctions, however in those species which lack a connective gland, plus *M. garcinioides* Bl. and *M. wallichii* Ridl. which have unique shapes, helpful clues can be found. The mature anthers provide the most important structural evidence for the identification of several species, e.g. *M. lilacinum* Z. & M., *M. floridum* Ridl., and *M. pauciflorum* Bl.

The mature anthers of *Memecylon* can be separated into 4 basic groups: "J" or "C" shaped, "U" shaped, uniquely shaped, and glandless anthers. Mature anthers with a "J" or "C" shape are characteristic of 18 taxa. *Memecylon excelsum* Bl. and *M. megacarpum* Furtado have the largest anthers with very thick connectives, but for the other taxa the variation is difficult to describe. Several species (e.g. *M. acuminatum* Sm., *M. caeruleum* Jack, *M. edule* Roxb., etc.) have obviously different anthers and form seems to vary with different stages of maturity. The variability of the curved anthers is not completely known because of the lack of sufficient flowering material and detailed field observations. There is a tendency for the anthers to curve from a nearly linear shape in bud to crescent shape and then to a "C"-shape. In some taxa, (e.g. *M. edule* Roxb. var. *ovatum* (Sm.) Cl.) some anthers are actually "U"-shaped due to more extensive bending. All these anthers have a thickened connective;

a distinct, approximately central gland, and locules which are smaller than the connective.

There are 6 species with "U"-shaped mature anthers viz. *M. cantleyi* Ridl., *M. fruticosum* King, *M. kunstleri* King, *M. paniculatum* Jack, *M. pauciflorum* Bl., and sometimes *M. oleifolium* Bl. *M. lancifolium* Ridl., which is insufficiently known, also has (bud) anthers with this shape. In *M. cantleyi* Ridl. and *M. oleifolium* Bl. some anthers show an asymmetric "C" outline. The anthers in bud of these 7 species are usually more curved than those of the "J" or "C"-shaped anthers described above, however the present understanding of this group is also incomplete. Indeed, some anthers of *M. paniculatum* Jack, perhaps due to immaturity, are "C"-shaped and resemble mature anthers of *M. acuminatum* Sm. More observations of anther forms in these two groups are necessary in order to understand both the variation in and the relationships among the various taxa.

Anthers in the following taxa show unique shapes: *M. garcinioides* Bl. and *M. hullettii* King (orbicular) and *M. wallichii* Ridl. (linear). Orbicular anthers have a very reduced connective about as large as the locules with a small, often obscure gland situated on a membranous extension of the connective. *M. hullettii* King is, in addition, distinct from all other species of *Memecylon* by virtue of its broadly rounded, subsessile leaves and compound – umbellate inflorescence. The anthers of *M. garcinioides* Bl. are the most reduced among those studied, and along with *M. hullettii* King are also the smallest in all taxa of *Memecylon* from the Malay Peninsula. *M. intermedium* Bl. often has similar anthers, especially in bud, but the connective in most specimens is less reduced, thus giving the anther a "J" shape. The two species can be easily distinguished by their leaves and calyx margins. The linear shape of the bud and mature anthers of *M. wallichii* Ridl. immediately distinguishes this species from *M. dichotomum* (Cl.) King and *M. corticosum* Ridl. which have "C"-shaped anthers and are similar vegetatively. The locules of *M. wallichii* Ridl. are about the same size as the connective which has a distinct, centrally located gland.

There are 5 species of *Memecylon* from the Malay Peninsula that have glandless anthers, triangular or cuneate in form, which in many respects, resemble those of *Astronia smilacifolia* Triana. These are: *M. cinereum* King, *M. floridum* Ridl., *M. malaccense* (Cl.) Ridl., *M. lilacinum* Z. & M., and *M. oligoneurum* Bl. Apart from *M. oligoneurum* Bl., which is readily distinguished from all other species of *Memecylon* in the region by its 3-nerved blades, the other 4 species in this group are often confused with other species. Both young and mature anthers can be used to distinguish (1) *M. floridum* Ridl. from *M. acuminatum* Sm., (2) *M. lilacinum* Z. & M. from *M. garcinioides* Bl. and *M. pauciflorum* Bl., and (3) *M. malaccense* (Cl.) Ridl. from *M. dichotomum* (Cl.) King and *M. acumiantum* Sm. These species are difficult (except *M. garcinioides* Bl.) to distinguish solely by anther morphology, therefore various other characteristics must be used to correctly identify each.

GYNOECIUM

The stigma is typically minute and is often difficult to distinguish from the slender, glabrous style which is usually not much longer than the stamens and merges with the top of the ovary without any disc or basal swellings. The ovary is unilocular with very short free central (perhaps indistinguishable from basal) placentation with 2–20 ovules attached in a whorl on a flattened, peltate

placenta. *Memecylon oligoneurum* Bl., as far as can be determined, has the lowest ovule number (2), while most other taxa have at least 6 ovules in each gynoecium. The number of ovules might ultimately provide a useful means to help distinguish various taxa.

FRUIT

There are two basic fruit shapes in *Memecylon* viz. globose, or nearly so (22 taxa) and oblong to elliptic (7 taxa). The fruits of *M. acuminatum* Sm. var. *flavescens* Cl. and *M. pauciflorum* Bl. var. *brevifolium* Craib have not been studied since fruits have yet to be described or collected from these two varieties. However, it is most likely that they are globose as in their typical varieties. *Memecylon lilacinum* Z. & M. usually has depressed, oblate, globose fruit; but sometimes it is elliptic.

Within each group there are usually sufficient vegetative differences and structural features of the infructescence to distinguish the taxa. In some species, however, (e.g. *M. lilacinum* Z. & M., *M. globosum* Bakh. f., and *M. excelsum* Bl.) the fruit provides the most reliable diagnostic feature. Because flowers and fruits are rarely found together on the same specimen (except in *M. caeruleum* Jack) matching flowering material with fruiting specimens has often been difficult. A good example is with *M. minutiflorum* Miq. and *M. intermedium* Bl. which are easily confused unless collections are available. A similar situation exists between *M. excelsum* Bl. and *M. megacarpum* Furtado, which have oblong and globose fruit, respectively; but frequently have similar vegetative features. There seems to be no correlation between vegetative characteristics, nature of the inflorescence, and morphology of the anthers between species with globose or oblong to elliptic fruit; except that the five species with glandless anthers all have globose fruits.

The exocarp in dry specimens varies from smooth (e.g. *M. cinereum* King and *M. intermedium* Bl., both with globose fruit; or *M. caeruleum* Jack with elliptic fruit) to moderately rough (e.g. *M. dichotomum* (Cl.) King, and *M. edule* Roxb., both with globose fruit, and *M. paniculatum* Jack which often has ovate fruit). Very rugose or pustulate surfaces are typical of *M. lilacinum* Z. & M., and *M. amplexicaule* Roxb., both having globose fruit; and *M. excelsum* Bl. with oblong to elliptic fruit.

The colour of immature fruit is generally green, changing to yellowish, pink or reddish, and finally in many taxa dark purple to blackish when ripe. The dry colour ranges from black (e.g. *M. edule* Roxb. var. *ovatum* (Sm.) Cl. and *M. cinereum* King) to tan-greenish (e.g. *M. lilacinum* Z. & M.), while *M. cantleyi* Ridl. has fruit which dry light brown to tan.

The pericarp varies from very thin (c. 0.25 mm thick, e.g. *M. cinereum* King and *M. intermedium* Bl.), moderately thick (c. 0.5 mm, e.g. *M. edule* Roxb. and *M. oligoneurum* Bl.), to very thick (c. 1 mm or more and gritty in *M. amplexicaule* Roxb., *M. lilacinum* Z. & M. and *M. megacarpum* Furtado). *M. floridum* Ridl. has a fibrous pericarp which immediately distinguishes it from the other species. Generally speaking, species with ovate to elliptic fruits have a thinner pericarp, the thickest being in *M. excelsum* Bl. (c. 0.5 mm thick).

The calyx remnant, which is always present on immature and mature fruit, varies somewhat in size and shape. A distinctly raised, crown-like remnant is

found in all taxa except *M. amplexicaule* Roxb. where it is flattened in the plane of the fruit. All fruits have an areolus or space on the top enclosed by the calyx remnant. The internal septa, most obvious in flowers, are also usually distinct in fruits. The style in all taxa falls off with the petals and stamens soon after the fruit begins to develop.

DISTRIBUTION AND RELATIVE ABUNDANCE

Memecylon is found in all the Malaysian States and Singapore. Several taxa are found throughout the region, e.g. *M. amplexicaule* Roxb. and *M. lilacinum* Z. & M., while others, e.g. *M. malaccense* (Cl.) Ridl., *M. kunstleri* King, and *M. globosum* Bakh. f. are comparatively rare and have only been found in a few localities.

Based on the data gathered from herbarium specimens, I have grouped the taxa from the Malay Peninsula in four categories regarding their relative abundance:

A. **Very Common:** *M. amplexicaule* Roxb. *M. caeruleum* Jack, *M. dichotomum* (Cl.) King var. *dichotomum*, *M. edule* Roxb., var. *edule*, *M. edule* Roxb. var. *ovatum* (Sm.) Cl., *M. excelsum* Bl., *M. megacarpum* Furtado, *M. minutiflorum* Miq., *M. lilacinum* Z. & M., and *M. oleifolium* Bl.;

B. **Common:** *M. cantleyi* Ridl., *M. garcinioides* Bl., *M. intermedium* Bl., *M. oligoneurum* Bl., *M. paniculatum* Jack, *M. pauciflorum* Bl. var. *pauciflorum*, *M. pubescens* (Cl.) King, and *M. wallichii* Ridl.

C. **Not Common:** *M. acuminatum* Sm. var. *acuminatum*, *M. campanulatum* Cl., *M. cinereum* King, *M. floridum* Ridl., *M. fruticosum* King, and *M. hullettii* King; and

D. **Rare:** *M. acuminatum* Sm. var. *flavescens* Cl., *M. corticosum* Ridl., *M. dichotomum* (Cl.) King var. *rotundatum* (Craib) Maxw., *M. globosum* Bakh. f., *M. kunstleri* King, and *M. malaccense* (Cl.) Ridl.

MEMECYLON L.

Linnaeus, Sp. Pl. I (1753) 349; Smith in Rees Cyclopedia 23:4 (1813); Jack, Malay Misc. I:5 (1820) 26, II (1822) 62; Wallich Catalogue (1831); De Candolle, Prodr. III (1828) 5; Roxburgh, Fl. Ind. ed. 2, II (1832) 260; Blume, Mus. Bot. Lugd. Bat. I:23 (1851) 353; Naudin, Ann. Sc. Nat. ser. III:18 (1852) 264; Miquel, Fl. Ned. Ind. suppl. I, Sumatra (1860) 323; Triana, Trans. Linn. Soc. 28 (1871) 155; Kurz, For. Fl. Brit. Burma I (1877) 515; Clarke in Hk. f., Fl. Brit. Ind. II (1879) 553; Cogniaux in DC., Monogr. Phanerog. 7 (1891) 1130; King, J. As. Soc. Beng. 69, II:1 (1900) 71 (Mat. Fl. Mal. Pen., 479); Ridley, Fl. Mal. Pen. I (1922) 810; Craib, Fl. Siam. Enum. I:4 (1931) 702; Bakhuizen van den Brink, f., Med. Mus. Bot. Utrecht 91 (1943) 333 and Rec. Trav. Bot. Neerl. 40 (1943-45) 333; Corner, Wayside Tr. Mal. I (1952) 448; Furtado, Gard. Bull. Sing. 20 (1963) 119, Backer & Bakhuizen van den Brink f., Fl. Java I (1963) 371; Maxwell, Mal. Nat. J. 34:1 (1980).

Trees or terrestrial shrubs; branchlets cylindric, flattened and 2-grooved, or 4-angled to 4-winged; smooth, glabrous. Leaves simple, opposite, glabrous; blades chartaceous, subcoriaceous, or thick coriaceous; entire; lanceolate to suborbicular; with 1 main nerve (except in one species 3-nerved), secondary venation pinnate, distinct to invisible, intramarginal nerves similar; petioles c. 1 mm to 15 mm long. Stipules absent, interpetiolar ridge or line distinct on upper nodes, obscure to invisible on older nodes. Inflorescence cymose, arising from leafy or leafless nodes, less frequently terminal; the axes with up to 4 ramifications, or reduced to multiflowered glomerules or umbels; glabrous or less commonly puberulent. Calyx tube campanulate to funnelform, constricted or not above the ovary; margin truncate, with 4 minute cusps, or undulations, to 4-lobed; tube glabrous or papillose outside, with 8 internal ridges or lines, extraovarial chambers absent. Petals 4, thin or thick coriaceous; oblong, obovate, to orbicular; with or without a thickened mid-line, usually reflexed at maturity, frequently colourful. Stamens 8, equal, glabrous; filaments flattened; anthers globose, axe-shaped, or curved in a "J", "C", or "U" shape; connective often thickened, with or without a gland on the connective; 2-locular, each opening by a vertical slit. Stigma minute, style slender; ovary inferior with one locule, with basal to free central placentation; ovules 2–20, whorled on a flattened placenta. Fruit a berry, globose or elliptic to ovoid; 1, rarely 2, seeded; pericarp juicy, fibrous, or gritty; areolus distinct, raised or not; exocarp ripening red to purplish.

The genus *Memecylon* was established by Linnaeus in 1753 with a brief description of *M. capitellatum* L. from Ceylon. Since then over 300 species have been described from tropical Africa, Asia, Australia, and the Pacific Islands. *Memecylon* has been traditionally included in the Melastomataceae by most botanists, however a separate family, Memecylaceae DC. has been accepted by Airy Shaw (Willis Dict. Fl. Pl. & Ferns) which includes four genera: *Memecylon*, *Axinandra*, *Mouriri*, and *Votomia* — the former two being found in the Malay Peninsula and neighbouring countries; and the latter two from Central and South America, and the West Indies. Airy Shaw notes that Memecylaceae is more or less intermediate between Myrtaceae and Melastomataceae. In this work accord is made with most other botanists in maintaining *Memecylon* in the Melastomataceae since the internal septae in the calyx tube and the morphology of the stamens (especially the anthers) indicate relationship to *Astronia* and *Pternandra* very closely and not to any genus in the Myrtaceae.

Memecylon, however differs from most other genera of Melastomataceae in having uninerved blades (except *M. oligoneurum* Bl. and a few species from Africa and Ceylon which have 3-nerved Blades); 8 equal, unappendaged anthers with locules opening by slit (instead of pores as in most other genera); a unilocular ovary with free central (almost basal) placentation; fewer ovules (up to 20); and a (usually) single seeded berry. Therefore, the separation of *Memecylon* as a subfamily, Memecyloideae, appears justified.

Key to the species of *Memecylon* from the Malay Peninsula based on flowering material

1. Inflorescence sessile or nearly so; glomerulate with primary axes indistinct or up to 2 mm long; leaf blades with 1 or 3 main nerves

    2. Leaf blades with 1 main nerve; calyx with distinct internal ridges; ovules 6–20; anthers with a gland

3. Branchlets prominently angled or winged, especially below the upper node

4. Blade venation prominently raised on the undersurface; inflorescence from leafy or leafless nodes (often ramiflorous); pedicels c. 3 m long ..... *M. corticosum* Ridl.

4. Blade venation obscure, not prominently raised on the undersurface; inflorescence from leaf axils; pedicels 1.5–5 mm long ..... *M. fruticosum* King

3. Branchlets cylindric

5. Blades sessile or very shortly (1–3 mm) petioled

6. Inflorescence glomerulate, primary axes absent; blades thick coriaceous, veins obscure to invisible .... *M. amplexicaule* Roxb.

6. Inflorescence cymose, primary axes at least 0.5 mm long; blades subcoriaceous to coriaceous, venation invisible or distinct

7. Flowers 3–5 per inflorescence, bracts persistent; pedicels 1–1.5 mm long; blades cordate at the base, venation invisible .... *M. dichotomum* (Cl.) King var. *dichotomum* (limestone form)

7. Flowers usually more than 5 per inflorescence, bracts caducous, pedicels 2–3 mm long; blades narrowed at the base, venation distinct .... *M. megacarpum* Furtado

5. Petioles over 3 mm long

8. Calyx truncate; anthers with a gland; inflorescence mostly from leafless nodes

9. Blades thick coriaceous, 7–10 cm long, venation invisible ..... *M. campanulatum* Cl.

9. Blades coriaceous, 12–26 cm long, venation distinct ..... *M. excelsum* Bl.

8. Calyx with 4 broadly triangular lobes; anthers without a gland; inflorescence from leaf axils .... *M. cinereum* King

2. Leaf blades with 3 main nerves; calyx with faint internal ridges; ovules 2; anthers glandless ..... *M. oligoneurum* Bl.

1. Inflorescence peduncled, primary axes at least 2.5 mm long; leaf blades with 1 main nerve

10. Inflorescence 4–8 cm long, secondary axes at least 2 mm long, or if not developed then the inflorescence is umbellate

11. Inflorescence umbellate; calyx tube muricate-papillose externally

    12. Inflorescence a compound umbel, lowest internode of the primary axes 4–5 cm long, secondary axes 2–15 mm long; venation distinct ..... *M. dichotomum* (Cl.) King var. *rotundatum* (Craib) Maxw.

11. Inflorescence an open panicle of cymes or cymose, lower internodes of the inflorescence 1–3 cm long, secondary axes distinct; venation obscure or prominent; pedicels and calyx smooth, not muricate-papillose

    13. Veins prominent, raised on the undersurface

        14. Branchlets cylindric

            15. Inflorescence axes glabrous ..... *M. oleifolium* Bl.

            15. Inflorescence axes pubescent

                16. Leaf blades 8–15 by 4–6 cm; petiole 1.5 mm thick ..... *M. pubescens* (Cl.) King

                16. Leaf blades 14–30 by 6–8 cm; petiole 3 mm thick ..... *M. beccarianum* Cogn.

        14. Branchlets 4-angled to 4-winged ... .. *M. paniculatum* Jack

    13. Veins obscure, not raised below

        17. Blades 6–13 by 2.5–5 cm; petiole 2–3 mm long, 1–1.5 mm thick; inflorescence 2–4.5 cm long with sharply 4-angled axes ..... *M. kunstleri* King

        17. Blades 10–20 by 5–10 cm; petiole 7–10 mm long, 2–3 mm thick; inflorescence 7–9 cm long with flattened or cylindric axes ..... *M. oleifolium* Bl.

10. Inflorescence a contracted cyme or umbel, 0.4–4 (5) cm long, secondary and/or tertiary axes up to 2 mm long, often indistinct

    18. Inflorescence axes slender, 1 mm or less thick, or flattened and 1–2 mm wide; blades acute, cuneate, or rounded and usually decurrent at the base

        19. Inflorescence sub-sessile or up to 1.5 cm long

            20. Leaf blades somewhat narrowed, rounded, or shallowly cordate at the base, not or only slightly decurrent at the base

                21. Veins conspicuous and often slightly raised below; upper branchlets sharply 4-angled to 4-winged; anthers with a gland

                    22. Upper internodes 4-winged, oftering tapering to 4-angles; bracts thin, caducous; pedicels clustered on each secondary axis; calyx smooth

23. Anthers "U"-shaped; blades lanceolate or ovate, 5–13 cm long ..... *M. fruticosum* King

23. Anthers slightly curved to almost "C"-shaped; blades lanceolate, 10.5–18 cm long .... *M. corticosum* Ridl.

22. Upper internodes 4-angled tapering to cylindric; bracts thickened, persistent; pedicels solitary on each secondary axis; calyx papillose .... *M. dichotomum* (Cl.) King var. *dichotomum*

21. Veins obscure to invisible; upper branchlets cylindric, often 2-grooved or somewhat 4-angled below the upper node; anthers with or without a gland

24. Calyx thin, 1.5–2 mm long; anthers without a gland ..... *M. malaccense* (Cl.) Ridl.

24. Calyx thick, at least 2 mm long; anthers with a distinct gland

25. Branchlets drying brown to blackish; calyx truncate; bracts persistent .... *M. caeruleum* Jack

25. Branchlets drying tan; calyx with 4 broad lobes; bracts caducous .... *M. globosum* Bakh. f.

20. Leaf blades narrowed and often decurrent at the base; venation obscure to invisible, or prominently raised on the undersurface; branchlets not 4-winged (often 4-angled in *M. lilacinum* and *M. excelsum*)

26. Upper branchlets grooved on 2 sides, each flanked by 2 ridges, or sharply 4-angled (becoming obscure on older branches and appearing cylindric)

27. Pedicels, ovary, and calyx minutely papillose, texture roughened; petals obtuse to acute at the tip ..... *M. minutiflorum* Miq.

27. Pedicels etc. smooth; petals caudate- acuminate at the tip

28. Anthers without a gland; flowers usually more than 5 per inflorescence

29. Petals lanceolate to oblong .... *M. lilacinum* Zoll. & Mor.

29. Petals broadly ovate

30. Inflorescence 5–7 mm long, pedicels c. 1 mm long, blades drying black ..... *M. cinereum* King

30. Inflorescence 10–15 mm long, pedicels c. 4 mm long, blades drying greenish ..... *M. floridum* Ridl.

28. Anthers with a distinct gland; flowers c. 5 per inflorescence

31. Blades 3–4 by 1–2.5 cm .... *M. pauciflorum* Bl. var. *pauciflorum*

31. Blades 1.2–1.7 by c. 1 cm ..... *M. pauciflorum* Bl. var. *brevifolium* Craib

26. Upper branchlets cylindric, often slightly flattened, shallowly grooved, or somewhat 4-angled below the upper node

32. Calyx lobes reduced to 4 extremely minute points or completely truncate; petals broadly ovate to sub-orbicular, acute or mucronate at the tip

33. Calyx c. 1–1.5 mm long, c. 1.5 mm wide

34. Bud and mature anthers circular in outline, with the gland on a thin extension of the connective; calyx with 4 minute points ..... *M. garcinioides* Bl.

34. Bud and mature anthers not circular in outline, gland not as above or absent

35. Bud and mature anthers curved in a "C" shape, gland on the thickened connective; calyx truncate .... *M. acuminatum* Sm. var. *flavescens* Cl.

35. Bud and mature anthers straight, without a gland; calyx with 4 short, triangular cusps ... *M. floridum* Ridl.

33. Calyx 2–3.5 mm long, 3–5 mm wide; bud anthers curved in a "C" or hook shape, gland on the thickened connective distinct

36. Calyx campanulate, not constricted above the ovary

37. Leaf blades thick coriaceous, venation obscure to invisible .... *M. caeruleum* Jack

37. Leaf blades subcoriaceous, venation visible and raised on the undersurface ..... *M. excelsum* Bl.

36. Calyx flattened campanulate to funnel-shaped, sharply constricted above the ovary ..... *M. constrictum* Craib (q.v. *M. minutiflorum* Miq.)

32. Calyx with 4 distinct cusps, each c. 0.25 mm high, or distinctly 4-lobed, the lobes undulate or 1/3 as long as the calyx tube; petals lanceolate-oblong, or elliptic-oblong, the tips not mucronate

38. Leaf veins invisible; petals lanceolate-oblong and longer than wide, caudate-acuminate at the tip; anthers without a gland .... *M. lilacinum* Zoll. & Mor.

38. Leaf veins prominent; petals broadly elliptic to oblong, wider than long; acute, broadly rounded, or truncate at the tip; anthers with a gland ..... *M. excelsum* Bl.

19. Inflorescence 1.5–5 cm long

39. Bud and mature anthers circular in outline with the gland along the entire surface of a thin, flat connective appendage ..... *M. garcinioides* Bl.

39. Bud and mature anthers "J", "C", or "U"-shaped; gland centrally located on the thickened connective

40. Calyx with 4 triangular cusps or lobes; venation of blades visible on the undersurface .... *M. acuminatum* Sm. var. *acuminatum*

40. Calyx truncate or with 4 minute cusps or 4 undulate lobes; blade venation very obscure to invisible on the undersurface

41. Inflorescence with 3–10 flowers; petals thin with visible venation ..... *M. cantleyi* Ridl.

41. Inflorescence usually with more than 10 flowers; petals coriaceous, with obscure to invisible veins

42. Branchlets cylindric below the upper node

43. Blades 6–9 by 2–3 cm, petiole 3–4 mm long; inflorescence 1.5–2 cm long, secondary axes not developed (glomerulate on the primary axis) or up to 2 mm long; calyx with 4 minute cusps or lobes ... . *M. intermedium* Bl.

43. Blades (6) 9–21 by (2.5) 3–10 cm, petiole 6–9 mm long; inflorescence 1.5–5 cm long, secondary axes 2–12 mm long; calyx truncate ..... *M. oleifolium* Bl.

42. Branchlets 2-grooved to 4-angled below the upper node

44. Petiole 4.5–7.5 mm long, 2.5–4 cm wide; inflorescence (0.5) 1.5–2 cm long .... *M. edule* Roxb. var. *edule*

44. Petiole 6–15 mm long; blades 5–12 cm long, 3–6.5 cm wide; inflorescence up to 4 cm long ..... *M. edule* Roxb. var. *ovatum* (Sm.) Cl.

18. Inflorescence axes robust, flattened or not, 1.5–2 mm thick; blades broadly rounded to cordate at the base, less frequently with a slightly cordate-auriculate base

45. Veins on leaf blades raised on the undersurface, intramarginal nerve distinct, blades 14–27 cm long; midnerve of petals slightly raised dorsally, margins with a narrow thin portion (less than 1/10 mm wide)

46. Anther locules extending all along one side of the connective and upper part of the other, connective shorter than the locules, gland minute, round; branchlets 4-angled; shrub or tree up to 6 m tall ..... *M. wallichii* Ridl.

46. Anther locules on the enlarged tip of the connective, connective longer than the locules, gland elongate, prominent; branchlets cylindric; trees 10–15 m tall ... *M. excelsum* Bl.

45. Veins on leaf blades obscure to invisible on the undersurface, intramarginal nerve invisible; blades 8–14 cm long; mid-nerve of petals prominently keeled dorsally, margins with a prominent thin portion (at least 0.25 mm wide) ..... *M. caeruleum* Jack

Key to the species of *Memecylon* from the Malay Peninsula based on fruiting material

1. Mature fruit subglobose to globose, i.e. about as long as wide

2. Mature fruit 1.2–2 cm diameter

3. Axes of infructescence indistinct, glomerulate; areolus flat, not raised above the plane of the fruit; leaf blades thick coriaceous, veins invisible ..... *M. amplexicaule* Roxb.

3. Axes of infructescence at least 3 mm long, cymose; areolus distinctly raised above the plane of the fruit, often flattened; leaf blades subcoriaceous, veins distinct

4. Upper branchlets 4-angled

5. Leaf blades 5–10 cm by 2–5 cm; secondary axes 3, distinct ..... *M. dichotomum* (Cl.) King var. *dichotomum*

5. Leaf blades 14–25 by 3.5–10 cm; secondary axes indistinct, clustered at the tips of the primary axes .... *M. wallichii* Ridl.

4. Upper branchlets cylindric

6. Leaf blades 15–20 by 6–7.5 cm, the veins slightly raised on the undersurface; areolus slightly (1 mm) raised .... *M. megacarpum* Furtado

6. Leaf blades 7–10 by 3.5–5 cm, the veins not raised on the undersurface, often invisible; areolus flattened in the plane of the fruit, i.e. not raised ..... *M. globosum* Bakh. f.

2. Mature fruit 2–12 mm diameter

7. Upper branchlets cylindric, flattened and grooved on 2 sides, or somewhat 4-angled near the nodes

8. Veins of blades sunken above, raised on the undersurface

9. Fruit smooth when dry; blades 14–30 cm by 6–8.5 cm; petiole c. 3 mm thick ..... *M. beccarianum* Cogn.

9. Fruit rough when dry; blades 8–12 by 4–5.5 cm; petiole 1.5 mm thick ..... *M. pubescens* (Cl.) King

8. Veins of blades obscure to invisible on both surfaces

10. Upper branchlets somewhat flattened with a vertical groove flanked by two ridges on opposite sides of the petioles, or 4-angled throughout

11. Fruit flattened at the poles; pericarp 1–2 mm thick and gritty, often grooved near the base

12. Blades drying black above, brown on the undersurface; fruit drying black; infructescence glomerulate, up to 10 mm long .... *M. lilacinum* Zoll. & Mor.

12. Blades drying brown above; green, tan, to yellowish on the undersurface; fruit drying tan to grey-greenish; infructescence cymose, the axes 10–15 mm long ..... *M. minutiflorum* Miq.

11. Fruit globose throughout, usually not flattened at the poles; pericarp up to 0.5 mm thick, not gritty or grooved

13. Primary axes of the infructescence less than 1.5 mm long

14. Exocarp rough when dry; blade undersurface and fruit drying tan, yellowish, to grey-greenish ..... *M. minutiflorum* Miq.

14. Exocarp smooth when dry; blade undersurface and fruit drying brown

15. Infructescence from the axils of older leaves or from leafless nodes; primary axes 6–19 mm long, secondary axes 4–5 mm long ..... *M. edule* Roxb. var. *edule*

15. Infructescence from the axils of upper leaves; primary axes 1.5–2 mm long, secondary axes indistinct and reduced to a tubercle c. 0.5 mm long

16. Leaf blades 3–6 by 1–3 cm ..... *M. pauciflorum* Bl. var. *pauciflorum*

16. Leaf blades 1.2–1.7 by up to 1 cm ..... *M. pauciflorum* Bl. var. *brevifolium* Craib

13. Primary axes of the infructescence less than 1.5 mm long

17. Leaf blades and fruit drying black .... *M. cinereum* King

17. Leaf blades drying browish above, greenish on the undersurface; fruit drying greenish-brown ..... *M. edule* Roxb. var. *edule*

10. Upper branchlets cylindric, somewhat 4-angled, or flattened with a shallow groove on 2 sides, below the upper node

18. Blades with 3 main nerves from the base; exocarp with a grey-mealy texture when dry .... *M. oligoneurum* Bl.

18. Blades with 1 main nerve (midvein) from the base; exocarp not with a grey-mealy texture when dry

19. Infructescence an open, compound umbel; primary axes 4–5 cm long; blades broadly rounded to cordate at the base, petiole 1–2 mm long .... *M. hullettii* King

19. Infructescence cymose, often very compact to glomerulate; primary axes shorter; blades acute and decurrent at the base; petiole more than 2 mm long (except *M. constrictum*)

20. Infructescence axes up to 5 mm long

21. Blade venation invisible; infructescence from behind the leaves; primary axes up to 1.5 cm long

22. Infructescence glomerulate, of 10 or more pedicels, from behind the leaves; blades thick coriaceous, petiole 5–12 mm long .... *M. campanulatum* Cl.

22. Infructescence cymose, of 3–5 pedicels, from leaf axils; blades coriaceous; petiole c. 2 mm long .... *M. dichotomum* (Cl.) King var. *dichotomum* (limestone form)

21. Blade venation visible on the undersurface (often obscure); infructescence in leaf axils; primary axes at least 3 mm long

23. Petiole 2–4 by 1–1.5 mm .... *M. garcinioides* Bl.

23. Petiole c. 2 by 2–2.5 mm .... *M. constrictum* Craib (q.v. *M. minutiflorum* Miq.)

20. Infructescence axes at least 7 mm long

24. Petiole 7–15 mm long; blades (5) 8–12.5 by 3–6.5 cm

25. Fruit drying tan-brown, exocarp smooth, pericarp c. 0.2 mm thick ..... *M. cantleyi* Ridl.

25. Fruit drying black or greenish, exocarp rugose, pericarp 0.5–1 mm thick, gritty ..... *M. edule* Roxb. var. *ovatum* (Sm.) Cl.

24. Petiole less than 7 mm long; blades 4–9 by 2–4.5 cm

26. Blades coriaceous, veins invisible

27. Infructescence mostly from behind the leaves; blades drying greenish to brown, obtuse to acute at the tip .... *M. edule* Roxb var. *edule*

27. Infructescence mostly from leaf axils; blades drying dark brown to black, acuminate at the tip ..... *M. intermedium* Bl.

26. Blades chartaceous to sub-coriaceous, veins visible

28. Blades acute at the base; petiole 3–6 mm long

29. Fruit 6–7 mm diameter, pericarp c. 1/3 mm thick; blades broadly ovate to elliptic ..... *M. acuminatum* Sm. var. *acuminatum*

29. Fruit 10–12 mm diameter, pericarp fibrous, 1–2 mm thick, blades lanceolate-elliptic .... *M. floridum* Ridl.

28. Blades broadly rounded to shallowly cordate at the base, petiole 1–2 mm long

30. Primary axes of the infructescence up to 6 mm long, 1 mm thick ..... *M. dichotomum* (Cl.) King var. *dichotomum*

30. Primary axes of the infructescence 15–20 mm long, 1/3 mm thick ..... *M. dichotomum* (Cl.) King var. *rotundatum* (Craib) Maxw.

7. Upper branchlets generally 4-winged or at least distinctly 4-angled along the entire length of the internodes

31. Petiole 2 mm thick; blades 11–26 by 3.5–14 cm, broadly rounded to cordate at the base

32. Infructescence axes (total length) 3–4 cm, from behind the leaves; trees 10–20 m tall ..... *M. paniculatum* Jack

32. Infructescence axes 1–1.5 cm long, generally from leaf axils; shrubs or trees up to 6 m tall ..... *M. wallichii* Ridl.

31. Petiole 1–1.5 mm thick; blades 5–13 by 2–6 cm, rounded to narrowed at the base

33. Blades thin coriaceous, veins usually visible (often obscure); branchlets 4-winged to 4-angled

34. Primary axes up to 6 mm long, c. 1 mm thick

35. Upper branchlets 4-angled, tapering to cylindric; bracts persistent; secondary axes not glomerulate, up to 3 mm long .... *M. dichotomum* (Cl.) King var. *dichotomum*

35. Upper branchlets 4-winged, tapering to 4-angled; bracts not present in fruit; secondary axes glomerulate or up to 1 mm long ..... *M. fruticosum* King

34. Primary axes 15–20 mm long, c. 1/3 mm thick ..... *M. dichotomum* (Cl.) King var. *rotundatum* (Craib) Maxw.

33. Blades coriaceous, veins invisible; branchlets 2-grooved to 4-angled ..... *M. malaccense* (Cl.) Ridl.

1. Mature fruit ovate to elliptic, i.e. longer than wide

36. Infructescence axes up to 2 cm long, 3d and 4th axes usually not developed

37. Mature fruit grooved near the base, often flattened at both ends, areolus c. 1.5 mm wide ..... *M. lilacinum* Zoll. & Mor.

37. Mature fruit not grooved or flattened; areolus at least 2 mm wide

38. Fruit 8–10 mm long, areolus c. 2 mm wide

39. Blades coriaceous; ovate, acute, and often decurrent at the base

40. Infructescence axes 6–10 mm long ... *M. excelsum* Bl.

40. Infructescence axes at least 15 mm long ..... *M. oleifolium* Bl.

39. Blades subcoriaceous, lanceolate to narrowly ovate, rounded to shallowly cordate at the base

41. Branchlets cylindric ..... *M. kunstleri* King

41. Branchlets 4-winged

42. Blades ovate, 8–13 cm long ..... *M. fruticosum* King

42. Blades lanceolate, 10.5–18 cm long ..... *M. corticosum* Ridl.

38. Fruit 10–20 mm long, areolus 3–5 mm wide

43. Fruiting bracts persistent; exocarp smooth; blades coriaceous, veins mostly invisible ..... *M. caeruleum* Jack

43. Fruiting bracts caducous; exocarp rugose-pustulate; blades subcoriaceous, veins distinct ..... *M. excelsum* Bl.

36. Infructescence axes 2–8 cm long, 3d and 4th axes usually developed

44. Secondary veins sunken above, prominently raised on the undersurface; branchlets drying brown, upper internodes usually 4-angled or 4-winged ..... *M. paniculatum* Jack

44. Secondary veins faint or invisible, not sunken above, invisible to slightly raised on the undersurface; branchlets drying greyish to khaki, upper internodes cylindric ..... *M. oleifolium* Bl.

fruit unknown: *M. acuminatum* Sm. var. *flavescens* Cl.
M. pauciflorum Bl. var. *brevifolium* Craib

1. *Memecylon acuminatum* Sm., Rees Cyclop. 23 (1813) var. *acuminatum*

Tree up to 15 m tall with a diameter of 15 cm; branchlets slender and often hanging; upper internodes cylindric, often flattened and grooved below the nodes, smooth, drying brown; blades subcoriaceous, broadly elliptic to ovate, acuminate to caudate (up to 12 mm) at the tip, narrowed and decurrent at the base, midnerve sunken above, raised below, secondary venation very obscure or invisible on both surfaces; 5–7 cm long, 1.5–3.5 cm wide, dark glossy green drying brownish to olive-green above, dull green below when dry, entirely glabrous; petiole 5–7 mm long, c. 1 mm wide, glabrous; inflorescence from leaf axils, loosely cymose with many branches, (1) 2–3 cm long, with (10) 20–30 flowers, glabrous, axes flattened, bracts and bracteoles not seen, falling off before the petals mature; primary axes solitary, 10–20 mm long with 1 or 2 nodes, c. 1 mm wide at the base, secondary axes c. 5 from each primary node, 2–3 mm long with 2–3 nodes, tertiary axes c. 2 mm long, 4th axes not developed or up to 0.5 mm long, pedicels 1–2 mm long; calyx campanulate, wider and becoming flattened above the ovary, glabrous, c. 1 mm long, 1–1.5 mm wide, margin with 4 well developed triangular lobes, each c. 0.25 mm long; petals broadly ovate to sub-orbicular, acute at the tip, truncate at the base, thickened with thinner margins, c. 2–2.5 mm long and of similar width; anthers c. 1 mm long, crescent shaped, with a prominent gland centrally located on the connective; stigma minute, style c. 3.5 mm long, glabrous; fruit globose, often depressed, 6–7 mm diameter, calyx remnant distinct, flat, areolus c. 4 mm wide; exocarp pale green when immature, drying straw yellow with a slightly roughened texture, c. 0.3 mm thick

Figure 1: a. calyx and corolla bud, b. petals, c. bud stamen, d. mature stamen

This species is sometimes confused with *M. floridum* Ridl. (q.v.) which has glandless anthers, a shorter inflorescence, larger fruit, and angled branchlets.

M. intermedium Bl. (q.v.) has a shorter inflorescence with reduced, often glomerulate, secondary axes. Even in specimens of *M. acuminatum* with very reduced axes, e.g. Ridley 3297, 6413, 7309; and Foxworthy 1194, the nodes of the secondary and tertiary axes are visible. The blades in *M. intermedium* tend to dry black above, and brown below.

