

***ALPINIA* (ZINGIBERACEAE): A PROPOSED NEW INFRAGENERIC CLASSIFICATION**

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K. Schumann's classification of *Alpinia* (Zingiberaceae), which subdivided the genus into five subgenera and 27 sections, was based, in the main, on the character of the secondary bracts (bracteoles). It is here proposed that the subgenera be reduced to two—*Alpinia* (7 sections and 10 subsections) and *Dieramalpinia* (4 sections and 2 subsections), and that the character of the labellum (petaloid or non-petaloid) be used as the main differentiating criterion. Such a classification shows the centre of distribution of subgen. *Alpinia*, in which the labellum is petaloid, to lie north of the equator; subgen. *Dieramalpinia*, in which the labellum is non-petaloid, or rarely so at the apex only, is now excluded from continental Asia and has its main concentration east of Wallace's line with its greatest number of species in New Guinea. Stigma types have been examined when possible and, so far, they substantiate the proposed classification.

Keys to the subgenera, sections and subsections, together with distribution maps are provided. In Appendix 1 all published names in *Alpinia* are listed and annotated. Appendix 2 gives a key to the terminally-flowered genera of subfamily *Alpineae*; this is followed by five new names and six new combinations in *Alpinia* while *A. cordylinoides* is transferred to *Riedelia*.

INTRODUCTION

The existing classification of *Alpinia* is almost entirely that of K. Schumann (1904) with later small additions, mainly at sectional and subsectional level, by Valeton (1913, 1914) and Loesener (1930). Holttum (1950), dealing with species occurring in the Malay Peninsula only, divided *Alpinia* into four genera; *Cenolophon*, *Alpinia*, *Catimbium* and *Languas*. The two latter names are illegitimate when used at generic level in the sense of Holttum (Burt & Smith, 1972). Some reduction in the number of sections has been effected by Burt & Smith (1972) and Smith (1978). Schumann's classification divided the genus into five subgenera (see Map 1, p. 66) and 27 sections, and was primarily based on the character of the bracts and, more particularly, the bracteoles (secondary bracts). Subgenera *Alpinia* (seven sections), *Probolocalyx*, and *Catimbium* (two sections) comprised species with or without bracts; bracteoles, when present, are open to the base. Subgenus *Dieramalpinia* (12 sections) covered all species with tubular bracteoles. The remaining subgenus *Rhizalpinia* contained species said to produce radical inflorescences; most of these have been transferred to other genera. The infrageneric structure now proposed gives emphasis to the form of the labellum.

MATERIALS

It should be made clear that, in many instances, type collections have not been seen. This is particularly true of the numerous species recently described from China, several of which have no full description in Latin, and English translations from the Chinese

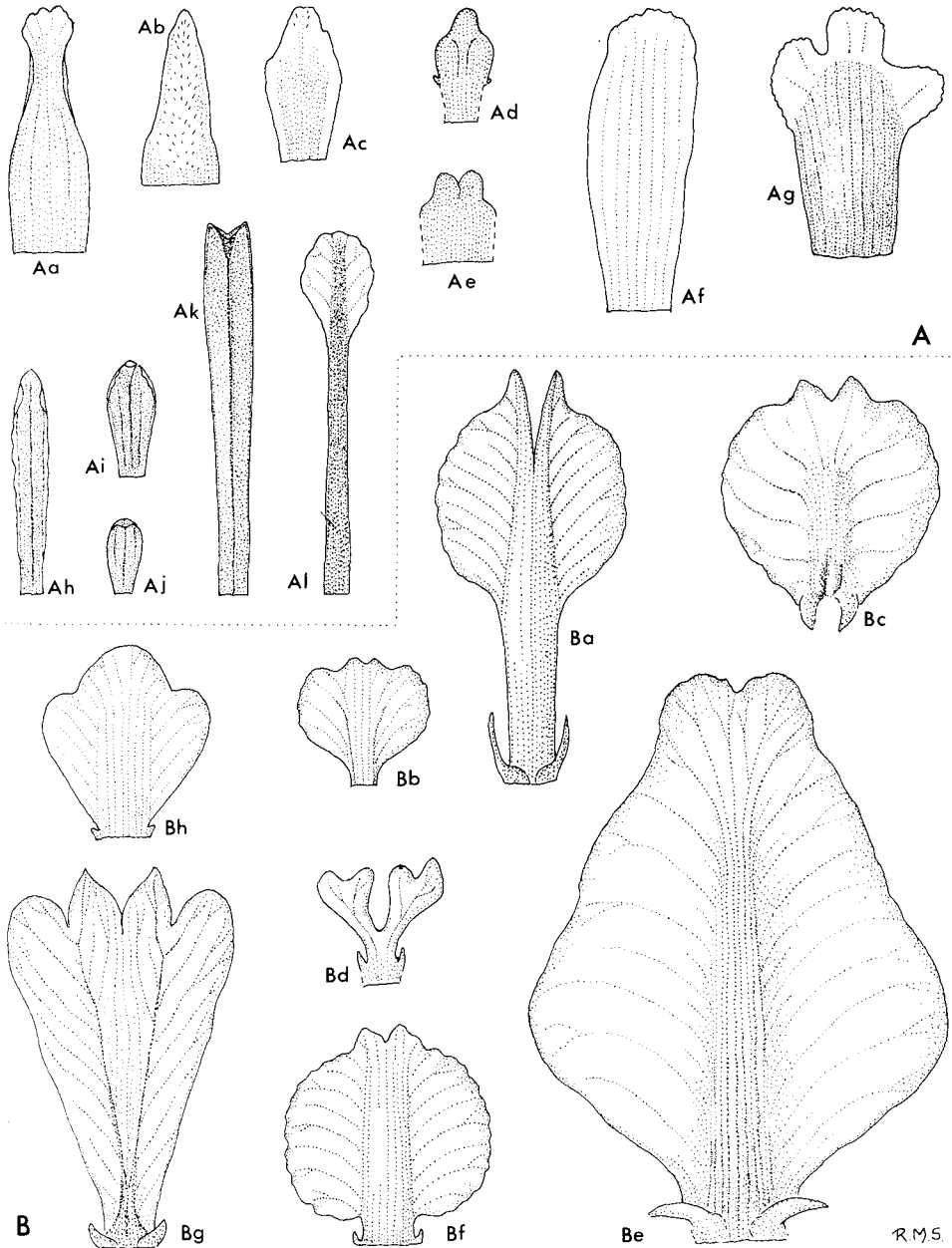


FIG. 1. Labellum types in *Alpinia*. A, subgenus *Dieramalpinia*: a–c, sect. *Dieramalpinia*: a, *A. oceanica*; b, *A. domatifera*; c, *A. carinata*; d, e, sect. *Eubracteata*: d, *A. eubracteata*; e, *A. beamanii*; f, g, sect. *Myriocrater*: f, *A. laxiseconda*; g, *A. monopleurata*; h–l, sect. *Pycnanthus*: h, *A. inaequalis*; i, *A. samoensis*; j, *A. hemsleyana*; k, *A. singuliflora*; l, *A. macrocephala*. B, subgenus *Alpinia*: a–d, sect. *Alpinia*: a, *A. galanga* (subsect. *Alpinia*); b, *A. chinensis* (subsect. *Alpinia*); c, *A. nieuwenhuizii* (subsect. *Paniculatae*); d, *A. rosea* (subsect. *Presleia*); e, *A. calcarata* (subsect. *Catimbium*). C, subgenus *Allughas*: f, *A. caerulea* (subsect. *Caerulea*); g, *A. nigra* (subsect. *Allughas*); h, *A. murdochii* (subsect. *Allughas*). All $\times 2$.

are not yet to hand. The many species described from Taiwan by Hayata (1915, 1920) have also proved problematic; here I have followed, in the main, the synonymy of the recent *Flora Reipublicae Popularis Sinicae* 16 (1981). Elmer's Philippine species, often described from fruiting material, have proved particularly difficult to elucidate, and several have merely been listed (Appendix 1) as imperfectly known species.

The destruction of the types of Schlechter and others at Berlin, upon which so many species from New Guinea are based, is less troublesome. The descriptions of Valetton, always excellent and frequently well illustrated, and to a lesser extent those of Schumann, usually allow a decision on the sectional position of a species to be made with certainty.

Unquestionably, some species will have been incorrectly placed in the following account; the names of those to which serious doubt is attached are preceded by an interrogation mark.

NEW CLASSIFICATION AND CHARACTERS

It is proposed that *Alpinia* be subdivided into two subgenera, namely *Alpinia* and *Dieramalpinia*. It has long been recognized that subgenus *Probolocalyx* does not form a homogeneous group; Valetton (1913) correctly transferred two species to *Riedelia*, the remainder are here assigned to four different subsections of subgenus *Alpinia*. *Catimbium* is retained but reduced to subsectional rank.

Major subdivision of *Alpinia* based on the character of the bracteole while undeniably useful at sectional level (in the present treatment only in sect. *Kolowratia* are species with open bracteoles and species with tubular bracteoles placed together) is less than satisfactory since it separates taxa with very similar flower types. For example, the showy petaloid lips of *A. argentea* and *A. glabra*, neither of which have tubular bracteoles, closely resemble those of *A. rafflesiana* and *A. pahangensis*, species hitherto placed in subgen. *Dieramalpinia* but here assigned to subgen. *Alpinia*. Study of labellum form and, as will be shown below, that of the stigma, indicates that these organs may provide a sounder basis for subdivision and this is to some degree justified geographically (Map 2).

LABELLUM

Broadly speaking the labellum (Fig. 1) in *Alpinia* falls into two categories:

1. Subgenus *Alpinia*. Labellum usually concave often with incurved margins, sometimes held flat or pendulous, commonly striped or spotted, the margins extending into a petaloid area with divergent venation (except in *A. denticulata*); rarely the venation parallel throughout.
2. Subgenus *Dieramalpinia*. Labellum always held erect, almost always closely pressed against the stamen, usually unstriped and without spots, the lateral margins not well developed, the apex occasionally expanding into a small petaloid area.