Kedah — Pulau Dayang Bunting: Corner sn, 13 Nov. 1941

Perak — Larut: King's collector 3458, 6754

Kelantan — G. Stong: Symington 37731

Selangor — Bukit Kutu: Ridley 7309; Sempang Mines: Ridley 15591, 15618

Pahang — Ulu Rembau: Nur 11778

Malacca — Batu Tiga: Derry 1041; Gunong Ledang: Ridley 3297; Pokoh Magas: Alvins 765; sine loc.: Griffith 2325/1

Johore — G. Belumut: Holttum 10779; Kluai Yong Estate: Corner 36295; Gunong Pulai: Mat 3741; Peuyabong: Foxworthy 1194; Tana Runto: Ridley 4656; Tanjong Bunga: Ridley 6412, 6413, Sungai Bau: Ridley s.n. in 1894

Singapore — Ridley 4574, 6411

1a. *Memecylon acuminatum* Sm. var. *flavescens* Cl. in Hk. f., Fl. Brit. Ind. II (1879) 562.

This variety differs from the typical variety by the completely truncate calyx. The differences, according to Clarke, are that var. *flavescens* has more rigid blades, which dry yellowish; and shorter (c. 1 cm long) cymes. The anthers appear to be quite similar to those of typical *M. acuminatum*. The blades, especially with their rostrate tips, also compare well.

King (J. As. Soc. Beng. 69, II : I (1900) 81 and Mat. Fl. Mal. Pen. III, 489) and Craib (Fl. Siam. Enum. 1:4 (1931) 709) both considered var. *flavescens* as a synonym of *M. minutiflorum* Miq. Their opinions are not accepted here since the structure of the inflorescence, smooth calyx, and anthers all differ significantly. The upper internodes of var. *flavescens* are cylindric and not 4-angled or 2-grooved as with *M. minutiflorum*. The affinities of var. *flavescens* lie with M. *acuminatum* and not *M. minutiflorum*; however since only 4 collections of var. *flavescens* were studied during this research I cannot be certain of any variations or to which other species of *Memecylon* it may be related. Fruiting material of var. *flavescens* has not been seen or described.

Figure 1a: a. calyx, b. petal, c. mature stamen

Penang

I.H. Burkill 2655: Curtis 815, 816

Malacca

Griffith 2325/2 (type K, L)

2. *Memecylon amplexicaule* Roxb., Fl. Ind. II (1832) 260 (*M. amplexicaulis*); *M. microstomum* Cl. in Hk. f., Fl. Brit. Ind. II (1879) 557; King, J. As. Soc. Beng. 69, II : I (1900) 79 (Mat. Fl. Mal. Pen. III, 487), syn. by Ridley, Fl. Mal. Pen. I (1922) 815; Craib, Fl. Siam. Enum. I : 4 (1931) 703..

Tree 6–18 m tall, diameter 15–75 cm; bark smooth, grey-brown, thin, shallowly fissured and cracked; slash inner bark thin, brown or orange; slash wood brown or orange; bole straight, crown spreading; branches cylindric, smooth, c. 2 mm thick, drying light brown, nodes thickened; blades coriaceous, ovate or elliptic, obtuse or with an obtuse acumen c. 5 mm long, base rounded or more often (especially in more mature or larger blades) cordate and clasping the branch; 7–15 cm long, 3–8 cm wide; veins generally invisible above, invisible or very obscure below, intramarginal nerve invisible; midnerve distinct and sunken above, prominently elevated below, thickened near the petiole and taper-

ing towards the leaf tip; dark glossy green above, light yellowish-green below, drying brown to greenish (often with a mottled pattern), greenish to lighter brown below; petiole 0.5–2, less frequently up to 3 mm long, c. 2 mm wide; leaf scars prominent, becoming elevated on older branches; inflorescence sessile, glomerulate, in leaf axils, glabrous, composed of every reduced cymes united in compact and globose fascicles; bracts and bracteoles lanceolate-ovate, acute, c. 0.5 mm long, persistent; primary and secondary axes not apparent, united axes 5–8 (rarely 10) mm diameter, entire inflorescence 1.5–2.5 cm wide; pedicles numerous, 15–25 per axil, 2–3 mm long, white to pinkish; calyx campanulate, c. 1.5–2 mm long, 1.5–2 mm wide, margin shallowly undulate or with 4 distinct, broadly triangular, acute lobes; glabrous and smooth outside, prominently ridged inside, white to pinkish; petals broadly ovate to suborbicular, acute at the tip, truncate at the base, 1.5–2 mm long, 2 mm wide, thin with the venation visible and a prominent and thickened dorsal midnerve, margins thinner, ventrally cocave at maturity, white to cream coloured; filaments 2.5–3 mm long, glabrous, white; anthers curved in a ")" shape, connective white, gland tan, distinct; style slender c. 4 mm long, white; ovules 5–12, erect, reniform, and flattened; ovary slightly wider than the pedicel, much narrower than the calyx, c. 1 mm wide; fruit globose, slightly flattened at the apex, glabrous, 1.2–2 cm diameter, pedicels 2–3 mm, calyx remnant sunken at the top without any tissue projecting above the plane of the fruit, c. 2 mm wide, internal ridges generally obscure, style scar distinct; pericarp c. 2 mm thick, pulpy, exocarp smooth, greyish-green to dark green and hard, turning red, purplish and soft when ripe, drying tan to light brown with a roughened texture, seed globose, 6–8 mm diameter, testa blackish, smooth.

Figure 2: a. calyx, b. petal, c. stamen

vernacular: nipis kulit, pantai ulat, kelat, daun pekan, dalak

properties: leaves boiled together with onions form a liquid which, when used as a poultice and applied to the head, cures headaches

uses: charcoal

habitat: primary forest, swamp forest, 600–1200 m elevation

The glomerulate inflorescence and the thick blades are similar to *M. multiflorum* which differs in having longer petioles, blades with acute bases, and a truncate calyx. The anthers appear to be the same. *M. caeruleum* Jack (q.v.) differs, among other traits, in having distinct primary axes, larger flowers, and elliptic fruit.

Kedah — Bukit Enggang: Everett 13747; Bukit Perak For. Res: Chan 13128, 13133, Everett 13684; Koh Mai For. Res.: Kiah 35182; Ulu Muda For. Res.: Bray 11511; Kedah, Haniff & Sallah 10475

Penang — Curtis 766, 3592, s.n.

Perak — Kampong Tera: Ismail 95021; Padang Batang: Shing 17388; Ulu Bubong: King's coll. 10588; Ulu Kenderong: Hamid 11615

Kelantan — G. Rabong: Shah 2484; Kampong Gobek: Shah & Kadim 484; Sungei Galas: Cockburn 7477; Sungei Merkeh; Shah & Shukor 3178

Trengganu — Jambu Bongkok For. Res.: T. & P. 12, 439 (3030); Sekayu For. Res.: Shing 13538; Ulu Bendong: Corner 30003, 30188

Pahang — Aur For. Res.: Whitmore 3683; Bukit Blakang: Haniff 21047; Bukit Tersit; Shah & Shukor 2628, Soepadmo 837; Fraser's Hill: Henderson 11515, Henderson & Nur 11212; Gunong Benom: Ismail 97802; Gunong Berembun: Ismail 104897; Kuala Teku: Kiah 31740; Baloh For. Res.: Mahamud 0820; Labis For. Res.: Ahmad & Shukor 522

Negri Sembilan — Gunong Angsi: Loh 17310; Jelebu: Everett 104909A

Malacca — Kedah Peak: Maingay 821 (1565) (*type M. microstomum* Cl.); Nyalas: coll. ? 797; Sungei Udang: Alvins 24

Johore — Gunong Besar, Labis For. Res.: Everett 13994, 14098; Gunong Blumut: Whitmore 8829; Kota Tinggi: Corner 30781; Kluai: Corner 29953; Labis For. Res.: Suppiah 104957; Ma'okil For. Res.: Shah 3666, Shing 6861; Panti For. Res.: Everett 13812

Singapore — Cantley sn; Henderson 36357; Ngadiman 37009; Ridley 2023, 9182, 15622

Further Distribution — peninsular Thailand: Surat (*fide* Craib, 703).

3. *Memecylon beccarianum* Cogn. in DC., Monogr. Phanero. 7 (1891) 1143.

Tree, 10–18 m; bark smooth, thin, reddish, brittle; branches cylindric, smooth, c. 2 mm thick; blades sub-coriaceous, broadly lanceolate to elliptic, acuminate at the tip, narrowed and slightly decurrent to somewhat rounded and shallowly cordate at the base; venation pinnate, 15–20 pairs of nerves, sunken above, prominently raised below; intramarginal nerve similar, 1.5–3 mm from the margin, looping; midnerve sunken above, raised and tapering to the tip below. 14–30 cm long, 6–8.5 cm wide; drying olive-green to brown above, greenish to light brown below; entirely glabrous; petiole 6–9 mm long, 2–3 mm thick, glabrous; inflorescence a panicle of cymes, many flowered, from leafy or upper leafless nodes; 3–10 cm long, axes 4-angled, often flattened and grooved, minutely muricate-furfuraceus, becoming glabrous; bracts and bracteoles lanceolate, acute 0.25–0.5 mm long, caducous; primary axes usually solitary, 6.5–9 cm long, with up to 4 nodes, secondary axes up to 2.5 cm long with 1 node, terminated by 15–20 pedicles, 1.5–2 mm long, clustered at the tip; calyx campanulate, often constricted above the ovary, truncate with 4 minute cusps, at first minutely muricate-papillose, becoming smooth, ridged internally, 1.5 mm high, 2 mm wide; petals thickened, broadly ovate to suborbicular, acute at the tip, truncate at the base, margins thinner, midvein slightly raised dorsally; 2 mm long, 2.5 mm wide, light blue; filaments c. 2 mm long, anthers "C"-shaped, gland distinct; style c. 4 mm long; ovules c. 16; fruit globose, 7–8 mm wide, capped by the raised calyx remnant, areolus c. 2 mm wide; exocarp thin, smooth, drying tan to black; pericarp c. 0.2 mm thick.

Figure 3: a. calyx and style, b. petal, c. stamen. Figure 32

Memecylon beccarianum Cogn. is very close to *M. paniculatum* Jack (q.v.) and can be distinguished by the cylindric internodes in the former and 4-angled to 4-winged branches in the latter. The structure of the inflorescence, calyx, petals, and anthers are virtually the same. *M. paniculatum* is a rather variable species and several other species have been reduced to synonyms of it. It is quite possible that *M. beccarianum* Cogn. is also the same since the relative

nature of the branches is not a good feature meriting maintenance of a separate taxon. As sufficient authentic material of *M. beccarianum* has not been seen (types Beccari 1311, 1518, from Matang, Borneo) it is difficult to determine its exact affinities with *M. paniculatum* merely from the orginal description and a few specimens. Therefore, pending a detailed study of the two species, *M. beccarianum* is maintained as a distinct species in this paper. As far as can be determined *M. beccarianum* has only been collected in Borneo. The inforescence, especially the pubsecence, of *M. pubescens* (Cl.) King (q.v.) is also similar, however the leaves of that species are smaller, more acute at the base, and there are differences with the calyx and petals.

Memecylon oleifolium Bl. (q.v.) can be separated from *M. beccarianum* by the cylindric inflorescence axes which are thicker, less branched, and the elliptic-ovate fruit.

4. *Memecylon caeruleum* Jack, Mal. Misc. 1:5 (1820) 26; *M. floribundum* Bl., Mus. Bot. Lugd.-Bat. 1:23 (1851) 361; *M. caeruleum* Jack var. *floribundum* (Bl.) Kurz, For. Fl. Brit. Burma I (1877) 511; *M. cordatum* Wall. Cat. 4100E.

Shrub up to 4 m or less commonly a tree up to 12 m tall; bark thin, finely fissued, grey-brown to blackish; branchlets cylindric, often flattened and shallowly grooved on 2 faces below the upper node, smooth, 1.5–2.5 mm thick, drying brown to blackish; blades coriaceous, ovate to elliptic, acute to obtuse at the tip, often with a very minute cusp; broadly rounded, cordate, or acute at the base; 8–16 cm long, 3.5–7 cm wide; venation very obscure to invisible on both surfaces, midnerve sunken above, prominently raised and tapering below; dark green above, green below, drying dark brown or blackish above, lighter brown, less commonly greenish below; margin often inrolled below; glabrous; petiole 1–3 mm long, c. 2 mm thick in broadly rounded to cordate blades; 5–7 mm long in acute blades and usually not as thick; glabrous; inflorescence cymose, appearing glomerulate, 1–1.5 cm long, glabrous, many flowered, primary axes 2–3 from foliate nodes, 2–4 mm long, slightly flattened, c. 2 mm thick; secondary axes 2–3 mm long, generally with one pedicel at the tip of each; pedicels 1–2 mm long; bracts ovate, acute, keeled on the back, up to 0.5 mm long, persistent; calyx campanulate, often somewhat funnelform, smooth, glabrous; margin truncate, thick, often cracking in 4 places (opposite the petals) after flowering; 2–4 mm long, 2.5–3.5 mm wide; pink to purple; petals coriaceous, broadly ovate to orbicular, acute or tipped with a minute mucro, truncate to emarginate at the base, c. 2.5–3 mm long, 3–3.5 mm wide at the middle; midnerve thickened and often keeled, margins thinner, reflexed at maturity, dark purple, or deep blue, margins often whitish; filaments 2.5 mm long, deep blue; anther curved in a ")" or "C" shape, c. 1 mm long, deep blue, locules white, gland distinct, reddish or orange-brown; style 4–6 mm long, blue; ovules c. 10; infructescence axes thicker, secondary axes often elongating 1–2 mm, total length up to 2.5 cm; fruit ellipsoid, smooth, glabrous, 10–15 mm long, 6–9 mm wide, crowned by the persistent calyx remnant, areolus 3–4 mm wide; exocarp thin, pink to red, turning light blue, deep purple to black with deep purple juice when ripe; pericarp pulpy and gritty, c. 2 mm thick, white.

Figure 4: a. inflorescence, b. petal, c. stamen, d. fruit and seed

There is considerable variation in the leaves of this species. Specimens with broadly rounded to cordate blades with petioles 1–3 mm long and 2 mm thick confer with Jack's description of *M. caeruleum*. In *M. floribundum* Bl. the blades are generally narrowed at the base, however broadly rounded, but not cordate, blades are often found associated with these narrowed blades (Noor & Samsuri 10, is a good example). The petioles in *M. floribundum*, regardless of the base of the blades, are always 5–7 mm long. The blades and leaves of *M. caeruleum* Jack, specifically those described by Blume as *M. floribundum*, are similar to those of *M. campanulatum* Cl. (q.v.) and *M. edule* Roxb. var. *ovatum* (Sm.) Cl. (q.v.), however the former has a glomerulate inflorescence (axes not distinct) and the latter has an elongate (1–4 cm) one; both differ in having globose fruit. *M. amplexcaule* is easily distinguished from *M. caeruleum* s.s., by its clasping leaf bases, smaller flowers, and globose fruit.

M. caeruleum s.s. is apparently restricted in distribution to southern Thailand, the Malay Peninsula, and parts of Indo-China. *M. floribundum* s.s. ranges from central Thailand to the Malay Archipelago. While the blades differ significantly and there seem to be no intermediate shapes linking the two types; the inflorescences, flowers, and fruits are identical. There is, therefore, no reason in keeping the species separate, therefore *M. florubundum* Bl. has been reduced in this paper to a synonym of *M. caeruleum* Jack on the basis of publication priority.

Kadim and Noor 660, from Pulau Tulai, Pahang; is an exceptional specimen in that the infructescence is up to 2.2 cm long. The primary axes are solitary and are up to 17 mm long with 1 or 2 nodes, the secondary axes are about 2 mm long and the pedicels are slightly shorter.

Thailand

Singora: Annandale 1662; Teratau Is.: Haniff & Nur 7479; Mohea, Trang: Hamid 2959

Malay Peninsula

Perlis — Besih Hangat: Henderson 22881; Kaki Bukit: Kiah 35280

Kedah — Alor Star: Ridley 15057; Kedah Peak: Rao, Keng, Wee 77; Pulau Langkawi: Bolinan 6787, Chew 138, Kerr 21762, Robinson 6328, Turnau 741, Whitmore 12984; Pulau Rawei: Ridley 15777; Pulau Selang: Corner sn, 22 Nov. 1941; Pulau Timun: Henderson 29125; Tau: Ridley sn, June 1893; Yan: Ridley sn, June 1893.

Wellesley — Bukit Jura: Ridley sn. Dec. 1895

Penang — Ahmad 1015: Curtis 54, Oct. 1884; Curtis 54, Aug. 1889; Curtis 54 (= 1507), 1507; King's coll. 1687; Selvaraj 99660; Sinclair 39045; Wallich 4100E (*type M. cordatum* Wall.)

Perak — Pulau Jarajah: King's Coll. 4972; Pulau Lanang: Seimund sn; Pulau Pangkor: H.M. Burkill & Shah 253; Corner 31654; Foxworthy 1736; Ridley sn; Yeob 1097; sine loc.: Scortechini 641, 1027

Trengganu — Pulau Kapas: Holttum 15216

Selangor — Kuala Selangor: Watson 16410

Pahang — Pulau Sepoi: Corner 25764, 29846; Pulau Tioman: Corner sn, 17 Aug. 1935: I.H. Burkill sn, June 1915; Henderson 18538; Pulau Tulai: Kadim & Noor 660; S. Kampong Aur: Ahmad & Shukor 484

Negri Sembilan — Port Dickson: Strugnell 10988

Malacca — Bukit China: Goodenough 1522; Bukit Panan: Alvins 280; Gambaga Batu: Hervey 2020; G. Kalan: Alvins sn, 19 Dec. 1885; Lanjong Kling: Ridley 218; Pang Kalan Miniak: Alvins sn, 19 Dec. 1885; sine loc.: Cuming 2322, Griffith 2322, Maingay 809 (1423)

Johore — Hulu Sedil: Lake & Kelsall 4074, Pulau Pemanggil: Noor & Samsuri 10

Singapore — Chew 1463; Furtado 34854; Kassim 1489; Pangi sn; Walker sn.

Further Distribution — Indo-China, Burma, Thailand, Sumatra, Java (and islands to north),, Anambas Islands, New Guinea (*fide* Craib and Bakh. f.).

5. *Memecylon campanulatum* Cl. in Hk. f., Fl. Brit. Ind. II (1879) 563; *M. multiflorum* Bakh. f., Med. Mus. Bot. Utrecht 91 (1943) 343 and Rec. Trav. Bot. Neerl. 40 (1943-45) 343; Furtado, Gard. Bull. Sing. 20 (1963) 121 *syn. nov.*

Tree up to 20 m tall with a diameter of up to 60 cm, shortly buttressed; bark closely fissured, soft, c. 2.5 mm thick, brown to grey; inner bark pink; slash wood yellow; branches 2-grooved to slightly 4-angled below the upper node, becoming cylindric, 2–2.5 mm thick, drying grey to light brown; blades coriaceous, glabrous, elliptic to ovate, less frequently lanceolate, obtuse at the tip, acute and decurrent at the base; venation invisible on both surfaces, intramarginal nerve very obscure to invisible, c. 2 mm from the margin, mid-vein sunken above, raised and tapering below; drying tan to dark olive-brown above, lighter brown below; 7–12.5 (15.5) cm long, 4–7 cm wide; petiole 5–8 mm long, 2 mm thick, glabrous; inflorescence glomerulate, up to 10 mm long, 5–10 mm wide, glabrous, many flowered, on tubercles from older branches behind the leaves; bracts and bracteoles lanceolate-ovate, acute, up to 0.5 mm long; primary axes 0.5–2 mm long, secondary axes glomerulate or up to 1 mm long; pedicels 10 or more, c. 3 mm long, calyx narrowly campanulate, thickened, 1.5–2 mm long, 1.5 mm wide, constricted above the ovary, margin truncate, flattening after flowering, glabrous, smooth, yellow, drying dark brown to black; petals ovate, acute at the tip, narrowed to the truncate base, c. 3 mm long, 1.5 mm wide, thickened with thinner margins, midnerve dorsally raised; filaments 4–4.5 mm long, anthers "C"-shaped, c. 1.5 mm long, gland prominent; style 2.5–3 mm long; ovules 10–12; fruit subglobose, 7–8 mm diameter, on pedicles c. 2.5 mm long, calyx remnant small, areolus c. 2 mm wide; exocarp green turning pink, roughened and blackish when dry; pericarp c. 1 mm thick and gritty.

Figure 5: a. inflorescence axes, calyx and style; b. petal, c. stamen

In general appearance *M. campanulatum* very closely resembles *M. edule* Roxb. var. *ovatum* (Sm.) Cl. (q.v.) which has longer inflorescences (primary axes at least 5 mm long), shallowly lobed to apiculate calyx, and petals that are more acute at the tip. The anthers and fruit appear to be the same. There seems to be a clear distinction between the lengths of the primary axes in these two species, those of *M. campanulatum* are not more than 2.5 mm long and in var.

ovatum they are at least 5 mm (generally 1–3 cm) long. It is tempting to consider *M. campanulatum* as a synonym of var. *ovatum,* but there are differences which do not, as far as can be determined, merge to form a clear gradation of variation between the two species. *M. campanulatum,* therefore, is maintained as a distinct species in this paper with a strong suggestion that it may be the same as var. *ovatum.* Kloss s.n., from Rawong, Selangor; is identical to the holotypes of *M. campanulatum* and *M. multiflorum* except that the calyx has a 4-apiculate margin. The petals and anthers of this specimen appear to be the same as the two type collections. The type collection of *M. multiflorum* Bakh. f. (Achmad 1191, from Sumatra) is identical to the holotype of *M. campanulatum* at Kew. Both type collections are in flower and fruits from other specimens collected in Sumatra and the Malay Peninsula match. *M. campanulatum* is apparently uncommon in both areas since there are only a few collections of this species available.

The congested, glomerulate inflorescence and the thick leaves of *M. campanulatum* are similar to those of *M. amplexicaule* Roxb. (q.v.) which differs in having a lobed calyx, nearly sessile and clasping leaves, and larger fruit.

Trengganu — Bukit Bauk: Hou 765; Jerangau For. Res.: Kochummen 2114

Selangor — Rawong For. Res.: Kloss sn

Pahang — Ulu Singei Anak, Endau: Cockburn 8105

Malacca — Ayer Panas: Derry 1184, Ridley 1184; sine loc.: Griffith 2325 (*type*)

Johore — Kluang For. Res.: Ng 98023; Ma'okil For. Res.: Sinclair 38992

Singapore — Ngadiman 36139

Further Distribution — Sumatra, Simeuloee Is. (*fide* Bakh. f.).

6. *Memecylon cantleyi* Ridl., J. Str. Br. Roy, As. Soc. 79 (1918) 72; *M. dissitum* Craib, Kew Bull. 1930, 325 *syn. nov.; M. steenisii* Bakh. f., Med. Mus. Bot. Utrecht 91 (1943) 355 and Rec, Trav. Bot. Neerl. 40 (1943-45) 355 *syn. nov.*

Shrub up to 3 m or a tree up to 15 m with a diameter up to 25 cm; bark thin, smooth, finely fissured and flaking, brown to greyish, inner bark yellow to brown; branchlets cylindric, often with two shallow grooves, sometimes with four faint lines or four distinct angles, very smooth, c. 1.5 mm thick, light tan to greyish when dry; blades coriaceous, less often subcoriaceous, lanceolate to ovate, acuminate at the tip (acumen up to 1 cm long), acute at the base and decurrent on the petiole for 2–3 mm, venation pinnate, 8–10 pair of nerves, very obscure to invisible above, very obscure below, more distinct in thinner blades, intramarginal nerve c. 2 mm from the margin, obscure to invisible. mid-vein sunken above, raised and tapering below, texture smooth in thin blades, rough in thicker ones when dry, 8–19.5 cm long, 3–7.5 cm wide; dark green above, slightly yellowish-green below; drying brown-greenish above, greenish below; petiole (5) 7–9 mm long, 1..25–1.5 mm wide; inflorescence 1.5–2.5 cm long, cymose from leafy or leafless nodes, each with 3–10 flowers; primary axes 1 or 2 from each axil, 5–11 mm long, flattened, secondary axes not developed or up to 6 mm long, pedicels clustered at the tips of the main axes, 3–5 mm long; calyx campanulate, c. 2.5–3 mm high 3–4 mm wide, flattening after flowering, smooth and glabrous outside, faintly ridged inside, margin truncate to somewhat undulate

with 4 minute (often indistinguishable) cusps, purplish-pink; corolla buds apiculate, tips twisted; mature petals broadly ovate, 3–4 mm long, 3–4 mm wide, acute at the tip and often provided with a mucro, shortly clawed at the base, thickened with thinner margins, mid-nerve visible, lateral venation frequently visible, anthers bent in an overturned "U" shape, gland distinct in immature anthers, rather obscure and elongating in mature ones, anthers and filaments deep red-violet; ovary distinctly narrower than the base of the calyx, ovules 6–8, infructescence axes thickening and elongating 1–2 mm; mature fruit subglobose, c. 10 mm long, 8 mm wide, calyx remnant very prominent in immature fruits, less so when mature; areolus c. 4 mm wide, internal ridges very faint; pinkish-white or sulphur yellow, turning dark purple when mature, drying blackish when immature, light brown to tan when mature, smooth with a thin (c. 0.25 mm) exocarp.

Figure 6: a. inflorescence, b. flower, c. petal, d. stamen

The relatively large flowers that are on short inflorescences plus the large, subglobose fruit; and the flattened calyx in old flowers tend to characterise this species.

Memecylon dissitum Craib is, in this paper, considered as being the same as *M. cantleyi* Ridl. The types of *M. dissitum* (Kerr 15408, from peninsular Thailand) are in poor condition, nevertheless the holotype from Kew does have a few small buds and the isotypes from BM and BK both have fruit. The immature flowers, especially the anthers, match the buds of Sidek 380 — which is *M. cantleyi*. The fruit on both isotypes are the same as on Chelliah 104387 and Sinclair & Kiah 39964 — both clearly being *M. cantleyi*. The leaves on the type specimens of *M. dissitum* match those on the specimens of *M. cantleyi* (including the holotype) examined. Craib (l.c. 325) notes that *M. dissitum* is close to *M. garcinioides* Bl. (q.v.), however the structure of the inflorescence, size of the flowers, fruit, and especially the anthers differ. The anthers of *M. garcinioides* are quite unusual and those of *M. dissitum* are not at all similar.

Memecylon cantleyi Ridl. is most closely related to *M. oleifolium* B. (q.v.) since the branches, especially the grey-tan colour when dry; leaves, and inflorescence structure are very similar. The flowers are also similar, however those of *M. oleifolium* are much smaller and the fruit of *M. cantleyi* is smooth and not roughened as with *M. oleifolium*.

Memecylon steenisii Bakh. f., from Sumatra, has also been reduced to a new synonym of *M. cantleyi* Ridl. and is more remotely related to *M. oleifolium* Bl. than Bakh. f. suggests. The holotype of *M. steenisii* (van Steenis 3373) and the paratype (Achmad 1387) at Leiden both have inflorescences c. 1 cm long each with 3–7 flowers. The size of the calyx (all buds) and the shape of the petals, especially the texture, strongly resemble *M. cantleyi*. The bud anthers resemble both *M. cantleyi* and *M. oleifolium*. These two specimens of *M. steenisii* also have blades which have dried greenish to yellow-greenish as in *M. cantleyi* — in contrast to *M. oleifolium* which dries brown.

The holotype of *M. steenisii* matches Yusoff 99141 and Suppiah 104811 (from Pahang and Kelantan, respectively) and is essentially identical to Chelliah 104387 (from Pahang) which has definite *M. cantleyi* fruit. The flowering and fruiting axes of all of these specimens are up to 1 cm long and are structurally the same. *M. oleifolium* has longer axes which are typically over 1 cm long. The holotype of *M. dissitum* Craib compares very closely in all vegetative and flowering features to the two types of *M. steenisii*. All these specimens are in bud and the size and shape of the inflorescences and buds are essentially identical.

Since the fruit of *M. steenisii* Bakh. f. has not been seen it is impossible to be absolutely certain that it is a synonym of *M. cantleyi*. However, from the evidence described above it is reasonably certain that this reduction is justified.

Thailand

Kanchanaburi, Kwae Noi Basin: Kostermans 940; Nakorn Sri Tammarat, Kao Luang: Kerr 15408 (*type M. dissitum* Craib)

Malay Peninsula

Kedah — Bukit Enggang For. Res.: Sidek 380; sine loc.: Saaid 20661

Penang — Nauen sn, May 1940

Perak — Larut: King's coll. 7635

Kelantan — Ulu Sat For. Res.: Suppiah 104811

Trengganu — Ulu Brang: Moysey & Kiah 33641; Sinclair & Kiah 39964

Selangor — Bukit Bauk For. Res.: Kochummen 2384

Pahang — Belingoo, Temerloh: Awang-Lela 4578; Bentong: Ahmad 5099; Gunong Benom, Ulu Krau: Chelliah 104387, Yusoff 9914; Jambu Bongkok: T. & P. 8 (2608); Jenderak Halt: Kadim & Mahmood 50; Jerantut: Holttum 24751; Raub: I.H. Burkill & Haniff 16219; Sungei Krau, Temerloh: Strugnell 22472, 22475; Tembeling: Henderson 24515; Titi Bungkor, Temerloh: Henderson 10671; Ulu Checka, Benom Forest: J.C. (Carrick) 1639 (2569); Ulu Chineas, Kuala Lipis: I.H. Burkill & Haniff 17091

Negri Sembilan — Seremban: Alvins sn, 21 April 1886

Malacca — Ayer Panas: Derry 1240; sine loc.: Maingay 817 (1688)

Johore — Sungai Kayu: Kiah 32170; Sungai Sedili: Corner 36980

Singapore — Ahmad 1221, Cantley 148, Ridley 13012 (type), Shah 1733.

Further Distribution — Sumatra, Simeuloee Is. (*fide* Bakh. f.)

7. *Memecylon cinereum* King, J. As. Soc. Bengal 69, II:1 (1900) 82 (Mat. Fl. Mal. Pen. III, 490); *M. umbellatum* Wall. Cat. 4109, in part.

Shrub 1–2 m or a tree up to 4 m tall; upper branches grooved and ridged on 2 sides, or somewhat 4-angled with wider grooves, c. 1 mm thick; older branches cylindric, smooth, thicker, younger branches drying dark brown to blackish, older ones tan; blades subcoriaceous, ovate to lanceolate, long acuminate to almost caudate at the tip (acumen up to 1 cm long), acute to cuneate and often decurrent on the petiole; midnerve sunken above, raised and tapering below, other venation generally invisible on both surfaces; 5.5–12 cm long, 2.5–5 cm wide, drying dark brown to blackish above, dark brown below, very smooth on both sides, entirely glabrous; petiole c. 5 mm long, 1 mm thick; inflorescence cymose, appearing glomerulate, 5–7 mm long, from leafy nodes, glabrous; primary axes flattened, up to 1.5 mm long with 1 node, secondary axes fused and indistinct or c. 1 mm long, pedicels c. 1 mm long, flowers numerous in each inflorescence; calyx campanulate and widened above the ovary, 1.5–3 mm

long, 2.5–3.5 mm wide, smooth or minutely papillose outside, ridged internally; lobes distinct, broadly triangular, 0.25–1 mm long; pinkish or blue; petals broadly ovate, acuminate to aristate at the tip, narrowed and truncate at the base, mid-vein thickened but not keeled, 1.5–3.5 mm long, 1–1.5 mm wide, whitish or purple; filaments c. 3 mm long; anthers triangular-cuneate, without a gland or in bud anthers sometimes visible as a very minute bump, c. 1.5 mm long; ovules 6–10; fruit globose, 7–8 mm diameter, calyx remnant slightly raised, with a square limb which is often flattened in the plane of the fruit, easily falling off; areolus 1.5–2 mm wide, internal ridges distinct; exocarp generally smooth or with a few minute warts, c. 0.2 mm thick, black when dry; testa glossy, brown-tan when dry.

Figure 7: a. calyx and style, b. calyx, c. bud petal, d. mature petal, e. stamen

M. cinereum King is very closely related to *M. lilacinum* with the inflorescence, calyx, and especially the glandless anthers. The blades and fruit differ. *M. malaccense* (Cl.) Ridl. is probably even more closely related, and the only major difference is with its rounded and shallowly cordate (c. 0.5 mm) blades and shorter calyx lobes. Those of *M. cinereum* are acute and decurrent at the base. The inflorescence, in basic structure, is similar, although less glomerulate with *M. malaccense*. The petals, anthers, and fruit are the same.

Memecylon floridum Ridl. (q.v.) has slightly larger axes, but otherwise the flowers are the same. The blades and especially the larger fruit with a fibrous pericarp are major differences.

Two specimens of Wallich Catalogue 4109 at Kew, inserted in a type folder of *M. edule* Roxb. var. *ovatum* (Sm.) Cl., are clearly *M. cinereum*. According to Cogniaux (l.c. 1155, 1156) other parts of the collection belong to *M. edule* var. *ramiflora* Triana, and *M. edule* var. *ovatum*.

Perak — Salama: King's coll. 3143 (*lectotype*); Silma: Scortechini 2035 (*syntype*); Ulu Kal: King's coll. 10758 (*syntype*); sine loc.: Scortechini 394 (*syntype*)

Trengganu — Gunong Padang: Moysey & Kiah 3390

Selangor — Ginting Simpah: Hume 9011; Pahang Track: Ridley 8615; Semangkok Pass: I.H. Burkill 8888, Ridley 15570; Sungei Bulok: Goodenough 10602; Trig. Station: Suilliee 8888; Weld's Hill: Cubitt 5109, Hamid 9908

Pahang — Bentong: Best 13852; Temerloh: Henderson 10514, 10704

Singapore — Wallich Cat. 4109 (type *M. umbellatum* Wall., in part)

8. *Memecylon corticosum* Ridl., J. Fed. Mal. States Mus. 10 (1920) 92.

Shrub 2–3 m tall or treelet up to 3 m tall; branches distinctly 4-winged throughout the upper internodes, nodes with wider wings (appearing auricled); branches becoming cylindric with age, 2–3 mm thick, drying grey to tan; blades sub-coriaceous, lanceolate to elliptic, acuminate at the tip (acumen 1–2 cm long); rounded, and in larger blades slightly (c. 1 mm) cordate, less frequently narrowed, at the base, venation pinnate, c. 15–20 pairs of nerves, sunken and obscure to distinct above, raised, often prominently, below, intramarginal nerve similar, 4–6 mm from the margin, broadly looping, midnerve sunken above, prominently raised and tapering below; 10–23 cm long, 3–9 cm wide; medium glossy green

above, dull green below, drying light greenish-brown above, light brown or greenish below; petiole 2–3 mm long, 2–3 mm thick; inflorescence cymose, often appearing glomerulate, from behind the leaves, often ramiflorus on thickened (c. 1 cm) branches with tubercles 2–4 mm thick; c. 5 mm long; bracts and bracteoles ovate, acute, thickened, c. 0–5 mm long, persisting; primary axes several per axil, with 1 or 2 nodes, flattened, 1–4 mm long; secondary axes almost indistinguishable and appearing fused or up to 0.5 mm long; pedicels 5–10, 2.5–3 mm long; calyx campanulate, often appearing funnelform with a constriction above the ovary, margin truncate with 4 broad and short lobes; thickened, smooth, glabrous, ridged internally, sometimes flattening after flowering, 1–1.5 mm long, 2–2.5 mm wide; pink, drying black; bud petals thick, broadly ovate, obtuse at the tip, truncate at the base, margins thinner, 3–4 mm long, 4 mm wide, dark crimson, white; anthers slightly curved to almost "C"-shaped, purple with a prominent gland; ovules 4–6; fruiting pedicels c. 5 mm long; fruit pyriform to obovate, capped by the slightly raised calyx remnant, areolus c. 3 mm wide; 9–11 mm long, 8–9 mm wide (at the widest point), exocarp pale greenish-white, flushed purplish-violet when nearly ripe, drying smooth or with a somewhat roughened texture; pericarp c. 0.5 mm thick.

Figure 8: a. upper node and internode, b. leaf, c. flower bud, d. calyx, e. petal, f. stamen

The holotype of *M. corticosum* Ridl. (Kloss 7027, from peninsular Thailand) has bud anthers which differ completely from *M. wallichii* and *M. longifolium*, thus it is certain, even though the blades and branches of *M. corticosum* often appear similar, that *M. corticosum* is distinct from these other two. The blades on the holotype of *M. corticosum* have distinct venation, however in most other specimens the venation is more prominently raised below. One specimen (Shah & Noor 1838) has a few very immature buds on a small tubercle in a leaf axil, however all the other specimens studied have the inflorescence behind the leaves or on thickend branches.

The winged branches and general shape of the leaves suggest close affinities with *M. fruticosum* King (q.v.) (including synonyms *M. epiphyticum* King and *M. tenuifolium* Ridl.). All of these taxa are poorly known, thus their exact relationships are difficult to determine. *M. kunstleri* King (q.v.), which is also incompletely known, has elliptic fruit and similar bud stamens, but cylindric branches.

Vegetative specimens are easily confused with *M. wallichii* Ridl. (q.v.) and in several collections, e.g. Henderson 19581, Moysey & Kiah 33738, 33856; the distinction is not clear due to lack of flowers or fruit. The inflorescences in these three collections are ramiflorus, thus they have been inserted under *M. corticosum*. Henderson s.n., from Batu Papan, Kelantan is vegetative and could also be referrable to *M. wallichii*.