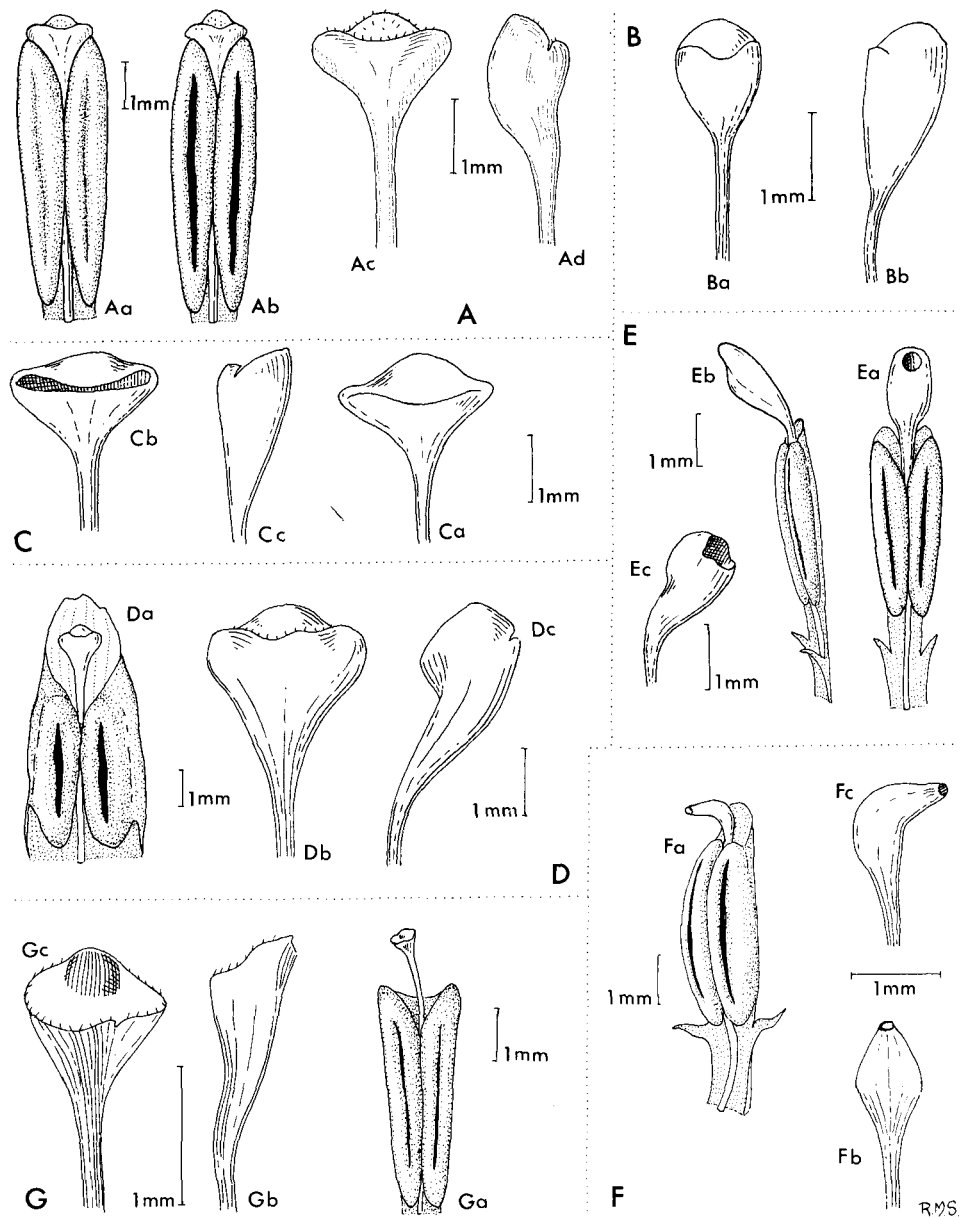


FIG. 2. Stigmas and anthers in subgen. *Dieramalpinia*. A, *A. oceanica* (sect. *Dieramalpinia*): Aa, from an unopened flower; Ab, after anthesis; Ac, stigma; Ad, stigma, lateral view. B, *A. kiungensis* (sect. *Dieramalpinia*): Ba, stigma; Bb, stigma, lateral view. C, *A. carolinensis* (sect. *Dieramalpinia*): Ca, stigma before anthesis; Cb, stigma after anthesis; Cc, stigma, lateral view. D, *A. laxiseconda* (sect. *Myriocrater*): Da, stigma; Db, stigma, lateral view. E, *A. pulchra* (sect. *Pycnanthus*): Ea, at anthesis; Eb, lateral view; Ec, stigma from old flower. F, *A. boia* (sect. *Pycnanthus*): Fa, at anthesis; Fb, stigma; Fc, stigma, lateral view. G, *A. eubractea* (sect. *Eubractea*): Ga, after anthesis; Gb, stigma, lateral view; Gc, stigma. A from living material; B, C, D, E, G from spirit material; F from dried material.

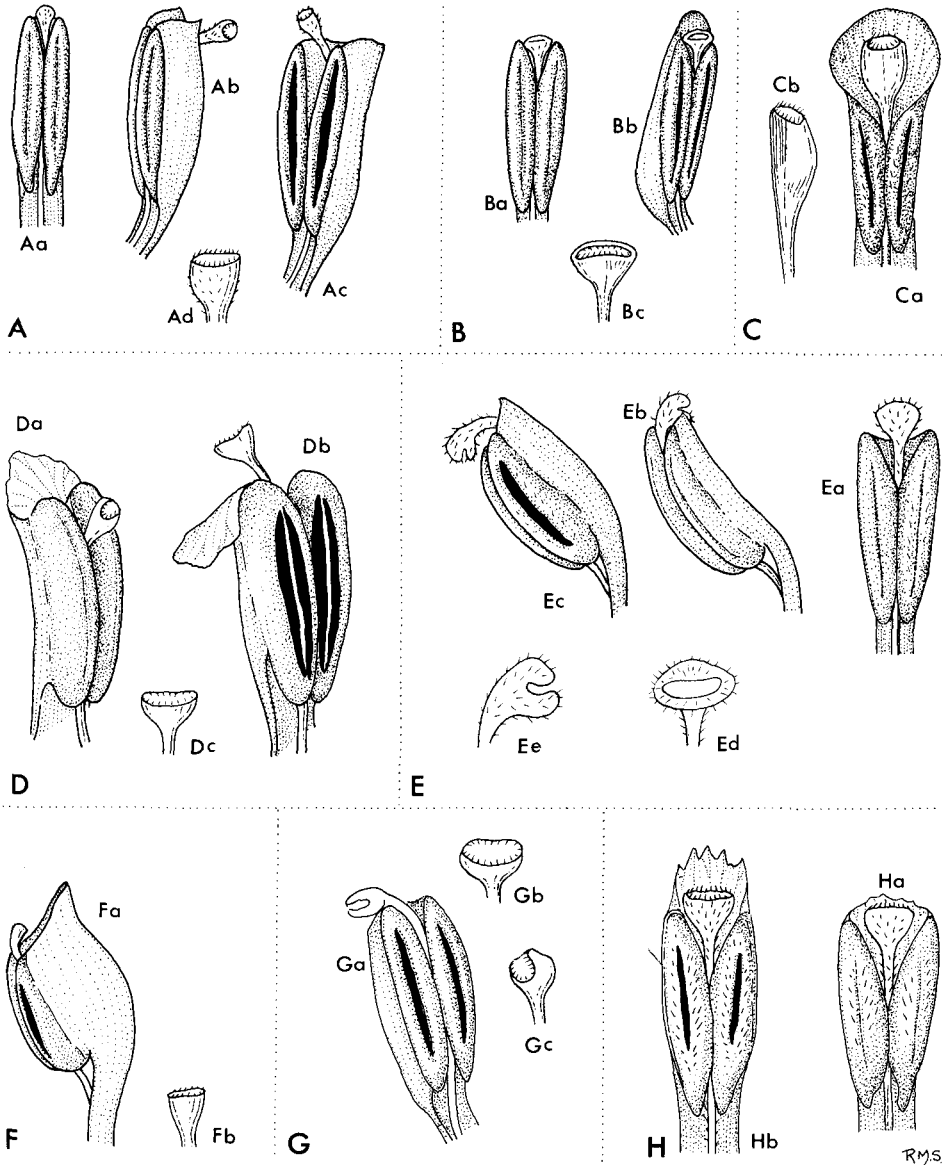


FIG. 3. Anthers and stigmas in *Alpinia* subgen. *Alpinia*. A, *A. galanga* (sect. *Alpinia* subsect. *Alpinia*): Aa, from an unopened flower; Ab, just before anthesis, stigma strongly recurved; Ac, after anthesis, stigma curving forwards; Ad, stigma. B, *A. pubiflora* (sect. *Alpinia* subsect. *Presleia*): Ba, from an unopened flower; Bb, after anthesis; Bc, stigma. C, *A. purpurata* (sect. *Guillainia*): Ca, after anthesis; Cb, stigma, lateral view. D, *A. glabra* (sect. *Alpinia* subsect. *Probolocalyx*): Da, before anthesis; Db, after anthesis, anther crest becoming reflexed. E, *A. zerumbet* (sect. *Alpinia* subsect. *Catimbium*): Ea, from an unopened flower; Eb, just before anthesis; Ec, after anthesis; Ed, stigma, from above; Ee, stigma, lateral view. F, *A. nieuwenhuizii* (sect. *Alpinia* subsect. *Paniculatae*): Fa, after anthesis; Fb, stigma. G, *A. abundiflora* (sect. *Fax*): Ga, after anthesis; Gb, stigma, lateral view. H, *A. argentea* (sect. *Alpinia* subsect. *Cenolophon*): Ha, from an unopened flower; Hb, after anthesis. A, E from living material, the remainder from spirit collections. Anthers $\times 4$. Stigmas much enlarged.

The adoption of the labellum type as the major criterion for the division of *Alpinia* dictates the transfer of some 17 species hitherto placed in subgenus *Dieramalpinia* to subgenus *Alpinia*.

STIGMA

With the exception of Valeton (1913, 1914), and he only to a small extent, virtually no one has paid attention to the morphology of the stigma (Figs 2, 3) in *Alpinia* (or indeed to the stigmas of most genera throughout the Zingiberaceae *sensu stricto*). In fact, comments on indumentum apart, they are rarely described at all. There are, however, indications that differing stigma types occur and that these may strengthen the case for a new classification of *Alpinia*. The following observations are perhaps premature in that only a small number of species have been studied from ideal material, i.e. fresh or in spirit, and with flowers at different stages of development.

Subgenus *Alpinia* (Fig. 3). In all but sections *Arctiflora* and *Fax*, the stigma is generally (but not always) well expanded with a more or less terminal, rounded to elliptic, frequently ciliate opening. It may occasionally be funnel-shaped, and is strongly so in sect. *Kolowratia*. More usually the rim is more or less thickened. In the young stage the style often curves over the anther so that the stigma projects behind the thecae, e.g. *A. galanga*; this has not been observed in subgen. *Dieramalpinia*. In sect. *Fax* the orifice is probably ventrally placed. The monotypic sect. *Arctiflora* deviates, with a stigma-type approaching that of sect. *Pycnanthus*.

Subgenus *Dieramalpinia* (Fig. 2). In sect. *Pycnanthus* the stigma is commonly erect and clavate with a usually rounded orifice (which is clearly visible in the young bud) placed subapically or, more often, on the ventral face. In a few species it is geniculate with a small orifice at the tip. In the species examined in sect. *Dieramalpinia*, and sect. *Myriocrater*, many of them from dried material only, the stigma is much more rigid, gradually becoming well expanded and always erect, more or less obconical and flattened on the ventral face. On the same plane there is a narrowly elliptic opening which is only visible on the old flower; in bud, or even at anthesis, this opening is quite closed. Stigmas of this type have not been observed in subgen. *Alpinia*. The small sect. *Eubracteae* may represent a further stigma type within subgen. *Dieramalpinia*, possibly funnel-shaped; but additional material is essential to verify this.