Thailand

Bangtapan, Ratchaburi: Keith 492; Tasau, Chumpawn: Kloss 7027 (*type*)

Malay Peninsula

Kelantan — Bukit Batu Papan: Henderson sn, 8 July 1935; Gua Minik: Henderson 19581; Gua Panjang: UNESCO 609

Trengganu — Kuala Trengganu-Besut Road: Sinclair & Kiah 4058; Ulu Brang: Moysey & Kiah 33738, 33856; Ulu Telemong For. Res.: Suppiah 11408

Pahang — Ulu Sungei Sat: Shah & Noor 1838

Johore — Sungei Juasseh, Labis: Ahmad 283

9. *Memecylon dichotomum* (Cl.) King in J. As. Soc. Beng. 69, II:I (1900) 75 (Mat. Fl. Mal. Pen. III, 483). *M. elegans* Kurz var. *dichotoma* Cl. in Hk. f., Fl. Brit. Ind. II (1879) 554; Cogniaux in DC., Monogr. Phan. 7 (1891) 1138; *M. ridleyi* Cogn. ex Ridl., J. Str. Br. Roy. As. Soc. 30 (1897) 85 *nomen nudum; M. eugeniiflora* Ridl. (*"eugeniflora"*), J. Str. Br. Roy. As. Soc. 57 (1910) 48 *syn. nov.; M. dichotomum* (Cl.) King var. *eugeniiflorum* (Ridl.) Ridl., Fl. Mal. Pen. I (1922) 812 syn. *nov.*

var. *dichotomum*

Tree 6–12 m tall with a diameter up to 30 cm, less commonly a treelet or a shrub up to 3 m tall; bole irregular with many knots; bark thin, slightly fissured and scaly, light brown; upper nodes slightly flattened, often somewhat 4-winged or 4-auricled; internodes usually sharply 4-angled and usually tapering to cylindric, older branches cylindric; 1–2 mm thick; blades chartaceous to subcoriaceous, lanceolate or ovate, acuminate at the tip, rounded or shallowly cordate at the base; venation pinnate, c. 8–15 (20) pairs of nerves, obscure above, distinct and often slightly raised below; intramarginal nerve obscure to distinct, 3–4 mm from the margin, broadly looping; mid-vein sunken above, raised and tapering below; 5–10 cm long, 2–5 cm wide; glossy greeen above, duller green below; drying dark brown to greenish above, greenish to olive-green or brown below; entirely glabrous; petiole 1–2 mm long, 1–1.5 mm thick (cordate based blades appearing sessile), glabrous; inflorescence cymose, 5–7 mm long, glabrous, few (often 3) flowered; primary axes 1 — several from leaf axils, 0.5–3 (exceptionally 5) mm long, with 1 or 2 nodes, flattened and 4-angled; secondary axes 3–5, up to 3 mm long, less commonly not developed; pedicels papillose, solitary on the tip of each secondary axis, 0.5–1 mm long; bracts thick, lanceolate to ovate, acute, c. 1 mm long, persistent; bracteoles similar, both usually minutely papillose; calyx campanulate, often constricted above the ovary, becoming funnelform after flowering, slightly thickened, truncate and often splitting irregularly at the margin, usually minutely papillose outside, 3 mm long, 4 mm wide, pink to red; petals thick coriaceous with thinner margins, broadly ovate to suborbicular, broadly rounded to almost truncate at the tip, often with a minute mucro; narrowed and somewhat clawed or entirely truncate at the base; midnerve not apparent, 3–3.5 mm long, 3.5–5 mm wide, whitish to pink, reflexed at maturity; filaments white, 3–4 mm long; anthers lilac, crescent shapped to "C"-shaped, 1–1.5 mm long; gland centrally located, prominent, red-brown; stigma minute, style 3–4 mm long; ovules c. 8; fruit globose, 12–16 mm diameter, calyx remnant distinctly raised (c. 1 mm) and thickened, areolus 4–5 mm wide; exocarp green when immature, turning yellow flushed with rose-red, becoming blackish when ripe, edible, sweet, smooth and thin in smaller and immature fruits, becoming minutely muricate-papillose and black when dry; pericarp c. 1 mm thick, gritty.

Figure 9: a. branch, leaf, and internode;
b. bracts, calyx, and style; c. petal, d. stamen

A variable species with several forms which are not well understood. The papillose pedicels and calyx recall *M. minutiflorum* Miq. (q. v.), but that species has a very sharp constriction above the ovary, different branches, leaves, and fruit.

The two syntypes of *M. eugeniiflora* Ridl. have narrower and thicker blades than the type collection of *M. dichotomum*, however both taxa have identical branches, inflorescences, and flowers. Several collections clearly show that both narrow and wide blades occur on the same plant, e.g. Ridley 13423 and others with both distinct (*dichotomum*) and indistinct to invisible (*eugeniiflora*) venation, e.g. Selvaraj 11189. There is no reason, therefore, to maintain Ridley's taxon as distinct from *M. dichotomum*. The papillose calyx and distinct bracts of Ridley 14695 (syntype of *M. eugeniiflora*) match those of the type collection of *M. dichotomum*.

Another species, *M. ridleyi* Cogn. ex Ridl., only differs from *M. dichotomum* in the former having more rounded leaf bases and perhaps fainter venation on the leaf undersurfaces. Two specimens (Ridley 2241, 2609) from Tahan River and Kuala Tahan (respectively), Pahang) were collected within days of each other and have "*M. ridleyi* Cogn." written in Ridley's writing on their original labels. These are the only two specimens of *M. ridleyi* seen in the Singapore collection. King (l.c. 75) lists Ridley 2609 under *M. dichotomum*, and Furtado annotated this specimen as *M. dichotomum* also. Ridley 2241 was annotated as *M. perakense* by Furtado. There is no doubt that both of these specimens are *M. dichotomum*. *M. ridleyi* is listed by Ridley in his compilation of Malay plant names as "delima burong". Apparently Ridley never published a description of this species, therefore it is a *nomen nudum*. Thus, not only are the differences of this species artificial, but the name itself cannot be used due to nomenclatural rules.

A form of *M. dichotomum* with cylindric or obscurely 4-angled branches, coriaceous blades with shallowly (1–2 mm) cordate bases with invisible venation, and a smooth calyx with a broadly 4-lobed margin each tipped with a minute cusp is known from two collections on limestone from Kelantan. More material of this form is desired for a better understanding of its exact taxonomic status (UNESCO 520, Whitmore 4039).

uses: the liquid from boiled roots is drunk after childbirth, boiled roots used for rheumatism, used for house posts which last for 5 or 6 years when exposed; the fruit is stupefying, and the very heavy (sinks in water), durable wood is used for making spring bows (belantek).

Kedah — Bukit Enggang For. Res.: Kochummen 2011; Gunong Baling: Corner sn, 25 Nov. 1941; Gunong Jerai: Ridley 5752

Perak — Bujong Malacca: Ridley 9638; Gunong Tempurong: Allen & Kadim 494; Larut: King's coll. 3239, 5036, 5297; Maxwell's Hill: Ridley 2938, sn in June 189?; Wray 2989; Temengo: Ridley 14695 and 14696 (*types M. eugeniiflora* Ridl.); Ulu Kal: King's coll. 10783

Kelantan — Gua Batu Goh: Whitmore 4039; Gua Musang: UNESCO 241; Gua Panjang: UNESCO 520, Henderson 19595; Gunong Rabong: Shah 2486; Kampong Gobeh For. Res.: Shah & Kadim 489; Sungai Ketchil, Batu Papan: Nur & Foxworthy 12073; Sungai Lebir: Cockburn 7103; Temanga For. Res.: Brown 52920

Selangor — Bukit Enggang: Symington 24199; Chadangan For. Res.: Chelliah 98204; Dusun Tua: Ridley 7331; Gading For. Res: Loh 13369; Klang Gates: Ridley 13423; Kuala Lumpur: Curtis 2338; Sempang Mines: Ridley 15693; Sungei Bulok: Jaamat 13908; Sungei Lalang Kajang: Symington 24075; Ulu Klang Ampang: Gadoh 1661; Ulu Langat: Gadoh 959, Suppiah 11262

Trengganu — Bukit Kajang: Corner 30312, 30327; Gunong Tebu, Besut: Selvaraj 11189

Pahang — Bentong: Shah 194; Bukit Cheras: Henderson 25064; Cameron Highlands: Nur 32862; Fraser's Hill: I.H. Burkill & Holttum 8697, Cubitt 6522, Henderson & Nur 11142, Kalong 22411, Kochummen 98156; Gali near Raub: I.H. Burkill & Haniff 16249; Genting Highlands: Kochummen 16678; Whitmore 0925, 4629; Gunong Serudom, Kuantan: Shah, Sidek, Samsuri 3777; Jenderah Halt: Kadim & Mahmood 27, Kadim & Nur 27; Kota Glanggi: Henderson 22403; Krau Game Res.: Whitmore 3231; Kuala Tahan: Ridley 2241 (*syntype M. ridleyi* Cogn. ex Ridl.); Kwala Tembeling: Ridley sn (= 2241), Aug. 1891; sn in 1891; Holttum 20535, Henderson 21772; Lesong For. Res.: Ahmad & Shukor 421; Raub: Strugnell 22259; Sungai Nerling, Temerloh: Henderson 10565; Tahan River: Ridley 2609 (*syntype M. ridleyi* Cogn. ex Ridl.); Sungai Tahan: Kiah 31902, Mat sn in 1893; Taman Negara: van Balgooy 2479; Telom Valley: Kiah & Strugnell 24023; Temerloh: Burn-Murdoch 164; Ulu Keniayam: Shah 1535; Ulu Sungei Sat: Shah & Noor 1777

Negri Sembilan — Gemas: I.H. Burkill 6387; Gunong Angsi: Nur 11572, Osman 23669; Bukit Tangga: Ridley sn on 17, 22, 27 Dec. 1920; Gunong Tampin: Holttum 9574; Sungei Ujong: Alvins 1925, 2217, sn

Malacca — Mt. Ophir: Maingay 820 (2598); sine loc.: Alvins 119, Griffith 2324 (*type*), Maingay 818 (1424)

Johore — Gunong Belumut: Whitmore 8748; Khiang: Holttum 9279; Labis For. Res.: Jumali 6711 (4257), Maxwell 77–372; Sungei Endau: Shah, Shukor, Ahmad 2624; Sungei Juasseh, Labis: Ahmad 273

Further Distribution — peninsular Thailand: Pattani (*fide* Craib).

9a. *Memecylon dichotomum* (Cl.) King var. *rotundatum* (Craib) Maxw. *comb. nov.*; *M. gracilipes* Ridl. var. *rotundatum* Craib, Fl. Siam. Enum. I:4 (1931) 708; *M. gracilipes* Ridl., J. Str. Br. Roy. As. Soc. 79 (1918) 72 not C. B. Robinson, Phil. J. Sci. Bot. 6 (1911) 353; *M. curtisii* Burk. & Hend., Gard. Bull. Str. Settl. III (1925) 377 *syn. nov.*; *M. perakense* Merr., Gard. Bull. Str. Settl. 8 (1935) 132 *nom. illeg.*

Tree up to 6 m tall or a shrub 1–3 m high; branchlets 4-angled and almost winged below the upper nodes, often becoming cylindric in the lower parts of the internode, cylindric in older branches, c. 1 mm thick; blades subcoriaceous, ovate, acuminate at the tip (acumen 1–2 cm long); shallowly (1–2 mm) cordate or less commonly broadly rounded at the base; venation pinnate, 6–12 pairs of nerves, sunken above, faintly to distinctly raised below, intramarginal nerve 2–3 mm from the margin, looping, midnerve sunken above, raised and tapering below; 5.5–10 cm long, 2.5–4.5 cm wide; drying dark brown to blackish above, brown below; petiole c. 1 mm long, shorter than the cordate sinus at the base of the blade; inflorescence a simple umbel composed of 3 flowers, solitary from leaf axils, 20–33 mm long; primary axes 15–20 mm long, c. 0.3 mm thick, glabrous; secondary axes subtended by a pair of lanceolate-ovate, acute bracts, c. 0.75 mm long, 1 or 3 per inflorescence, 1–4 mm long; each, when developed, with 1 pedicel; pedicels 2–4 mm long, subtended by 2 lanceolate, acute bracteoles, 0.5–0.75 mm long; calyx campanulate, lobes broadly triangular, acute, sinuses wide, lobes less distinct as the flowers mature and often appear almost truncate, minutely papillose-muricate outside, ridged internally, c. 2 mm long, 2.5 mm

wide; petals ovate, acute, 1–1.5 mm long (ex description); anthers (only seen in bud) crescent shaped, c. 2 mm long, gland obscure, not cupular, in many instances it is merely a thickened area on the connective, probably even more obscure in mature anthers; fruit globose, 15–20 mm diameter at maturity (*ex* description), calyx remnant distinctly raised, areolus 1.5–2 mm wide; exocarp smooth, becoming minutely muricate with maturity drying black; pericarp thin when immature, thickening with maturity; testa glossy brown.

Figure 9a: a. inflorescence and calyx, b. bud stamens.

This variety is very closely related to *M. fruticosum* King (q.v.) and even closer to the typical variety. A reduction of var. *rotundatum* to the typical variety has not been made since there is variation in the inflorescences of the two taxa, thus the two can always be easily distinguished on this basis. This is not true with the leaves of both since they are variable.

There are two specimens in the Singapore collection (Haniff 14969, and Henderson 23798) which fit Ridley's description of *M. gracilipes* Ridl. viz. the nearly sessile blades with round, often cordate bases; and the three flowered, slender, long-peduncled umbel. Furtado annotated both of these as *M. perakense* Merr. *M. gracilipes* Ridl. is a later homonym of *M. gracilipes* C. B. Rob. — an entirely different species from the Philippines. *M. gracilipes* Ridl. was incorrectly renamed as *M. curtisii* by Burkill and Henderson. At varietal status *M. gracilipes* Ridl. var. *rotundatum* Craib is the oldest and only existing epithet for this taxon and must be used as the correct name here. Merrill's epithet cannot be used since it was not only published after Craib's var. *rotundatum*, but also has no priority outside its species rank.

Curtis 1295, the type collection of *M. gracilipes*, matches Kerr 15766 which is the type collection of var. *rotundatum*.

Thailand

Trang: Kerr 15766 (*type M. gracilipes* Ridl. var. *rotundatum* Craib), 19172

Malay Peninsula

Perak — Gunong Pondoh: Henderson 23798; Padang Rengas Reservoir: Haniff 14969; Waterloo Estate: Curtis 1295 (type *M. gracilipes* Ridl.)

10. *Memecylon edule* Roxb., Corom. Pl. I:4 (1798) tab. 82, and Fl. Ind. ed. 2, (1832) 260; *M. globiferum* Wall. Cat. 4108.

var. *edule*

Tree up to 12 m tall with a diameter up to 15 cm, less frequently a shrub up to 3 m tall; bark finely fissured, not flakikng, grey-brown; inner bark thin, ochre; branchlets somewhat flattened and grooved on 2 sides, grooves often widened, thus appearing 4-ridged or 4-angled, becoming cylindric with age, 1–1.5 mm thick; blades coriaceous ovate, obtuse to acute at the tip, acute and decurrent at the base; venation pinnate, invisible or infrequently extremely obscure on both surfaces; mid-nerve sunken above, raised and tapering below, 4.5–7.5 cm long, 2.5–4 cm wide; dark green above, light green below; drying dark brown above, brown below; petiole 4–6 mm long, 1–1.5 mm thick; inflorescence from the axils of older leaves, sometimes from defoliate nodes, cymose, often contracted and appearing glomerulate, glabrous, (0.5) 1.5–2 cm long, many flowered;

primary axis 1 or 2 from each axil, flattened and grooved or angled (1) 6–10 mm long; often with 2 or 3 nodes; secondary axes usually 5, less frequently glomerulate, 4–5 mm long; tertiary axes 0–2 mm long; pedicels 2–3 mm long; calyx campanulate, truncate with or without 4 minute cusps or 4 undulate lobes smooth outside, ridged internally, 1–1.5 mm long, 2–2.5 mm wide, pinkish; corolla buds conical, tips acute to shortly acuminate, twisted; petals coriaceous, broadly ovate to oblong, acuminate at the tip, truncate at the base with a very short, broad claw, dorsally keeled, margins with a wide thin zone, 1.5–2.5 mm long, c. 1.5 mm wide, white, often with a pink hue; filaments c. 2 mm long, blue; anthers crescent shaped, whitish to lilac, gland centrally located; stigma minute, style c. 3 mm long, blue; ovules 8–14; fruit globose, often somewhat flattened, thus slightly wider than long 5–9 mm wide, calyx remnant raised, areolus c. 1 mm wide, exocarp green to yellow/green, turning pinkish, finally dark purple to blackish when ripe, drying greenish-brown, often somewhat mottled, with a slightly rugose texture; pericarp 0.5–1 mm thick, not gritty.

Figure 10: a. calyx and corolla bud, b. calyx and style, c. petal, d. & e. stamens

habitat: open places, frequently found near the seashore

In many respects *M. edule* resembles *M. lilacinum* Z & M. (q.v.) but that species has 4 distinctly apiculate calyx points, narrower and long acuminate petals, no anther gland, and a grooved, flattened fruit with a very thick, gritty pericarp. *M. pauciflorum* Bl. (q.v.) is similar in flower structure to *M. lilacinum*, but has a distinct anther gland similar to that of *M. edule*.

Thailand

La Tang Si: Annandale 1696

Malay Peninsula

Kedah — Pulau Langgun: van Balgooy 2349; Pulau Langkawai: Curtis 2627, 3691, sn in Feb. 1899; Haniff & Nur 7072; Keng et al. 126; Ridley 15804; Robinson 6321; Telok Udang: Haniff 1027

Perak — Pangkor: Corner 31653

Kelantan — Gunong Brong: Shah & Ali 2891; Kota Baru: Ridley sn; Tumpat: Corner sn on 22 April 1936

Trengganu — Kuala Dugun: T. & P. 349 (2949); Kuala Trengganu: Holttum 15158, Brelkerta sn on 1 Nov. 1939, Sinclair 40726; Mesang: Poore 6133

Selangor — Merchang: Poore & Merton 1133

Pahang — Badok For. Res.: Hou 763; Fraser's Hill: Nur 11318, I.H. Burkill & Holttum 8937; Gunong Tahan: Wray & Robinson 5352; Pulau Duchong: Corner sn on 22 Aug. 1935; Praman Pekan: Ridley = 1027, sn on 26 Aug. 1889; Rompin: Bidin 15442; sine loc.: Ridley 1027

Negri Sembilan — Cape Rachado: Mahmud bin Sider 13212, Kochummen 2484

Malacca — Gadek: I.H. Burkill 4477; Pulau Rumbia: Seimund sn; Sungai Hudang: Derry 1028; Tanjong Bidara: Wong 2566; sine loc.: Alvins sn: Griffith 2326, 2327; Maingay 812

Johore — Mersing: H.M. Burkill & Shah 2508; Pulau Batu off Mersing: H.M. Burkill & Shah 2526; Pulau Setindan: Corner 29760; Tg. Penawar: Cockburn 7646

Singapore — Henderson 35783, Hullett sn; Ridley 6054, 6531, 9564, sn in 1890, sn in 1894, sn in 1906; Sinclair 39004, Maxwell 80-180

Further Distribution — India, Ceylon, Andaman Islands, Burma, Tonkin, Banka Is., Borneo (*fide* Cogniaux).

10a. *Memecylon edule* Roxb. var. *ovatum* (Sm.) Cl. in Hk. f., Fl. Brit. Ind. II (1879) 564. *M. ovatum* Smith, Rees Cyclop. 23 (1813). *M. laxiflorum* Wall. ex Ridl., J. Str. Br. Roy. As. Soc. 79 (1918) 74 *syn. nov. M. rhodophyllum* Bakh. f., Med. Mus. Bot. Utrecht 91 (1943) 357 and Rec. Trav. Bot. Neerl. 40 (1943-45) 357 *syn. nov.*

Tree up to 18 m tall, with a diameter up to 20 cm, or a shrub up to 5 m tall, bark thin, finely fissured and flaking off in thin, broadly oblong pieces, brownish; inner bark pale ochre, branchlets cylindric, often flattened and shallowly grooved on 2 sides below the upper node, 1–2 mm thick, drying greyish to tan; blades coriaceous, ovate, less commonly broadly elliptic or suborbicular, obtusely acute to obtusely acuminate at the tip, broadly rounded to acute and slightly decurrent at the base; venation pinnate, c. 15 pairs of nerves, very obscure to invisible above, distinct, but rather faint below; intramarginal nerve obscure to invisible below, c. 1 mm from the margin; midnerve sunken above, raised and tapering below; dark, glossy green above, yellow/green below, drying dark brown to blackish above, lighter brown below; 5–12 cm long, 3–6.5 cm wide; petiole 6–15 mm long, 1–2 mm thick; inflorescence from the axils of lower leaves and more commonly from leafless nodes just behind the leaves; cymose, densely flowered, often appearing glomerulate when the axes are short, 1–3 (exceptionally 4) cm long; primary axes 1–3 from each axil, vertically arranged, flattened and 4-angled or 2-grooved on 2 sides, 1–2 mm wide, glabrous, 5–15 (rarely 30) mm long; secondary axes 5–8 (10) mm long, tertiary axes 0–2 (5) mm long, pedicels 3–4 mm long; calyx campanulate, widened above the ovary, margin with 4 shallow undulations, or with 4 broadly rounded to acute lobes, sometimes truncate with 4 minute cusps; smooth outside, ridged internally, c. 1.5 mm long, 2 mm wide, pink; corolla buds conical, apiculate, tips twisted; petals thin, venation visible, broadly ovate to orbicular, broadly rounded and acute at the tip, truncate and sometimes distinctly clawed at the base, midline and claw with a thicker texture; 2.5 mm long, 2.5 mm wide, pale to brilliant blue, often purplish; filaments 2.5 mm long, pale blue; anthers "J" to "U"-shaped, c. 1 mm long; gland centrally located, reddish black; stigma minute, style c. 3 mm long; ovules c. 8; fruit globose, 8–10 mm diameter, calyx remnant raised, thin, areolus c. 2 mm wide; exocarp green, turning yellow, red, pink, then purple-black when ripe, smooth to slightly rugose and black when dry; often associated with keringga (red) ants, pericarp at first thin, when ripe 0.5–1 mm thick, gritty.

Figure 10: a. calyx and style, b. petal, c. stamen. Figure 33.

habitat: open lowlands, commonly near the sea, recorded on limestone.

In general the blades of var. *ovatum* are larger and have longer petioles than var. *edule*. The calyx in var. *ovatum* is usually broadly and shallowly 4-lobed while those of the typical variety are truncate and sometimes have 4

minute cusps. The bark of var. *edule* is narrowly fissured and does not flake off while that of var. *ovatum* has wide fissures and flakes off. The blade venation of var. *edule* is generally invisible, while those of var *ovatum* are faint, but visible in most specimens, var. *edule* also has a shorter petiole and smaller inflorescences which most frequently come from leaf axils. The petals of var. *edule* are coriaceous, with a short claw, and white.

Memecylon campanulatum Cl. (q.v.) is very closely allied and differs in having a nearly sessile inflorescence, truncate calyx, and blunt petals. As I have not seen any intermediate forms linking the two taxa, I have maintained the two as separate entities (q.v. discussion under *M. campanulatum*). The holotype of *M. laxiflorum* Wall. ex Ridl. (Wallich 4472, from Singapore) is a fruiting specimen which matches many similar specimens from throughout the peninsula. Considering the variation in the size of the leaves and inflorescence, Wallich 4472 is in no way variant and should be considered a synonym of *M. edule* Roxb. var. *ovatum* (Sm.) Cl. This specimen was cited by Clarke and Cogniaux under *M. grande* Retz., however King did not agree with this treatment and included it under doubtful species. *M. rhodophyllum* Bakh. f., described from 5 sheets collected by de Vriese (s.n.) from the Moluccas, only differs from *M. laxiflorum* Wall. ex Ridl. in having slightly shorter (2–4 cm) infructescences on thinner axes. All the isotypes are in fruit, however all of them are identical to var. *ovatum*. The fruit of these specimens of *M. rhodophyllum* are smaller and have a more prominent calyx remnant, but aside from this and the axes, significant differences between this species and var. *ovatum* have not been found. There are specimens at Singapore and Leiden which have smaller fruit and thinner axes and these all fall well within the range of variation for var. *ovatum*, therefore *M. rhodophyllum* has been reduced.

Thailand

Bang Son: Haniff & Nur 4245

Malay Peninsula

Perlis — Bukit Lapi: Henderson 22803; Kaki Bukit: Kiah 35283

Kedah — Bukit Hantu: Chew 207; Gunong Kerriang, Alor Star: Kiah 35412; Pulau Langkawi: van Balgooy 2319; Stone 6906, 6967; Chan 6800; Pulau Jerkam: Corner sn on 7 Nov. 1941; Pulau Selang: Corner sn on 22 Nov. 1941; Pulau Rawei: Ridley 15779; Pulau Tuba: Chen 41016

Penang — Pulau Jerjak: Ahmad 1004, 1012; Penang: Curtis 723 in Oct. 1885 (*syntype M. laxiflorum* Wall. ex Ridl.), Muka Head: Curtis 723 in March 1886 (*syntype M. laxiflorum*), Curtis 723 in May 1893 (*syntype M. laxiflorum*), Curtis 723 in 1893 (*syntype M. laxiflorum*); Gov.'t. Hill: Curtis 723 in May 1894; Batu Ferengy: Curtis sn, May 1901; sine loc.: Forest Guard sn, Guard sn

Perak — Larut: King's coll. 4175; Pangkor Island: Foxworthy 237, Corner 31656, Whitmore 3006

Trengganu — Pulau Kapas: Holttum 15215

Selangor — Ginting Simpah: Whitmore 4620; Gua Batu: Ridley 8279; Pulau Angsa: H.M. Burkill & Shah 970; Pulau Selatan: H.M. Burkill & Shah 933.

Pahang — Gunong Tahan: Ridley 16279; Kluang Terbang: Barnes sn; Kuantan: I.H. Burkill & Haniff 17513; Pulau Chibeh: Corner sn on 19 Aug. 1935; Pulau Sepoi: Corner 29846

Malacca — Malacca Pindah: Alvins sn

Johore — Kilat Estate: Ridley 15396 (*syntype M. laxflorum* Wall. ex Ridl.); Minyak Buku: Ridley 11092 (*syntype M. laxiflorum*)

Singapore — Pulau Merambong: Corner sn on 29 Sept. 1935; Singapore: Ridley 9565, 9591; Wallich 4103B, 4109B, 4472 (*lectotype M. laxiflorum*).

Further Distribution — India, Ceylon, Andaman Islands, Burma, Tonkin; Banka, Karimata, Billington Islands; Borneo (Indonesian part), Karimoen Djawa Islands, Sumatra, Java (*fide* Cogniaux and Bakh. f.).

11. *Memecylon excelsum* Bl., Bijdr. Fl. Ned. Ind. 17 (1826) 1094; *M. heteropleurum* Bl., Mus. Bot. Lugd.-Bat. I:23 (1851) 362 *syn. nov.*, *M. heteropleurum* Bl. var. *olivaceum* King ("*olivacea*"), J. As. Soc. Bengal 69, II:1 (1900) 78 (Mat. Fl. Mal. Pen. III, 486), *syn.* in part by Furtado, Gard. Bull. Sing. 20 (1963) 120, *non M. heteropleurum* Bl. *sensu* King l.c. 78; *M. subtrinervium* Miq., Fl. Ned. Ind. Suppl. I, Sumatra (1860) 322 *syn. nov.*; *M. maingayi* Cl. in Hk. f., Fl. Brit. Ind. II (1879) 567 *syn. nov.*; *M. kurzii* King l.c. 77 *syn. nov.*; *M. elmeri* Merr., Univ. Calif. Publ. Bot. 15 (1929) 230 *syn. nov.*

Tree up to 18 m tall with a diameter up to 60 cm, bole straight, crown spreading, branches long and deflexed, bark thin, finely fissured and flaking, brownish-grey or greenish-brown; inner bark thin, pale brown, wood hard, brownish; branches cylindric, often flattened and shallowly grooved on 2 sides or sometimes slightly 4-lined or 4-angled below the upper node; 2–2.5 mm thick, glabrous; blades coriaceous, elliptic to ovate, acute to obtuse at the tip, acute at the base and not or only slightly decurrent on the petiole; venation pinnate, 15–22 pairs of veins, sunken above, slightly raised below, lower veins running parallel to the midrib for 1–2 mm, then diverging directly towards the margin; tertiary venation generally visible below; intramarginal nerve c. 2–4 mm from the margin, nearly straight or looping, midnerve sunken above, raised and tapering below; 12–26 cm long, 4–12 cm wide, glabrous; dark glossy green above, duller green below, usually drying greenish-brown to dark brown above, olive-green to brown below; petiole 3–4 mm long, 2–3 mm thick, glabrous; inflorescence of clustered cymes, appearing glomerulate, 6–10 mm long, sometimes among the leaves, but usually just behind them, glabrous; primary axes several from each leaf axil, usually on a tubercle, 1–4 mm long, flattened, c. 1 mm thick, secondary axes not developed (glomerulate) or up to 3 mm long; tertiary axes, when developed, up to 1 mm long; pedicels 1–3 mm long; bracts and bracteoles ovate, acute, c. 0.5 mm long; calyx campanulate, thickened, truncate, smooth outside, ridged internally, 3.5–5 mm wide when mature, pink; petals coriaceous, broadly elliptic to oblong, broadly rounded or truncate at the tip, truncate at the base, 3–4 mm long, 3.5–5 mm wide, midnerve often raised on the dorsal surface margins thinner, pale lilac to pink on the dorsal surface, white to cream ventrally; filaments white, c. 2 mm long; bud anthers "J"-shaped, c. 2 mm long, blue, with a narrow and elongated gland; style c. 4 mm long; ovules 6–8; fruit oblong-elliptic, 8–20 mm long, 10–12 mm wide when ripe, calyx remnant raised, aerolus c. 4 mm wide; exocarp green when immature, purple when ripe, drying greenish to black with a rugose and often pustulate texture; pericarp 0.5–1 mm thick; seed purple, containing a liquid.

Figure 11: a. inflorescence, b. calyx, c. petal, d. stamen, e. fruit, f. areolus. Figure 34 a — e

The leaves are similar to *M. oleifolium* Bl. (q.v.) (including *M. ambiguum* Bl and *M. acuminatissum* Bl.), but this species has a paniculate inflorescence at least 4 cm long. *M. paniculatum* Jack (q.v.) has nearly sessile leaves, a paniculate inflorescence, smaller fruit, and winged branches.

The holotype of *M. excelsum* Bl. (Blume 208, from Java) at Leiden is in poor condition and is without inflorescences and flowers. A specimen collected by Bakh. Sr. (3092), also from Java, has identical branches and leaves as the holotype. This specimen has a few loose buds which are identical in structure to those on the isotype of *M. heteropleurum* Bl. (Korthals sn. from Sumatra). The only distinction is that the blade venation of *M. heteropleurum* is more prominent. Blume's descriptions of these two species differ only with the blade venation. Fruiting collections of *M. heteropleurum*, e.g. Bakh. Sr. 1777 (Sumatra) and Achmad 779 (P. Simeuloee); match those of Blume s.n. from Java which has blades identical to those on the holotype of *M. excelsum* Bl. The majority of specimens in the Leiden collection of *M. excelsum* have the *M. heteropleurum* - type blade venation, however since all other features between these two species are the same it is necessary, due to priority, to reduce the latter to a synonym of the former.

The holotype of *M. subtrinervium* Miq. (Teysmann 835, from Sumatra) at Utrecht is without any axes, flowers, or fruit. Miquel (l.c. 322) did note that the species has few flowered inflorescences with a peduncle c. 7 mm long. The young berries are said to be oviod, constricted at the top; and have a persistent, 4-lobed calyx limb. The branches on the holotype are cylindric and the blades have a distinct intramarginal nerve; both of these features match the two types of *M. heteropleureum* at Leiden — especially the smallest leaf on the isotype. The larger leaves on this isotype resemble *M. excelsum* s.s Since it is virtually impossible to determine the structure of the inflorescence, and what the leaves and fruit of *M. subtrinervium* looked like, it appears from the specimens available that it is the same as *M. excelsum*. It is obvious that many botanists have been confused over *M. subtrinervium* and have, as an alternative, referred most of their specimens to *M. heteropleurum* and *M. excelsum*. The isotypes of *M. elmeri* Merr. (Elmer 21646, from Sabah) at Singapore and Leiden are identical to the holotype of *M. heteropleurum* Bl. Both sheets are in bud, however the leaves and flowers (especially the immature anthers) match the buds on the holotype of *M. heteropleurum*. They are both, therefore, synonyms of *M. excelsum* Bl. Furtado reduced *M. elmeri* to a synonym of *M. maingayi* Cl. *M. Kurzii* King (l.c. 77), originally described as *M. subtrinervium* Miq. var. *grandiflorum* Kurz ("*grandiflora*") (J. As. Soc. Beng. (1876) 131), is recorded by King from the Nicobar Islands. The specimens of King's coll. 509, cited by King under this species are in poor condition, and the specimen from BM is without inflorescences and flowers. The specimen from Kew is somewhat better in that the axes are intact and there are a few loose post-flowering specimens. The branches and blades of these two sheets are very similar to those of *M. excelsum* Bl., however the inflorescence is larger (up to 1 cm long) and the calyx is described as being undulate with 4 broad teeth. This feature is not apparent with the post flowering material. In any case, the calyx remnant on these immature fruit is irregularly cracked and it is suspected that King misinterpreted these as lobes. The size and shape of these pieces are very similar to those of *M. maingayi*.

Memecylon maingayi Cl. is unqestionably the same as *M. excelsum* and *M. heteropleurum*. The holotype of *M. maingayi* (Maingay 814 (1422) has larger buds than the holotype of *M. heteropleurum*, but this is merely a developmental factor; the structure of the inflorescences, and flowers — especially the bud anthers — of the two specimens are the same. There is variation in the prominence of the blade venation and texture, but with numerous collections of *M. excelsum* and its synonyms available the general vein pattern is the same.

Nicobar Island — King's collector 509 (*type M. kurzii* King)

Malay Peninsula

Kedah — Bukit Perak For. Res.: Chan 13120

Perak — Larut: King's collector 4726; Lumut: Ridley 9474; Pondok Tanjong: Sallih 9710; Tapa: Wray 1310 (*lectotype M. heteropleurum* Bl. var. *olivaceum* King); sine loc.: Scortechini 89, Yong 94670

Kelantan — Gunong Sitong: Nur & Foxworthy 12257; Kuala Krai: Ismail 104273

Trengganu — Bukit Kajang: Corner sn, 30 Oct. 1935; Gunong Tebu For. Res.: Kochummen 2507; Sekayu For. Res.: Suppiah 11846, 11865; Gunong Padang: Whitmore 12543, Belara: Wood 76072

Pahang — Aur For. Res.: Whitmore 3631; Pulau Tioman: Kadim & Noor 580; Kemasul For. Res.: Temerloh: Kochummen 98586; Whitmore 0078: Kota Glanggi: Henderson 22482; Lepar For. Res.: Suppiah 108998; Lesong For. Res.: Ahmad & Shukor 450; Tahan River: Ridley 2240

Negri Sembilan — Seremban: Ismail 109424

Malacca — Selangor: Alvins 245, 430: sine loc.: Maingay 814 (1422) (*type M. maingayi* Cl.)

Johore — Anbong, Endau: Kadim & Noor 416; Bekok For. Res.: Jumali 4100; Bukit Tinjar Laut: Ngadiman 36931; Gunong Besar: Everett 14076; Kluang Reserve: Kochummen 2824, Ng 97953; Kota Tinggi: Corner 28702; Maokil For. Res.: Shing 68877; Mersing: Wyatt-Smith 76278; Sarom: Ridley sn in 1900; Sungei Kayu: Corner 29245, 32246, 32504, 32759, Kiah 31981, 32311; Ulu Sungei Segamat: Jumali 4496 (973), Samsuri & Shukor 727.

Further Distribution — Sumatra, Simeuloee Is., Mentawai Islands, Java, Borneo (Sabah, Kalimantan) (*fide* Bakh. f.).

12. *Memecylon floridum* Ridl., J. Str. Br. Roy. As. Soc. 79 (1918) 73.

Tree 10–17 m tall with a diameter of up to 15 cm; bark brown-grey, finely fissured, thin; slash inner bark thin, brown; slash wood yellow-orange, hard; upper nodes thickened, 4-angled to 4-auriculate; upper internodes sharply 4-angled or somewhat compressed and appearing 2-grooved, glabrous, c. 1.5 mm thick, drying greyish to tan; older branches mostly cylindric with widened nodes, drying greyish; blades subcoriaceous, lanceolate to elliptic, acuminate-rostrate at the tip (acumen 1–2 cm long), sharply narrowed and decurrent at the base; midnerve sunken above, raised and tapering below; secondary venation pinnate, faint; 6.5–8.5 cm long, 2.5–3 cm wide; drying greenish, often with a brown hue above, greenish below; petiole 5–6 mm long, c. 1.5 mm wide; inflorescence cymose,

from leafy and upper leafless nodes, 10–20 mm long, many flowered, glabrous; bracts and bracteoles lanceolate, acute, c. 0.5 mm long, falling off early; primary axes 1 or 2 per axil, flattened, 5–9 mm long with 1, less commonly 2, nodes; secondary axes not developed, glomerulate at the tips of the primary axes, pedicels c. 4 mm long; calyx campanulate, widened above the ovary, 1.5 mm long, 2 mm wide, margin truncate to undulate with 4 broadly triangular lobes, each c. 0.25 mm long, smooth outside, ridged internally, yellow-green; petals broadly ovate, acute at the tip, truncate at the base, slightly thickened with thinner margins, 3 mm long, 2.5 mm wide, white; filaments c. 2.5 mm long, anthers axe-shaped, without a gland, purple; stigma minute, style slender, c. 4 mm long, immature fruit pryiform, becoming globose when mature, 10–13 mm diameter, calyx remnant slightly raised, flattened, areolus c. 3 mm wide; exocarp smooth, green turning yellow then pinkish, drying blackish; pericarp fibrous, c. 2 mm thick.

Figure 12: a. calyx, b. petal, c. stamen

vernacular: nipis kulit (Perak, Kelantan)

This species is very closely related to *M. cinereum* King (q.v.) in having similar inflorescences and nearly identical flowers. The axes are slightly shorter in *M. cinereum* and its blades are less acute at the base, have invisible venation, and dry black. A major difference lies in the fruit viz. those of *M. cinereum* are smaller and have a very thin, non-fibrous pericarp.

Memecylon malaccense (Cl.) Ridl. (q.v.) and *M. lilacinum* Z. & M. (q.v.) also have similar inflorescences, flowers (especially the glandless anthers), but have different leaves and fruit. *M. acuminatum* Sm. (q.v.) is readily distinguished by having an anther gland, smaller fruit, larger and more complex inflorescence, and cylindric branches.