MONOECISM

It has been shown (Burt & Smith, 1972; Smith, 1977, 1989) that in two sections of subgen. *Dieramalpinia*, namely sections *Myriocrater* and *Eubracteae*, the lowermost flowers on the cincinnus are hermaphrodite, the remainder are functionally male. In sect. *Myriocrater* (Fig. 8D) it is the first (rarely the second) flower that is hermaphrodite. In sect. *Eubracteae* (Fig. 8B) the situation appears to be different in that more or less half the flowers in a cincinnus (the lower half) produce fruit. Monoecism has not yet been observed in sect. *Dieramalpinia* (Fig. 9) but many of its species are badly known. Sex forms appear to be quite absent from the otherwise very distinct—and much better known—sect. *Pycnanthus* (Fig. 8A, C). There are no records of monoecism in subgen. *Alpinia*.

GENERIC LIMITS

Any attempt to reclassify *Alpinia* should at least make reference to the terminally-flowered genera of the tribe *Alpineae* that are nowadays generally accepted. Reasons for the acceptance of *Psychanthus* Ridley are given elsewhere (*Edinb. J. Bot.* 47: 77, 1990). Setting aside the neotropic and African *Renealmia*, which is cytologically distinct, these genera are restricted to Asia. *Pommereschea* Wittmack, *Stadiochilus* R. M. Smith and *Rhynchanthus* Hook. f. are clearly defined, and may be misplaced in the tribe *Alpineae* (Smith, 1980). All occur in Burma, although *Rhynchanthus* is also known in China. The remaining five genera have a more southerly distribution. *Burbidgea* Hook. f. comprises five species native to Borneo, and is distinctive in the uniformly yellow/orange flowers which are sometimes pink initially and in the inconspicuous narrow labellum. The monotypic *Vanoverbergia* Merr. (Philippines) is a curious plant which Merrill considered to be intermediate between *Alpinia* and *Riedelia*. The lateral petals are united to the lower part of the labellum for a third to half of their length and the free part of the lip divided into two linear lobes. The filament is described as 'channelled on the inside and inclosing the style'. The isotype material (K) is poor. *Riedelia* D. Oliver, a large genus of c.60 species, occurs in New Guinea, the Bismarck Archipelago and the Moluccas. It is separable from *Alpinia* by the deciduous calyx and is badly in need of revision. *Plagiostachys* (Indonesia, Malaysia and the Philippines) still requires much elucidation. It is characterized by the apparently lateral, tightly congested inflorescence, which is, in fact, terminal on the short stem of the leafy-shoot, and breaks through the leaf sheaths usually just above ground level. The inflorescence is, in many species, very mucilaginous and in herbarium material it is often impossible to distinguish its structure accurately. However, as far as is known, the *Plagiostachys* inflorescence is not dissimilar to some found in *Alpinia*; the bracteoles are usually tubular, each subtending a single flower, and the labellum, although small and rather fleshy, is petaloid with divergent venation. Laterally produced inflorescences are not unknown in *Alpinia* (*A. havilandii*, *A. hansenii* for example) but are pushed out from the leaf sheath near the top of the long-stemmed leafy-shoot and are, as far as is known, never mucilaginous.

Following Ridley (1909) and Merrill (1922), *Leptosolena* Presl, which Schumann reduced to sectional level within *Alpinia*, is treated as a separate genus. *Leptosolena* is a monotypic Philippine endemic, well differentiated from *Alpinia* by the large flowers (to 12cm long), with very slender corolla tubes which are exerted from the calyx for more than half their length.

A key to the terminally-flowered genera of tribe *Alpineae* is included (Appendix 2).

A good case might be made for raising sect. *Pycnanthus* to generic level, also the Philippine endemic *Kolowratia*, but the prime aim of the present work is to suggest new lines for future research and the ranks accorded to the various 'groups' is a secondary consideration. No apology is made for the reduction of subgenus *Catimbium* and sect. *Cenolophon* to subsectional rank; the dividing line between the two is not clear cut. *A. havilandii* for example, here placed in subsect. *Cenolophon*, is a single-

flowered species with minute bracts which are rarely seen in the herbarium, but in the large, showy labellum it resembles subsect. *Catimbium*.

Two genera described by Ridley have had to be dealt with. *Eriolopha* (1916) is confined to the mainland of New Guinea and most of its species have already been transferred to *Alpinia* by Loesener (1930). One of its members belongs to sect. *Pycnanthus*, and the remainder, including the type species (*E. flagellaris* Ridley), are placed in sect. *Dieramalpinia*. *Adelmeria* (1909), which is confined to the Philippines, is poorly known, as are many Zingiberaceae from these islands whence few good modern collections have come. They are here placed, tentatively, in sect. *Dieramalpinia*.

DISTRIBUTION

With the exception of Fiji and Samoa, subgen. *Alpinia*, as here defined, occurs throughout the entire geographical range of the genus, but its centre of distribution lies well to the north of the equator. Mainland Asia, plus Japan, Taiwan, Hainan, Sri Lanka and the Andamans account for approximately 70 species and subgen. *Dieramalpinia* is not represented in this area. In Borneo, Sumatra, Java and the Philippines we find over 50 species of *Alpinia*, only nine of them in subgen. *Dieramalpinia*, but in Sulawesi the subgenera are evenly divided, each with seven species. In New Guinea and the surrounding islands, including the Moluccas, subgen. *Dieramalpinia* dominates with over 60 species while there are only seven in subgen. *Alpinia*. Australia provides the exception to this pattern, the five species recorded from that continent all belong to subgen. *Alpinia*.

TAXONOMIC REVISION

Alpinia Roxb. in *Asiat. Res.* 11: 350 (1810)—nom. cons.; K. Schum. in *Bot. Jahrb.* 27: 270 (1899) & *Pflanzenr. Zing.* 308 (1904).

Syn.: *Heritiera* Retz., *Obs. Bot.* 6: 17 (1791)—non Aiton (1798). Type:

H. allughas Retz. = **Alpinia nigra** (Gärtner) B. L. Burtt.

Albina Giseke, *Prael. Ord. Nat.* 207, 227, 248 (1792). Lectotype (selected here): *A. alba* Giseke = **Alpinia galanga** (L.) Sw.

Buekia Giseke, *op. cit.* 204, 216, 239. Type: *Costus malaccensis* König = ? **Alpinia javanica** Bl.

Martensia Giseke, *op. cit.* 207, 229, 249—non *Martensia* Hering (1841, nom. cons.). Type: *M. aquatica* Giseke = **Alpinia aquatica** (Retz.) Roscoe.

Hellenia Willd., *Sp. Pl.* 1: 4 (1791)—non *Hellenia* Retz. (1791).

Type: *H. allughas* Willd. = **Alpinia nigra** (Gärtner) B. L. Burtt.

Zerumbet Wendl., *Sert. Hannov.* 4: 3 (1798). Type: *Zerumbet speciosum* Wendl. = **Alpinia zerumbet** (Pers.) Burtt & Smith.

- Catimbium* Lestib. in Ann. Sc. Nat. 2 sér. 15: 341 (1841)—non *Catimbium* Juss. (1798). Type: **Alpinia zerumbet** (Pers.) Burtt & Smith (1972: 205).
- Enolophon* Bl., Enum. Pl. Jav. 81 (1827). Type: *C. rubrum* Bl. = **Alpinia rubricaulis** K. Schum.
- Kolowratia* Presl, Reliq. Haenk. 1: 113 (1827). Type: *K. elegans* Presl = **Alpinia elegans** (Presl) K. Schum.
- Strobidia* Miq., Fl. Ind. Bat. Suppl. 614 (1860). Type: *Strobidia sumatrana* Miq. = **Alpinia sumatrana** (Miq.) K. Schum.
- Guillainia* Vieill. in Bull. Soc. Bot. Normand. 10: 92 (1866). Type: *G. purpurata* Vieill. = **Alpinia purpurata** (Vieill.) K. Schum.
- Hellwigia* Warb. in Bot. Jahrb. 13: 279, 451 (1891). Type: *Hellwigia pulchra* Warb. = **Alpinia pulchra** (Warb.) K. Schum.
- Elmeria* Ridley in Elmer, Lfts Phil. Bot. 2: 569 (1909)—non *Elmera* Rydb. (1905). Type: *E. bifida* Ridley = **Alpinia paradoxa** (Ridley) Merr.
- Adelmeria* Ridley in Elmer, op. cit. 603. Type as above.
- Languas* J. K. Small, Fl. SEUS, ed. 2, 307 (1913). Type: *Languas speciosa* (Wendl.) Small = **Alpinia zerumbet** (Pers.) Burtt & Smith.
- Eriolopha* Ridley in Hooker's Icon. Pl. 31: t.3067 (1916). Type: *Eriolopha flagellaris* Ridley = **Alpinia flagellaris** (Ridley) Loesen.

Type species: *A. galanga* (L.) Sw., Obs. Bot. 6 (1791). Type: No specimen at LINN.

Herbs up to 12m tall, more usually 2–4m; leafy shoots many-bladed and frond-like, rarely with 1–4 blades. *Inflorescence*, almost without exception, terminal on the leafy-shoot, tightly congested or lax, sometimes branched. *Bracts*, when present, open to the base, rarely calyprate, each subtending a single flower or a cincinnus of two–many flowers. *Bracteoles* open to the base or tubular, rarely calyprate, sometimes absent. *Calyx* usually tubular, sometimes unilaterally split, occasionally to the base; corolla-tube often more or less equal to or shorter than the calyx, more rarely exerted from it, the dorsal lobe more or less hooded, sometimes markedly so, generally wider than the lateral lobes; labellum often petaloid and showy, sometimes inconspicuous and much thickened, variously lobed or entire; lateral staminodes small or absent; anther sessile or with a well-developed filament, connective crested or not; stigma usually well-expanded, sometimes clavate, rarely geniculate; epigynous glands rarely free from each other, often massive; ovary usually trilocular with axile placentation, rarely unilocular with parietal placentation. *Capsule* commonly spherical, more rarely ellipsoid to flask-shaped; seed arillate, often angular.

Distribution: Japan, China, Indo-China, Burma, India, the Andamans, Sri Lanka, Thailand, Malaysia, the Philippines, Carolines, Indonesia, New Guinea, Australia, the Solomons, New Hebrides, New Caledonia, Fiji and Samoa.

THE SUBGENERA

Subgenus **Alpinia**.

- Syn.: *Heritiera* Retz.
Albina Giseke
Buekia Giseke
Martensia Giseke
Zerumbet Wendl.
Catimbium Lestib.
Cenolophon Bl.
Kolowratia Presl
Strobidia Miq.
Guillainia Vieill.
Languas J. K. Small

Labellum usually concave with incurved margins, sometimes flat or pendulous, commonly fleshy centrally, sometimes unguiculate, the margins of the limb expanded into a usually thin textured petaloid area with divergent venation (except in *A. denticulatum*), rarely the venation parallel throughout. *Stigma* barely to well expanded, the orifice elliptic to rounded, \pm terminal, occasionally distinctly funnel-shaped, often held behind the anther before anthesis. *Bracts*, when present, rarely persistent; bracteoles open to the base or tubular, rarely calyptrate, occasionally absent. *Flowers* borne singly or in cincinni. *Plants*, as far as is known, never monoecious.

Type species: *A. galanga* (L.) Sw.

Distribution: As for the genus excluding Fiji and Samoa. **Map 2.**

Subgenus **Dieramalpinia** (K. Schum.) K. Schum., Pflanzenr. Zing. 343 (1904).

- Syn.: *Hellenia* Willd.
Hellwigia Warb.
Elmeria Ridley
Adelmeria Ridley
Eriolopha Ridley

Labellum held erect and close to the stamen, usually fleshy, the lateral margins not expanded, the apical part sometimes extending into a small petaloid area with divergent venation. *Stigma* often well expanded, rigid, \pm obconical with an elliptic orifice on the ventral face or clavate with a \pm rounded orifice or geniculate, rarely funnel-shaped. *Flowers*, except in some species of sect. *Pycnanthus*, in cincinni. *Bracts* often large, usually persistent; bracteoles always tubular, often tightly clasping. *Plants* sometimes monoecious.

Lectotype species (selected here): *A. oceanica* Burkill.

A. oceanica is a well-known species, currently in cultivation. Its distribution ranges from the Manus Is. south and east to the New Hebrides; it has not been recorded from the New Guinea mainland.

Distribution: the Philippines, Carolines, Borneo, Sulawesi, the Moluccas, New Guinea and the Bismarck Archipelago, the Solomons to Fiji and Samoa.

KEY TO THE SECTIONS OF SUBGENUS ALPINIA

1. Leafy-shoots not frond-like; blades 1–4 _____ **Didymanthus**
 – Leafy-shoots frond-like; many-bladed _____ **2**
2. Calyx spathe-like, coriaceous, splitting to the base at anthesis; corolla tube exerted from the base of the calyx and held more or less at right angles to it; stigma large, funnel-shaped (the Philippines) _____ **Kolowratia**
 – Calyx not as above, if splitting to the base then membranous; corolla tube usually straight, occasionally curved; stigma funnel-shaped or not, sometimes barely expanded _____ **3**
3. Bracteoles absent or, if present, open to the base (occasionally joined in the young stage or, rarely, calyprate); flowers single or in cincinni _____ **Alpinia**
 – Bracteoles always present, always tubular, often persistent (rarely, in *A. abundiflora*, open to the base and tubular in the same cincinnus); flowers always in cincinni _____ **4**
4. Inflorescence surrounded by an involucre of sterile bracts, sometimes radical _____ **Fax**
 – Inflorescence lacking sterile bracts, always terminal _____ **5**
5. Bracts large, showy, concealing all but the upper part of the flower; corolla tube slender, well exerted from the calyx; pedicels short _____ **Guillainia**
 – Bracts sometimes conspicuous but never concealing the flowers; corolla tube equal to or slightly longer than the calyx; pedicels usually at least 2cm long _____ **6**
6. Bracteoles narrowly cylindrical; anther sessile, thecae \pm divaricate (Australia) _____ **Arctiflorae**
 – Bracteoles cup to funnel-shaped; filament well formed; thecae \pm parallel _____ **Allughas**

Sect. **Didymanthus** K. Schum., Pflanzenr. Zing. 366 (1904).

Short stemmed or almost stemless; leaves 1–4. *Bracts* oblong, ebracteolate. *Flowers* in cincinni of 2–4, calyx not unilaterally split; labellum entire or bilobed at the apex; lateral staminodes subulate points; anther \pm ecristate; stigma slightly expanded with a ciliate orifice; epigynous glands free from each other. *Capsule* ellipsoid (at least in *A. psilogyna*).

Type species: *A. pumila* Hook. f. in Bot. Mag. 111: t.6832 (1885). **Fig. 6A.**

Other species: *A. psilogyna* D. Fang.

Distribution: China. **Map 4.**

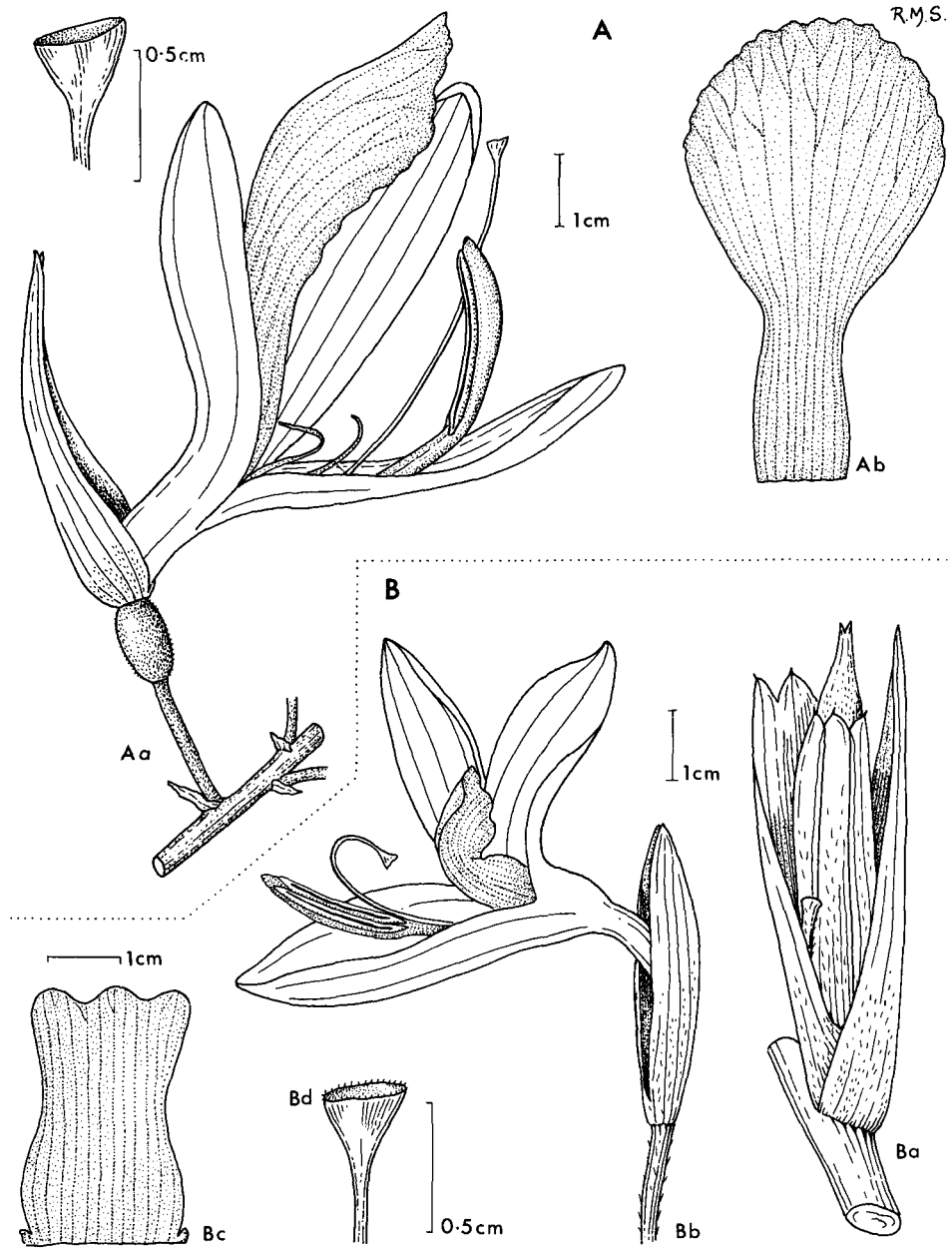


FIG. 4. *Alpinia* subgen. *Alpinia* sect. *Kolowratia*. A, *A. vanoverbergii*: Aa, part of main axis and single flower; Ab, labellum; Ac, stigma. B, *A. elegans*: Ba, part of main axis and cincinnus; Bb, flower; Bc, labellum; Bd, stigma. A, from dried material, B from spirit material.

Hooker had some misgiving in placing what he considered to be a plant with a radical inflorescence in *Alpinia*. In fact, the inflorescence of *A. pumila* arises from the leaf sheaths, exactly as in *Boesenbergia* (tribe *Hedychieae*), and is terminal on the very short stem. The few-leaved shoots of sect. *Didymanthus* are unique in *Alpinia*.

Sect. **Kolowratia** (Presl) Loesener, Pflanzenfam. ed. 2, 15a: 621 (1930).

Syn.: *Kolowratia* Presl, Reliq. Haenk. 1: 113, t.20 (1827). Type: *K. elegans* Presl.

Alpinia sect. *Eubracteae* K. Schum. subsect. *Kolowratia* (Presl) Val. in Nova Guinea (Botanique) 8: 943, 947 (1913)—p.p. incl. type: *Alpinia elegans* (Presl) K. Schum.

Alpinia sect. *Kolowratia* (Presl) Loesener subsect. *Eukolowratia* Loesener, Pflanzenfam. ed. 2, 15a: 622 (1930)—p.p. incl. type. [*Alpinia* sect. *Dieramalpinia* K. Schum. in Bot. Jahrb. 27: 272, 286 (1899)—p.p. excl. type.]

[*Alpinia* sect. *Eubracteae* K. Schum., Pflanzenr. Zing. 352 (1904)—p.p. excl. type.]

Inflorescence pendulous (or erect?), unbranched. *Bracts* large and persistent or small and caducous; bracteoles tubular or non-tubular. *Flowers* single or in cincinni; calyx \pm coriaceous, splitting to the base as the flower opens, the corolla tube exerted from the base of the calyx and held more or less at right angles to it; labellum obovate or rectangular, venation entirely parallel or divergent in the upper half; lateral staminodes present; filament well formed; anther with a small crest; stigma funnel-shaped; epigynous glands massive. *Capsule*, as far as known, elongate.