Perak — Gunong Bubu: Everett 13922; Larut: King's collector 3551 (*type*), 3870

Kelantan — Kuala Mersing: Ng 5460; Relai For. Res.: Cockburn 7414

Trengganu — Sekayu For. Res.: Suppiah 11867; Ulu Bendong, Kajang: Corner 30190; Ulu Besut: Cockburn 8288

Pahang — Raub: Renggol 20341; Tasek Bera: Chen & Noor 249

Negri Sembilan — Tampin For. Res.: Shing 17093

Singapore — Liew 37742, Ngadiman 36360, Ridley 6219

13. *Memecylon fruticosum* King, J. As. Soc. Bengal 69, II:1 (1900) 74 (Mat. Fl. Mal. Pen. III, 482): *M. epiphyticum* King l.c. 74 (l.c. 482), *syn. nov.*; *M. tenuifolium* Ridl., Fl. Mal. Pen. I (1922) 812, *syn. nov.*; *M. depokkense* Bakh. f., Med. Mus. Bot. Utrecht 91 (1943) 339 and Rec. Trav. Bot. Neerl. 40 (1943-45) 339, *syn. nov.*

Shrub 1.5–2.5 m tall, often epiphytic, or a treelet up to 3 m tall; branches sharply 4-angled to 4-winged, generally prominently so below the nodes giving an auricled appearance, c. 1.5 mm thick, glabrous; blades subcoriaceous, glabrous, lanceolate to ovate, acuminate at the tip (acumen up to 1 cm long), rounded at the base, 5–13 (16) cm long, 1.5–6 cm wide; venation pinnate, 10–12 pairs

of nerves, sunken and obscure above, slightly raised or obscure below; intramarginal nerve distinct or obscure, 1–4 mm from the margin, broadly looping; mid-nerve sunken above, raised and tapering below; light green when young, turning yellowish/greenish, drying dark brown with a roughened texture above, brown to greenish-brown below; petiole 2–3 mm long, 1–1.5 mm thick, glabrous; inflorescence cymose, often in pairs from leaf axils, sometimes from leafless nodes, 1–1.5 cm long; primary axes flattened, 0.5–1 mm wide, 1–6 mm long with 1 or extended for 1 mm with a second node, secondary axes glomerulate or up to 1 mm long, pedicels 1.5–5 mm long, clustered; bracts and bracteoles ovate, acute, thin, up to 0.75 mm long, caducous; calyx funnelform, c. 1 mm long, 3 mm wide, smooth outside, ridged internally, truncate, or with 4 undulations, or 4 broadly triangular, acute lobes, sinuses wide; petals oblong to broadly ovate, tipped with a mucro, truncate at the base, 2 mm long, 1.25–1.5 mm wide, margins thinner, mid-line thickened and slightly raised dorsally; filaments 2–2.5 mm long; anthers "U"-shaped with a distinct gland, c. 1 mm long; style cylindric, c. 3 mm long, ovules 9–12; immature fruit oblong-pyriform, 8–10 mm long, 6–7 mm wide, becoming globose, 8–10 mm diameter, when mature; calyx remnant distinctly raised (c. 1 mm), areolus c. 4 mm wide; exocarp smooth, green turning light red when ripe; pericarp c. 0.5 mm thick.

Figure 13: a. branch, leaf, and inflorescence, b. calyx, c. petal, d. anthers

King notes that *M. fruticosum* and *M. epiphyticum* approach *M. dichotomum* (Cl.) King (q.v.), but the latter has several major differences viz. 4-angled to cylindric branches which are not winged, more prominent leaf venation; a much shorter inflorescence with larger, thicker, and persistent bracts; papillose calyx tube; and larger fruit with a thick pericarp. The anthers of the 3 species have a similar "U" shape. Unfortunately, all three syntypes and other collections of *M. fruticosum* seen lack petals and mature fruit, however from its entirely different inflorescence *M. fruticosum* is a distinct, albeit poorly known, species.

Memecylon epiphyticum King merely differs from *M. fruticosum* in having a shorter (more reduced) inflorescence, fewer flowers, and smaller leaves. The two syntypes (King's coll. 5184, and Wray 2727) were collected after flowering and the specimens are in immature fruit. These parts are identical to King's coll. 2971 which is the lectotype of *M. fruticosum*.

Memecylon tenuifolium Ridl. hardly differs from *M. fruticosum* and *M. epiphyticum* except that its leaves are narrower and the inflorescence is shorter (c. 5 mm). The holotype of *M. tenuifolium* (Kassim 0748) at Kew has 3 loose fruit which are depressed globose, c. 10 mm diameter, and are without a raised areolus. Since Ridley did not describe the fruit of this species, plus the fact that these fruit differ from those of *M. fruticosum*, it is strongly suspected that they have been attached to the sheet by mistake. It is not common to find both flowers and mature fruit on the same specimen of *Memecylon*.

Memecylon depokkense Bakh. f., from Java, is another variant of *M. fruticosum* which has shorter inflorescences (7–8 mm long), and differs from *M. tenuifolium* in having more flowers and wider blades. Both species, in all other respects, are identical to *M. fruticosum*.

Memecylon corticosum Ridl. (q.v.) is similar to *M. fruticosum* in the angled-winged branches, and structure of the inflorescence; and it is possible that the

mature stamens are also "U"-shaped. *M. corticosum* differs in having larger, lanceolate blades with prominent venation. As collections of either species that have any transitional features have not been seen, the two species are maintained as separate taxa in this paper.

Penang — Government Hill: Ridley sn, Mar. 1896; West Hill: Curtis 1773

Perak — Larut: King's collector 2971 (*lectotype*), 3265 (*syntype*), 3425 (*syntype*), 5184 (*syntype M. epiphyticum* King); Kunstler 3265; Sungei Larut: Wray 2727 (*lectotype M. epiphyticum* King)

Trengganu — Bukit Kajang: Corner 30329

Selangor — Bukit Payong Kajang: Symington 24235

Pahang — Telok Mungkuang, Temerloh: Kassim 0748 (type *M. tenuifolium* Ridl.)

Negri Sembilan — Gunong Angsi: Sow 23712

Singapore — Ridley 5753

Further Distribution — Natoena Islands (west of Sarawak), Java (*fide* Bakh. f.).

14. *Memecylon garcinioides* Bl., Mus. Bot. Lugd.-Bat. I:23 (1851) 358.

Shrub up to 5 m tall or a tree 6–15 m high; upper internodes cylindric, sometimes slightly flattened and shallowly grooved immediately below the upper node, c. 1 mm thick, drying greyish, older branchlets drying khaki-tan; blades subcoriaceous, elliptic to ovate, acuminate at the tip (acumen 8–10 mm long), narrowed and slightly decurrent at the base, midnerve sunken above, raised and tapering below, secondary venation very obscure to invisible on both surfaces; 5.5–10 (13.5) cm long, 2–6 cm wide; drying dark brown to blackish or sometimes greenish above, brown often mottled with a greenish hue below; petiole 2–4 mm long, 1–1.5 mm thick; inflorescence from leaf axils, cymose, 1–3.5 cm long, many flowered, axes flattened, glabrous; bracts and bracteoles lanceolate, acute, c. 0.5 mm long, falling off before the petals mature; primary axes 1–3 per axil, 0.4–1.3 (2) cm long with 1 or 2 nodes; secondary axes not developed or up to 4 mm long; pedicels 2–4 mm long; calyx campanulate, slightly constricted above the ovary, c. 2 mm long, and slightly wider, margin truncate with 4 minute, triangular cusps, internal ridges prominent, drying with a slightly rugose-papillose texture; bud petals dome shaped, acute; mature petals broadly ovate to suborbicular, acute at the tip, truncate at the base, thickened with a keeled mid-rib, 1.5–2 mm long, 1.5–2 mm wide; anthers suborbicular, 0.75–1 mm long, with a thin, flat, connective extension with a long shallow gland along its entire surface; filaments c. 2 mm long; stigma minute, style slender, 3–3.5 mm long; fruit globose, 6–7 mm diameter, areolus 2–3 mm wide internal ridges distinct, calyx remnant slightly raised very thin; exocarp drying black or greyish-green, with a slightly roughened texture, c. 0.25 mm thick.

Figure 14: a. calyx, b. petal, c. stamen

The truncate calyx with 4 minute points and suborbicular anthers with a tail-like extension (actually a remnant) of the connective distinguish this species. The holotype of *M. garcinioides* Bl. var. *elongatum* Bl. (l.c. 358), which was considered to be identical to *M. intermedium* by King (l.c. 86) and a synonym

of *M. garcinioides* by Bakh. f. (l.c. 363), has blades up to 13 cm long and 4.5 cm wide with inflorescenes 10–12 mm long. It is obvious, therefore, that the lengths of the blades and inflorescences of all these taxa and specimens studied at Lieden and Singapore do not correlate.

Furtado (Gard. Bull. Sing. 20 (1963) 119) annotated a set of specimens in the Singapore collection as *M. hepaticum* Bl., which are actually *M. garcinioides*. The type specimen of *M. hepaticum* (Blume s.n., from Sumatra) at Leiden is without inflorescences, flowers, and mature fruit; therefore it is not certain what this species really is since the description is inadequate for a critical study. The specimens from Johore and Malacca all have lanceolate leaves, but the inflorescences and flowers (especially the globose anthers) strongly resemble *M. garcinioides*. For this reason this set of specimens has been cited under *M. garcinioides*. No specimens from the Malay Peninsula have been seen with the same kind of leaves as the type collection of *M. hepaticum*. The anthers of *M. intermedium* Bl. (q.v.), especially in bud, often resemble those of *M. garcinioides*. Good distinguishing features of *M. intermedium* include its smaller and narrower leaves, and calyx with 4 triangular lobes.

Perak — Gunong Boobo: King's collector 7394; Gunong Malacca: King's collector 7152, Kunstler 7123; Jor Batang Padang: Henderson 10886; Larut: King's collector 1984, 2938; Maxwell's Hill: Wray 2961, 3203; Sungai Seluang: Shah & Shukor 3451; Ulu Bubong: King's collector 10034

Kelantan — Sungai Renong: Nur & Foxworthy 12159

Selangor — Bukit Kulu: Goodenough 10812; Gunong Bunga Bua: Ng 1160; Kuala Lumpur: Mohamet 2024; Raweang: Ridley 7333; Sungei Bulok: Hamid 1600, Symington 21077; Ulu Gombak: Strugnell 12738

Pahang — Gunong Senyum: Evans 13190; Taman Negara: van Balgooy 2584; Tasek Bera; Stone 9472a, 9474

Negri Sembilan — Gunong Angsi, Loh 17304

Malacca — sine loc.: Alvins 1212; Mt. Ophir: Keng et al. 6312

Johore — Endau: Kadim & Noor. 314; Gunong Panti: Everett 13837, H.M. Burkill 3189; Joh: Ridley 14167; Kota Tinggi: Corner 32491; Mawai: Corner 30882; Mawai — Jemaluang Road: Corner sn, on 9 Feb. 1935; Mawai — Kota Tinggi Road: Corner 30976; Sungei Kayu: Corner 29251, 32476, Kiah 31961; Sungei Kayu Ara: Corner 29481; Ulu Langat For. Res.: Whitmore & Wong 115654

Singapore — Ngadiman 34975, Rao sn; Ridley 4805,, 8118, 14171

Further Distribution — peninsular Thailand, Sumatra, Java, Borneo (Kalimantan), Karimata Is. (*fide* Craib and Bakh. f.).

15. *Memecylon globosum* Bakh. f., Med. Mus. Bot. Utrecht 91 (1943) 355 and Rec. Trav. Bot. Neerl. 40 (1943-45) 355.

Shrub up to 2 m tall or a tree up 5 mm tall; branchlets cylindric, often grooved immediately below the upper node on 2 sides, smooth, glabrous, 1.5–2 mm thick, drying tan; blades coriaceous; oblong, elliptic, or ovate; acuminate at the tip (acumen up to 12 mm long), narrowed and shortly (1–3 mm) decurrent at the base, midnerve distinct, intramarginal and secondary nerves obscure to invisible above, more distinct below; 7–20 (23) cm long, 3–11.5 cm wide; drying brownish above, lighter brown below; petiole flattened, dorsally grooved, 5–8 mm long, 1.5–3.5 mm thick; inflorescence cymose, 1–1.5 cm long, from leaf axils, sometimes terminal, few to many flowered, glabrous; bracts ovate, acute, c. 1.5 mm long, caducous; primary axes generally several per axil, flattened, 2.5–5 mm long, with one node, lateral axes shorter; pedicels 3–4 mm long; calyx campanulate, thickened, widened above the ovary, c. 3 mm long, 4 mm wide; margin with 4 short, broadly rounded lobes, sinuses splitting in mature flowers, glabrous; petals thick, (sub) orbicular, c. 4 mm long, 4 mm wide, obtuse at the tip, truncate at the base, reflexed at maturity; filaments c. 2.5 mm long; anthers "J" shaped, c. 2 mm long, connective thick with a prominent gland; 14–16 mm diameter, areolus flattened, c. 4 mm wide; exocarp greenish (immature), drying brownish-tan with a slightly roughened texture; pericarp fibrous, c. 1 mm thick.

Figure 15: a. inflorescence and leaf, b. calyx, c. petal, d. stamen

The branches and leaves closely resemble those of *M. oleifolium* Bl. (q.v.) which has, among other major differences, longer and more complex inflorescences, and elliptic-ovate, pustulate fruit. *M. globosum* is easily distinguished from other species of *Memecylon* by its short inflorescence, relatively large flowers, 4 broad calyx lobes, and large, globose fruit.

The type collection of *M. globosum* (van Steenis 1265, from the Natoena Islands west of Sarawak) consists of buds, and the mature flowers and fruit were not previously described. Several other collections from Borneo, Johore, and Singapore compare closely with this type collection, thus enabling a complete description of this species. There is considerable variation in the size and shape of the leaves, however the inflorescence, flowers, and fruit seem to be constant. The species is apparently rare and ranges from southern Johore, Singapore, to Borneo.

Johore — Gunong Blumut, Kluang: Shah & Sanusi 2173

Singapore — Bukit Timah: Ridley 6768

Further Distribution — Natoena Islands, Borneo (*fide* Bakh. f.).

16. *Memecylon hullettii* King, J. As. Soc. Beng. 69, II:1 (1900) 76 (Mat. Fl. Mal. Pen. III, 484).

Shrub or treelet up to 3 m tall; branchlets cylindric, often flattened and shallowly grooved below the upper node, 1.5–2 mm thick; blades coriaceous, lanceolate, ovate, to oblong; acuminate at the tip (acumen up to 2 cm long), broadly rounded and usually cordate at the base; venation pinnate, 15–20 pairs of nerves, very obscure but visible on both surfaces; intramarginal nerve 1–2 mm from the margin; 12–27 cm long, 3.5–8 cm wide; drying dark brown above, lighter brown below; petiole 1–2 mm long, shorter than the basal lobes of the blades, thus appearing sessile, 1.5–2 mm thick; inflorescence a compound umbel, 6–8 cm long, often reflexed, many flowered; axes muricate-papillose; primary

axes solitary from leafy nodes, 4–5 cm to the first node of the inflorescence, often extending beyond the first node for 0.5–1.5 cm; secondary axes 5–7, ranging in length from 2 mm (peripheral ones) to 1.5 cm (central one); pedicels 4–5 mm long, papillose, in terminal clusters ranging from 3–5 flowers (peripheral axes) to c. 25 on the terminal axis; bracts ovate, acute, c. 0.75 mm long, appearing clustered, caducous; calyx campanulate, flattening somewhat after maturity, truncate with 4 minute cusps, widened abruptly above the ovary, papillose outside, ridged internally, 1.5 mm long, 3 mm wide; petals coriaceous, broadly ovate, broadly round and apiculate at the tip, rounded and shortly clawed at the base, slightly keeled in the upper $\frac{1}{2}$ dorsally, margins thinner, 3 mm long, 4 mm wide, white, filaments c. 2.5 mm long, anthers blue, c. 1 mm long, suborbicular in outline, connective shortened and reduced to about the same size as the locules, gland distinct, situated on the curved tip of the connective; stigma minute, style slender c. 5 mm long; ovules c. 6; fruit globose, 7–9 mm diameter, capped by the persistent calyx remnant, c. 0.5 mm high, with a thickened, undulate margin, areolus c. 2–3 mm wide, internal ridges generally indistinct; exocarp smooth, c. 0.2 mm thick, white, then pinkish, finally blueish when ripe, drying blackish.

Figure 16: a. branch, leaf, and inflorescence, b. calyx and corolla bud, c. petal, d. stamen

The broadly rounded or cordate, nearly sessile leaves; long primary axis, and compound umbellate inflorescence distinguish this species from all others in the region. The leaves of *M. dichotomum* (Cl.) King (q.v.) are often similar, but its angled branchlets and glabrous inflorescence axes immediately distinguish it from *M. hullettii*. The anthers of *M. garcinioides* Bl. (q.v.) appear similar, but all other vegetative and floral characteristics of the two species differ considerably.

Johore — Gunong Belumut: Holttum 10854; Gunong Muntajak: Nur 19976; Gunong Pulai: King & Hullett 253 (*lectotype*), Mat 3739, Sinclair 39549; Khiang: Holttum 9436; Kluang For. Res.: Alphonso, Sanusi, Sidek 210; Shah & Sanusi 2133; Kota Tinggi: Shah 454; Pelepah Kiri: Corner sn on 19 Oct. 1936; Sedenah: Ridley 13501; Sungai Batu Pahat: Lake & Kelsall 4073 (*syntype*); Sungai Buloh Kasap: Corner 29984; Sungai Kayu Ara: Corner 29234; Sungei Pelepoh Kiri: Corner sn, on 26 June 1938; Virgin Jungle Res.: Ahmad 390

17. *Memecylon intermedium* Bl., Mus. Bot. Lugd.-Bat. I:23 (1851) 358.

Tree up to 25 m tall, with a diameter up to 1 m, buttressed in larger trees, bark grey-brown, smooth, rugose, finely fissured and flaking off, inner bark brownish; branches cylindric, often with a shallow groove on 2 faces which usually disappears before the next node, 1–1.5 mm thick, drying tan to brown; blades subcoriaceous to coriaceous, glabrous, lanceolate to ovate, acuminate at the tip (acumen up to 1 cm long), narrowed and decurrent at the base, midnerve sunken above, raised below, secondary venation extremely obscure or invisible; 6–9 cm long, 2–3 cm wide, drying dark brown to blackish above, brown below, with a roughened texture; petiole flattened, 3–4 mm long, 1.5–2 mm thick; inflorescene from leaf axils, cymose, 1.5–2 cm long, many flowered, glabrous; bracts and bracteoles lanceolate, c. 0.5 mm long, caducous; primary axes usually solitary, flattened, 7–12 mm long usually with 1 node, seondary axes glomerulate or up to 2 mm long, pedicels 1–2 mm long; calyx campanulate, 1.5–2 mm long, 2–3 mm wide, widened above the ovary, smooth and glabrous, flattening after flowering, margin truncate with 4 cusps or short lobes, internal ridges prominent;

petals broadly ovate to sub-orbicular, 2.5–3 mm long, c. 3 mm wide, acute at the tip, truncate at the base, thickened with a slightly raised midrib, margins thinner, pinkish; filaments c. 2 mm long, pale blue; anthers "J"-shaped, c. 2 mm long, gland distinct; stigma minute, style cylindric c. 3 mm long; fruit globose. 6–8 mm wide, calyx remnant nearly flat or slightly raised, areolus c. 2 mm wide, exocarp smooth, green ripening blue, drying black, pericarp c. 0.2 mm thick.

Figure 17: a. branch, leaves, and inflorescence;
b. calyx, c. petal, d. anthers

In terms of the inflorescence and flowers this species closely resembles *M. acuminatum* Sm. (q.v.), however that species has larger fruit with a thicker, more rugose pericarp, and thinner blades. The leaves and fruit of *M. glomeratum* Bl. (known from Sumatra and Borneo) are very similar to those of *M. intermedium*, however the former has much shorter (apparently nearly sessile) inflorescences.

Authentic inflorescences and flowers of *M. glomeratum* have not been seen, thus further comparisons cannot be made here. Blume notes that *M. intermedium* is close to *M. garcinioides* Bl. (q.v.), however I feel that its affinities lie with *M. edule* Roxb. (q.v.). *M. garcinioides* has sub-orbicular anthers with a curious appendage which can be used to immediately distinguish the species.

The anthers of *M. intermedium* Bl., especially in bud, are closest to those of *M. garcinioides* Bl. (q.v.) which differs in having larger leaves and a minutely apiculate calyx. The anthers of *M. garcinioides* have, in general, a more reduced connective, thus giving the anther an orbicular rather than "J" shape. Several collections from Java known as *M. intermedium* Bl. var. *longipes* Bl. (l.c. 359), and reduced to the typical variety by Bakh. f. (l.c. 363) have inflorescences up to 6 cm long. Sepcimens of this species from the Malay Peninsula have inflorescences 1.5–2 cm long.

The typical variety of *M. edule* Roxb. (q.v.) is also close to *M. intermedium* and can be distinguished by having inflorescences behind the leaves, blades which dry greenish or brownish — never black, and 4-angled or 2 grooved branches.

Kedah — Gunong Jerai: Chelliah 9801, Evans & Gorden 95; Hou 798, 814; Stone 8635; Stone & Mahmud 8505

Trengganu — Gunong Padang: Whitmore 12690

Penang — Penara Bukit: Curtis sn in June 1890

Perak — Slim Hills For. Res: Whitmore 0812

Kelantan — Bukit Brangkat: Shah & Ali 2880; Gunong Stong: Whitmore 12453

Selangor — Gunong Bunga Bua: Ng 1153, Whitmore 0345; Semangko For. Res.: Whitmore 12556; Ulu Langat For. Res.: Whitmore 12175; sine loc.: Kepong no. 85084

Pahang — Balok Game Res.: Kochummen 2095; Fraser's Hill: Nur 11259; Gunong Benom: Whitmore 3194; Gunong Lesong, Rompin: Shah & Shukor 3130; Kuala Kelepah: Shah & Noor 1767; Kuala Teku: Whitmore 4803; Merapoh: Shing 17265

Malacca — Gunong Ledang: Ridley 3296

Johore — Bukit Chongkrak: Shah & Samsuri 3635; Kuala Palong For. Res: Everett 14263; Rengam For. Res.: Suppiah 17770

Further Distribution — Sumatra, Java (*fide* Bakh. f.).

18. *Memecylon kunstleri* King, J. As. Soc. Beng. 69, II:1 (1900) 76 (Mat. Fl. Mal. Pen. III, 484).

Tree up to 20 m tall, diameter up to 45 cm; branches cylindric, striate, often with two very shallow grooves below the upper node, becoming cylindric, c. 1 mm thick, drying tan; blades subcoriaceous, glabrous, lanceolate-ovate, shortly acuminate (c. 5 mm) at the tip, rounded and often shallowly cordate at the base, venation pinnate, 10–12 pairs of nerves, obscure on both surfaces in smaller blades, distinct on larger ones, sunken above, slightly elevate below; intramarginal nerve obscure or distinct, 2–2.5 mm from the margin; 6–13 cm long, 2.5–5 cm wide; deep glossy green drying dull dark brown above, brown below; with a roughened texture; petiole 2–3 mm long, 1–1.5 mm thick; inflorescence cymose, 2–4.5 cm long, glabrous, from leaf axils, many flowered, axes sharply 4-angled; primary axes 1 or 2 per axil, 10–35 mm long with 1 or 2 nodes, secondary axes 3–15 mm long, pedicels 2–3 mm long; calyx campanulate, flattening after flowering, truncate or undulate at the margin, with 4 minute cusps, smooth outside, prominently ridged inside, 1.25–1.5 mm long, 2 mm wide; petals thickened with thinner margins, oblong to broadly ovate, rounded and apiculate at the tip, truncate at the base, 1.5–2 mm long, 2–2.5 mm wide, waxy white; filaments c. 2.5 mm long, bud anthers "J"-shaped, "U"-shaped when mature, c. 1 mm long, gland distinct; dark brown; style c. 3 mm long, ovules 12–15; immature fruit ovoid, 7–9 mm long, 4–5 mm wide, crowned with the obscurely 4-toothed calyx remnant, areolus c. 3 mm wide, waxy pale green, drying grey-greenish, pericarp c. 0.2 mm thick.

Figure 18: a. branch, leaves, and inflorescence;
b. calyx and style, c. petal, d. stamen, e. areolus

The cylindric branches and glabrous inflorescence axes distinguish this species from *M. paniculatum* Jack (q.v.), *M. fruticosum* King (q.v.), and *M. corticosum* Ridl. (q.v.). The leaves of *M. kunstleri* closely resemble those of the type collections of *M. appendiculatum* Bl. and *M. nudum* Bl. — both of which were reduced to synonyms of *M. costatum* Miq. by Bakh. f. (l.c. 345), and now synonymous with *M. paniculatum.* These species have similar inflorescences, but differ in having 4-angled branches and pubescent inflorescence axes.

The dry blades and "U" shaped anthers of *M. kunstleri* and *M. fruticosum* are similar, however the winged branches and shorter inflorescences of the latter are obvious differences.

Kedah — Sungai Terap, Selma: Henderson 35447

Penang — Penang Hill: Nauen sn, in April 1940

Perak — Changkat, Serdang: Wray 744; Gunong Dipang: King's collector 8195 (*syntype*); Ulu Bubong: King's collector 10419 (*lectotype*)

Selangor — Labu: Ridley 7334

19. *Memecylon lilacinum* Zoll. & Mor., Syst. Verzeich. (1845-46) 9; *M. myrsinoides* Bl. var. *lilacinum* (Zoll. & Mor.) King, J. As. Soc. Bengal 69, II:1 (1900) 81 (Mat. Fl. Mal. Pen. III, 489); *M. myrsinoides* Bl., Mus. Bot. Lugd.-Bat. I:23 (1851) 356 *syn. nov.; M. laevigatum* Bl., l.c. 358 *syn. nov.; M. laevigatum* Bl. var. *sulcicarpum* Furtado *in scheda,* Herb. Singapore; *M. pseudo-nigrescens* Bl., l.c. 357 *syn. nov.; M. pseudo-nigrescens* Bl. var. *acuminatum* Bl. *in scheda,* Leiden; *M. confine* Bl., l.c. 357 (syn. by Bakh. f., Med. Mus. Bot. Utrecht 91 (1943) 361 and Rec. Trav. Bot. Neerl. 40 (1943-45) 361).

Tree up to 25 m tall, diameter up to 40 cm, bole shortly fluted; less frequently a shrub up to 3 m tall; bark pale grey-brown, thin, finely fissured and flaking; slash inner bark thin, brown; slash wood dark yellow to white, wood dense and sinks in water; upper nodes flattened, prominent after leaf fall, black when dry; upper internodes often shortened (8–12 mm) or 2–3 cm long, 1–1.5 mm thick, flattened and grooved on 2 sides, often somewhat 4-angled, becoming cylindric, drying greyish to khaki-tan; blades coriaceous, glabrous, lanceolate to ovate, acuminate at the tip (acumen 5–15 mm long), acute and decurrent at the base, 2.5–8.5 cm long, (1) 1.5–4 cm wide, mid-nerve sunken above, raised below, other venation invisible; dark glossy green drying dark brown to blackish above, dull green drying brown to dark brown below; petiole 4–8 mm long, 1–1.5 mm thick, glabrous; inflorescence from the axils of lower leaves or upper leafless nodes, cymose and appearing glomerulate, many flowered, 5–8 mm long, glabrous; bracts and bracteoles subulate, c. 0.25 mm long, falling off before the petals mature; primary axes flattened, with 1 node, 1–1.5 mm long, secondary axes 3–5, glomerulate or c. 1 mm long each with 3 pedicels c. 1 mm long; calyx campanulate, glabrous, smooth, 1.5 mm long, 1.25–1.5 mm wide, tan, margin truncate with 4 distinct triangular cusps each c. 0.25 mm high; corolla buds dome shaped, acute, tips twisted; petals lanceolate-oblong, sharply acuminate at the tip, truncate at the base, 1.5–2 mm long, c. 1 mm wide, slightly thickened with a keeled dorsal mid-nerve, margins thinner; white, lilac, or blue; filaments c. 1.5 mm long, lilac; anthers c. 1.5 mm long without a gland, whitish; style slender, 3–5 mm long, lilac; ovules c. 8; fruit globose, 8–12 mm diameter, flattened at both poles, calyx remnant minute, flattened in the plane of the fruit; areolus c. 1.5 mm wide not sunken; generally with 4–8 shallow (often indistinct) vertical grooves, especially near the pedicel; exocarp smooth when immature, often becoming somewhat rugose in mature dry specimens, infrequently with minute whitish pustules, green when immature, turning yellow to pale orange, finally black when ripe, grey-green or black when dry; pericarp 1–2 mm thick, gritty.

Figure 19: a. inflorescence, b. calyx and corolla bud, c. petal, d. stamen

Figure 31: bark

vernacular: delik (Selangor), nipis kulit (Kedah, Johore), tengading (Temuan)

The very compact cymes, calyx with 4 cusps, narrow and acuminate petals, glandless anthers, and the depressed, grooved, globose fruit distinguish this species. *Memecylon edule* Roxb. (q.v.) can be confused here, but it has no or extremely minute calyx points, wider and blunter petals, an anther gland, and a smooth, globose fruit with a thin pericarp and no grooves.

Some specimens may be confused with *M. garcinioides* Bl. (qv.) wh.ch has cylindric branches without grooves, thinner blades, and different flowers (especially the anthers) and fruit. The fruit on some specimens, e.g. Chan 6764, have dried

black and the exocarp has scattered, minute pustules. Everett 13821 has fruit with a similar colour and texture, but the shape is more pyriform with a narrowed tip, unequal base, and lacks grooves. The type specimens in Leiden of *M. myrsinoides* (Blume 1374 from Java) all have relatively small blades, 3–4.5 cm long and 1.5–2.5 cm wide on branches with short (8–12 mm) upper internodes.

The inflorescences on the specimen designated as the holotype are about 5 mm long with numerous flowers. These specimens, at first glance, appear to differ from the type specimens at Leiden of *M. laevigatum* Bl. collected by Blume (s.n.) from Borneo. The blades are generally larger, 5.5–8.5 cm long, 2.5–4 cm wide, and the upper internodes are all over 2 cm long. The inflorescences are essentially the same except that the secondary axes are slightly less obscure.

The two type specimens of *M. myrsinoides* Bl. var. *lilacinum* (Zoll. & Mor.) King in the Leiden collection (Zollinger 187) are intermediate between the two species discussed above. The blades are 5–6.5 cm long and 2.5–3.25 cm wide and the inflorescences are structurally the same, but with more flowers and longer (c. 5 mm) styles. The upper nodes are from 1.5–2 cm long, that is intermediate between the other two species. All three taxa have identical flowers which are typified by the truncate margin with 4 distinct cusps; thin, oblong, acuminate petals, and the uniquely shaped anthers without a gland. Fruit of the large leaved *M. laevigatum* and the smaller leaved *M. myrsinoides* and various intermediate specimens from several sheets at Singapore and Leiden are the same.

A specimen collected by van Steenis (12657) from Java has branches and leaves which match the type specimens of *M. myrsinoides* and the inflorescences, being very dense and having long styles, are the same as those on Zollinger's collections of var. *lilacinum*. Paie 13320, from Sarawak, has short internodes characteristic of *M. myrsinoides* and larger blades which range in size for those of var. *lilacinum* and *M. laevigatum*. Dilmy et al. 11, from east Java, has both small and medium sized blades, relatively long upper internodes, and inflorescences similar to those of *M. myrsinoides* and *M. laevigatum*. Even on the type specimens of *M. myrsinoides* and *M. laevigatum* the range of blade size overlaps, and with all taxa the upper internodes are shallowly grooved on 2 sides and dry a khaki-tan colour.

Unfortunately, variation in the length of the upper internodes and size of the blades has caused some taxonomic confusion. Cogniaux (l.c. 1159, 1160) separated the species mainly on the size of the inflorescences and considered *M. lilacinum* as a synonym of *M. myrsinoides*. Bakh. f. (l.c. 335) maintained both species and var. *lilacinum* as distinct taxa. Since all three taxa are structurally idental and have intermediate traits which link all of them togetther, they are considered as representing one species and in this paper have been lumped under the oldest name viz. *M. lilacinum* Zoll. & Mor.

Memecylon cinereum King, *M. floridum* Ridl., and *M. malaccense* (Cl.) Ridl. have very similar inflorescences, calyx lobes, and identical glandless anthers. The blades, petals, and fruits differ (q.v. discussions under these species). The holotype of *M. peudo-nigrescens* (Blume s.n. from Sumatra) in the Leiden collection has branches, blades; and most important, immature fruit which is depressed globose, grooved, and with a thick, rugose pericarp. It is, undoubtedly, the same as *M. myrsinoides* Bl. et al. Other specimens in the Leiden and Singapore collections confirm this fact. The blades in most specimens of *M. pseudo-nigrescens* are ovate and fall within the upper size range of *M. myrsinoides* and

match the smaller ones of *M. laevigatum*. There are no flowers on the holotype of *M. pseudo-nigrescens*, however, Lörzing 10163 from Sumatra has inflorescences and flowers, especially the glandless anthers, similar to the holotype of *M. myrsinoides*. Lörzing's specimen has the calyx margin distinctly undulate with 4 triangular cusps. This feature differs slightly from the truncate calyx in the holotype of *M. myrsinoides* Bl.

There is no reason to maintain *M. pseudo-nigrescens* Bl. as a distinct taxon and since it cannot be adequately distinguished from *M. myrsinoides* et al. it should be combined with *M. lilacinum* Zoll. & Mor.

A specimen collected by Korthals (s.n.) from Sakoembang, Borneo has *M. pseudo-nigrescens* Bl. var. *acuminatum* written on the original label. This specimen is identical to the holotype of *M. pseudo-nigrescens* Bl. Bakh. f. (l.c. 362) placed this specimen in his list of species under *M. pseudo-nigrescens*. I agree with Bakh. f. (l.c. 361) in reducing *M. confine* Bl. (l.c. 357) to a synonym of *M. pseudo-nigrescens*. Cogniaux (l.c. 1160) combined *M. pseudo-nigrescens* and *M. confine* under *M. glomeratum* Bl. (l.c. 356), however the fruit of the holotype of *M. glomeratum* Bl. at Leiden is globose with a smooth, thin pericarp which dried black. The branches and leaves of *M. glomeratum* do, however, match those of *M. myrsinoides, M. pseudo-nigrescens*, et. al. Flowers of *M. glomeratum* have not been described and all the material of this species at Leiden lacks flowers. It is not certain, therefore, what *M. glomeratum* really is, but at least from the immature fruit is not the same as *M. lilacinum* Z. & M. *M. oligoneurum* Bl. (q.v.) has similarly shaped, glandless anthers; but differs greatly in the 3-nerved blades, different calyx and petals, 2 ovules, and globose fruit. *M. minutiflorum* Miq. (q.v.) has similarly shaped fruit, but differs in having larger fruiting axes, a raised areolus, and blades which dry with lighter colours.

The fruit in some specimens, e.g. Goh 15701 and Chew 726 is obovate to oblong, often with grooves; thus differing from the typically depressed globose shape of most fruiting material. Furtado annotated Goh's specimen as *M. laevigatum* Bl. var. *sulcicarpum* Furtado *var. nov.* (*in scheda* Herb. Sing.). This variety is not accepted here.

Perlis — Ginting Kabok: Ridley 15058; Kaki Bukit: Kiah 35281

Kedah — Bukit Enggang: Everett 13768; Bukit Perak For. Res.: Chan 13118; Bukit Selambau: Meh 8977; Gunong Inan For. Res.: Whitmore 4678; 48th mile Jeninag Road: Kiah 36152; Pulau Adang: Ridley 15778; Pulau Langkawi: Batten-Pooll sn, Keng et al. 30, Stone 6934; Ulu Muda For. Res.: Chan 6764

Penang — Waterfall: I.H. Burkill 6893; Garden: Curtis 100 in Dec. 1884, Curtis 100 at Government Hill in 1885; Curtis = 100 at the waterfall in March 1893, 1503, 2219, 3596, sn at the waterfall in June 1893 and June 1901, sn; King's collector 1457; Ridley 7962, sn at the waterfall in June 1893 and March 1915

Perak — Larut: King's collector 3517, 3768, 5923; Wray 2258; Ulu Bubong: King's collector 10442; Ulu Kerling: King's collector 8828; sine loc. Scortechini 87

Kelantan — Kulal Badong: Henderson 10395

Trengganu — Sungei Pelong: Suppiah 14877

Selangor — Sungei Buloh: H.M. Burkill sn on 24 Nov. 1956; H.M. Burkill & Shah 1048; Kochummen 2568; Sungei Lalang Kejang: Symington 24224; Ulu Langat: Gadoh 1137, 1295; Weld's Hill: Ahmad 2477; CF 2477, 6419; Kochummen 99517; Pawanchee 12902; coll. ? 6410

Pahang — Lesong For. Res.: Ahmad & Shukor 450A; Rompin: Goh (Soh) 15701; Gunong Benom, Ulu Krau: Yusoff 99102; Temerloh: Hamid 10678

Negri Sembilan — Gunong Angsi: Shing 17338; Gunong Tampin: Holttum 9570

Malacca — Bukit Senanau: Holttum 9669; Julutong: Goodenough 1767; Poloh Diak: Alvins 163; Poloh Dulle: Alvins 2296; Pulau Rumbia: Seimund sn; sine loc.: Alvins 69, Griffith 2328

Johore — Gunong Panti: Chew 726; Labis For. Res.: Ahmad & Shukor 523; Pulau Tuiggi: I.H. Burkill 903; Sedili Ketchil: Corner 28562; Sungei Sedili: Corner 25896, sn on 28 March 1932; Tana Runto: Ridley 2026; Tebrau River: Ridley 13502 (aff.)

Singapore — Corner sn on 7 May 1937, Hullett 390, Jumali 943; Maxwell 76-790, 77-84, 78-56; Ridley 1815, 3848, 4804, 6218, sn in 1892 and 1893; Walker 176; Ahmad 1416, 1475

Further Distribution — Indo-China, Burma, Thailand, Sumatra. Java, Banka Island, Borneo (Kalimantan), Karimata Is., Celebes (*fide* Craib and Bakh. f.).

20. *Memecylon malaccense* (Cl.) Ridl., J. Str. Br. Roy. As. Soc. 79 (1918) 73; *M. amabile* Bedd. var. *malaccensis* Cl. in Hk. f., Fl. Brit. Ind. II (1879) 555.