Type species: *A. elegans* (Presl) K. Schum. in Bot. Jahrb. 27: 288 (1899) & Pflanzenr. Zing. 352 (1904). **Fig. 4B.**

Other species: ?*A. congesta* Elmer; *A. vanoverbergii* Merr. **Fig. 4A.**

Distribution: The Philippines. **Map 4.**

It has already been remarked that only in sect. *Kolowratia* have species with tubular bracteoles been placed with a species which has not. In *A. vanoverbergii* the bracts and bracteoles are open to the base, minute and soon deciduous, yet the character of the flowers is so similar to that of *A. elegans* that it would be inappropriate to separate them. The manner in which the corolla tube is exerted from the base (or near to the base) of the deeply split spathaceous calyx, i.e. held more or less at a right angle to it, is very striking.

Sect. **Alpinia**

Syn.: *Albina* Giseke, Prael. Ord. Nat. 207, 227, 248 (1792). Type: *A. alba* Giseke = *Alpinia galanga* (L.) Sw.

Martensia Giseke, op. cit. 207, 229, 248—non *Martensia* Hering (1841, nom. cons.). Type: *M. aquatica* Giseke = *Alpinia aquatica* (Retz.) Roscoe.

Zerumbet Wendl., Sert. Hannov. 4: 3 (1798). Type: *Zerumbet speciosum* Wendl. = *Alpinia zerumbet* (Pers.) Burt & Smith.

Catimbium Lestib. in Ann. Sc. Nat. 2 sér. 15: 341 (1841)—non

- Catimbium* Juss. (1798). Type: *Alpinia zerumbet* (Pers.) Burt & Smith.
- Cenolophon* Bl., Enum. Pl. Jav. 81 (1827). Type: *C. rubrum* Bl. [— non *Alpinia rubra* Dietr. (1839)] = *Alpinia rubricaulis* K. Schum.
- Languas* J. K. Small, Fl. SEUS ed. 2, 307 (1913). Type: *Alpinia zerumbet* (Pers.) Burt & Smith.
- Amomum* subgen. *Cenolophon* (Bl.) Baker in Hook. f., Fl. Brit. Ind. 6: 242 (1892).
- Alpinia* subgen. *Autalpinia* (K. Schum.) K. Schum., Pflanzenr. Zing. 310 (1904)—p.p. incl. type: *Alpinia galanga* (L.) Sw.
- Alpinia* subgen. *Probolocalyx* K. Schum., Pflanzenr. Zing. 325 (1904)—p.p. incl. lectotype (selected here): *Alpinia glabra* Ridley.
- Alpinia* subgen. *Catimbium* (Horan.) K. Schum., op. cit. 321—p.p. incl. type: *Alpinia zerumbet* (Pers.) Burt & Smith.
- Alpinia* subgen. *Catimbium* sect. *Flosparadisi* K. Schum., op. cit. 333. Type: *Alpinia zerumbet* (Pers.) Burt & Smith.
- Alpinia* subgen. *Catimbium* sect. *Boniophyton* K. Schum., op. cit. 342. Lectotype (selected here): *Alpinia tonkinensis* Gagnep.
- Alpinia* sect. *Ethanium* Horan., Prodr. Monogr. Scitam. 33 (1862)—p.p. incl. type: *Alpinia galanga* (L.) Sw.
- Alpinia* sect. *Catimbium* Horan., op. cit. 34. Type: *Alpinia zerumbet* (Pers.) Burt & Smith.
- Alpinia* sect. *Autalpinia* K. Schum. in Bot. Jahrb. 27: 271, 272 (1899)—p.p. incl. type: *Alpinia galanga* (L.) Sw.
- Alpinia* sect. *Hellenia* K. Schum., Pflanzenr. Zing. 321 (1904)—non *Hellenia* Willd.—p.p. incl. type: *Alpinia galanga* (L.) Sw.
- Alpinia* sect. *Cenolophon* (Bl.) K. Schum., op. cit. 320—p.p. incl. type: *Alpinia rubra* (Bl.) R. M. Smith.
- Alpinia* sect. *Presleia* Val. in Bot. Jahrb. 52: 47, 64 (1914). Lectotype (selected here): *Alpinia brevilabris* Presl.
- [*Alpinia* sect. *Dieramalpinia* K. Schum. in Bot. Jahrb. 27:286 (1899)—p.p. excl. type.]
- [*Alpinia* sect. *Allughas* K. Schum., Pflanzenr. Zing. 344 (1904)—p.p. excl. type.]
- [*Alpinia* subgen. *Dieramalpinia* K. Schum., op. cit. 343—p.p. excl. type.]

Inflorescence erect or pendulous, branched or unbranched. *Bracts* often soon deciduous, rarely persistent, occasionally calyprate, sometimes absent; flowers single or in cincinni. *Capsule* spherical or elongate.

Type species: *A. galanga* (L.) Sw., Obs. Bot. 6 (1791).

Distribution: Japan to New Guinea. **Map 3.**

KEY TO THE SUBSECTIONS OF SECTION ALPINIA

1. Inflorescence truly paniculate (i.e. with lateral branches more or less throughout the inflorescence); flowers single; bracts calyptrate _____ **Paniculatae**
 - Inflorescence unbranched or with one or two lateral branches at the base; flowers single or in cincinni; bracts, when present, rarely calyptrate and then inflorescence unbranched _____ **2**
2. Labellum deeply bilobed (except in *A. romblonensis*), the lateral lobes bifid thus forming a quadrate organ rarely more than 1cm long; base of lip and filament usually joined to form a tube above the insertion of the petals _____ **Presleia**
 - Labellum sometimes bilobed but never quadrate, usually much larger; lip and filament not forming a tube _____ **3**
3. Bracteoles absent; bracts (sometimes none observed) minute or, in *A. oxymitra*, calyptrate; flowers single; inflorescence never branched _____ **Cenolophon**
 - Bracteoles present, often soon deciduous; bracts present or not, never calyptrate; flowers in cincinni throughout at least part of the inflorescence; sometimes with lateral branches at the base _____ **4**
4. Labellum up to 2.5cm long, commonly much less; bracteoles not completely enclosing the buds _____ **Alpinia**
 - Labellum rarely under 3cm long, often much more; bracteoles usually completely enclosing the buds _____ **5**
5. Calyx deeply split at anthesis; anther ecristate; inflorescence unbranched _____ **Catimbium**
 - Calyx not deeply split; anther crested; inflorescence usually with one or two lateral branches at base _____ **Probocalyx**

Sect. **Alpinia** subsect. **Alpinia**Syn.: *Albina* Giseke.*Alpinia* subgen. *Catimbium* sect. *Boniophyton* K. Schum.—p.p. incl. lectotype.*Alpinia* sect. *Ethanium* Horan.—p.p. incl. type.*Alpinia* sect. *Autalpinia* K. Schum.—p.p. incl. type.*Alpinia* sect. *Hellenia* K. Schum.—non Willd.—p.p. incl. type.[*Alpinia* subgen. *Probocalyx* K. Schum.—p.p. excl. type.]

Inflorescence erect, sometimes with a few branches at the base. *Bracts* usually small and soon deciduous, sometimes larger and ? persistent; bracteoles open to the base or apparently lacking. *Flowers* in cincinni of two to many flowers; calyx not deeply split unilaterally; labellum flat or concave, sometimes unguiculate, the limb often shortly bilobed; lateral staminodes usually present; filament well formed, anther

usually ecristate; stigma slightly expanded with a terminal orifice; epigynous glands small and, as far as is known, free from each other, *Capsule* spherical to ovoid.

Type species: *A. galanga* (L.) Sw., Obs. Bot. 6 (1791). **Figs 1Ba, 3A.**

Other species: *A. bambusifolia* Liang & Fang; *A. bilamellata* Makino; *A. boninsimensis* Makino; *A. breviligulata* Gagnep.; *A. brevis* Wu & Senjen; *A. coriacea* Wu & Senjen; *A. coriandrifera* Fang; *A. densibracteata* Wu & Senjen; *A. globosa* (Lour.) Horan.; *A. guandongensis* Senjen & Chen; *A. intermedia* Gagnep.; *A. japonica* (Thunb.) Miq.; *A. jingxiensis* Fang; *A. kiushiana* Kitamura; *A. maclurei* Merr., **Fig. 5D**; *A. nanchuanensis* Z. Y. Zhu; *A. penduliflora* Ridley; *A. pinnanensis* Wu & Senjen; *A. polyantha* Fang; *A. stachyoides* Hance, **Fig. 5C**; *A. strobiliformis* Wu & Senjen; *A. suishaensis* Hayata (*A. chinensis* auct. — non (Retz.) Roscoe), **Fig. 1Bb**; *A. tonkinensis* Gagnep.; *A. velutina* Ridley.

Distribution: Japan, China, Indo-China, Thailand, India, Malaysia, Indonesia and the Philippines. **Map 7.**

In general the species of subsect. *Alpinia* are small-flowered plants, the labellum rarely over 2cm long and often much less. The type of sect. *Boniophyton*, *A. tonkinensis* (misplaced by Schumann in subgenus *Catimbium*), is curious in that the lateral staminodes have become connate to the base of the dorsal petal; the closely related *A. globosa* and *A. maclurei* have similar staminodes.

Sect. **Alpinia** subsect. **Presleia** (Val.) R. M. Smith, **stat. nov.**

Syn.: *Alpinia* sect. *Presleia* Val. in Bot. Jahrb. 52: 47, 64 (1914)—incl. type.

Martensia Giseke, Prael. Ord. Nat. 207, 227, 248 (1792)—non *Martensia* Hering (1841—nom. cons.).

[*Alpinia* sect. *Ethanium* Horan., Prodr. Monogr. Scitam. 33 (1862)—p.p. excl. type.]

[*Alpinia* sect. *Autalpinia* K. Schum. in Bot. Jahrb. 27: 271, 272 (1899) p.p.—excl. type.]

[*Alpinia* sect. *Hellenia* K. Schum., Pflanzenr. Zing. 312 (1904)—p.p. excl. type.]

Inflorescence erect, occasionally with lateral branches at the base. *Bracts* soon deciduous, probably minute; bracteoles not seen. *Flowers* usually in cincinni of 2–3, small; calyx not split unilaterally; base of labellum occasionally connate to the base of the filament into a short tube above the insertion of the petals, the limb almost always bilobed, often deeply so, each lobe bifid; lateral staminodes present; filament well formed; anther crested or not; stigma \pm funnel-shaped, small; epigynous glands narrow, ventrally fused. *Capsule* round.

Lectotype: *A. brevilabris* Presl, Reliq. Haenk. 1: 110 t.17 (1830).

Other species: *A. aquatica* (Retz.) Roscoe, **Fig. 5F**; *A. brachyanthera* Merr.; *A. cumingii* K. Schum.; *A. elmeri* R. M. Smith; *A. flabellata* Ridley; *A. foxworthyi* Ridley; *A. graminea* Ridley; *A. lauterbachii* Val.; *A. pubiflora* (Benth) K. Schum., **Fig. 3B**; *A. pulchella* K. Schum.; ? *A. romblonensis* Elmer; *A. rosea* Elmer, **Fig. 1Bd**; *A. scabra* (Bl.) Baker; *A. sibuyanensis* Elmer; *A. subspicata* Val.; *A. wenzlii* Merr.