Shrub 1–4 m tall, branches widely 2-grooved and appearing 4-angled, slightly winged below the upper nodes, becoming cylindric below, c. 1 mm thick; blades coriaceous, broadly ovate to broadly lanceolate, acuminate at the tip, broadly rounded and usually shallowly (c. 0.5 mm) cordate at the base, venation extremely obscure to invisible on both surfaces, midnerve sunken above, raised and tapering below, 4–7 cm long, 2.5–4 cm wide, drying brown above, lighter brown below; petiole 0.5–1 mm long, 1 mm wide, basal lobes of cordate blades longer than the petiole and appearing sessile; inflorescence cymose, 8–10 mm long, from leaf axils, glabrous; bracts and bracteoles lanceolate-ovate, acute, c. 0.75 mm long, falling off early; primary axes 1 or 2 per axil, cylindric, 1.5–3 mm long, secondary axes glomerulate or c. 0.25 mm long, pedicels clustered at the tips. c. 1 mm long, 4–8 per inflorescence; calyx campanulate, truncate with 4 broadly rounded and minutely mucronate lobes, smooth outside, ridged internally, 1.5–2 mm long, 2–3 mm wide; petals thick with thinner margins, broadly ovate, acute at the tip, clawed at the base, c. 3 mm long, 2.5 mm wide; anthers without a gland; ovules c. 6; fruit globose, capped by the raised calyx remnant which often has 4 distinct points, areolus c. 2 mm wide, exocarp smooth, drying black, pericarp c. 0.25 mm thick.

Figure 20: a. calyx and style, b. petal, c. stamen

M. malaccense Ridl. appears to be very closely related to *M. lilacinum* Z. & M. (q.v.). The branches, inflorescence, calyx, and mainly the anthers are very similar. The petals of *M. malaccense* are more ovate and shortly clawed at the base. The blades of *M. malaccense* differ in having rounded and very shallowly (c. 0.5 mm) cordate bases. The fruit also differs in being globose with a smooth, thin exocarp without grooves.

I do not think that *M. malaccense* (Cl.) Ridl. should be united with *M. lilacinum* Z. & M. (q.v.) since there are some important differences: mainly the fruit and the leaves. Specimens of *M. lilacinum* with shallowly cordate blades or smooth fruit have not been seen. More material of *M. malaccense* is needed in order to properly understand its relation with *M. lilacinum.*

M. malaccense and *M. cinereum* King (q.v.) are essentially the same, except that *M. cinereum* has larger blades which are acute and decurrent on a longer and thicker petiole; and a shorter, i.e. more glomerulate, inflorescence. The petals of *M. lilacinum* are generally narrower, the calyx lobes usually better developed, and the fruit is much different.

M. floridum Ridl. (q.v.) has nearly identical flower morphology. however the blades and fruit, namely the fibrous pericarp, differ significantly.

Malacca — Maingay 819 (2528) (*syntype*), 819 (2531) (*lectotype*).

21. *Memecylon megacarpum* Furtado, Gard. Bull. Sing. 20 (1963) 121; *M. pulchrum* Cogn. in DC., Monogr. Phan. 7 (1891) 1141, *nom. illeg.* not Kurz, For. Fl. Brit. Burma I (1877) 510 (= *M. caeruleum* Jack var. *pulchrum* (Kurz) Cl. in. Hk. f., Fl. Brit. India II (1879) 559); *M. heteropleurum* Bl. *sensu* King, J. As. Soc. Bengal 69, II:1 (1900) 78 (Mat. Fl. Mal. Pen. III, 486).

Tree up to 15 m tall with a diameter up to 30 cm, or a shrub up to 3 m tall; bark smooth, dark grey to brown, thinly fissured and flaking; inner bark brownish, yellow; slash wood pale brown; youngest branches slightly flattened with a groove on 2 sides, becoming cylindric, c. 2 mm wide, drying tan to brown; blades subcoriaceous, elliptic to ovate, acuminate at the tip (acumen up to 1.5 cm long), gradually narrowed and somewhat rounded at the base; glabrous; mid-nerve sunken above, raised and tapering below; secondary venation pinnate with 20–30 pairs of nerves, straight, sunken above, slightly raised below; intramarginal nerve 2–3 mm from the margin, straight; finer venation very obscure to invisible; 15–20 cm long, 6–7.5 cm wide; drying greenish to dark brown above, greenish to brown below; petiole 1–3 mm long, 2–2.5 mm thick; inflorescence of clustered cymes, from behind the leaves, 9–12 mm long, many flowered, glabrous; axes flattened; bracts and bracteoles lanceolate, acute, 1–2 mm long, falling off before the petals mature; primary axes clustered, often on raised tubercles, 1–2 mm long, 1.5 mm wide at the base, usually with 1 node; secondary axes indistinct or up to 2 mm long; pedicels 2–3 mm long; calyx campanulate, widened above the ovary, thick, margin truncate with 4 very shallow (best seen in bud) undulations, each with a minute cusp, indistinguishable in mature flowers where there are 4 minute thickenings below the rim, minutely papillose outside, prominently ridged inside, c. 5 mm long, c. 5 mm wide, pink; petals broadly ovate to sub-orbicular, glabrous, broadly and often irregularly rounded at the tip, narrowed to a broad claw at the base, c. 5 mm long, 6 mm wide, very thick with thinner margins, reflexed at maturity; filaments c. 2.5 mm long; anthers "C" or "J"-shaped, c. 2 mm long, gland very prominent; style c. 4 mm long, ovules c. 10; fruit globose, 16–18 mm diameter, aerolus slightly (1 mm) raised, c. 3 mm wide, exocarp green, drying olive to brown, with a roughened texture; pericarp c. 3 mm thick; seed with a liquid inside.

Figure 21: a. calyx and style, b. petal, c. stamen, d. fruit (lateral view), e. fruit (dorsal view) with areolus

Memecylon megacarpum Furtado is mostly closely related to *M. dichotomum* (Cl.) King (q.v.), the latter having angled branches, smaller leaves, and fewer flowers per inflorescence. Both species have large, globose fruit which are similar to those of *M. amplexicaule* Roxb. (q.v.) which has thick, coriaceous, cordate blades.

King misidentified several collections of *M. megacarpum* (e.g. Maingay 816 and Curtis 814) as *M. heteropleurum* Bl., which has been reduced to a synonym of *M. excelsum* Bl. (q.v.) in this revision.

Memecylon excelsum has the calyx widened above the ovary, different blade venation, and oblong to elliptic fruit. These distinctions are not obvious, except in fruit, unless the type collections are examined.

While it is certain that the species described above is distinct from *M. dichotomum* and *M. excelsum*, it is not certain that *M. megacarpum* is the correct name. Cogniaux described *M. pulchrum* as having much larger leaves (30–35 cm long, 9–11 cm wide) and longer pedicels (3–5 mm), which have basal bracts. By this it is assumed in this paper that the species lacks secondary axes. The type collections of *M. pulchrum* (Beccari 585 and 1833, from Sarawak) were not seen during this research. The epithet *M. pulchrum* Cogn. cannot be used since it is a later homonym of *M. pulchrum* Kurz which was reduced to *M. caeruleum* Jack. var.*pulchrum* (Kurz) Cl. by Clarke which is an entirely different species from the Andamans.

Kedah — Bongsu For. Res.: Everett 14169; Bukit Enggang For. Res.: Whitmore 0405; Gunong Bintang: Haniff 21048; 33rd mile Jeniang Road: Kiah 35959; Koh Mai For. Res.: Kiah 35153

Penang — West Hill: Curtis 814; sine loc.: Wallich 4102A

Perak — Gunong Batu Patch: Wray 1066, 1148; Gunong Bubu For. Res.: Hou 662; Larut: King's collector 6621; Pangkor Island: Whitmore 3081; Slim Hills For. Res.: Whitmore 0817; Sungai Ryah: King's collector 1110; Ulu Kerling: King's collector 8589, 8689; Upper Perak: Wray 3425; Waterfall, Taiping: Burn-Murdoch 162

Kelantan — Gunong Stong: Whitmore 12415; Ulu Sungei Lebir Ketchil: Cockburn 7115

Trengganu — Bukit Lanjut For. Res.: Loh 13459; Gunong Bubu Trong: Suppiah 11746; Gunong Tebu, Jabi; Shah, Shukor, Awang 3303; Ulu Telemong For. Res: Loh 13445

Selangor — Bukit Lagong, Kepong: Suppiah 108881, Kuchummen 79112; Bukit Tanggah: Everett 13781; Fraser's Hill: I.H. Burkill & Holttum 7869; Gading For. Res.: Chan 11239; Kuala Lumpur: Ridley 2053, Mat 2053; Ulu Gombak For. Res.: Kochummen 2353, T. & P. 43 (2643), Yong 99002; Weld's Hill: Hamid 965, Jaamat 10266

Pahang — Batu Balain: I.H. Burkill & Haniff 15829; Bukit Beserah For. Res.: I.H. Burkill & Haniff 16135, Whitmore 3751; Kadouchong, Pulau Tawar: Ridley 2242; Tahan River: Ridley 2340; Kemasul For. Res.: Ismail 98912; Kuala Lumpat, Krau: Soepadmo 759; Lesong For. Res.: Suppiah 14891; Robinson's

Falls, Cameron Highlands: Henderson sn; Raub: Sohadi 14661, Strugnell 20464, Syed-Alli 23365; Sungei Lemoi: Jaamat 28188; Sungai Teku: Kiah sn, on 29 July 1936; Taman Negara: Everett 14458; Ulu Sungai: Shah & Noor 1743, 1843

Negri Sembilan — Bukit Tangga: Ridley sn, in Dec. 1920; Gunong Angsi For. Res.: Nur 11699, Sohadi 14612

Malacca — Sungei Udang: Derry 582

Johore — Bunong Ma'okil Maur: Samsuri & Shukor 957; Gunong Panti: Corner 36290; Mawai-Jemalang Road: Corner 28683, 29016; Sedenah: Ridley 13507

Singapore — Henderson 35916; Maingay 815 (2746), 816 (3112); Ridley 3614a, 5092, 5928, 6215, 9210; Ahmad 1474

Further Distribution — Sumatra, Borneo (Sarawak) (*fide* Cogniaux and King).

22. *Memecylon minutiflorum* Miq., Fl. Ned. Ind. Suppl. I, Sumatra (1860) 323, King, J. As. Soc. Beng. 69, II:1 (1900) 80 (Mat. Fl. Mal. Pen. III, 488).

Tree up to 25 m tall with a diameter up to 60 cm; bole straight, buttressed in larger individuals; bark red-brown to brown-tan or blackish, finely fissured, flaking, thin; slash inner bark pink to red, cambium whitish-purple; slash wood orange-yellow or cream; youngest branches usually somewhat flattened with a vertical groove between internodes on 2 opposite sides, often with 2 raised ridges flanking each groove or 4-angled; older branches cylindric with little or no trace of the grooves or ridges, smooth, tan, c. 1 mm thick; blades subcoriaceous, glabrous, lanceolate, elliptic to broadly ovate, caudate-acuminate (acumen 1–1.5 cm long) at the tip, cuneate at the base and shortly decurrent on the petiole (c. about half its length); venation pinnate, 8–10 pairs of nerves, invisible to very obscure on both surfaces; intramarginal nerve invisible to very obscure, c. 1 mm from the margin; mid-nerve distinct, sunken above, raised and tapering below; 5–10 cm long, 2–5.5 cm wide; dark green, drying light to dark brown above, light brown or olive-greenish to yellowish below; petiole 3–6 mm long, 1–1.5 mm thick, glabrous; inflorescence cymose from leaf axils, or less commonly just behind the leaves, 7–15 (17) mm long, many flowered; axes flattened, grooved on 2 sides, glabrous; bracts and bracteoles lanceolate, acute, up to 1.5 mm long, caducous; primary axes usually solitary, 2–13 mm long, secondary axes glomerulate or up to 4 mm long; pedicels clustered, 1–1.5 mm long, minutely papillose; calyx tube funnelform, constricted above the globose ovary, truncate with 4 cusps, minutely papillose outside, tube 1–2 mm long, c. 2 mm wide, ovary 1 mm diameter; petals broadly ovate to suborbicular, obtuse to acute at the tip, truncate at the base, thin, midline slightly thickened, not keeled, c. 2–2.5 mm long, 1.5–2 mm wide, reflexed at maturity, pink; style c. 4 mm long; ovules 10–12; fruit globose, often flattened at both poles, sometimes with 4 shallow longitudinal grooves, or somewhat gibbous, 7–10 mm diameter, calyx remnant slightly (0.75 mm) raised, areolus c. 2 mm wide; exocarp green, drying yellow-green or grey-green, with a roughened, almost mealy, texture, pericarp 1–2 mm thick, gritty or not gritty.

Figure 22: a. branch and inflorescene, b. calyx and style, c. petal, d. stamen

vernacular: kemuning tikus (Temuan)

This species is easily recognized by the papillose pedicels and calyx; bulbous ovary abruptly widened into the funnelform, 4-cusped calyx; globose fruit with a rugose-mealy texture, and blades which dry concolorous. The holotype of *M. minutiflorum* at Utrecht (Diepenhorst 2337, from Sumatra) lacks inflorescences, flowers, and fruit. The branches and blades, however, compare well with many other specimens which have flowers and fruit that match King's description, e.g. Corner 30336, Mahmud 819, Haniff 15528, King's coll. 6265). Reconstructing an idea of what the holotype is has been done with the literature and other specimens, therefore it is reasonably certain that the description above fits the species.

It should be noted that the type collection of *M. grande* Retz. var. *khasiana* Cl. (Griffith 2333, from the Khasia Mountains in East Bengal), which King (l.c. 83) reduced to a synonym of *M. celastrinum* Kurz, has branches and leaves identical to the holotype of *M. minutiflorum.* The fruit of Griffith's collection is smooth and has a larger calyx remnant.

Memecylon acuminatum Sm. (q.v.) is, in many respects, similar to *M. minutiflorum,* but has cylindric branches, smooth calyx, and smooth fruit with a wider and flat areolus. *M. acuminatum* Sm. var. *flavescens* Cl. (q.v.) is also closely related but differs from both species by having a truncate calyx. The exact relationship of var. *flavescens* to these two species is uncertain, and in this paper King's reduction of var. *flavescens* to a synonym of *M. minutiflorum* Miq. is not accepted.

Memecylon minutiflorum has fruit which closely resembles those of *M. lilacinum* Z. & M. (q.v.). The two species can be easily distinguished by the very short (appearing glomerulate) infructescence, flat areolus, and blades which generally dry dark brown to blackish of the latter.

Memecylon constrictum Craib (Kew Bull. 1930, 324, only known from the type collection of Haniff & Nur (2732), from peninsular Thailand) has a short cymose inflorescence and a distinct constriction above the globose ovary which is similar to that of *M. minutiflorum. M. constrictum,* however, has a smooth, truncate calyx, and larger, thicker leaves. The type collection at Kew has a few very immature buds and from the stamens and petals the species could be related to *M. minutiflorum.* The species is poorly known and there is insufficient material available to study the matter any further (Figure 29, a. — c.).

Thailand

Huey Mut: Kiah 24400; Puket: Haniff & Nur 2732 (*type M. constrictum* Craib)

Malay Peninsula

Kedah — Bukit Perak: Everett 13681; Gunong Baysu: Meh 17954; Gunong Jerai: Stone & Mahmud 8540, Everett 13674; Jeniang Road: Kiah 55978; Sawa For. Res.: Langkawi: Chelliah 6945; N. Pulau Dayang, Langkawi: Whitmore 15043; Machinchang For. Res.: Langkawi: Whitmore 11216, 15030; Langkawi: Wilkinson 20776; Pulau Timon: Whitmore 15105; Sungei Batu Asap, Langkawi: Haniff 15528; Sungai Lugong: Kiah 35086

Penang — West Hill Res.: Burn-Murdoch 28: Reservoir Line, West Hill: Curtis 816

Perak — Larut: King's collector 5027, 6105, 6265; Maxwell's Hill: Ridley 9312, sn in June 1893, Wray 3240

Trengganu — Bukit Kajang: Corner 30336, 30479; Sri Bangun: Sinclair & Kiah 39870; Ulu Sungei Trengganu: Cockburn 10509

Selangor — Bukit Peringkot: Kochummen 1502, Gadoh 1502, Gading For. Res.: Shing 13357, Ginting Bidai: Ridley 7312; Ulu Gombak: Mahmud 819; Ulu Selangor: Goodenough 10601; Weld's Hill: Cubit 867

Pahang — Shah 172; Cameron Highlands: Everett 13664; Endau, Rompin: Mahamud 15519; Gunong Seuyum: Henderson 22211; Jerantut: I.H. Burkill & Haniff 16102; Kota Tongkat: Evans 13187; Kuala Tekam: Evans 13188; Lesong For. Res.: Ahmad & Shukor 447, Samsuri & Shukor 447; Taman Negara: Everett 14462

Negri Sembilan — Gemas: I.H. Burkill 4970; Gunong Sungei For. Res.: Osman 23759; Jelebu For. Res.: Suppiah 11285; Tebong For. Res.: Holttum 9641

Malacca — Bukit Panchor: I.H. Burkill 3046; Bukit Sidenau: Derry 127; Sungei Udang: Alvins 21; sine loc.: Alvins 129, 2302, sn; Maingay 810 (2551)

Johore — Bukit Badok: Hassan & Kadim 92; Gunong Ma'okil: Samsuri & Shukor 958; Gunong Panti West: Samsuri & Shukor 768; Kluang: Whitmore 8691; Kuala Telung Tinggi: Ridley 11078; Maokil For. Res.: Shing 6865, 6873; Mawai-Jemulang Road: Corner 29021, 29044, 29450; Sungei Kayu: Kiah 32057; Sungei Kayu Ara: Corner 28733, sn on 10 Feb. 1935; Sungei Sedili: Corner: 31942

Singapore — Kassim 261

Further Distribution — peninsular Thailand, Sumatra (*fide* Craib).

23. *Memecylon oleifolium* Bl. ("*oleaefolium*"), Mus. Bot. Lugd.-Bat. I:23 (1851) 359 (no. 877); *M. ambiguum* Bl., l.c. 359 (no. 879) *syn. nov.; M. micranthum* Bl., l.c. 360; *M. acuminatissimum* Bl., l.c. 360 *syn. nov.; M. horsfieldii* Miq., Fl. Ned. Ind. I (1855) 572; *M. grande* Retz. var. *horsfieldii* (Miq.) Cl. in Hk. f., Fl. Brit. Ind. II (1879) 558; *M. lampongum* Miq., Fl. Ned. Ind. Suppl. I, Sumatra (1860) 321; *M. brandisianum* Craib, Kew Bull. 1930, 323 *syn. nov.*

Tree up to 12 m tall with a diameter up to 45 cm; bark thin, smooth, fissured to slightly scaly, greyish to whitish; inner bark yellow; sap wood white to brown; branches cylindric, 1–2 mm thick, drying greyish to khaki; blades subcoriaceous to coriaceous, glabrous, elliptic to ovate (often broadly so), acuminate at the tip (acumen up to 17 mm long), acute and decurrent at the base; venation invisible to distinct above; invisible, obscure, or prominent below; mid-nerve sunken above, raised and tapering to the tip below; dark glossy green above, pale green below; drying dark brown above, brown below; (6) 9–21 cm long, (2.5) 3–10 cm wide; petiole (4) 6–9 mm long, 1.5–2.5 mm wide, glabrous; inflorescence from leafy or upper leafless nodes, cymose, 1.5–5 cm long, glabrous, axes 2-grooved to 4-angled; bracts and bracteoles lanceolate, acute at the tip, 0.5 mm long; primary axes 0.8–4 cm long, secondary 2–12 mm, tertiary axes generally not developed or sometimes up to 2 mm long, pedicels 2.5–7 mm long; calyx campanulate, truncate, 1.5–3 mm long, 2–4 mm wide, glabrous, cream coloured with a purple hue; petals thickened, broadly ovate, acute and mucronate at the tip, truncate at the base, 2–2.5 mm long, 2.5 mm wide, mid-nerve thickened and slightly raised dorsally, margins thinner, blue to purple; filaments c. 2 mm long, anthers "C" or "J"-shaped, purple, gland prominent; style 3–4 mm long; ovules

9–12; fruit elliptic-ovate, 8–10 mm long, 6–8 mm wide, pedicels 3–8 mm long, calyx remnant raised, c. 1 mm high, areolus c. 2 mm wide; exocarp green turning light yellow, black and smooth or with minute pustules when dry; pericarp c. 0.5 mm thick.

Figure 23: a. calyx and corolla bud, b. petal, c. bud stamen, d. mature stamens, e. fruit

At first glance, the holotypes of *M. oleifolium* Bl. and *M. acuminatissimum* Bl. appear to be very different; the former has smaller blades with indistinct or invisible venation and the latter has larger blades with conspicuous venation. The holotype of *M. acuminatissimum* (Korthals s.n., from Sumatra) lacks inflorescences and has only a few loose flowers buds. Comparison of this specimen with other collections plus the original description has helped in reconstructing an idea of what the species is. Cockburn 10839 and Whitmore 8773 are flowering and fruiting specimens, respectively, which have branches and leaves similar to the holotype of *M. acuminatissimum*. The inflorescences on Cockburn's specimen range from 2–5 cm long, with distinct secondary (infrequently with tertiary) axes, pedicels 4–5 mm long, and a calyx 3 mm long and 4 mm wide. Whitmore's fruit are elliptic, c. 14 mm long, and 8 mm wide.

Distinguishing *M. acuminatissimum* from *M. oleifolium*, especially with numerous collections of specimens which have been referred to either one, is difficult. Some distinguishing features of *M. acuminatissimum* include the larger: leaves, inflorescences, and calyx. Similar features include the structure of the inflorescence, flowers (especially the anthers), and the fruit. There are several specimens which have blades with faint venation resembling those of *M. oleifolium*, e.g. Cockburn 10839 and Chew 728, but both of these have the inflorescences and calyx similar to *M. acuminatissimum*. Ng 97986 has leaves approaching the size of *M. acuminatissimum*, but the venation is invisible. The inflorescence is more similar to that of *M. acuminatissimum*. There are other specimens which combine features of these two species, e.g. Whitmore 12320 (flowers) and Kochummen 2618 (fruit) in which the inflorescence and fruiting axes are like *M. acuminatissimum* and the leaves resembling both species. In at least two other specimens, Jumali & Heaslett 3056, and Cockburn 10839, the larger leaves resemble *M. acuminatissimum* and the smaller ones *M. oleifolium*. Since there are no structural differences that can be used to separate these two species, plus the fact that the leaves have intermediate forms, I feel that it is necessary to lump *M. acuminatissimum* with *M. oleifolium*, thereby expanding the range of variation of the latter even further.

Memecylon laurinum Bl. (l.c. 359, no. 878), which Bakh. f. (l.c. 357) reduced to *M. oleifolium* Bl. var. *laurinum* (Bl.) Bakh. f. is only known from three collection which include the two types (Korthals s.n., from Sumatra, and Korthals s.n. from Borneo) and another specimen (without collector or number) from Sumatra. Only the two specimens from Sumatra can be studied in detail since the other type is without flowers or fruit.

The buds of var. *laurinum* differ from those of the typical variety in that the calyx is quite large (c. 4 mm long) and apiculate, and the inflorescence is shorter and more compact. The bud petals and anthers are of identical size and shape to those of *M. oleifolium*. The branches and leaves are also the same. The mature of the calyx differs from *M. oleifolium* and since there is

little similarity between the two taxa I do not feel confident in reducing the variety to a synonym of the typical variety since its mature flowers and fruit are still unknown.

Blume (l.c. 359) notes under *M. ambiguum* Bl. that the inflorescence is more dense, the blade venation is more prominent, and the base of the blades is more rounded that with *M. oleifolium*. The type specimens of both species at Leiden have been examined and while the vegetative features are somewhat different, the structures of the inflorescence and the morphology of the flowers are the same for both species.

Another species, *M. micranthum* Bl. (l.c. 360) was reduced to a synonym of *M. oleifolium* Bl. by Cogniaux (l.c. 1150). The type specimen of *M. micranthum* Bl. at Leiden is exactly the same as the type specimen of *M. ambiguum* Bl. in all respects. Bakh. f. (l.c. 353) combined *M. micranthum* with *M. ambiguum*, but maintained *M.. oleifolium* as a distinct species. Cogniaux (l.c. 1143), however, considered *M. ambiguum* as a good species and included it in his monograph in a different section from *M. oleifolium*. It is not understood how Cogniaux could have done this since the leaves of *M. ambiguum* and *M. micranthum* are exactly the same. This is not true with the leaves of *M. oleifolium*.

In any case, the structure of the inflorescences and the flowers are the same for all three species. This, therefore, is very good evidence for combining all of them under one species viz. *M. oleifolium* which was published above the other two. More evidence for this involves King's coll. 4420 from Larut, Perak. This specimen, cited by King (l.c. 83) as *M. oleifolium* combines features of this species and *M. ambiguum*. The relatively small leaves and their texture resemble *M. ambiguum*, however the acute base and the obscure venation are like *M. oleifolium*. The inflorescence has many flowers on thicker axes which is a *M. ambiguum* feature. The flower morphology matches both species. Bakh. f. annotated this specimen as *Memecylon* spec. and it is easily understood why since it is an apparent intermediate form between the two species.

In comparison to all the more typical specimens of *M. oleifolium* examined, King's coll. 4420 is very unusual. The specimens of *M. ambiguum* and *M. micranthum* at Leiden, at first glance, appear to be distinct from *M. oleifolium*. Similarly, most of the specimens of *M. oleifolium* match its type specimen. Unfortunately, there are only a few specimens of *M. ambiguum* and *M. micranthum* at Leiden, thus I am not certain of any other variation within this group.

Koorders 24271, from Java, is the only specimen of *M. ambiguum* (including *M. micranthum*) at Leiden that has fruit, and these match those of several collections of *M. oleifolium*.

From observations during this research and from the opinions of those botanists mentioned above, it seems that these three species are the same. I have little doubt that *M. micranthum* is the same as *M. ambiguum* and confidence is maintained in combining both of them with *M. oleifolium* Bl.

The holotype of *M. lampongum* Miq. (Teysmann 4281, from Sumatra) at Utrecht is in very immature calyx bud, but from the branches, leaves, and structure of the inflorescence this specimen matches Maingay 811 and to a lesser extent, due to its having more mature flowers, Blume's type collections of *M. oleifolium*.

Bakh. f. suggests that *M. lampongum* may be related to *M. ambiguum*, which it certainly is, but the striking similarities with Maingay 811 and Blume's material is more obvious. I agree with King in reducing *M. lampongum* Miq. to a synonym of *M. oleifolium* Bl. Agreement is also made with King (l.c. 83) in reducing *M. grande* Retz. var. *horsfieldii* (Miq.) Cl. to *M. oleifolium*. A specimen at Leiden (Maingayi 811) matches the types of the latter collected by Korthals (s.n.) from Sumatra. This variety, with less prominent nerves, more acute buds, and shorter inflorescences, lacks any structural differences from *M. oleifolium*. It cannot, therefore, be considered distinct from *M. oleifolium*.

Memecylon pubescens (Cl.) King (q.v.) has flowers similar to those of *M. oleifolium*, but the inflorescence of the former has many more flowers which are congested in glomerules on the tips of the secondary axes. Also these axes are pubescent and the venation of the blades, especially below, is much more prominent. Transitional forms linking the two species have not been seen, therefore it is better to maintain both of them as separate species.

The type specimens of *M. brandisianum* Craib (Kerr 14169 from peninsular Thailand) match the type specimens of *M. oleifolium* Bl. at Leiden. The holotype from Kew and the isotypes from BM and BK of *M. brandisianum* are in bud, however the calyx, petals, and stamens match a bud specimen collected by Blume (s.n.) from Sumatra. The leaves of Kerr's specimens have dried with a green colour on both surfaces in contrast to the typical brown colour of dried *M. oleifolium* blades.

Craib, in his original description, notes that *M. brandisianum* is related to *M. garcinioides* Bl. (q.v.), however it is obvious from the anthers of Kerr's specimens that the relation is only superficial. The stamens of *M. garcinioides* are very unusual and quite distinct, and in no way, even in bud, resemble those of *M. brandisianum* or *M. oleifolium*.

Thailand

Terutao: Kerr 14169 (*type M. brandisianum* Craib)

Malay Peninsula

Kedah — Miujol: Meh 17879

Perak — King's collector 4420, 4439, 8198; Ulu Kerling: King's collector 8571; sine loc.: Scortechini 2069; Grik: Yong 94662

Kelantan — Bukit Yong: Shah & Shukor 3232; Ulu Sat For. Res.: Suppiah 104585

Trengganu — 34th mile Jerengau Road: Sinclair & Kiah 40939; Sungei Nipa: Corner sn on 20 Nov. 1935; Ulu Brang: Moysey & Kiah 33632; Ulu Bendong: Corner 30017; Ulu S. Loh: Cockburn 10839

Selangor — Gunong Simpah: Hume 8481, 8910, 9159; Sungei Lalang Kajang: Symington 22644; Ulu Gombak: Kochummen 2718; Ulu Langat: Gadoh 1781; sine loc.: Alvins 659

Pahang — Bukit Berelah, Kuantan: Shah, Sidek, Samsuri 3722; Kampong Aur: Samsuri & Shukor 484; Kemasul For. Res.: Temerloh: Kochummen 98582, Whitmore 0079; Lepar For. Res.: Suppiah 108952; Lompat Krau: Whitmore 3583; Pulau Tioman: Henderson 21651; Sabi Estate, near Bentong: Shah 223; Ulu Kuantan: Craddock sn in 1903; Ulu Sungei Sat: Shah & Noor 1842

Negri Sembilan — Bukit Tangga: Ridley sn in Dec. 1920; Gunong Angsi: Nur 11679; Kuala Pilak: Tassin 4498

Malacca — Ayer Panas: Derry 1199; Bukit Besar: Ridley sn; Bukit Sutu, Sungei Ujong: Alvins 1970; Bukit Tumiang: Alvins 2035; Sungei Ujong: Alvins sn; sine loc.: Maingay 811 (1228)

Johore — Gua Riman, Kluang: Jumali & Heaslett 3056; Gunong Blumut: Whitmore 8773; Gunong Ledang: Whitmore 12320, 12341; Gunong Panti: Ridley sn in 1892, Holttum 18095, Corner sn on 20 Jan. 1936; Chew 728; Gunong Pulai: Ridley 12179; Kluang For. Res.: Ng 97986; Labis For. Res.: Ahmad & Shukor 521, Kochummen 2618; Segamat: Shing 17155; Sungai Kayu Ara: Kiah 31994, 32079; Corner sn on 8 and 10 Feb. 1935; Virgin Jungle Reserve, Mersing: Ahmad 376

Singapore — Ridley 6414A, 6416

Further Distribution — Sumatra, Java, Soemba Is. (*fide* Bakh. f.).

24. *Memecylon oligoneurum* Bl. Mus. Bot. Lugd.-Bat. I:23 (1851) 353.

Shrub up to 3 m tall, more commonly a tree 5–15 m tall with a diameter of 15–30 cm; bark thin, finely fissured and flaking, light brown or grey; inner bark thin, dull greyish-brown, sapwood hard, brownish-yellow; branches cylindric, often a bit flattened and shallowly grooved on two faces below the upper node, sometimes 4-angled on lower internodes, drying brown; blades coriaceous, elliptic, often broadly so, acute to bluntly acuminate at the tip; narrowed and decurrent at the base; main veins 3, from the base to the tip, depressed above, raised (often prominently) below; secondary venation pinnate, very obscure to invisible on both surfaces; intramarginal nerve obscure to invisible, 1–2 mm from the margin, arching smoothly towards the tip, (5) 7–12 cm long, (2) 3.5–6.5 cm wide, drying dark brown to blackish above, brown below; petiole 5–7 mm long, 1 mm thick; inflorescence glomerulate, 3–5 mm long, glabrous; primary axes 0–1.5 (exceptionally 2.5) mm long, flattened, usually several in the leaf axils, flowers numerous; pedicels 1–2 mm long, crowded along the fused secondary axes; bracts and bracteoles ovate, acute, 0.75 mm long; calyx campanulate, slightly to sharply constricted above the ovary, often flattened when mature, c. 1 mm high, 1.5 mm wide, glabrous, truncate with 4 obscure, broad, short, apiculate lobes, faintly ridged inside, cream to whitish; petals thin, oblong to sub-orbicular, ventral surface often concave at maturity, broadly rounded at the tip, narrowed or rounded to a claw at the base, margins slightly thinner, mid-nerve slightly raised near the tip of the dorsal surface; 1–1.5 mm long, 1–1.25 mm wide, white, filaments 1.5–2 mm long; anthers rounded - cuneate to globose, 0.5–0.75 mm long, connective several times to as long as the locules, without a gland, light yellow; stigma capitate, minute; style slender c. 3 mm long; ovules 2; fruit globose, 5–7 mm diameter, pedicels 3–4 mm long, calyx remnant raised and lobed, areolus c. 1.25 mm wide; often appearing didymous with 2 shallow, vertical grooves near the pedicel extending half way up, two seeds have developed in this situation; exocarp

green when immature, turning blue and finally black when ripe; drying grey to blackish, often mealy in texture; pericarp c. 0.5 mm thick.

Figure 24: a. leaf, b. inflorescence, c. calyx and style, d. petal, e. stamen

The 3 basal veins, calyx with faint internal ridges, and glandless anthers immediately distinguish this species from all others in the region. *M. oligoneurum* Bl. is often confused with various species of *Pternandra*, especially *P. galeata* (Korth.) Ridl., and *P. coerulescens* Jack. *Pternandra* in general, has thicker blades with invisible secondary venation which dry black or very dark brown, larger flowers, and many seeded fruit. The inflorescence of *P. coerulescens*, even when it is very short, always has distinct primary axes, which are not on tubercles, and sometimes secondary axes, fewer flowers, and a much larger, campanulate-cyathiform, truncate calyx with an external tessellate pattern.

The epidermis on the branchlets of *Pternandra coerulescens* Jack is usually blackish and in most instances peels off. This feature and that of the secondary venation afford good distinguishing features with vegetative material. Confusion is also possible with various species of *Strychnos* L. (Loganiaceae), however a distinction can immediately be made by its climbing habit.

M. oligoneurum Bl. has, as far as can be determined, the fewest number of ovules of all the species of *Memecylon* from the Malay Peninsula. The glandless anthers are similar to those of *M. lilacinum* Z. & M. (q.v.), but that species has, among other major differences, uninerved blades, and narrow petals.

Kedah — Gunong Bougan: Bosewell 18022

Penang — Curtis 1065, 1146, 2220, sn in March 189?; Forest Guard 2220

Perak — Larut: King's collector 2513; Taiping: Shah & Sidek 1158; Tapah: Ridley 14060; Ulu Bubong: King's collector 10280, 10920; sine loc.: Burn-Murdoch 191, Scortechini 1309

Kelantan — Sungai Lebir: Cockburn 115981; Ulu Sungei Aring: Whitmore 4490;

Selangor — Ginting Simpah: Hume 9309, 9687; Gombak For. Res.: van Balgooy 2125; Sepang: Corner sn on 27 Nov. 1941; Sungai Buloh: Nur 11881; Ulu Gombak: Hume 9381

Pahang — Jengka For. Res.: Whitmore 0059; Kuala Lipis: Mat 4038; Pulau Tioman: I.H. Burkill 1103; Rompin: Mahamud 17164; Taman Negara: Lim sn; sine loc.: Nong 4038

Negri Sembilan — Gunong Angsi: Nur 11654

Malacca — Ayer Keroh: Ridley 10752; Bukit Buiang: Alvins 40

Johore — Labis For. Res.: Ogata 110396

Singapore — Kiah 34670

Further Distribution — Banka Is., Sumatra, Java, Philippines, Borneo (Kalimantan) (*fide* Bakh. f.).

25. *Memecylon paniculatum* Jack, Mal. Misc. II (1822) 62; *M. costatum* Miq., Verh. Kon. Ned. Inst. (1850) 29; *M. appenduculatum* Bl., Mus. Bot. Lugd.-Bat. I:23 (1851) 361; *M. nudum* Bl., l.c. 361; *M. caloneuron* Miq., Fl. Ned. Ind. Suppl. I, Sumatra (1860) 321 (synonyms in Bakh. f., Med. Mus. Bot. Utrecht 91 (1943) 345 and Rec. Trav. Bot. Neerl. 40 (1943-45) 345); Merrill, J. Arn. Arbor. 33 (1952) 235; Furtado, Gard. Bull. Sing. 20 (1963) 121); *M. venosum* Merr., Phil. J. Sci. 3 (1908) Bot. 154 *syn. nov.*; *M. gigantifolium* Elm., Leaf. Phil. Bot. 8 (1915) 2762 *syn. nov.*

Tree 10–30 m tall ,diameter up to 90 cm; bark thin, finely fissured and flaking, brownish-grey, greyish-white; branchlets distinctly 4-winged or 4-angled, less commonly 4-angled near the nodes and cylindric below, 3–4 mm thick, glabrous and smooth, drying dark brown, epidermis peeling off leaving a smooth, cylindric, light brown surface; blades subcoriaceous, glabrous, lanceolate, ovate, obtuse or shortly and obtusely acuminate (acumen up to 1 cm long) at the tip, broadly rounded or more frequently distinctly cordate (indentation 2–3 mm) at the base; (8) 11–26 cm long, (3.5) 45–14 cm wide, venation pinnate, (8) 10–14 opposite to subopposite pairs, sunken and clearly visible above, prominently raised below, arising at 45° from the mid-vein, straight or arching, intramarginal nerve similar in appearance to the veins on both surfaces, 5–8 mm from the margin, looping; mid-vein sunken above, prominently raised and tapering below; drying dark brown above, lighter brown below, very brittle; petiole 2–3 mm long, 1–2 mm thick, glabrous; inflorescence cymose, c. 4 cm long, axes generally 4-angled, minutely furfuraceus, becoming glabrous; primary axes 1–3, usually from leaf axils, 2–3 cm long, 1–2 mm thick; secondary axes 4–10 cm long, tertiary axes generally glomerulate or up to 3 mm long, 4th axes glomerulate and rarely distinguishable; pedicels c. 2 mm long, green; calyx funnelform-campanulate, truncate, often with 4 minute cuspus, 1–2 mm long, c. 3 mm wide, glabrous and smooth outside, prominently ridged inside, green; petals slightly thickened, broadly ovate to sub-orbicular, acute at the tip, truncate at the base, margins thinner, c. 2 mm long, 2 mm wide, white; anthers "J" shaped, c. 1 mm long, gland distinct, centrally located; stigma minute, style c. 3 mm long; ovules c. 12; infructescence axes generally not elongating, but becoming thicker, prominently angled to somewhat 4-winged, primary axes 3–4 mm thick, tertiary axes generally glomerulate, often irregularly so due to the unequal lengths of the tertiary axes, up to 3 mm thick, with numerous distinctly raised bract scars forming a rim about the pedicel scars; pedicels c. 3 mm long; fruit globose, 6–8 mm diameter, capped by the persistent calyx remnant; exocarp thin, whitish turning purple when ripe; or ovate, nipple-like and crowned by the persistent calyx remnant at the tip; 10–13 mm long, 7–9 mm wide; yellow/green when immature, drying tan to blackish.

Figure 25: a. calyx, b. petal, c. & d. stamens

Memecylon beccarianum Cogn. (q.v.) is very close to, if not the same as, *M. paniculatum* Jack. *M. beccarianum* differs from *M. paniculatum* in having cylindric branchlets. As far as can be determined from the original description and type specimens of *M. beccarianum* (from Borneo), this is the only major difference. Unfortunately, Jack, in his original description, did not indicate whether the branchlets are cylindric or angled to winged, however those specimens at Singapore and Leiden which are considered in this paper as being *M. paniculatum* all have angled to winged branchlets which become cylindric with age. *Memecylon beccarianum* has been retained as a distinct species in this paper since it is not certain that it is the same as *M. paniculatum* or one of its numerous synonyms.

Elmer 13548, from Mindanao, Philippines, which is the type material of *M. gigantifolium* Elm., has the same leaves, inflorescences, and flowers as *M. paniculatum* Jack and synonyms. Elmer's isotype at Leiden has a lower branch which is cylindric and with rather large leaves. In some specimens of *M. paniculatum* seen the leaves are of this size and nearly sessile, however all other features are distinctly those of *M. paniculatum* — including older branches which are cylindric. *M. gigantifolium* does not differ from *M. paniculatum sensu lat.* and should be reduced to a synonym of the latter.

Memecylon venosum Merr., according to Merrill, merely differs from *M. paniculatum* in having smaller, more acuminate blades with prominent reticulations on the undersurface; and a shorter inflorescence. A syntype of this specimen at Leiden (Clemens, s.n., from Camp Keithley, Mindanao, in September 1906) closely matches specimens annotated by Bakh. f. as *M. costatum*. There are no structural details in the inflorescences, flowers, or fruit which distinguish *M. venosum* from *M. costatum*, which has been reduced to a synonym of *M. paniculatum*. Two other collections identified as *M. venosum* Merr. at Leiden (Elmer 13666, 11752; both from Mindanao) match its syntype and confirm my belief that *M. venosum* is the same as *M. paniculatum*.

Kedah — Gunong Raya, Langkawi: Haniff 15526; Koh Mai For. Res.: Kiah 35198

Penang — Penang Hill: Ng 1112

Perak — Chior For. Res.: Ng 5799; Dindings: Burn-Murdoch 255; Larut: King's collector 6945, 8305; Wray 3235; Sungai Seluang, Telok Anson: Shah & Shukor 3450

Kelantan — Gua Nunik: Henderson 19711; Gunong Stong: Whitmore 12438; Kuala Sepia: Whitmore 4318; Sungei Lebir: Cockburn 7029

Trengganu — Ulu Brang: Moysey & Kiah 33635

Pahang — Tahan River: Ridley 2237

Malacca — sine loc.: Maingay 813 (1567)

Johore — Kangka Sedili Ketchil: Corner 28603; Mawai: Ngadiman 34734; Panau Sungei Sedili: Corner 37050; Panti River: Ridley 15399; Sungai Kayu: Kiah 32188

Singapore — Corner sn on 10 Sept. 1934; Sinclair 39658, 40234.

Further Distribution — Thailand (SE), Sumatra, Simeuloee Is., Java, Karimata Is., Borneo (Kalimantan), Philippines, Celebes, Talaud & Soela Islands, Moluccas (*fide* Craib and Bakh. f.).

26. *Memecylon pauciflorum* Bl., Mus. Bot. Lugd.-Bat. I:23 (1851) 356; *M. pulchellum* Ridl., J. Str. Br. Roy. As. Soc. 61 (1912) 52, syn. in Ridl., Fl. Mal. Pen. I (1922) 816; *M. pauciflorum* Bl. var. *obovatum* Furtado *in scheda* Herb. Sing.

var. *pauciflorum*

Shrub 2–3 m or a tree up to 8 m tall; bark thin, brown, longitudinally ridged; branches somewhat flattened and deeply grooved on 2 sides, each groove bordered by 2 sharp ridges, or sharply 4-angled, often with the grooves widened and appearing winged near the upper nodes, 1 mm thick, glabrous; blades coriaceous, ovate, bluntly acuminate at the tip, narrowed and not or only slightly decurrent on the petiole, venation extremely obscure or more commonly invisible on both surfaces, mid-nerve sunken above, raised and tapering below, 3–6 cm long, 1–3 cm wide, grey-green or glossy dull green above, yellow-green or olive-green below, drying blackish or very dark brown above, brown below; petiole 1–3 mm long, 1 mm thick, glabrous; inflorescence from leaf axils, 5–7 mm long, umbellate or a very contracted cyme which appears umbellate, primary axes 1 or 2 from each axil, 4-angled, 1.5–4 mm long, often extended beyond the first node for up to 1 mm; secondary axes indistinct and reduced to tubercles c. 0.5 mm long; pedicels 2–2.5 mm long; flowers few (c. 5); bracts and bracteoles lanceolate, acuminate at the tip, c. 0.25 mm long, cauducous; calyx campanulate, constricted above the ovary, truncate with 4 distinct cusps, smooth outside, ridged internally, white; corolla buds dome shaped, tips acuminate and twisted; petals thin, broadly ovate, caudate-acuminate at the tip, truncate to shortly clawed at the base, midvein slightly thickened, but not raised, c. 2 mm long, 1.5–2 mm wide, blue to purplish; filaments blueish, anthers yellowish with a blue spur, gland distinct; fruit globose, 5–8 mm diameter, calyx remnant raised, areolus c. 1–1.5 mm wide, exocarp smooth and sometimes minutely warty, c. 1/5 mm thick, green turning pale yellowish and tinged with pink, drying black or greenish.

Figure 26: a. calyx and corolla bud, b. petal, c. stamens

In many respects this species closely resembles *M. lilacinum* Z. & M. (q.v.), however that species has a greater variation in leaf size, more flowers in each inflorescence, and anthers without a gland. The fruit of *M. lilacinum* also is larger, depressed globose, and has a thick, gritty pericarp. The anthers and fruit provide the most reliable distinguishing features for the two species.

M. edule Roxb. var. *edule* (q.v.) very closely resembles *M. pauciflorum*, however the former has a truncate calyx with or without 4 very small bumps and a generally more complex inflorescence.

M. pulchellum Ridl. has more ovate blades, slightly larger and narrower calyx lobes, and shortly clawed petals. These features fall well within the range of variation for *M. pauciflorum*, and, therefore, agreement is made with Ridley in reducing *M. pulchellum* to a synonym of *M. pauciflorum*.

Memecylon pauciflorum Bl. var. *obovatum* Furtado, as noted on several sheets in the Singapore collection (Henderson sn, from Selat Panchor, Langkawi on 22 Nov. 1934; Corner sn, from Pulau Dayang Bunting, Langkawi on 13 Nov. 1941, etc.) differs from the typical variety in having obovate blades. Some blades on these collections are identical to those of typical *M. pauciflorum*, thus Furtado's unpublished variety is not worthy of further attention.

Kedah — Pulau Butong: Ridley 15828 (*lectotype M. pulchellum* Ridl.); Pulau Dayang Bunting: Alphonso & Samsuri 179; Corner 37853, sn on 13 Nov. 1941; Pulau Jerkam: Corner sn on 17 Nov. 1941; Pulau Langkawi: Haniff & Nur 7547, Holttum 17431; Sulau Sarang: Ridley 15829 (*syntype M. pulchellum* Ridl.); Selat Panchor, Langkawi: Henderson 29090, sn on 22 Nov. 1934; Telok Udang: Haniff 1071

Penang — Curtis 3434, King's collector 1684, Nauen sn on Penang Hill in April 1940

Kelantan — Gua Musang: UNESCO 326; Gua Teja: Henderson 29680; Gunong Brong Bertam: Shah & Ali 2886

Trengganu — S. Banum, Kemaman: Corner 25829

Selangor — Bukit Takun: Nur 34371; Gua Batu: Ridley sn in July 1897

Perak — Gunong Ginting: Ahmad & Sidek 579

Johore — Gunung Belumut: Holttum 16779; Kanga Sedili Ketchil: Corner 28565

Singapore — Lobb 296, Ridley 14178

Further Distribution — Burma, Laos, Thailand, Timor (type), New Guinea (*fide* Craib and Bakh. f.).

26a. *Memecylon pauciflorum* Bl. var. *brevifolium* Craib, Fl. Siam. Enum. I:4 (1931) 712.

Shrub 50–100 cm tall, branchlets flattened, deeply grooved on two sides, each groove flanked by two sharp ridges; grooves often wider, thus the branchlets appear somewhat 4-angled; older branches becoming cylindric, c. 1 mm thick; blades coriaceous, ovate, obtuse at the tip, sometimes shallowly emarginate; acute and shortly decurrent at the base; venation invisible on both surfaces, midvein sunken above, slightly raised near the base and tapering to the tip below, 1.2–1.7 cm long, 6–8 (ex descr. 10) mm wide, drying dark brown above, brown below; petiole 2 mm long, c. 0.5 mm thick; inflorescence, flowers, and fruit unknown.

Figure 35: isotype.

Craib notes that there is only one known collection of this taxon, and that the specimen he examined was in fruit. The two specimens at Singapore are vegetative and apparently only differ from the typical variety by the very small leaves.

Thailand

Puket: small islands near Pulau Panji: Haniff & Nur 4070 (*type*).

27. *Memecylon pubescens* (Cl.) King, J. As. Soc. Bengal 69, II:1 (1900) 74 (Mat. Fl. Mal. Pen. III, 482); *M. grande* Retz. var. *pubescens* Cl. in Hk. f., Fl. Brit. Ind. II (1879) 558.

Tree up to 30 m tall, diameter up to 75 (exceptionally 2 m) cm; trunk massive, twisted or straight, fluted to about 3 m high; crown with massive, spreading limbs; bark slightly fissured, in thin, brittle, and elongate scales, dull brown to grey-green; inner bark black-brown; sap wood yellow; branchlets slightly flattened and grooved below the upper node, otherwise cylindric; 1.5 mm diameter, smooth and glabrous, blades coriaceous, elliptic, acute or shortly acuminate at the tip, acute and decurrent at the base; venation pinnate, 8–12 pairs of nerves, sunken above; raised below; intramarginal nerve c. 3 mm from the

margin, looping; midnerve sunken above, prominently raised and tapering below; 8–15 cm long, 4–6.5 cm wide; dark, glossy green above, dull green below; drying dark and often glossy brown above, dull brown below, entirely glabrous; petiole 8–10 mm long, 1.5–2 mm thick, glabrous; inflorescence from leaf axils or just behind the leaves from leafless nodes, composed of an open panicle of cymes or umbellate, 2.5–7 cm long; axes flattened, grooved on 2 faces and frequently angled; minutely rufus hispid throughout; primary axes 1.5–5 cm long, usually solitary, less frequently paired, with 1 or 2 nodes, 1.5–2 mm wide; secondary axes 3–20 mm (exceptionally 25–35 mm) long, tertiary axes not developed or up to 2 mm long, pedicels glomerulate, glabrous, c. 1 mm long; flowers numerous; calyx campanulate, truncate, often with 4 minute points, widened above the ovary, smooth outside, ridged inside, 1.25–1.5 mm long, 1.5 mm wide, petals thickened, oblong to broadly ovate, obtuse with a mucro at the tip, truncate at the base; mid-nerve slightly raised, but not keeled, dorsally, margins thinner, c. 1.25 mm long, c. 1–1.5 mm wide; anthers "J" to "C"-shaped, gland prominent, centrally located, connective thickened, c. 1 mm long; stigma minute, style c. 2 mm long; ovules 10–12; infructescence axes often glabrescent, pedicels 2 mm long, fruit globose, 10–12 mm diameter, calyx remnant slightly raised, areolus c. 2 mm wide; exocarp minutely muricate, pericarp c. 1 mm thick, gritty, green when immature, purple to dark blue when ripe; drying black.

Figure 27: a. branch and inflorescence, b. calyx, c. petal, d. stamen, e. fruit

The axes in *M. hullettii* King are muricate-papillose and the inflorescence is a compound umbel. *M. beccarianum* Cogn. has pubescent axes, however the leaves in that species are larger, more rounded at the base, and the calyx has 4 minute points. Purseglove 5505 and Everett 13882, both from Johore, differ from most other specimens of *M. pubescens* in having thicker blades. The secondary veins are impressed above and are very faint to invisible below. The finer venation is invisible. The inflorescence, flowers, and fruit of these collections appear to be the same as more typical specimens of *M. pubescens*.

Kedah — Koh Mai Res.: Kiah 35188; Ulu Muda For. Res.: Chan 6693, 6791, 6802

Perak — King's collector 6089; Kinta Hills For. Res.: Zainuddin 99778; Slim Hills For. Res.: Whitmore 0746

Trengganu — Ulu Brang: Whitmore 12539

Selangor — Semangko For. Res.: Whitmore 12554; Sungei Bulok For. Res.: Kiai 8295, Sow & Tachon 16858

Pahang — Kemasul For. Res.: Hamid 10619; Pekan: I.H. Burkill & Haniff 17248, 17250; Temerloh: Pawanchee 13760

Negri Sembilan — Jelebu For. Res.: Suppiah 11353

Malacca — sine. loc.: Griffith 2336 (*type*)

Johore — Gunong Pulai: Purseglove 5505; Ulu Sungei Sedili Besar: Everett 13882

Singapore — Henderson 35911, 36437, Ridley 10390

Further Distribution — peninsular Thailand (*fide* Craib).

28. *Memecylon wallichii* Ridl., J. Str. Br. Roy. As. Soc. 79 (1918) 74; *M. heteropleurum* Bl. var. *olivaceum* King ("*olivacea*"), J. As. Soc. Bengal 69, II:1 (1900) 78 (Mat. Fl. Mal. Pen. III, 486), in part; *M. longifolium* Ridl., l.c. 72 *nom. illeg. non* Cogn.; *M. depressum* Benth. ex Triana, Trans. Linn. Soc. 28 (1871) 158; *M. amplexicaule* Roxb. *sensu* Clarke in Hk. f., Fl. Brit. Ind. II (1879) 559.

Shrub up to 4 m tall or a tree up to 5 mm with a diameter of 15 cm; bark greyish, finely fissured, thin; branchlets 4-angled, less commonly 4-winged, especially near the upper nodes, becoming cylindric with age, smooth, glabrous, light brown-tan when dry, c. 2 mm thick; blades coriaceous, glabrous, lanceolate, elliptic, to ovate; caudate-acuminate (acumen up to 2.5 cm long) at the tip; broadly rounded to cordate at the base; venation pinnate, 14–18 pairs of nerves, lower veins running parallel to the midvein for 1–2 mm, then diverging at 45° towards the margin, straight or slightly arching, sunken and rather faint above, prominently or less commonly slightly raised below; intramarginal nerve of similar appearance, 6–9 mm from the margin, broadly looping; midvein sunken above, prominently raised and tapering below; (12) 14–25 cm long, 3.5–10 cm wide; drying olive-brown to dark brown above, brown or greenish below; petiole 1–2 mm long, 1.5–2.5 mm thick, glabrous; inflorescence cymose, 1–1.5 cm long, glabrous, usually with about 10 flowers; primary axes 2 or 3 from leaf (often terminal) axils, 2–8 mm long, 1–2 mm thick, 4-angled; secondary axes 1–2 mm long, often clustered; tertiary axes generally glomerulate, less frequently up to 0.75 mm long; pedicels 2–2.5 mm long; bracts ovate, acute, thickened, c. 0.5–0.75 mm long, fimbriate at the base inside; calyx campanulate, truncate, cracking irregularly about the margin; smooth outside, ridged internally, glabrous, 3–4 mm long, 3–4 mm wide, red; petals orbicular in outline, acute at the tip, truncate at the base, thickened with thinner margins, 2.5–3 mm long, 3–4 mm wide; keel slightly developed dorsally, white; filaments c. 2 mm long; anthers linear, locules extending all along one side of the anther and curving around the distal tip, connective smaller, with a distinct gland near the filament, 1.5–2 mm long, white; stigma minute, style c. 4 mm long; ovules c. 8; fruit globose, 10–15 mm diameter, smooth, capped by the raised calyx remnant, areolus c. 4 mm wide; pericarp c. 0.5 mm thick, pink to bright red when immature, dark purplish-red, then blackish when ripe.

Figure 28: a. bracts and calyx, b. bud petal, c. stamens

The 4-angled to 4-winged branchlets and leaves are similar to *M. paniculatum* Jack (q.v.), but that species has longer primary and secondary axes (total length up to 4 cm), entirely different anthers, and smaller (globose or ovate) fruit. *M. excelsum* Bl. is also similar, but the inflorescence is behind the leaves, has different anthers, and ovate fruit. *M. corticosum* Ridl. is nearly the same as *M. wallichii* vegetatively, however that species has narrower blades, ramiflorus inflorescences, and different anthers. The anthers of *M. wallichii* are unique and are probably the most reliable structural feature that can be used to distinguish it from all related species.

Agreement is made with Furtado (Gard. Bull. Sing. 20 (1963) 122) in his reduction of *M. longifolium* Ridl. to a synonym of *M. wallichii* Ridl. The blades, inflorescence, and flowers (especially the anthers) of the holotype of *M. longifolium* (Ridley 9475, from Perak) match those of Curtis 1294 — which is a syntype of *M. wallichii*.

Memecylon longifolium Ridl. is a later homonym of a completely different species described by Cogniaux (Monogr. Phan. 7 (1891) 1150) from New Guinea and Sarawak. Ridley's epithet, even though it has publication priority over *M. wallichii*, cannot be used since it violates a nomenclatural rule.

The syntypes of *M. heteropleurum* Bl. var. *olivaceum* King include specimens which Furtado reduced to *M. maingayi* Cl. (Wray 1310) (now a synonym of *M. excelsum* Bl.) and *M. wallichii* (King's coll. 500). His observations are correct, however I have not seen the other syntype of var. *olivaceum* (King's coll. 10872) to determine its proper identity.

Penang — I.H. Burkill 1532, 2685, 3337, 6146, 6579; Curtis 457 (*syntype*); 965 from Experimental Nursery (*syntype*), 965 from Penang Hill, = 965 at Paya Trobong in Aug. 1892, sn from Paya Trobury in Aug. 1892; Ridley sn in Mar. 1915; Wallich 4101, 4101C (*lectotype*)

Perak — Goping: King's collector 500 (*lectotype M. heteropleurum* Bl. var. *olivaceum* King); Gunong Bujang Melaka: Shah & Shukor 3406; Gunong Keledang: Ridley 9628; Kali, Kuala Kangsar: Haniff 14949; Grik: Chelliah 98616; Larut: King's collector 2778 (*syntype M. heteropleurum* Bl. var. *olivaceum* King); 3058 (*syntype*); Lumut: Curtis sn in Dec. 1902; Ridley 9475 (*type M. longifolium* Ridl.); Piah For. Res.: Jaamat 39247; Taiping: Ridley 14687; Tapak: Ridley 14102; Waterfall: Wray 1964, 2326, 3278; Waterloo: Curtis 1294 (*syntype*); sine loc.: Scortechini 231 (*syntype*), sn

Kelantan — Bertam: UNESCO 95

Malacca — Bujoing: Ridley 9526

Insufficiently Known Taxa

1. *M. constrictum* Craib, Kew Bull. 1930, 324. (q.v. *M. minutiflorum* Miq.).

Figure 29: a. calyx and corolla bud, b. petal, c. stamen.

2. *M. lancifolium* Ridl. Ml. Malay Pen. V suppl. (1925) 311.

Small tree, glabrous; blades coriaceous, lanceolate, acuminate at the tip (acumen c. 1 cm long), narrowed and slightly decurrent at the base, midrib sunken above, raised below; secondary venation pinnate with c. 15 pairs of nerves, obscure to invisible on both surfaces; 15 cm long, 4 cm wide; drying olive-greenish above, brown below; petiole c. 1 cm long, 2 mm thick; inflorescence cymose, in pairs from leaf axils, axes slightly 4-angled to flattened, drying black; primary axes c. 7 mm long, secondary axes 3, 7–8 mm long; tertiary up to 4 mm. 4th not developed or up to 1.25 mm long, pedicels c. 2 mm long; bracts and bracteoles ovate, acute, c. 0.5 mm long; calyx campanulate, widened above the ovary, smooth and glabrous outside, c. 2 mm long, c. 3 mm wide, margin with 4 broadly undulate lobes; petals broadly ovate, acute at the tip, truncate at the base, very thick with thinner margins, in bud c. 1.5 mm long, 2 mm wide, blue; anthers in bud "C"-shaped, c. 1.25 mm long, gland distinct, centrally located; fruit unknown.

Type: Ridley 3840, Sungei Morai, Singapore

The holotype of this species at Kew consists of one detached leaf and a pile of broken inflorescences and flowers. Branchlets are not on the sheet. There is not much to see and from the description I have been unable to study this species in further detail. It is noted on this specimen that there is a duplicate in the Singapore collection, however I could not find it there. The leaf does not look like that of any species of *Memecylon* that I am familar with. Therefore, since this species cannot be adequately reconstructed it has been included in the section for inadequately known taxa.

Figure 30: a. calyx, b. petal, c. stamen

3. *M. pauciflorum* Bl. var. *brevifolium* Craib, Fl. Siam. Enum. I:4 (1931) 712; q.v. discussion under *M. pauciflorum* Bl. (26a.) Figure 35.

GENERAL CONCLUSIONS

In this treatment of *Memecylon* from the Malay Peninsula twenty eight species and three variations (not including three imperfectly known taxa) are discussed and twenty two taxa have been reduced to new synonyms. No new taxa are described here, although there are several collections which I have not been able to identify and these may be undescribed taxa. These specimens will have to remain undetermined until more material is studied. *Memecylon dichotomum* (Cl.) King var. *rotundatum* (Craib) Maxw. is the only new combination included in this paper. Although specimens of *M. beccarianum* Cogn. from the Malay Peninsula have not been seen, this Bornean species is presently included in this treatment since it is likely that it occurs in the region.

While examining a large number of collections from the Malay Peninsula and the Malay Islands at Singapore, Leiden, and Kew it became apparent that several widely distributed species and varieties show a broad range of variation. As a result a number of new synonyms which were formerly described as distinct taxa from the Malay Islands are included here. The reduction of three and five species to synonyms of *M. oleifolium* Bl. and *M. excelsum* Bl., respectively; appears, for this reason, to be justified.

Among King's five new species and two new varieties of *Memecylon* from the Malay Peninsula, one species and two varities have been reduced to synonyms of other species. Among the remaining taxa which King included in his paper, fourteen species and one variety have been accepted in this revision without nomenclatural changes. In the meantime the present revision includes four reduction made by other authors on King's work, plus two misinterpretations have been found: *M. heteropleurum* Bl. and *M. amplexicaule* Roxb. — the former being *M. megacarpum* Furtado, and the latter a mixture of *M. amplexicaule* Roxb. and *M. wallichii* Ridl.

Among the thirty one species and three varieties of *Memecylon* from the Malay Peninsula discussed by Ridley twenty species and one variety are included as distinct taxa in this revision. The other thirteen taxa; including *M. tenuifolium* Ridl., which was described as a new species; as synonyms of other species. In general, Ridley followed King's treatment quite closely, but did make some changes which I have accepted: reducing *M. microstomum* Cl. to *M. amplexicaule* Roxb., and considering *M. amabile* Bedd. var. *malaccensis* Cl. as *M. malaccense* (Cl.) Ridl. (King regarded this variety as a doubtful taxon). Ridley also followed

King in considering *M. acuminatum* Sm. var. *flavescens* Cl. as a synonym of *M. minutiflorum* Miq. In this present work var. *flavescens* has been maintained as a distinct, but poorly known taxon. The type collection of *M. laxiflorum* Ridl., described in vol. V of his flora, is incomplete and I have been unable to decide on its exact taxonomic status.

Craib's three new species and two new varieties of *Memecylon* from peninsular Thailand have been reconsidered in this revision and now includes only one new species and one new variety — both of which are incompletely known and perhaps synonyms of other taxa.

Bakhuizen van den Brink's extensive work on *Memecylon* from the Malay Archipelago includes twenty five taxa which are also found in the Malay Peninsula, twelve of which are recognized in the present revision as distinct taxa and the other thirteen as synonyms. At least four of his new species of *Memecylon* are, in this paper, considered identical to previously described taxa which have been recorded from the Malay Peninsula viz. *M. depokkense* Bakh. f. (= *M. fruticosum* King), *M. multiflorum* Bakh. f. (= *M. campanulatum* Cl.), *M. steenisii* Bakh. f. (= *M. cantleyi* Ridl.), and *M. rhodophyllum* Bakh. f. (= *M. edule* Roxb. var. *ovatum* (Sm.) Cl. *M. globosum* Bakh. f. is the only new record of *Memecylon* for the Malay Peninsula. His paper contains a tremendous amount of information which also clarifies many taxonomic problems and has greatly improved our knowledge of the family.

In regards to Corner's treatment of *Memecylon* my conclusions differ from his in that *M. heteropleurum* Bl. is replaced with *M. excelsum* Bl., and *M. ovatum* Sm. is reduced to *M. edule* Roxb. var. *ovatum* (Sm.) Cl.

Furtado's paper has been thoroughly reviewed. The specimens listed under *M. campanulatum* Cl. are all *M. minutiflorum* Miq. Furtado also discusses *M. hepaticum* Bl. and cites several specimens from Johore as examples. The type specimen of *M. hepaticum* Bl. (Blume s.n., from Sumatra) lacks inflorescences, flowers, and mature fruit; and the original description is inadequate for detailed analysis. The specimen (at Leiden) does not resemble the collections Furtado cites, and furthermore these specimens all have inflorescences and flowers (especially the anthers) identical to those of *M. garcinioides* Bl. The leaves, however, are longer and narrower than most collections of *M. garcinioides* Bl. from the Malay Peninsula and Malay Islands. Therefore, *M. hepaticum* Bl. is now considered to be an imperfectly known species which does not seem to occur in the Malay Peninsula.

Furtado correctly recognized the syntypes of *M. heteropleurum* Bl. var. *olivaceum* King as belonging to two other taxa: *M. maingayi* Cl. and *M. wallichii* Ridl., however he did not reduce *M. maingayi* Cl. to *M. excelsum* Bl. as Blume's holotype (at Leiden) was not available to him. *M. longifolium* Ridl. was also correctly reduced to a synonym of *M. wallichii* Ridl. A review of the salient morphological characteristics of each taxon is outlined in Table 1. These features, in several instances, can be used to distinguish individual taxa, while in others several closely related taxa can be separated — their individual identities requiring more detailed analyses.

TABLE 1. REVIEW OF SALIENT MORPHOLOGICAL CHARACTERS

Taxon	Branchlets	Calyx	Anther Shape	Fruit Shape	Distinguishing Features
M. acuminatum var. *acuminatum*	cylindric	4-lobed	C	globose	acuminate blades, long primary axis
acuminatum var. *flavescens*	cylindric	truncate	C	globose	poorly known
amplexicaule	cylindric	truncate-undulate	C	globose	sessile, thick blades; glomerulate inflorescence
beccarianum	cylindric	truncate-apiculate	C	globose	Bornean species
caeruleum	cylindric	truncate	C	ovoid	thick blades, fruit
campanulatum	flattened-grooved	truncate	C	globose	tall tree, thick blades, short inflorescence
cantleyi	grooved-angled	truncate	U	ovoid	flattened calyx, fruit
cinereum	flattened-grooved	lobed	triangular-cuneate	globose	acuminate petals, glandless anthers, short inflorescence
corticosum	winged	truncate-apiculate	C	ovoid	winged branchlets; ramiflorus inflorescence
dichotomum var. *dichotomum*	angled-winged	truncate	C	globose	bracts, inflorescence
dichotomum var. *rotundatum*	angled-winged	truncate	C	globose	longer inflorescence

Taxon	Branchlets	Calyx	Anther Shape	Fruit Shape	Distinguishing Features
edule var. *edule*	grooved-angled	truncate-apiculate	C	globose	smaller leaves, branchlets
edule var. *ovatum*	cyindric	truncate-apiculate	C	globose	larger leaves, branchlets
excelsum	cyindric	truncate	C	ovoid	large, thick calyx; ramiflorus
floridum	grooved-angled	lobed	truncate-cuneate	globose	glandless anthers, pericarp
fruticosum	angled-winged	truncate-undulate	U	globose	branchlets, inflorescence
garcinioides	cylindric-grooved	cusped	orbicular	globose	globose anthers with very reduced connective
globosum	cylindric	truncate-undulate	C	globose	large fruit (15–20 mm diam.)
hullettii	cylindric	undulate-apiculate	orbicular	globose	long, umbellate, papillose inflorescence
intermedium	cylindric	truncate-apiculate	C	globose	small: inflorescence, fruit
kunstleri	cylindric	truncate-apiculate	U	globose	poorly known
lilacinum	grooved-angled	lobed	triangular-cuneate	globose	acuminate petals; rugose, grooved fruit
malaccense	cylindric	truncate-apiculate	triangular-cuneate	globose	glandless anthers, not well known
megacarpum	cylindric-grooved	truncate-undulate	C	globose	large, rugose fruit

Taxon	*Branchlets*	*Calyx*	Anther Shape	Fruit Shape	Distinguishing Features
minutiflorum	flattened-grooved	cusped	C	globose	papillose calyx constricted above the ovary
oleifolium	cylindric	truncate	C to U	ovoid	complex inflorescence, branchlets drying tan, fruit
oligoneurum	flattened-grooved	truncate-apiculate	triangular-cuneate	globose	tri-nerved blades
paniculatum	angled-winged	cusped	U	globose, ovoid	blade venation, large inflorescence
pauciflorum	grooved-angled	truncate-apiculate	U	globose	small: leaves, inflorescence
pubescens	cylindric-grooved	truncate-cusped	C	globose	blade venation; complex and pubescent inflorescence
wallichii	angled-winged	truncate	linear	globose	axillary inflorescence and unique anthers

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M. brandisianum Craib, Kew Bull. 1930, 323 = *M. oleifolium* Bl.

M. dissitum Craib, Kew Bull. 1930, 325 = *M. cantleyi* Ridl.

M. epiphyticum King, J. As. Soc. Beng. 69, II:1 (1900) 74 (Mat. Fl. Mal. Pen. III, 482) = *M. fruticosum* King

M. eugeniiflora Ridl., J. Str. Br. Roy. As. Soc. 57 (1910) 48, and *M. dichotomum* (Cl.) King var. *eugeniiflorum* (Ridl.) Ridl., Fl. Mal. Pen. I (1922) 812 = *M. dichotomum* (Cl.) King

M. gracilipes Ridl., J. Str. Br. Roy. As. Soc. 79 (1918) 72, and *M. gracilipes* Ridl. var. *rotundatum* Craib, Fl. Siam. Enum. 1:4 (1931) 708 = *M. dichotomum* (Cl.) King var. *rotundatum* (Craib) Maxw.

M. heteropleurum Bl. var. *olivaceum* King, J. As. Soc. Beng. 69, II:1 (1900) 78 (Mat. Fl. Mal. Pen. III, 486) = *M. excelsum* Bl. and *M. wallichii* Ridl.

M. laxiflorum Wall. ex Ridl., J. Str. Br. Roy. As. Soc. 79 (1918) 74 = *M. edule* Roxb. var. *ovatum* (Sm.) Cl.

M. longifolium Ridl., J. Str. Br. Roy. As. Soc. 79 (1918) 72 = *M. wallichii* Ridl.

M. maingayi Cl. in Hk. f., Fl. Brit. Ind. II (1879) 557 = *M. excelsum* Bl.

M. microstomum Cl. in Hk. f., Fl. Brit. Ind. II (1879) 557 = *M. amplexicaule* Roxb.

M. perakense Merr., Gard. Bull. Str. Settl. 8 (1935) 132 = *M. dichotomum* (Cl.) King var. *rotundatum* (Craib) Maxw.

M. pulchellum Ridl., J. Str. Br. Roy. As. Soc. 61 (1912) 52 = *M. pauciflorum* Bl.

M. ridleyi Cogn. ex Ridl., J. Str. Br. Roy. As. Soc. 30 (1897) 85 = *M. dichotomum* (Cl.) King

M. tenuifolium Ridl., Fl. Mal. Pen. I (1922) 812 = *M. fruticosum* King

M. umbellatum Wall. Cat. 4109, in part = *M. cinereum* King

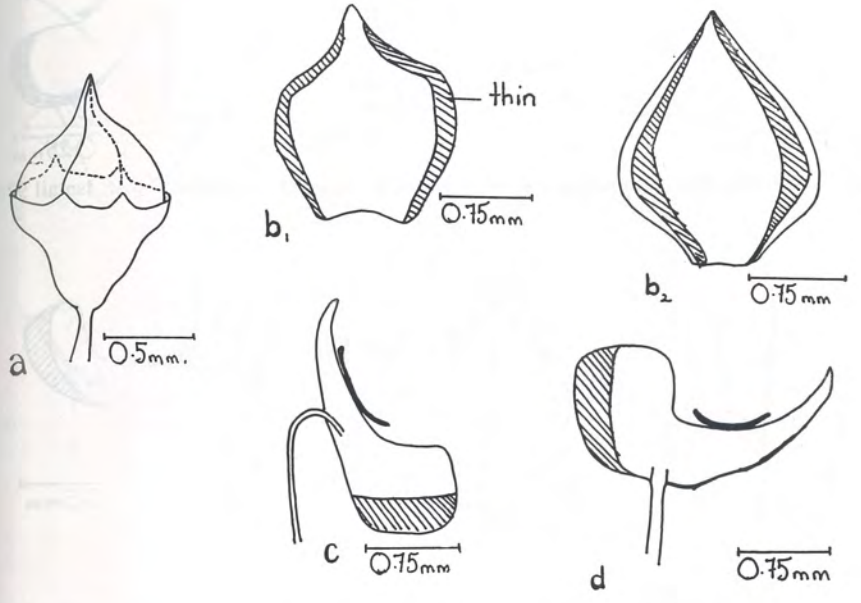


Fig. 1. *Memecylon acuminatum* Sm. var. *acuminatum* a. calyx and corolla bud b. (1) immature petal, (2) mature petal c. stamen in bud d. mature stamen a.-d. Griffith 2325/1

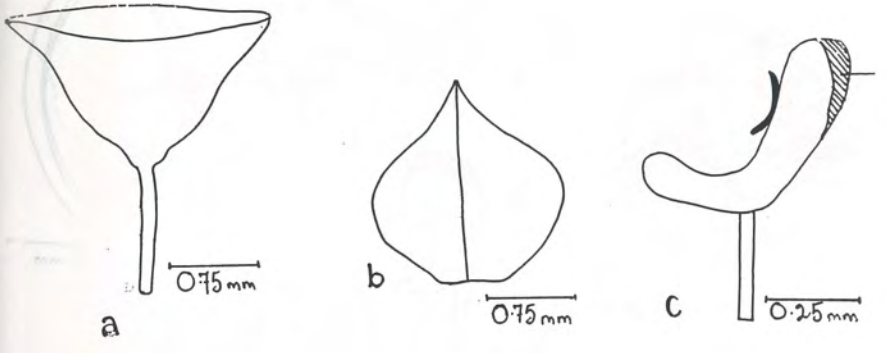


Fig. 1a. *Memecylon acuminatum* Sm. var. *flavescens* Cl. a. calyx b. petal c. mature stamen a. & c. Curtis 816, b. Griffith 2325/2 (isotype)

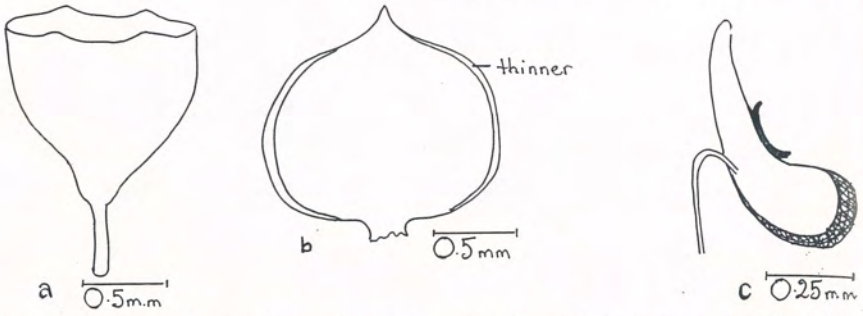


Fig. 2. *Memecylon amplexicaule* Roxb. a. calyx b. petal c. stamen a.-c. Ismail 97802

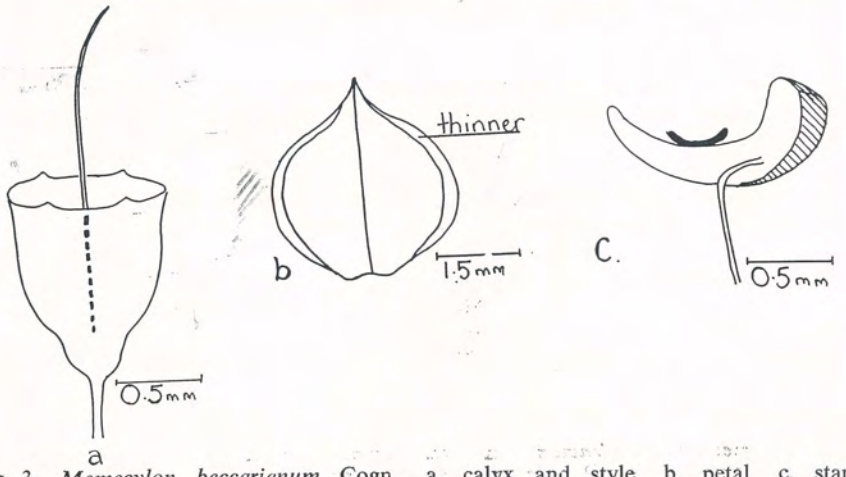


Fig. 3. *Memecylon beccarianum* Cogn. a. calyx and style b. petal c. stamen a.-c. Beccari 1518 (syntype)