Distribution: Malaysia, Indonesia, the Philippines, New Guinea, ? Japan, ? Taiwan.

Map 8.

Subsect. *Presleia* is a well-defined group characterized by the very small flowers and 4-lobed labellum. *A. romblonensis* deviates in the entire labellum.

Sect. **Alpinia** subsect. **Paniculatae** R. M. Smith, **subsect. nov.**

Syn.: [*Alpinia* subgen. *Probolocalyx* K. Schum., Pflanzenr. Zing. 325 (1904)—p.p. excl. type.]

[*Alpinia* sect. *Autalpinia* K. Schum. in Bot. Jahrb. 27: 271, 272 (1899)—p.p. excl. type.]

Inflorescentia erecta, per longitudinem ramosa. *Bracteae* calyptratae, mox expulsae, parte basali saepe relicta; bracteolae absentes. *Flores* singuli; calyx haud unilateraliter fissus; labellum plus minusve concavum, integrum, minus quam 2cm longum; staminodia lateralia praesentia; anthera cristata; stigma vix expansum ore terminali. *Capsula* globosa.

Type species: *A. ligulata* K. Schum. in Bot. Jahrb. 13: 275 (1899) & Pflanzenr. Zing. 326 (1904).

Other species: *A. nieuwenhuizii* Val. **Figs 1Bc, 5A.**

Distribution: Borneo. **Map 7.**

Branched inflorescences are comparatively rare in *Alpinia* and usually have just one or two lateral branches which arise at the base of the main rhachis (e.g. in *A. galanga* and *A. nigra*). In subsect. *Paniculatae* the inflorescence is branched throughout. Care should be taken not to confuse the calyptrate bracts in this group with the calyptrate bracteoles of the much larger-flowered *A. glabra* (subsect. *Probolocalyx*).

Sect. **Alpinia** subsect. **Cenolophon** (Bl.) R. M. Smith, **stat. nov.**

Syn.: *Cenolophon* Bl., Enum. Pl. Jav. 60 (1827).

Amomum subgen. *Cenolophon* (Bl.) Baker in Hook. f., Fl. Brit. Ind. 6: 242 (1892)—p.p. incl. type.

Alpinia sect. *Cenolophon* (Bl.) K. Schum., Pflanzenr. Zing. 320 (1904)—p.p. incl. type.

[*Alpinia* subgen. *Probolocalyx* K. Schum., Pflanzenr. Zing. 325 (1904)—p.p. excl. type.]

[*Alpinia* sect. *Autalpinia* K. Schum. in Bot. Jahrb. 27: 271, 272 (1899)—p.p. excl. type.]

Inflorescence usually erect, unbranched. *Bracts* very small, often the basal part remaining or early deciduous, rarely (*A. oxymitra*) calyptrate; bracteoles absent. *Flowers* strictly single (rudimentary second flowers occasionally seen); calyx split unilaterally; labellum broad, showy \pm entire, the margin usually fimbriate; lateral staminodes present; filament well formed; anther crested or not; stigma expanded with a terminal orifice; epigynous glands often united on one side. *Capsule* ellipsoid or spherical.

Lectotype species: *Cenolophon rubrum* Bl. = *A. rubricaulis* K. Schum.

Other species: *A. argentea* (Burt & Smith) R. M. Smith, **Figs 3H, 5E**; *A. corneri* (Holtum) R. M. Smith; ? *A. elwesii* Turrill; *A. gagnepainii* K. Schum.; *A. graminifolia*

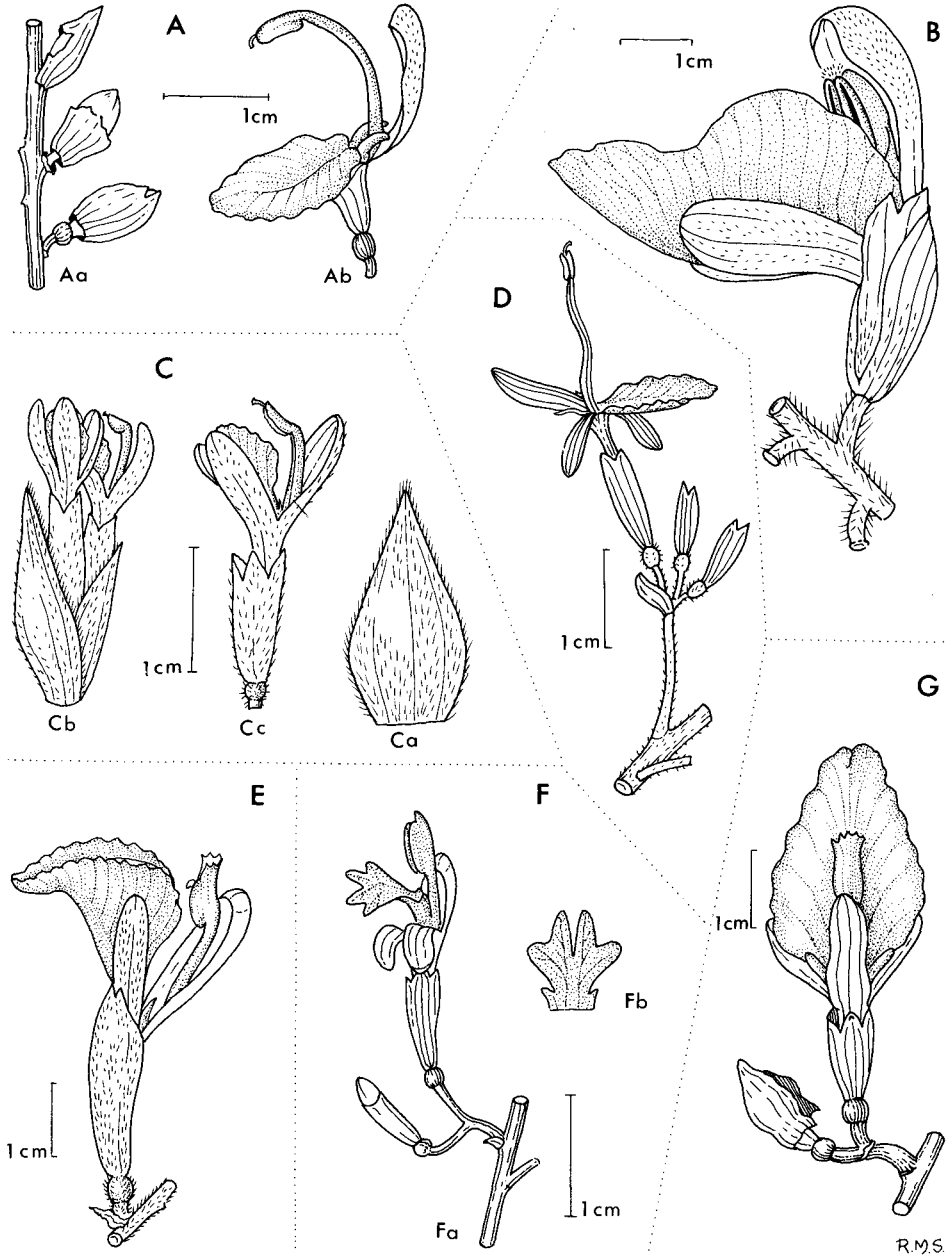


FIG. 5. Subgen. *Alpinia* sect. *Alpinia*. A, *A. nieuwenhuizii* (subject. *Paniculatae*): Aa, part of main axis showing calyprate bracts; Ab, flower. B, *A. novaepommeraniae* (subject. *Catimbium*), flower. C, *A. stachyoides* (subject. *Alpinia*): Ca, bract; Cb, cincinnus, bract removed; Cc, flower. D, *A. macturei* (subject. *Alpinia*): Da, part of main axis and cincinnus with mature flower. E, *A. argentea* (subject. *Cenolophon*) flower, with part of main axis. F, *A. aquatica* (subject. *Presleia*): Fa, main axis and cincinnus with mature flower; Fb, labellum. G, *A. glabra* (subject. *Probolocalyx*), main axis and cincinnus with mature flower, showing calyprate bracteole. A, B, E, F, G from spirit material, C, D from dried material.

Fang & Lo; *A. hansenii* R. M. Smith; *A. havilandii* K. Schum.; *A. hulstijnii* Val.; *A. macrostephana* (Baker) Ridley; *A. martinii* R. M. Smith; *A. mollissima* Ridley; *A. officinarum* Hance; *A. orthostachys* K. Schum.; *A. oxymitra* K. Schum.; *A. oxyphylla* Miq.; *A. padacanca* Val.; *A. petiolata* Baker; *A. pricei* Hayata; *A. ptychanthera* K. Schum.; *A. pulcherrima* Ridley; ? *A. shimadai* Hayata; *A. tamacuensis* R. M. Smith; *A. versicolor* K. Schum.; *A. vitellina* (Lindley) Ridley; *A. warburgii* K. Schum.

Distribution: China, Indo-China, Thailand, Malaysia and Indonesia. **Map 10.**

The type species of subsect. *Cenolophon*, *C. rubra* (Sulawesi, Reinwardt s.n.) was omitted from his monograph by Schumann on the grounds that the specimen had been lost. *C. rubra* has, however, since been recollected (*Alston* 15666, BM) from an area of Sulawesi visited by Reinwardt (Burt & Smith, 1975). Since the existence of *Alpinia rubra* Dietr. (1839) precludes the adoption of Blumes's epithet in *Alpinia*, *A. rubricaulis* K. Schum., placed in synonymy under *Cenolophon rubrum* by Burt & Smith (op. cit.) is here selected as lectotype of the section.

Sect. **Alpinia** subsect. **Catimbium** (Horan.) R. M. Smith, **stat. nov.**

Syn.: *Alpinia* sect. *Catimbium* Horan., Prodr. Monogr. Scitam. 34 (1868)—p.p. incl. type.

Zerumbet Wendl., Sert. Hannov. 4: 3 (1798).

Catimbium Lestib. in Ann. Sci. Nat. 2 sér. 15: 346 (1841)—non *Catimbium* Juss. (1798).

Languas J. K. Small, Fl. SEUS ed. 2, 307 (1913).

Alpinia subgenus *Catimbium* (Horan.) K. Schum. sect. *Flo-sparadisi* K. Schum., Pflanzenr. Zing. 321 (1904)—p.p. incl. type.

[*Alpinia* subgen. *Probolocalyx* K. Schum., op. cit. 325—p.p. excl. type.]

[*Alpinia* sect. *Ethanium* Horan., Prodr. Monogr. Scitam. 33—p.p. excl. type.]