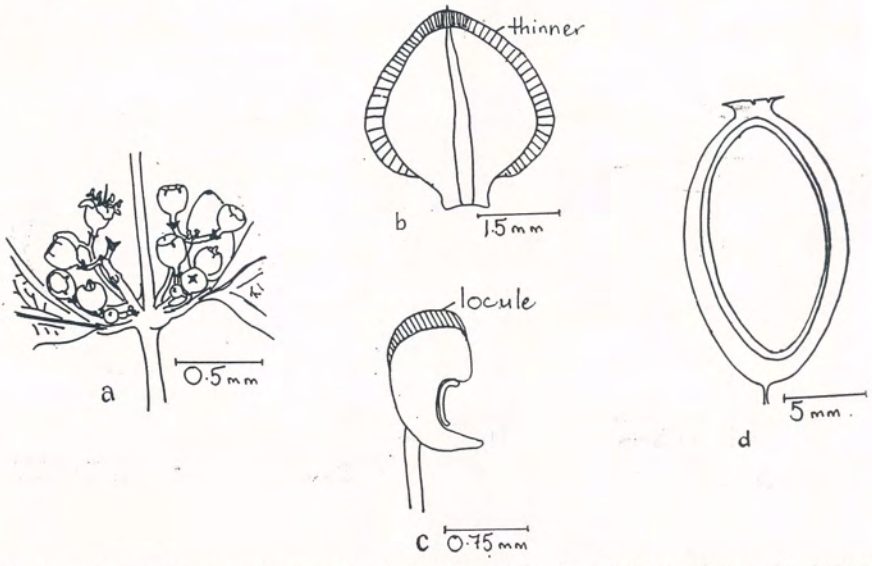


Fig. 4. *Memecylon caeruleum* Jack a. inflorescence b. petal c. stamen d. fruit and seed a.-d. Noor & Samsuri 10

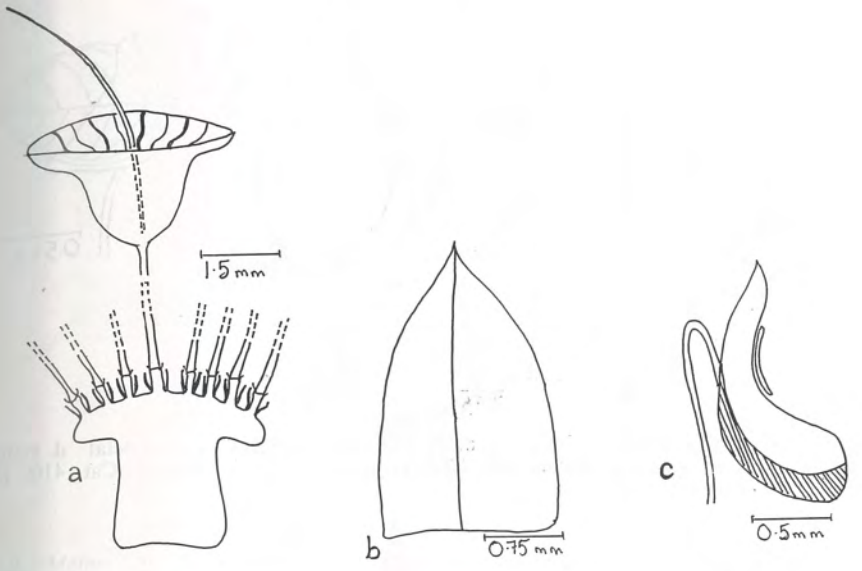


Fig. 5. *Memecylon campanulatum* Cl. a. inflorescence axes, calyx, and style b. petal c. stamen a.-c. Griffith 2325 (holotype)

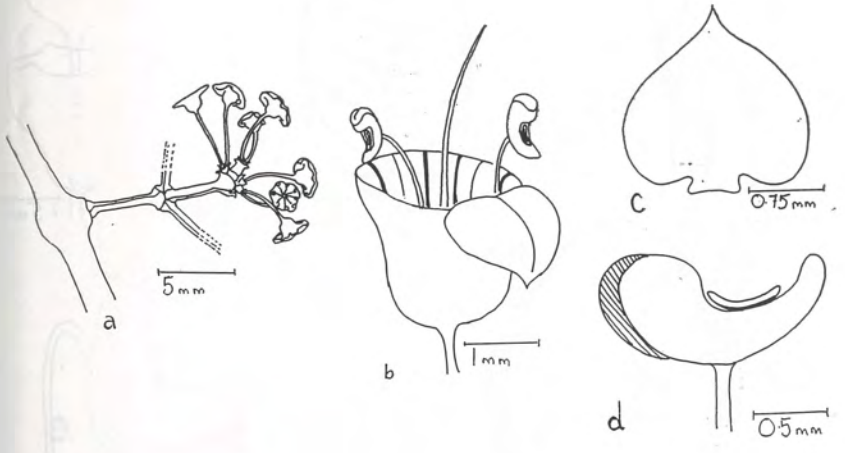


Fig. 6. *Memecylon cantleyi* Ridl. a. inflorescence b. mature flower c. petal d. stamen a. & b. Henderson 24514, c. & d. Ridley 13012 (holotype)

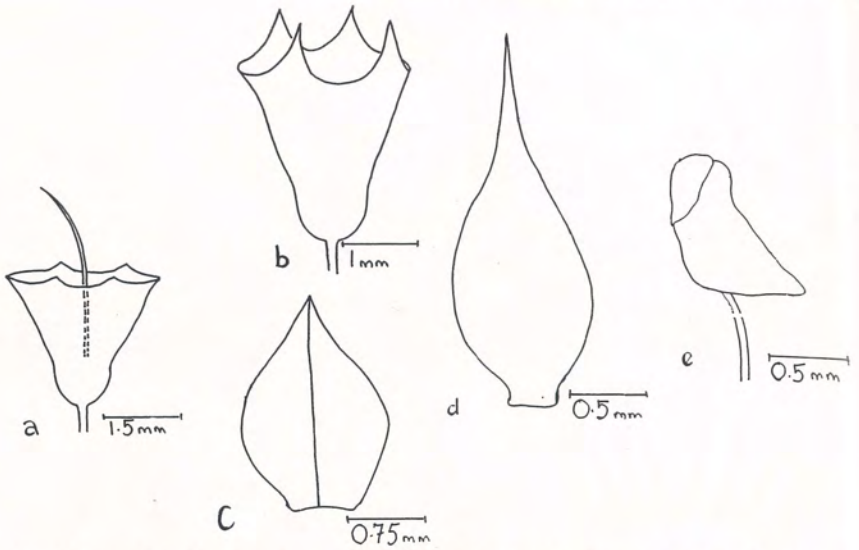


Fig. 7. *Memecylon cinereum* King a. calyx and style b. calyx c. bud petal d. mature petal e. stamen a., c., e. Scortechini 2035 (syntype); b. & d. Wallich Cat. 4109 (*M. umbellatum* Wall.)

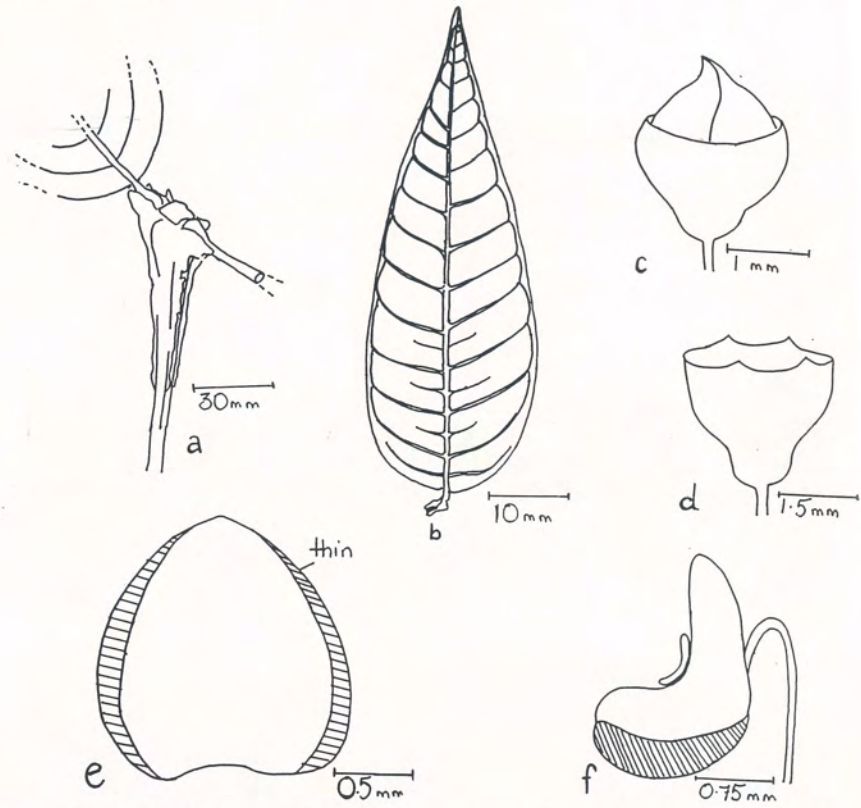


Fig. 8. *Memecylon corticosum* Ridl. a. upper node and internode b. leaf c. flower bud d. mature calyx e. petal f. stamen a.-c. Sinclair & Kiah 40858, d.-f. Kloss 7627 (holotype)

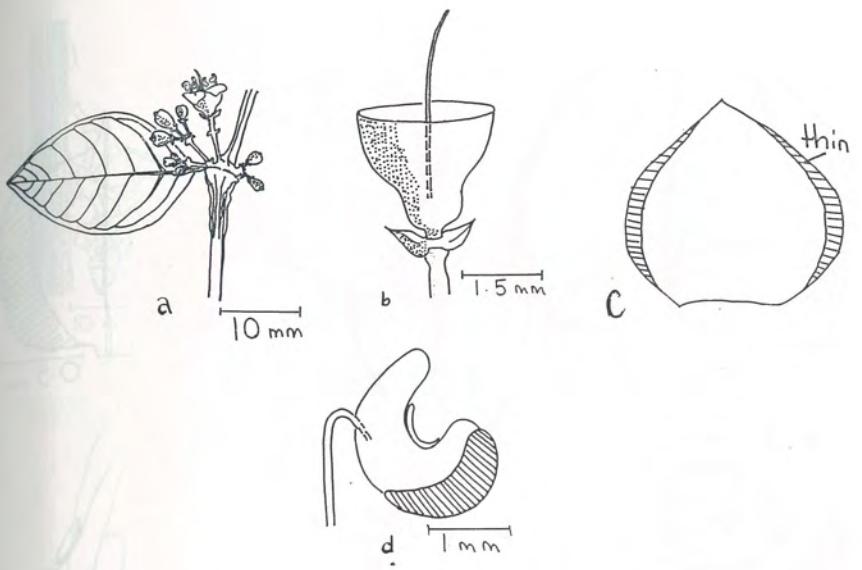


Fig. 9. *Memecylon dichotomum* (Cl.) King var. *dichotomum* a. branch, leaf, and internode b. bracts, calyx, and style c. petal d. stamen a.-d. Maxwell 77-372

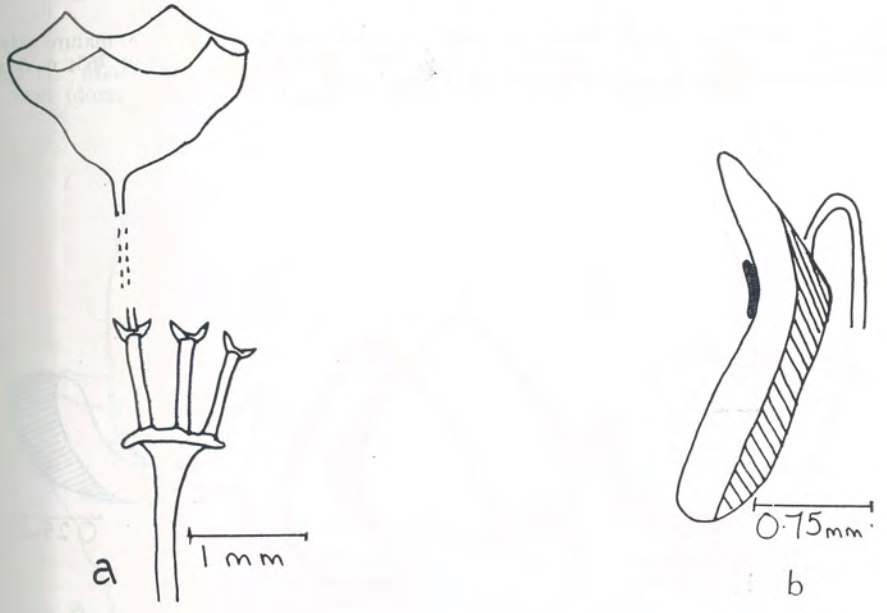


Fig. 9a. *Memecylon dichotomum* (Cl.) King var. *rotundatum* (Craib) Maxw. a. inflorescence axes, bracts, and calyx b. bud stamens a. & b. Haniff 14969

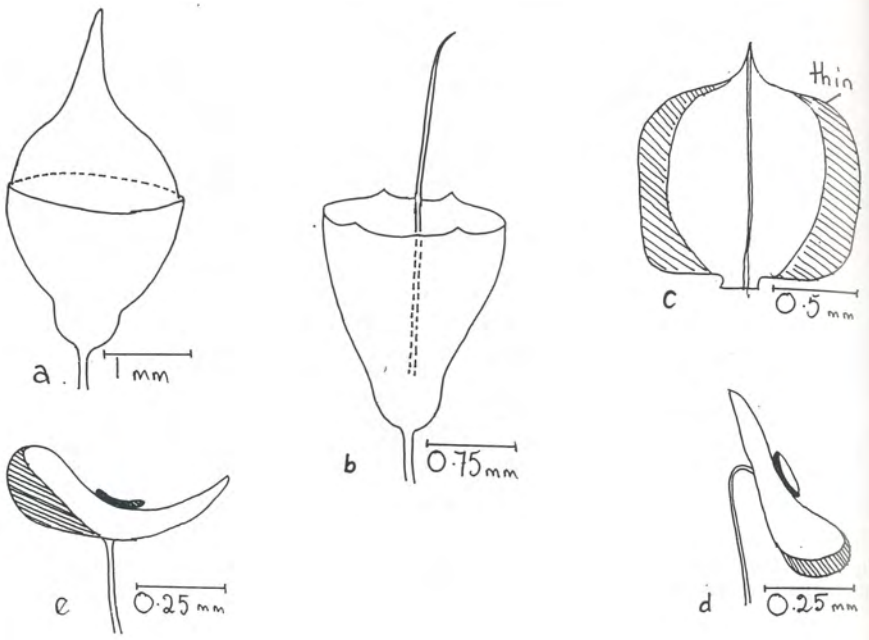


Fig. 10. *Memecylon edule* Roxb. var. *edule* a. calyx and corolla bud b. mature calyx and style c. petal d. & e. stamens a. & d. H.M. Burkill 2526; b. Hou 763; c. & e. Brelkerta sn, from Kuala Trengganu on 1 Nov. 1939

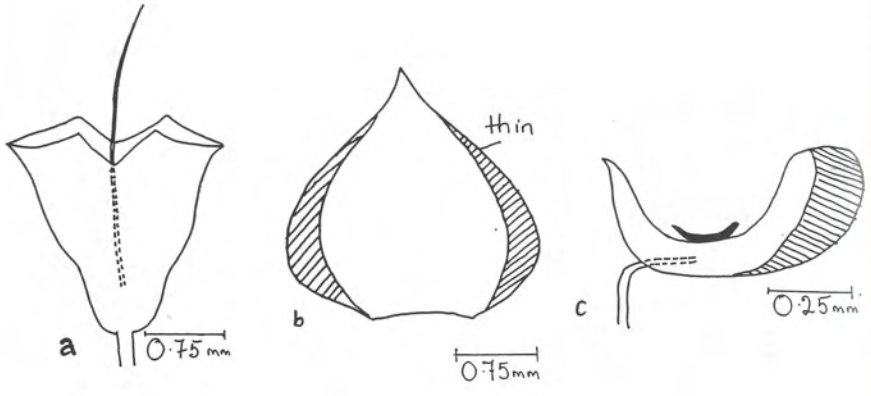


Fig. 10a. *Memecylon edule* Roxb. var. *ovatum* (Sm.) Cl. a. calyx and style b. petal c. stamen a.-c. Chan 6800

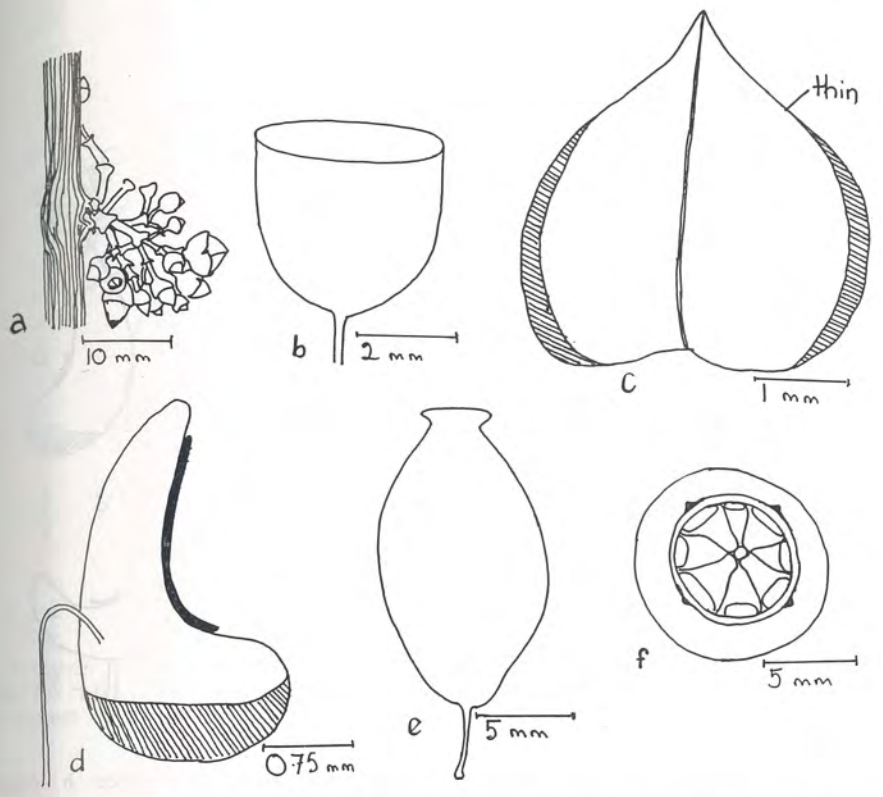


Fig. 11. *Memecylon excelsum* Bl. a. inflorescence b. calyx c. petal d. stamen f. fruit (dorsal view) a.-d. Ahmad & Shukor 450, e. & f. Corner 32246

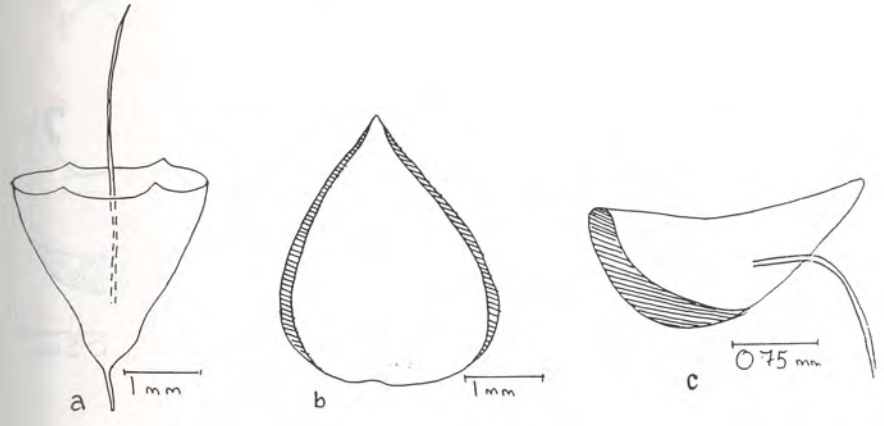


Fig. 12. *Memecylon floridum* Ridl. a. calyx and style b. petal c. stamen a.-c. King's coll. 3551 (holotype)

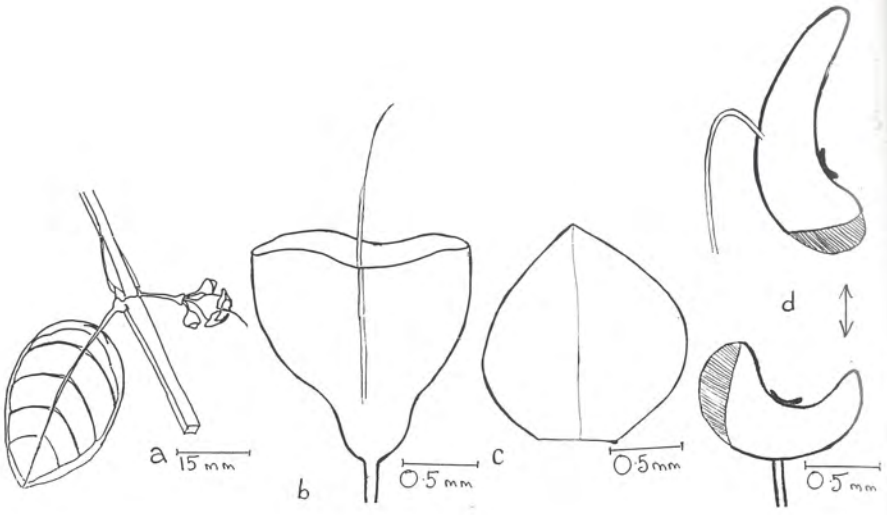


Fig. 13. *Memecylon fruticosum* King a. branch, leaf, and inflorescence b. calyx c. petal d. anthers a.-d. Kunstler 3265 (syntype)

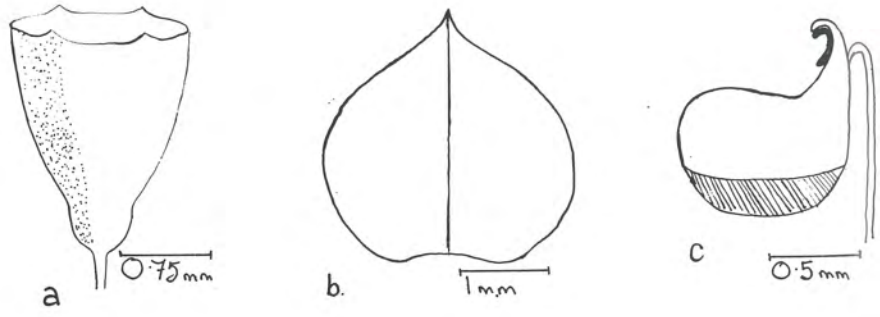


Fig. 14. *Memecylon garcinioides* Bl. a. calyx b. petal c. stamen a.-c. Korthals sn (Sumatra) (holotype)

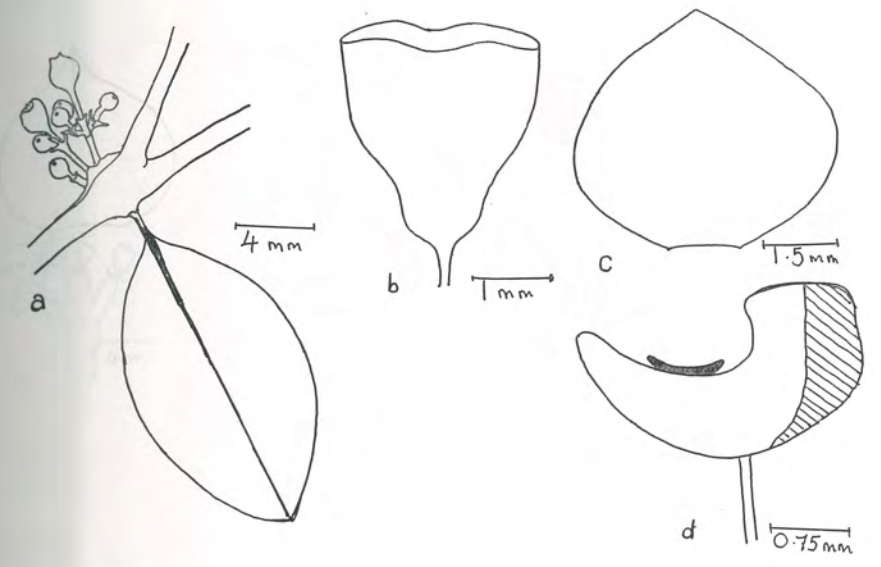


Fig. 15. *Memecylon globosum* Bakh. f. a. inflorescence and leaf b. calyx c. petal d. stamen a.-d. van Steenis 1265 (isotype)

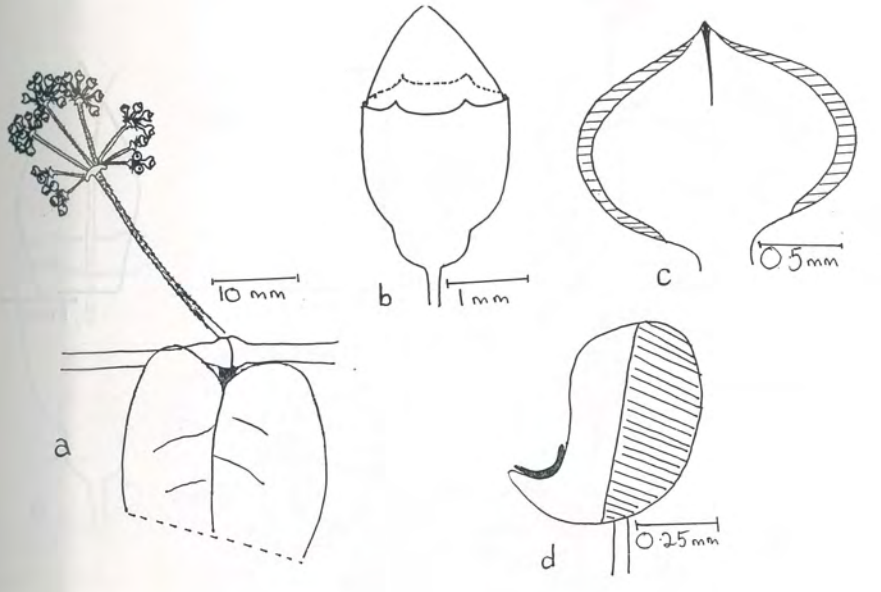


Fig. 16. *Memecylon hullettii* King a. branch, leaf, and inflorescence b. calyx and corolla bud c. petal d. stamen a.-d. Sinclair 39549

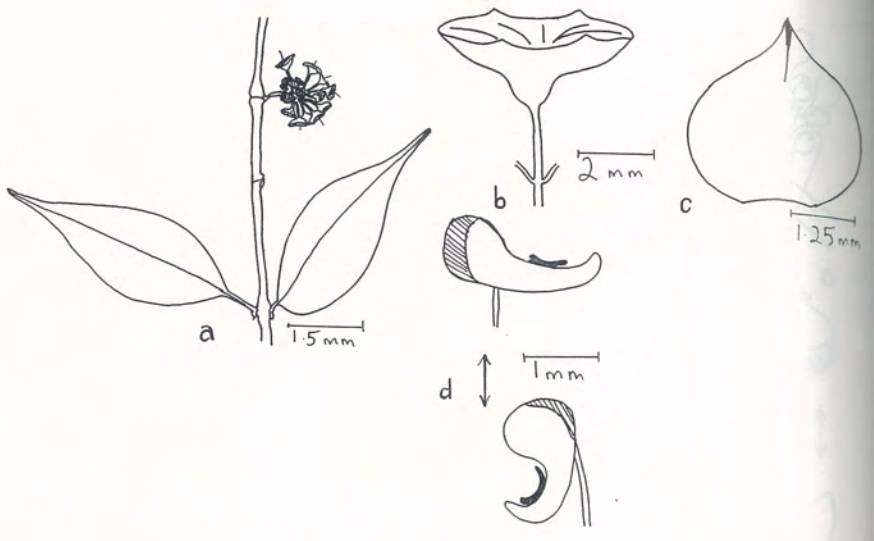


Fig. 17. *Memecylon intermedium* Bl. a. branch, leaves, and inflorescence b. calyx c. petal d. anthers a. Ng 1153, b.-d. Paie 27695

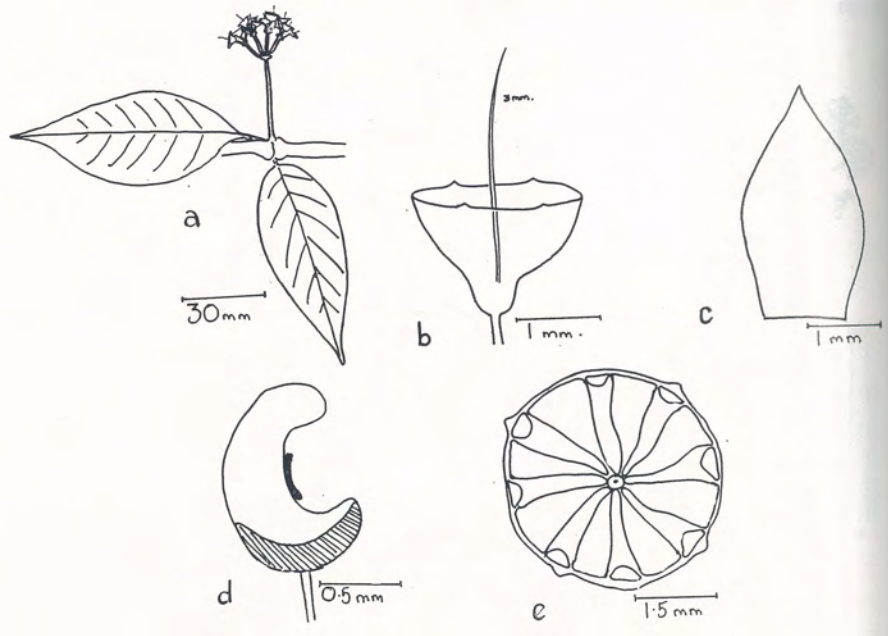


Fig. 18. *Memecylon kunstleri* King a. branch, leaves, and inflorescence b. calyx and style c. petal d. stamen e. areolus a.-e. King's coll. 10419 (lectotype)

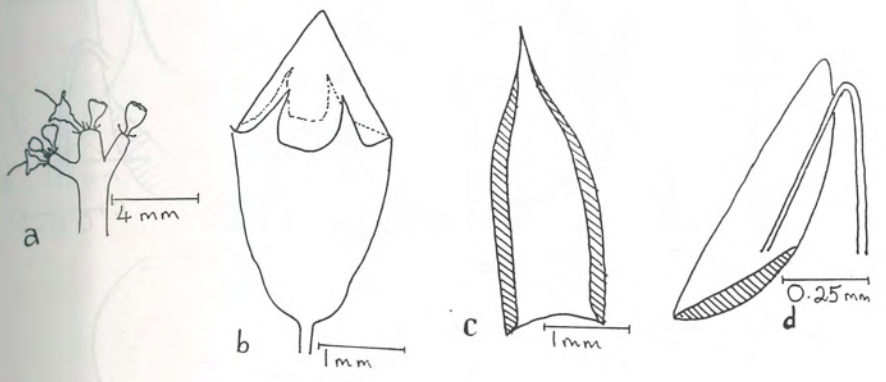


Fig. 19. *Memecylon lilacinum* Z. & M. a. inflorescence b. calyx and corolla bud c. petal d. stamen a.-d. Blume sn (Java) (holotype)

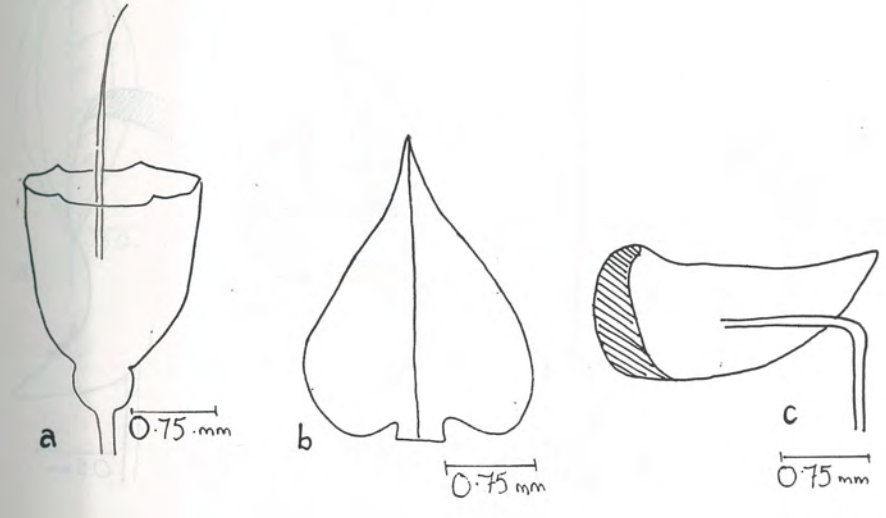


Fig. 20. *Memecylon malaccense* (Cl.) Ridl. a. calyx and style b. petal c. stamen a.-c. Maingay 2531 (819) (syntype)

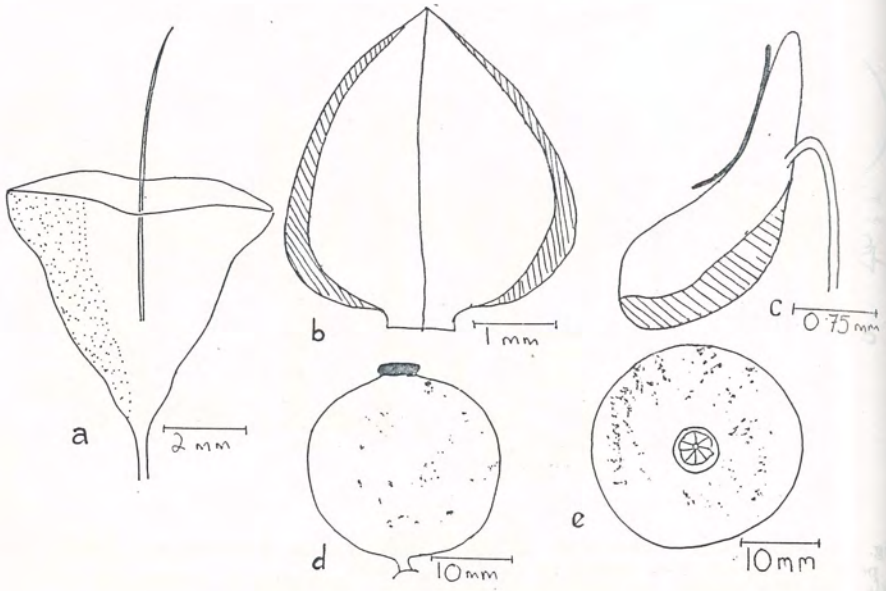


Fig. 21. *Memecylon megacarpum* Furtado a. calyx and style b. petal c. stamen d. fruit (lateral view) e. fruit (dorsal view) a.-c. Curtis 814, d. & e. Burn-Murdoch 162

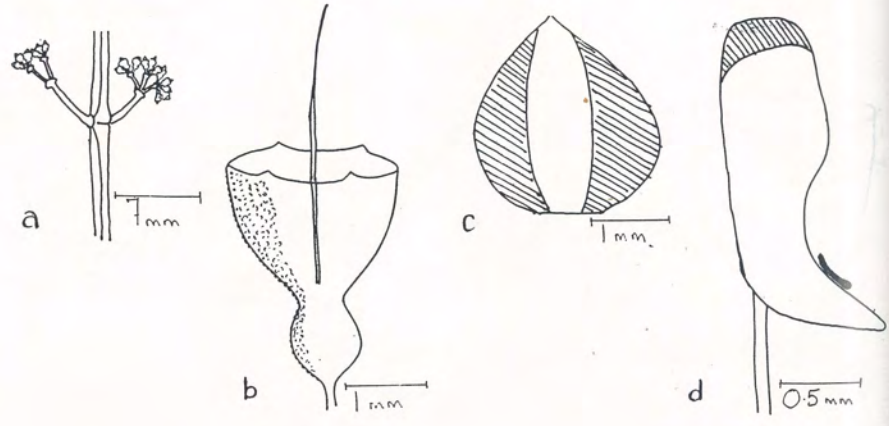


Fig. 22. *Memecylon minutiflorum* Miq. a. branch and inflorescence b. calyx and style c. petal d. stamen a. Cubitt 867, b.-d. Maingay 810 (2251)

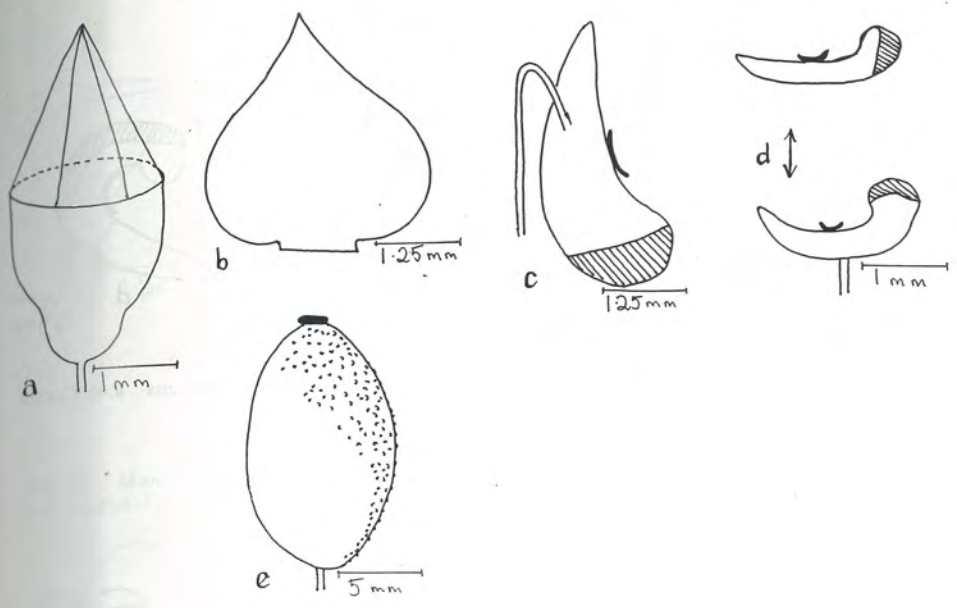


Fig. 23. *Memecylon oleifolium* Bl. a. calyx and corolla bud b. petal c. bud stamen d. mature stamen e. fruit a.-d. Blume sn (Sumatra) (isotype), e. Whitmore 0079