Inflorescence erect or pendulous. *Bracts* absent; bracteoles almost always enclosing the flower buds, sometimes joined at the base initially, falling soon. *Flowers* in cincinni of 2–4, rarely single; calyx split unilaterally; labellum usually over 3cm long, commonly yellow-orange heavily marked crimson red, convolute, usually \pm three-lobed; lateral staminodes present, often reduced to fleshy swellings; filament well formed; anther ecristate; stigma expanded with a narrow hairy orifice; epigynous glands massive. *Capsule* spherical to ellipsoid.

Lectotype species: *A. zerumbet* (Pers.) Burt & Smith in Notes RBG Edinb. 31: 204 (1972). **Fig. 3E, Plate 1B.**

Other species: *A. assimilis* Ridley; *A. auriculata* Roscoe; *A. blepharocalyx* K. Schum.; *A. bracteata* Roscoe; *A. calcarata* Roscoe, **Fig. 1Be**; *A. chrysorhachis* K. Schum.; *A. copelandii* Ridley; *A. diffisa* Roscoe; *A. dolichocephala* Hayata; *A. emaculata* Tong; *A. formosana* K. Schum.; *A. glabrescens* Ridley; *A. guinanensis* Fang & Cheng; *A. haenkei* Presl; *A. hainanensis* K. Schum.; *A. henryi* K. Schum.; ? *A. hirsuta* (Lour.) Horan.; *A. illustris* Ridley; *A. katsumadai* Hayata; *A. kwangsiensis* Wu & Senjen; *A.*



PLATE 1. A, *Alpinia vittata* Bull. (subgenus *Dieramalpinia*). B, *Alpinia zerumbet* (Pers.) Burtt & Smith (subgenus *Alpinia*).

latilabris Ridley; ? *A. macroscephis* K. Schum.; *A. macroura* K. Schum.; *A. malaccensis* (Burm.) Roscoe; *A. novae-pommeraniae* K. Schum., **Fig. 5B**; *A. pennicellata* Roscoe; *A. platyphilus* K. Schum.; *A. romburgiana* Val.; *A. schumanniana* Val.; *A. sessiliflora* Kitamura; ? *A. trachyascus* K. Schum.; *A. uraiensis* Hayata.

Distribution: China, Indochina, India, Burma, Thailand, Malaysia, Indonesia, New Guinea and the Bismarck Archipelago. **Map 9.**

The dividing line between subsections *Cenolophon* and *Catimbium* is not clear-cut. *Cenolophon*, as understood by Blume, is strictly single-flowered with very small primary bracts, no bracteoles and a prominent anther crest. Subsect. *Cenolophon* now includes species with ecristate anthers, *A. havilandii* for example—a Bornean endemic with minute bracts and flowers borne singly. In the showy labellum this species strongly resembles subsect. *Catimbium* where at least partially single-flowered inflorescences are known (*A. latilabris*).

Sect. **Alpinia** subsect. **Probolocalyx** (K. Schum.) R. M. Smith, **stat. nov.**

Syn.: *Alpinia* subgen. *Probolocalyx* K. Schum., Pflanzenr. Zing. 325 (1904)—p.p. incl. type: *A. glabra* Ridley.

[*Alpinia* sect. *Autalpinia* K. Schum. in Bot. Jahrb. 27: 271, 272 (1899)—p.p. excl. type.]

Inflorescence sometimes with short lateral branches at the base. *Bracts* membranous and soon deciduous, rarely seen in the dried state; bracteoles calyprate, pushed off by the opening flower, sometimes splitting to the base. *Flowers* in cincinni of 2–3, often only one developing; calyx not deeply split unilaterally; labellum convolute; lateral staminodes present; anther crested. *Capsule* spherical.

Lectotype species: *A. glabra* Ridley in J. Str. Br. Roy. Asiat. Soc. 32: 168 (1899). **Figs 3D, 5G.**

Distribution: Borneo. **Map 9.**

Schumann believed that his subgenus *Probolocalyx*, which he characterized by the minute (or absent) bracts and bracteoles, lay between his subgenera *Alpinia* and *Catimbium*. Of the 19 species included in *Probolocalyx*, eight are here placed in subsect. *Cenolophon*, three in subsect. *Catimbium*, and one in subsections *Alpinia* and *Paniculatae* respectively. *A. submutica* is imperfectly known, and two have been transferred to *Riedelia*. The remaining three species were united under *A. glabra* by Burt & Smith (1972). Since then much more material has become available and there is every indication that more than a single species is involved.

While *A. glabra* resembles the species of subsect. *Catimbium* in the labellum shape, it is well distinguished by the initially calyprate bracteoles, crested anther, and the calyx, which is not deeply split unilaterally.

Sect. **Fax** R. M. Smith, **sect. nov.**

Syn.: *Amomum* sect. *Geanthus* K. Schum. series *Polyanthae* K. Schum., Pflanzenr. Zing. 225 (1904)—p.p. incl. lectotype (selected here): *Elettaria involucrata* Thwaites = *Alpinia fax* Burt & Smith.

[*Alpinia* sect. *Cenolophon* (Bl.) K. Schum., op. cit. 320—p.p. excl. type.]

Inflorescentia erecta, haud ramosa, in fronde foliato terminalis vel radicalis, dense congesta et involucre bractearum steriliu[m] circumcincta. *Bracteae* fertiles exteriores sterilibus similes, interiores angustiores; bracteolae saepissime tubulares. *Flores* in cincinnis dispositi (paucis in inflorescentia radicali interdum solitariis exceptis); calyx unilateraliter fissus; labellum inconspicuum, obscure trilobum; staminodia lateralialia praesentia vel absentia; anthera sessilis, ecristata; stigma clavatum, ore plus minusve ventrali. *Capsula* globosa vel oblonga.

Lectotype species: *A. fax* Burt & Smith in Notes RBG Edinb. 34: 177 f.5 (1975).

Other species: *A. abundiflora* Burt & Smith, **Figs 3G, 6D**; *A. rufescens* (Thwaites) K. Schum.

Distribution: Sri Lanka; S India. **Map 4**.

All three members of sect. *Fax* were first described in *Elettaria* (Thwaites, 1861) and all were later transferred to *Amomum* by Trimen (1885, 1898) but the decision to place them in *Alpinia* is probably correct. In *A. rufescens*, which is known from the type plant alone, the inflorescence is terminal on the leafy shoot; that of *A. abundiflora* may be terminal but is more often radical, whereas in *A. fax* only radical inflorescences are known. Such diversity of habit is not unique in Zingiberaceae either at specific (*Zingiber wightianum*) or generic level (*Renealmia*, *Riedelia*).

The conspicuous involucre of sterile bracts which surrounds the inflorescence is a prominent characteristic of sect. *Fax*. Such bracts are never found in *Amomum*. Sterile bracts may occur in some species of *Alpinia* sect. *Dieramalpinia*, but they are never involucre-like and are usually not clearly differentiated from the bracts which subtend the flowers.

The bracteoles of *A. fax* are tubular, those of *A. abundiflora* usually open to the base, but this feature is not constant and tubular and non-tubular bracteoles may be found in the same cincinnus (Burt & Smith, 1975).

Sect. **Guillainia** (Vieill.) K. Schum., Pflanzenr. Zing. 323 (1904).

Syn.: *Guillainia* Vieill. in Bull. Soc. Linn. Normand. 10: 92 (1866).

Type: *Guillainia purpurata* Vieill.

Alpinia sect. *Kolowratia* (Presl) Loesen. subsect. *Guillainia* (Vieill.) Loesener, Pflanzenfam. ed 2 15a: 621 (1930)—p.p. incl. type: *Alpinia purpurata* (Vieill.) K. Schum.

[*Alpinia* sect. *Autalpinia* K. Schum. in Bot. Jahrb. 27: 271, 272 (1899)—p.p. excl. type.]

Inflorescence erect, unbranched. *Bracts* large, persistent, usually coloured; bracteoles tubular. *Flowers* in cincinni; calyx not split unilaterally; corolla tube long, well exerted from the calyx; labellum broad, variously lobed, lateral staminodes absent; anther \pm sessile, crested; stigma hard, expanded, unilaterally flattened with a terminal orifice; epigynous glands narrow, usually united on one side. *Capsule* spherical or flask-shaped.

Type species: *A. purpurata* (Vieill.) K. Schum., Pflanzenr. Zing. 323 (1904). **Figs 3C, 6C.**

Other species: *A. fusiformis* R. M. Smith; *A. ludwigiana* R. M. Smith.

Distribution: New Caledonia, New Hebrides, New Guinea, the Solomons, the Moluccas, the Bismarck Archipelago, Java and the Carolines. **Map 5.**

A. ludwigiana is native to Java and *A. fusiformis* to New Guinea. The well known *A. purpurata*, which was described from New Caledonia, is widely cultivated throughout the tropics and may not be truly native in all the areas listed above.

The stigma of *A. purpurata* approaches that of some members of subgen. *Dieramalpinia* in that it is very rigid and flattened on the ventral surface. The orifice is, however, terminal.

Sect. **Arctiflorae** R. M. Smith, **sect. nov.**

Syn.: [*Alpinia* sect. *Allughas* K. Schum., Pflanzenr. Zing. 344 (1904)—
p.p. excl. type.]

Inflorescentia plus minusve erecta, ramosa. *Bracteae* persistentes conspicuae; bracteolae tubulares. *Flores* in cincinnos dispositi; calyx plus minusve unilateraliter fissus; labellum tam latum quam longum, breviter bilobum, staminodia lateralia absentia vel praesentia; anthera subsessilis, thecis valde divergentibus, crista conspicua plus minusve petaloidea vel absente; stigma clavatum, paulo expansum ore ventrali; glandulae epigynae brevis, inter se liberae. *Capsula* elongata.

Type species: *A. arctiflora* F. Muell., Fragm. 8: (1872). Monotypic. **Fig. 6B.**

Other species: *A. sp. nov.?* (*Nagata* 3861, E).

Distribution: Australia. **Map 5.**

The stigma of *A. arctiflora* closely approaches that of some species of sect. *Pycnanthus* in subgenus *Dieramalpinia*, but in other respects the species is very different from the members of that section. The labellum is large and showy and the more or less petaloid anther crest is the largest of the genus. It appears to have no close affinity to the other groups of *Alpinia*. A second and as yet undescribed species from N Queensland also belongs here. It differs in the absence of an anther-crest, in the presence of subapical teeth on the very short filament, and in its smaller stature.

Sect. **Allughas** K. Schum., Pflanzenr. Zing. 344 (1904).

Syn.: *Heritiera* Retz., Obs. Bot. 6: 17 (1791)—non *Heritiera* Aiton (1798). Type: *H. allughas* Retz. = *Alpinia nigra* (Gärtner) B. L. Burtt.

Buekia Giseke, Prael. Ord. Nat. 204, 216, 239 (1792). Type: *Costus malaccensis* König = ? *Alpinia javanica* Bl.

Hellenia Willd., Sp. Pl. 1: 4 (1797)—non *Hellenia* Retz. (1791). Type: *H. allughas* (Retz.) Willd. = *Alpinia nigra* (Gärtner) B. L. Burtt.