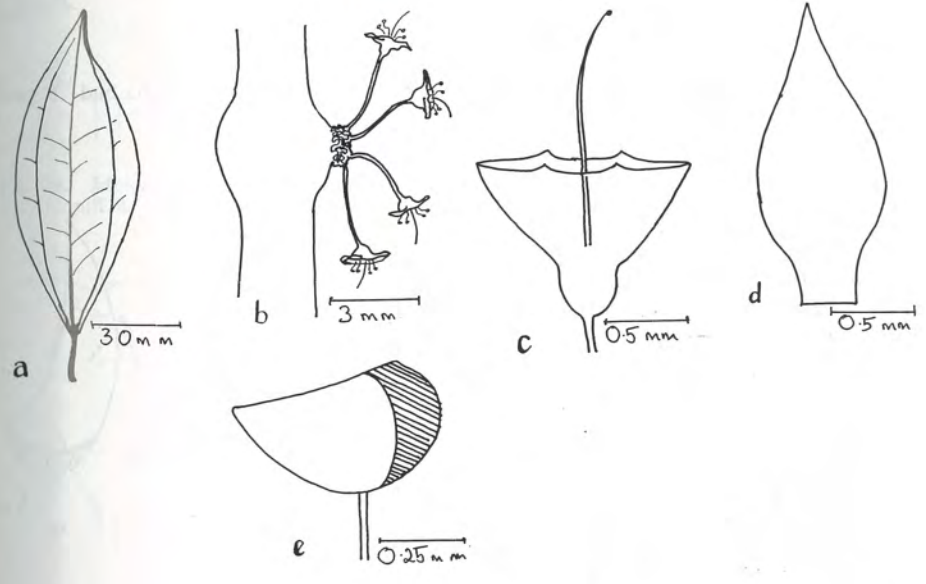


Fig. 24. *Memecylon oligoneurum* Bl. a. leaf b. inflorescence c. calyx and style d. petal e. stamen a.-e. Whitmore 0059

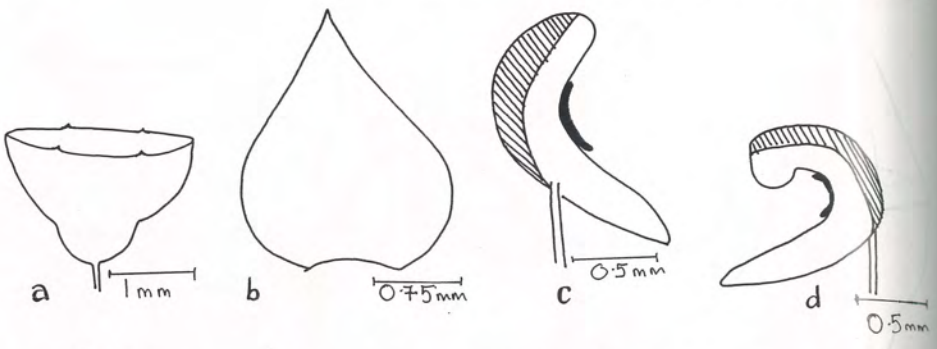


Fig. 25. *Memecylon paniculatum* Jack a. calyx b. petal c. & d. stamens a.-c. Corner 37050, d. Moysey & Kiah 33635

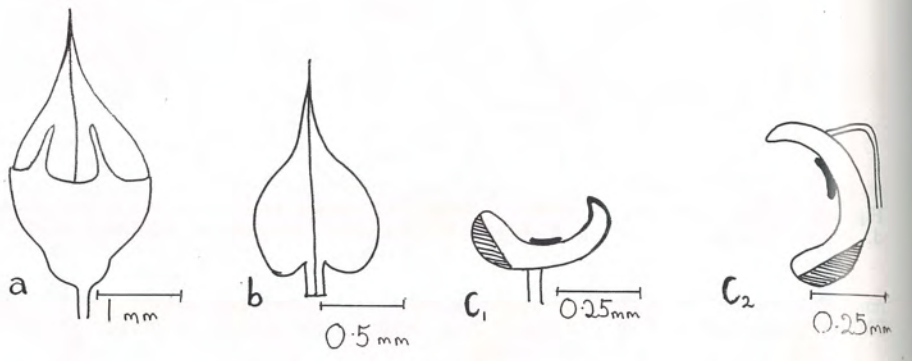


Fig. 26. *Memecylon pauciflorum* Bl. var. *pauciflorum* a. calyx and corolla bud b. petal c. stamens a.-c. Corner 28565

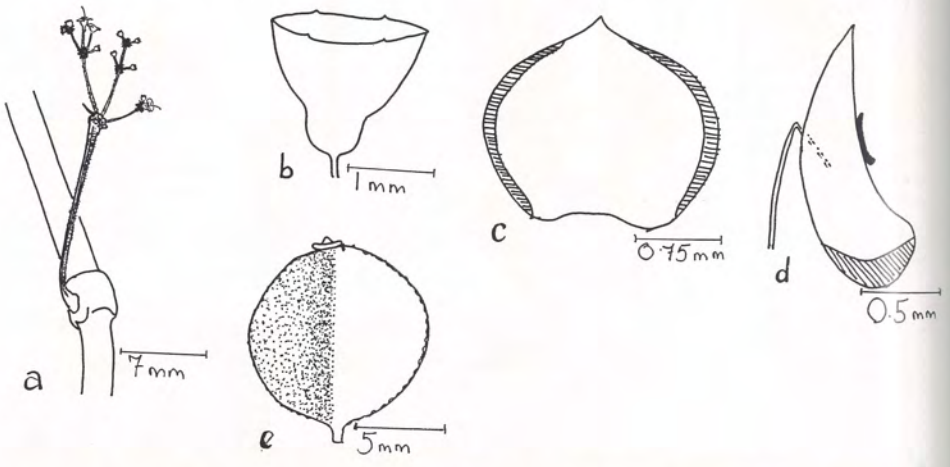


Fig. 27. *Memecylon pubescens* (Cl.) King a. branch and inflorescence b. calyx c. petal d. stamen e. fruit a.-d. Kiah 35188, e. Everett 13882

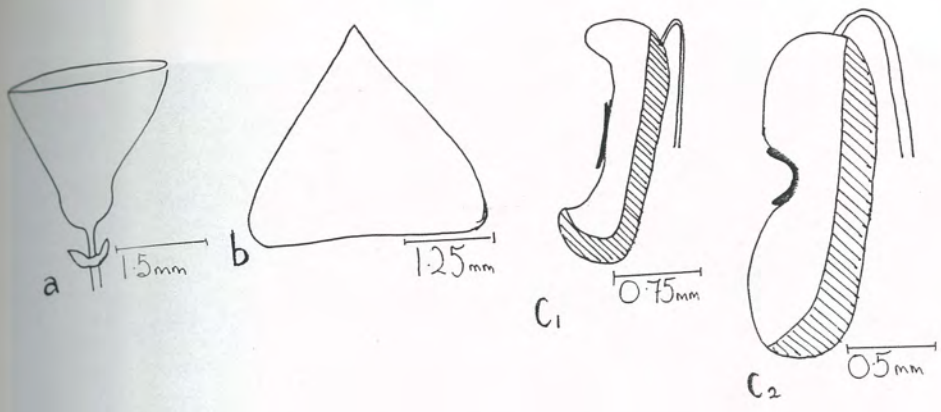


Fig. 28. *Memecylon wallichii* Ridl. a bracts and calyx b. bud petal c. stamens a.-c. Curtis 1294 (syntype)

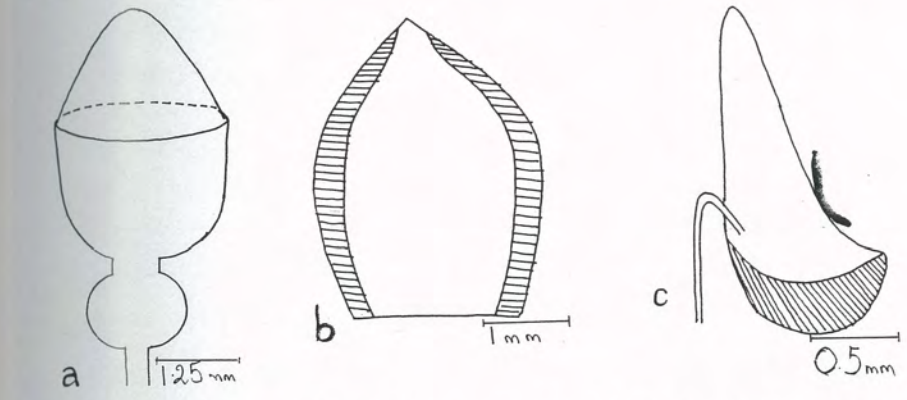


Fig. 29. *Memecylon constrictum* Craib a. calyx and corolla bud b. petal c. stamen a.-c. Haniff & Nur 2732 (holotype)

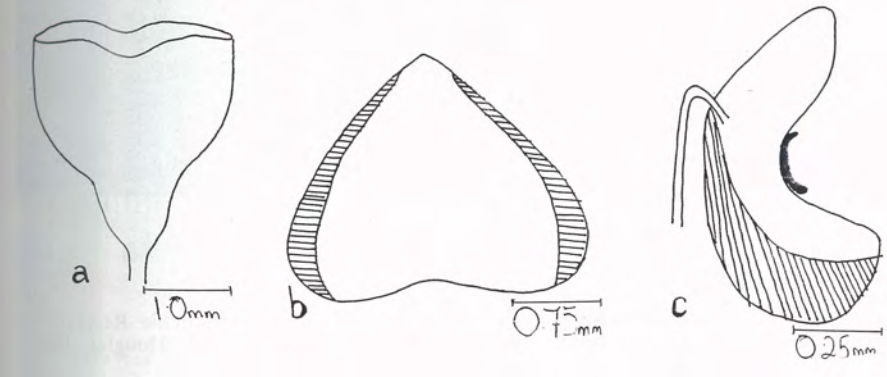


Fig. 30. *Memecylon lancifolium* Ridl. a. calyx b. petal c. stamen a.-c. Ridley 3840 (holotype)

Fig. 31. Bark of *Memecylon lilacinum* Z. & M., mature tree at MacRitchie Reservoir, Singapore; 18 Dec. 1976. Specimen: Maxwell 76-790. Photo by Mr. Douglas Teo.

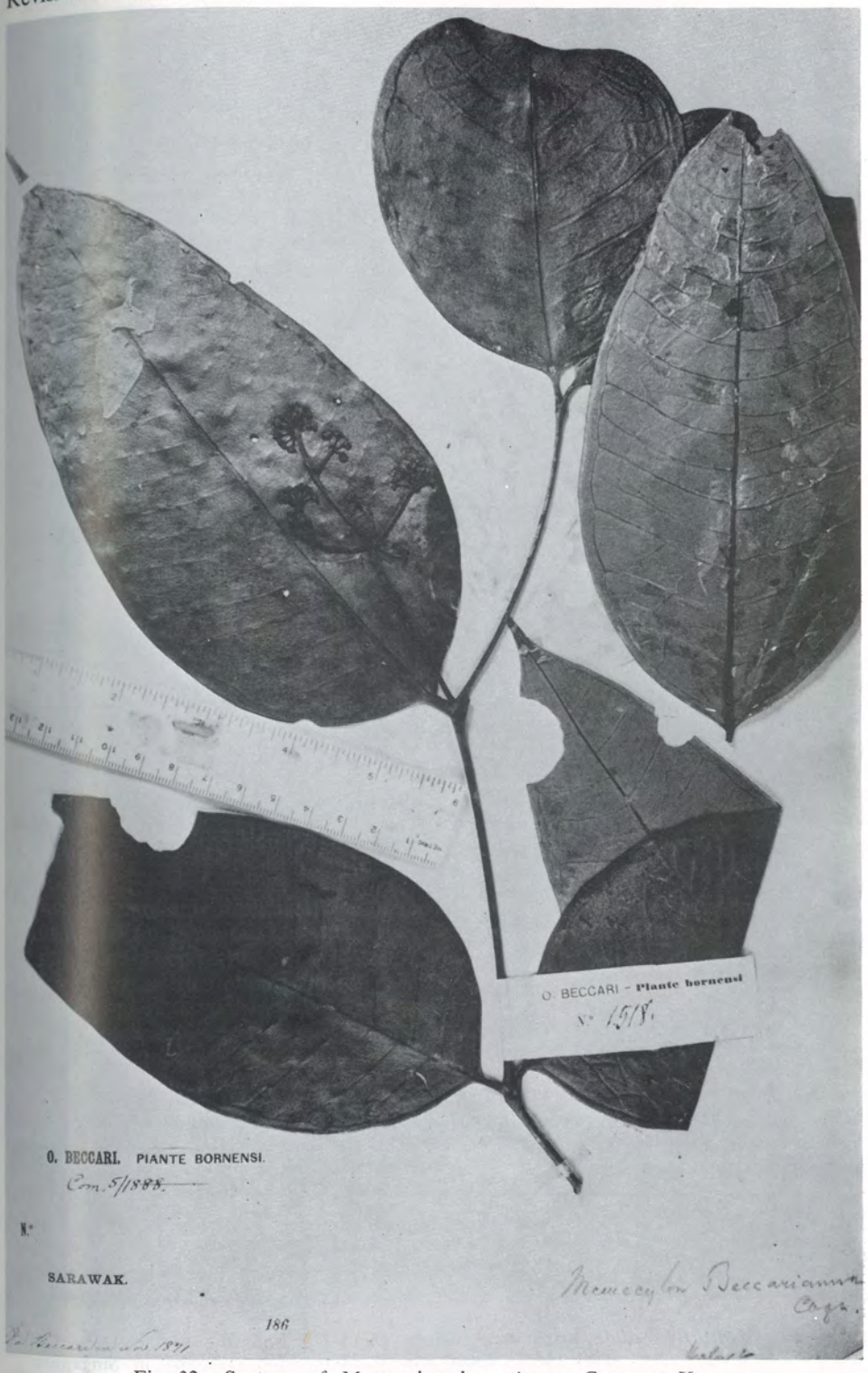


Fig. 32. Syntype of *Memecylon beccarianum* Cogn. at Kew.

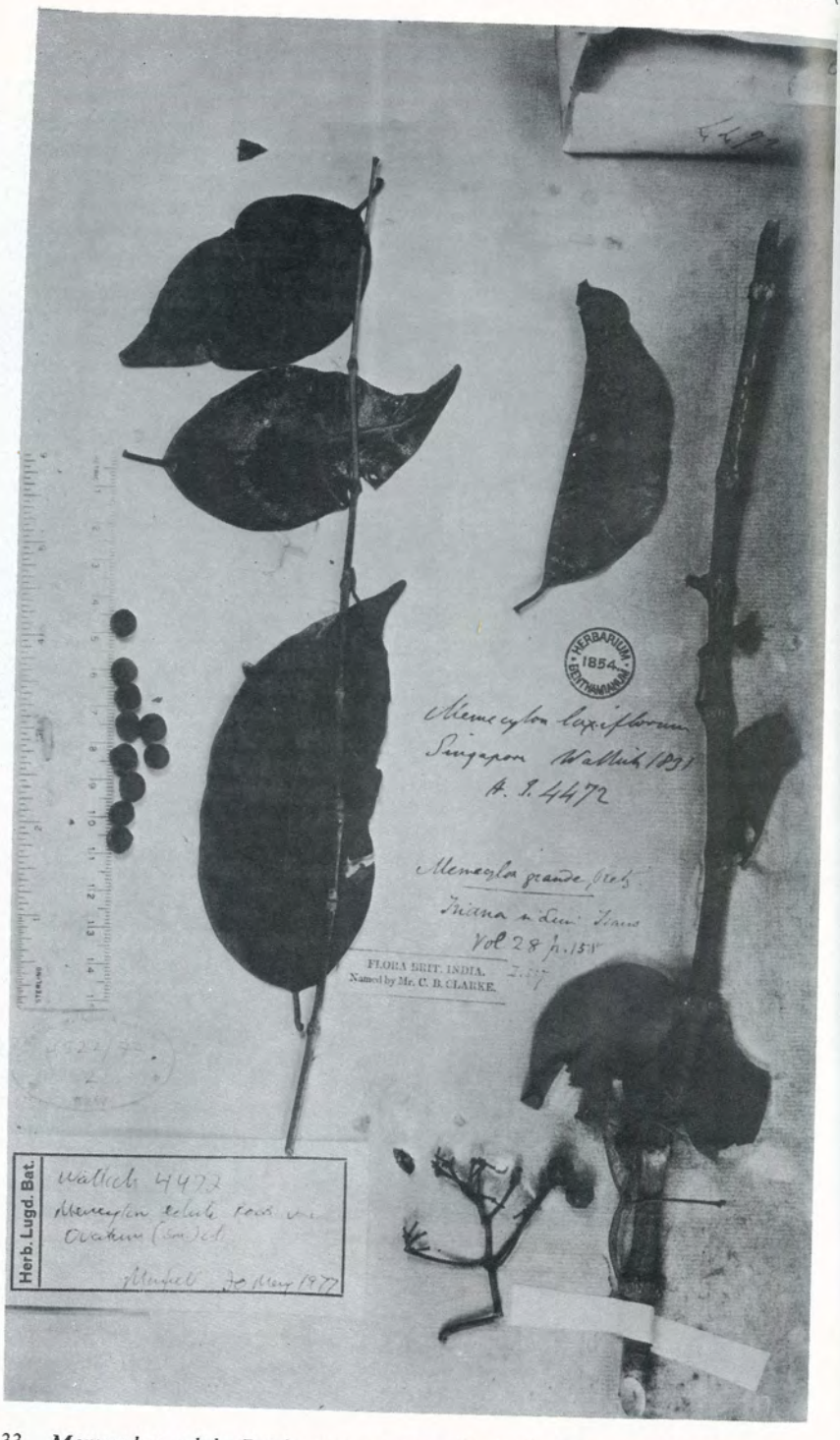


Fig. 33. *Memecylon edule* Roxb. var. *ovatum* (Sm.) Cl. from the Wallich collection at Kew. One of the oldest (1831) specimens of *Memecylon* collected in Singapore. Originally distributed as *M. laxiflorum* by Wallich, later included under *M. grande* Retz. by Triana (1871) and other botanists, described in 1918 by Ridley as *M. laxiflorum* Wall. ex Ridl., and now a synonym of *M. edule* var. *ovatum*.

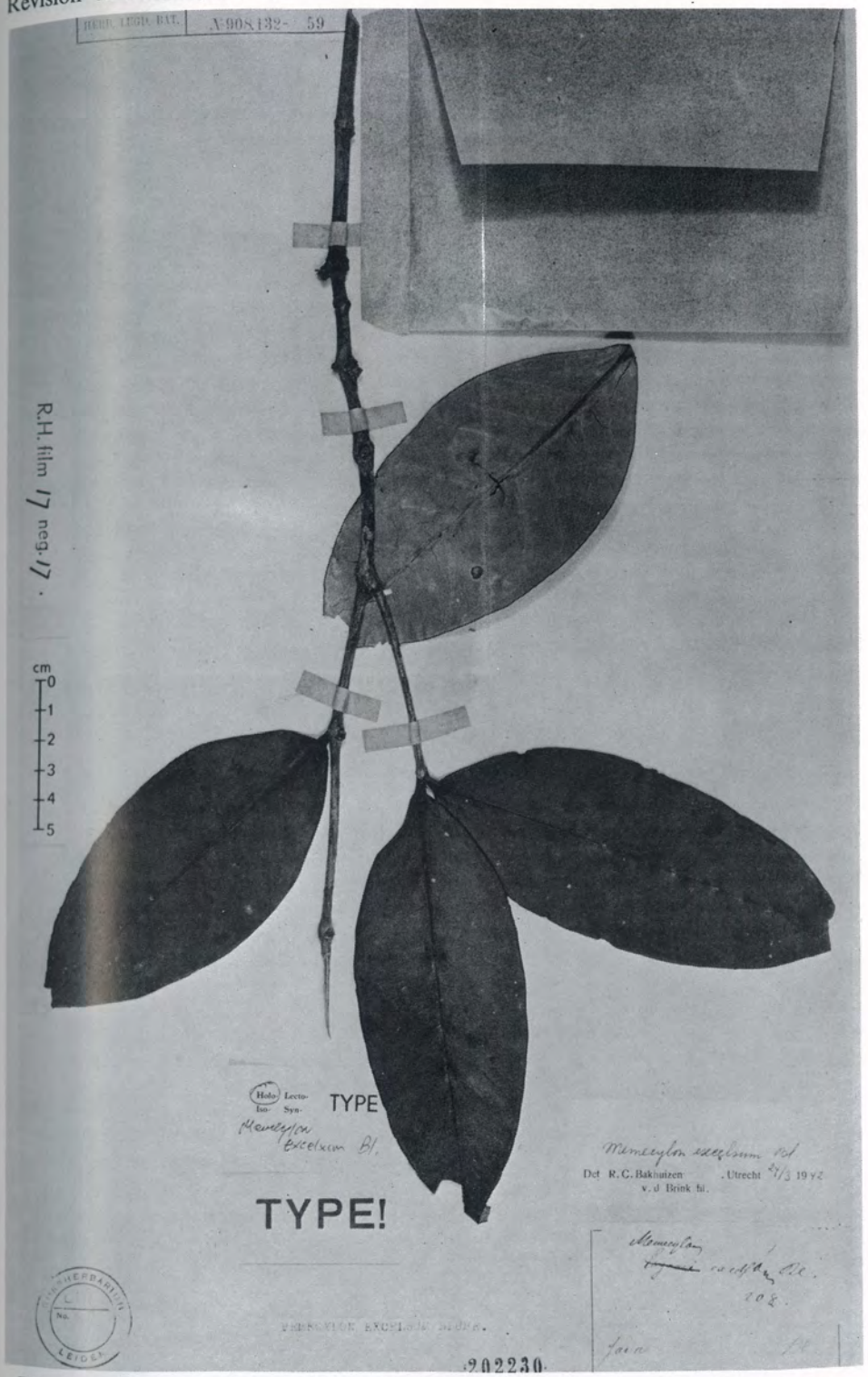
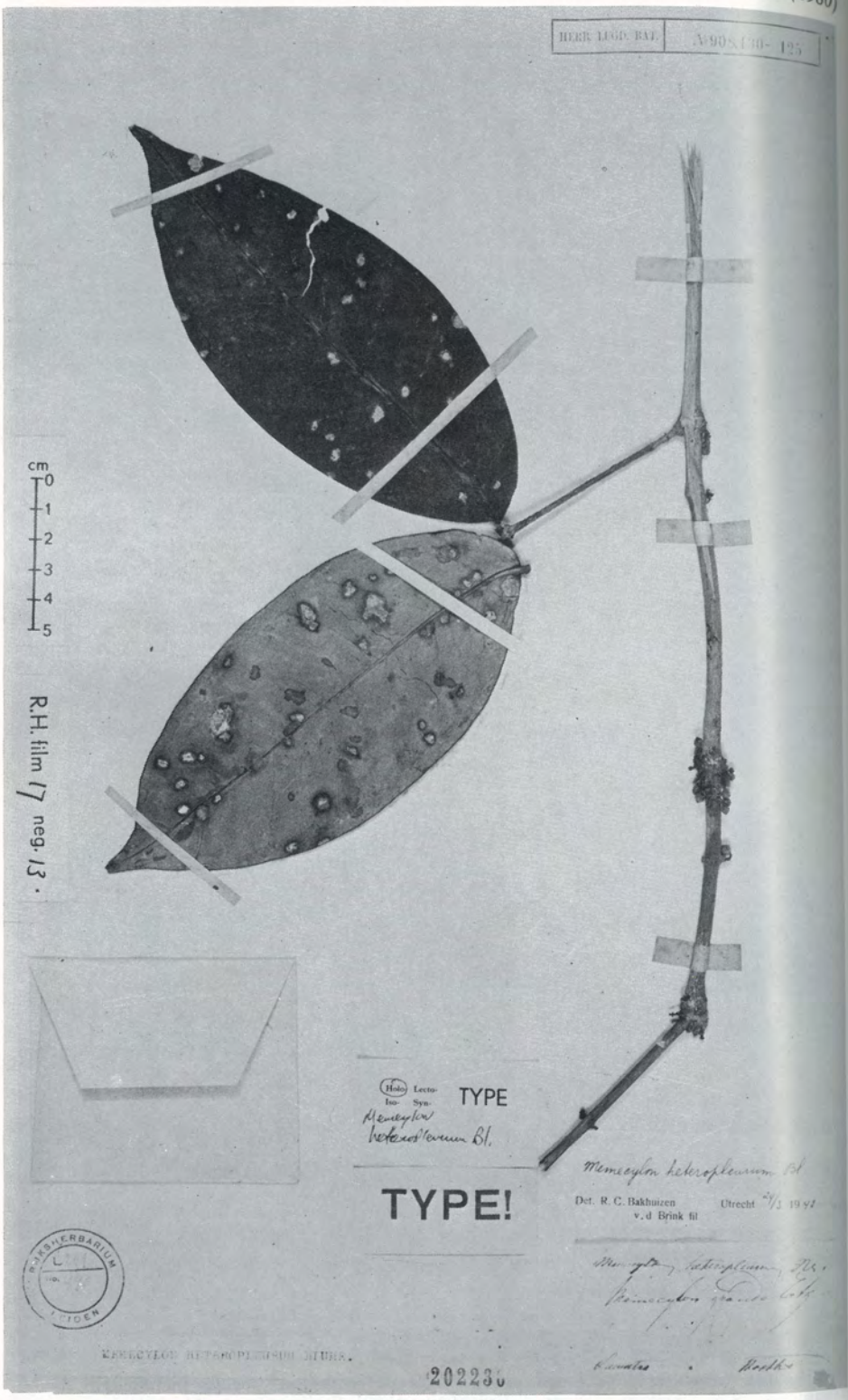


Fig. 34. (a) a. *Memecylon excelsum* Bl. (holotype) with four species included in this revision as new synonyms; b. *M. heteropleurum* Bl. (holotype); c. *M. subtrinervium* Miq. (holotype); d. *M. maingayi* Cl. (holotype); and e. *M. kurzii* King (isotype). Photos a.-e. Rijksherbarium, Leiden


TYPE
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Det. R. C. Bakhuizen
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R.H. film 17 neg. 13.

Fig. 34. (b)

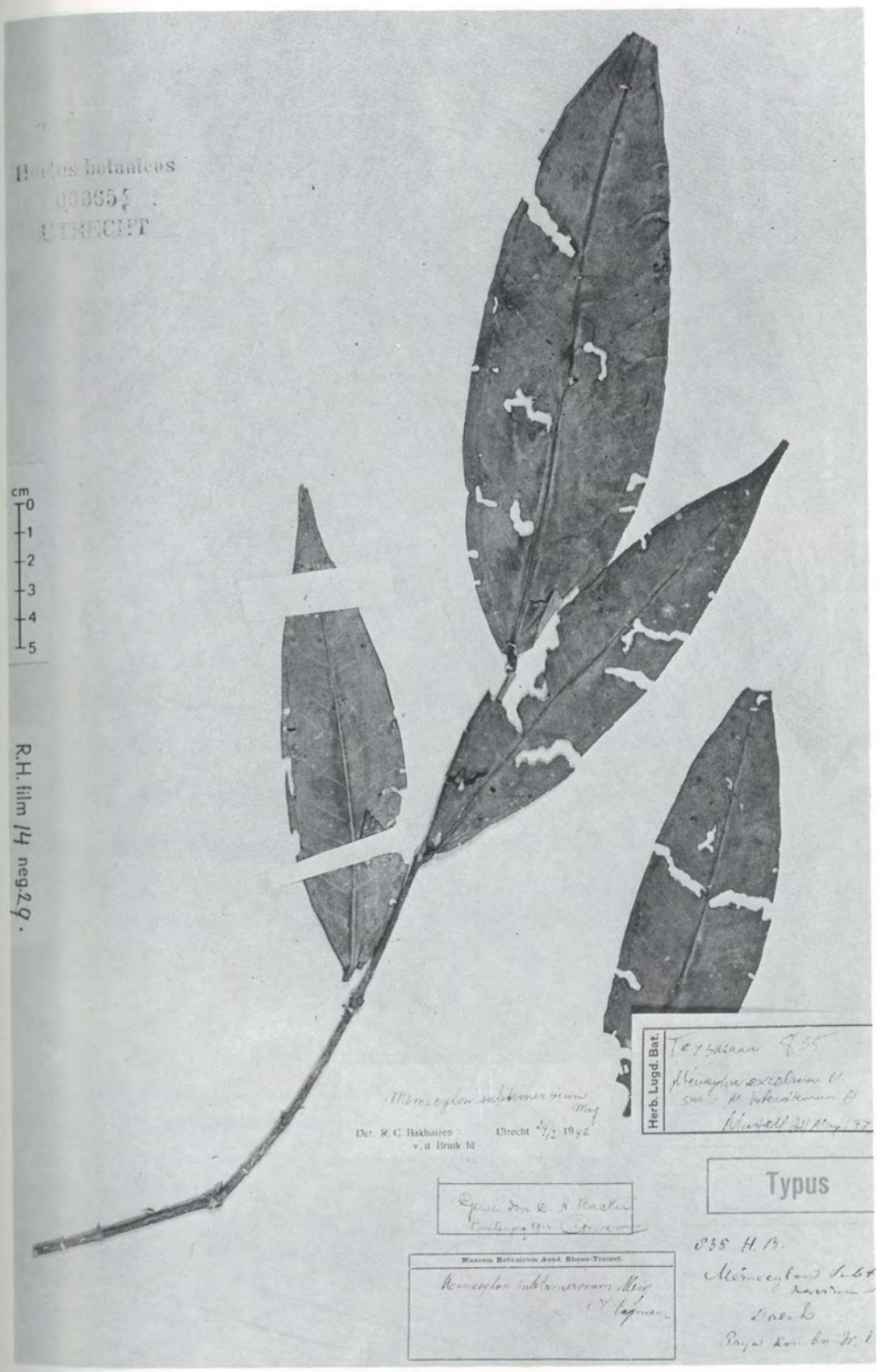
Herb. Lugd. Bat.
Typus
Museum Botanicum Acad. Rheno-Traject.
R.H. film 14 neg. 29.

Fig. 34. (c)


Herbarium of the late A. C. MAINGAY, M. D.
No. 2114
MALAYA.
Distributed at the Royal Gardens, Kew. 1871.
cm
0
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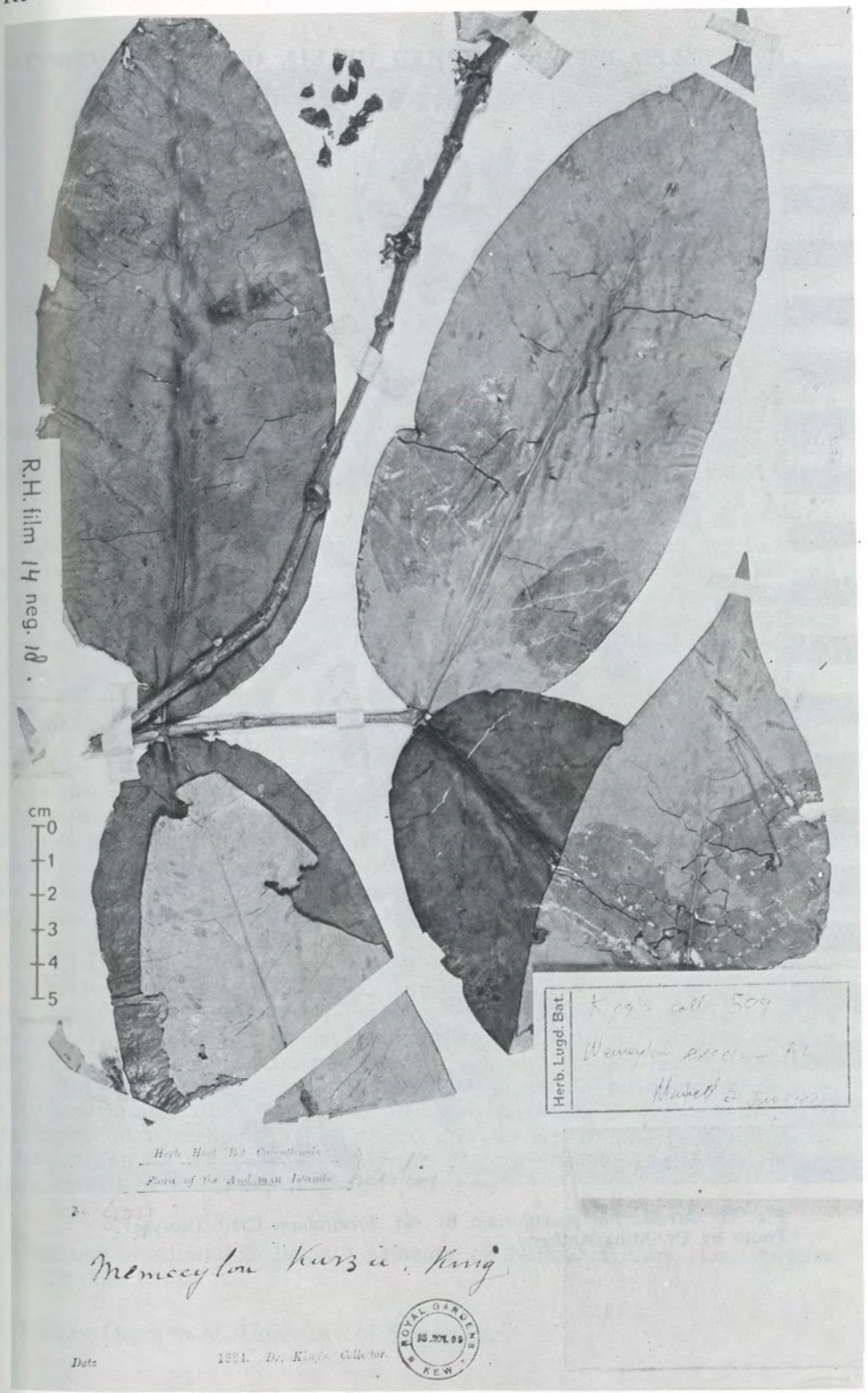
R.H. film 14 neg. 19.
HOLOTYPE
Herb. Lugd. Bat.
FLORA BRIT. INDIA.
Named by Mr. C. B. CLARKE.
Herb.—A. C. Maingay, M. D.
No. 1422.

Fig. 34. (d)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Herb. Lugd. Bat.
Herb. Hort. Bot. Calcuttensis
Flora of the Andaman Islands
Memecylon Kurzii, King
Date
1881. Dr. King's Collector.
ROYAL GARDENS KEW

Fig. 34. (e)

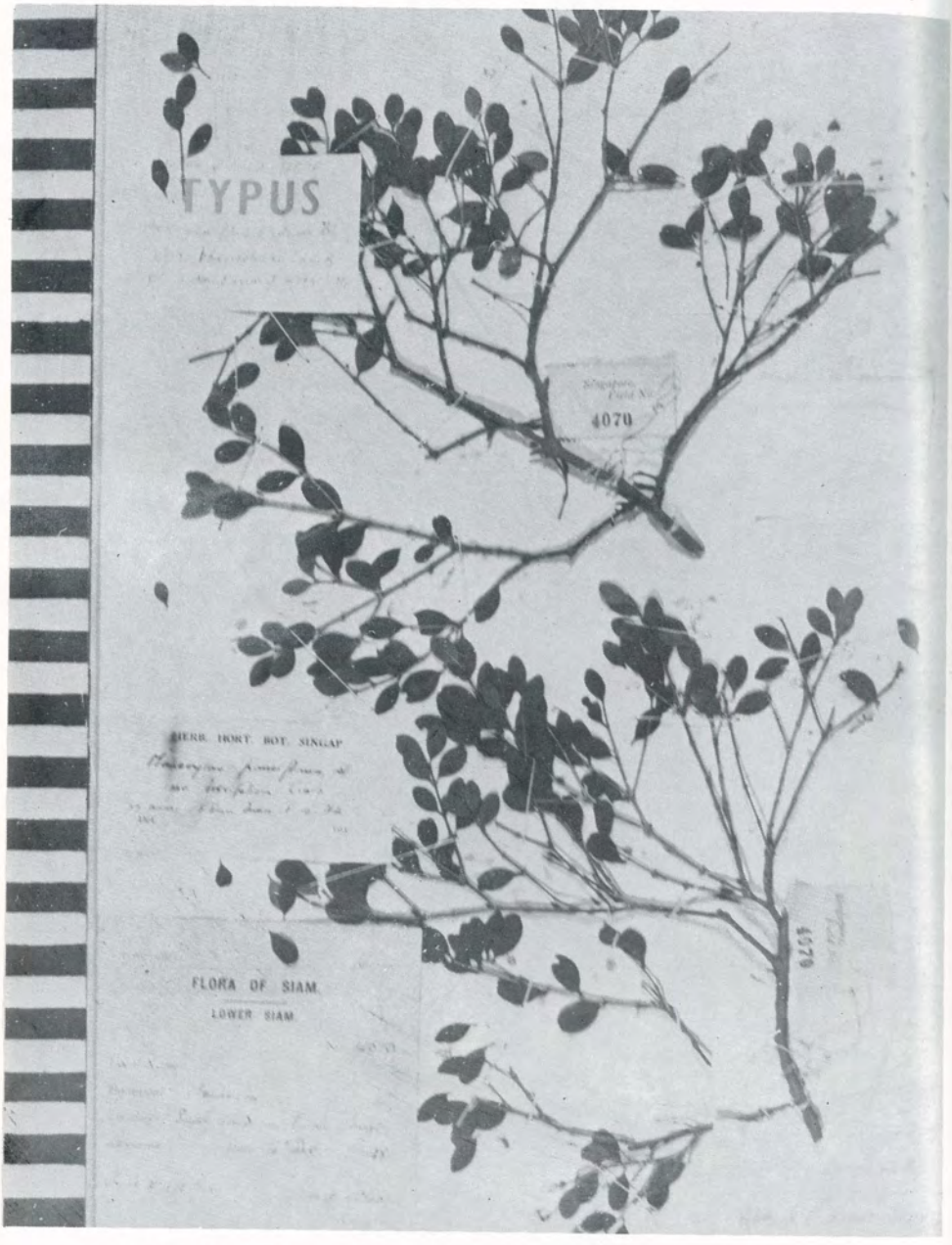

Fig. 35. *Memecylon pauciflorium* Bl. var. *brevifolium* Craib (isotype)
Photo by Dr. Ming Anthony