Strobidia Miq., Fl. Ind. Bat. Suppl. 614 (1860). Type: *S. sumatrana* Miq. = *Alpinia sumatrana* (Miq.) K. Schum.

Odontyrium K. Schum., Pflanzenr. Zing. 59 (1904). Type: *Hedy-*

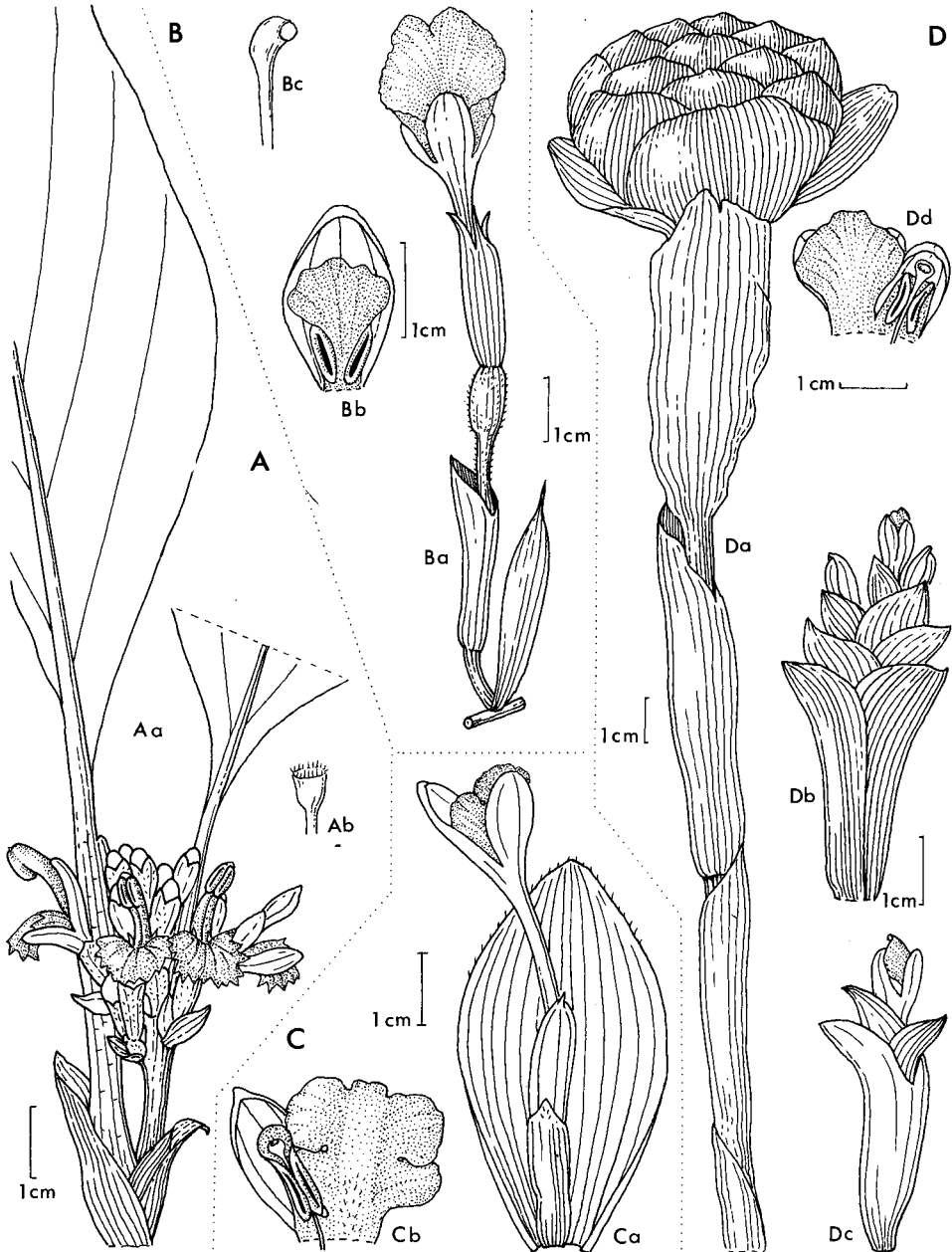


FIG. 6. Subgenus *Alpina*. A, *A. pumila* (sect. *Didymanthus*): Aa, habit; Ab, stigma. B, *A. arctiflora* (sect. *Arctiflorae*): Ba, cincinnus; Bb, anther and dorsal petal; Bc, stigma. C, *A. purpurata* (sect. *Guillainia*): Ca, cincinnus, within bract; Cb, upper part of flower, dissected. D, *A. abundiflora* (sect. Fax): Da, habit; Db, cincinnus showing first, non-tubular bracteoles; Dc, cincinnus showing tubular bracteoles; Dd, upper part of flower, dissected. A, after Bot. Mag. t.6832; B, C, Dc, b, d from spirit material; Da from dried material.

chium denticulatum Ridley = *Alpinia denticulata* (Ridley) Holttum.

Alpinia sect. *Ethanium* Horan., Prodr. Monogr. Scitam. 33 (1862)—p.p. incl. type: *Alpinia allughas* (Retz.) Roscoe = *A. nigra* (Gärtner) B. L. Burtt.

Alpinia sect. *Brachybotrys* K. Schum., Pflanznr. Zing. 358 (1904). Type: *Alpinia rafflesiana* Wall. ex Baker.

Alpinia sect. *Javana* K. Schum., op. cit. 359. Type: *Alpinia javanica* Bl.

Alpinia sect. *Strobidia* (Miq.) K. Schum., op. cit. 357. Type: *Alpinia sumatrana* (Miq.) K. Schum.

[*Alpinia* sect. *Catimbium* Horan., op. cit. 34—p.p. excl. type.]

[*Alpinia* sect. *Dieramalpinia* K. Schum. in Bot. Jahrb. 27: 286 (1899) p.p.—excl. type.]

[*Alpinia* sect. *Hellenia* K. Schum., Pflanzenr. Zing. 312—p.p. excl. type.]

[*Alpinia* sect. *Amomiceps* K. Schum., op. cit. 350—p.p. excl. type.]

Inflorescence erect, rarely pendulous, sometimes with branches at the base. *Bracts* often small and soon deciduous, occasionally large and more or less persistent; bracteoles tubular. *Flowers* always in cincinni; calyx not markedly split unilaterally; labellum usually flat or concave, rarely linear. *Capsule* spherical.

Type species: *A. nigra* (Gärtner) B. L. Burtt in Notes RBG Edinb. 35: 213 (1977).

Distribution: China, India, Burma, Thailand, Malaysia, Indonesia, New Guinea, Australia. **Map 6.**

KEY TO THE SUBSECTIONS OF SECTION *ALLUGHAS*

1. Dorsal petal with a conical cucullate apex; labellum up to 4cm long, always exceeding 1cm _____ 2
- Dorsal petal rounded and more or less hooded at the apex; labellum usually under 1cm long _____ 3
2. Labellum 2–3mm wide in lower two thirds _____ **Odontychium**
- Labellum much wider _____ **Allughas**
3. Mature fruit black or red; labellum with a callus-like appendage at the base _____ **Strobidia**
- Mature fruit blue; labellum without a callus _____ **Caeruleae**

Sect. *Allughas* subsect. *Allughas* (K. Schum.) R. M. Smith, **stat. nov.**

Syn.: *Alpinia* sect. *Allughas* K. Schum., Pflanzenr. Zing. 344 (1904)—p.p. incl. type.

Heritiera Retz., Obs. Bot. 6: 17 (1791)—non *Heritiera* Aiton (1798).

Buekia Giseke, Prael. Ord. Nat. 204, 216, 239 (1792).

Hellenia Willd., Sp. Pl. 1: 4 (1797)—non *Hellenia* Retz. (1791).

Alpinia sect. *Brachybotrys* K. Schum., Pflanzenr. Zing. 358 (1904).

Alpinia sect. *Javana* K. Schum., op. cit. 359.

[*Alpinia* sect. *Ethanium* (Salisb.) Horan., Prodr. Monogr. Scitam. 33 (1862)—excl. type.]

[*Alpinia* sect. *Amomiceps* K. Schum., op. cit. 350—p.p. excl. type.]

Inflorescence usually erect, sometimes branched. *Bracts* usually small and soon deciduous, rarely large and persistent. *Dorsal petal* with a conical cucullate apex; labellum 1–4cm wide, bilobed or entire; stigma more or less funnel-shaped.

Type species: *A. nigra* (Gärtner) B. L. Burtt. **Fig. 1Bg.**

Other species: *A. borraginoides* K. Schum.; *A. capitellata* Jack; *A. javanica* Bl.; *A. microlophon* Ridley; *A. murdochii* Ridley, **Fig. 1Bh**; *A. pahangensis* Ridley, **Fig. 7D**; *A. rafflesiana* Wall. ex Bak.; *A. seimundii* Ridley, **Fig. 7B**.

Distribution: China, India, Burma, Malaysia, Indonesia (Java). **Map 11.**

Sect. **Allughas** subsect. **Odontychium** (K. Schum.) R. M. Smith, **comb. et stat. nov.**

Syn.: *Odontychium* K. Schum., Pflanzenr. Zing. 59 (1904).

Dorsal petal cucullate; labellum 2–3mm wide in the lower two thirds, slightly expanded into three lobes (the mid-lobe bifid) at the apex; non-petaloid.

Type species: *A. denticulata* (Ridley) Holttum in Gard. Bull. Sing. 13: 143 (1950). **Fig. 7A.**

Monotypic.

Distribution: W Malaysia. **Map 12.**

A. denticulata was first described in *Hedychium* on account of its 6mm long lateral staminodes; these are in fact no longer than those of many other *Alpinia* (e.g. *A. glabra*). Schumann placed his new genus in the *Hedychieae*, but pointed out that in every other character of the inflorescence and in the fruit, it belonged to his subgen. *Dieramalpinia*. The curious non-petaloid labellum makes *A. denticulata* anomalous in sect. *Allughas* when it is treated as a section of subgen. *Alpinia*, but the elongate, rather papery tubular bracteoles and prominently cucullate dorsal corolla lobe give *A. denticulata* the general facies of *A. pahangensis* and *A. rafflesiana* with which it shares a similar distribution.

Sect. **Allughas** subsect. **Strobidia** (Miq.) R. M. Smith, **stat. nov.**

Syn.: *Strobidia* Miq., Fl. Ind. Bot. Suppl. 614 (1860).

Alpinia sect. *Strobidia* (Miq.) K. Schum., Pflanzenr. Zing. 357 (1904).

[*Alpinia* sect. *Dieramalpinia* K. Schum. in Bot. Jahrb. 27: 272, 286 (1899)—p.p. excl. type.]

Dorsal petal rounded, hood not pointed; labellum strongly concave with a wart-like callus at the base. *Capsule* red or black.

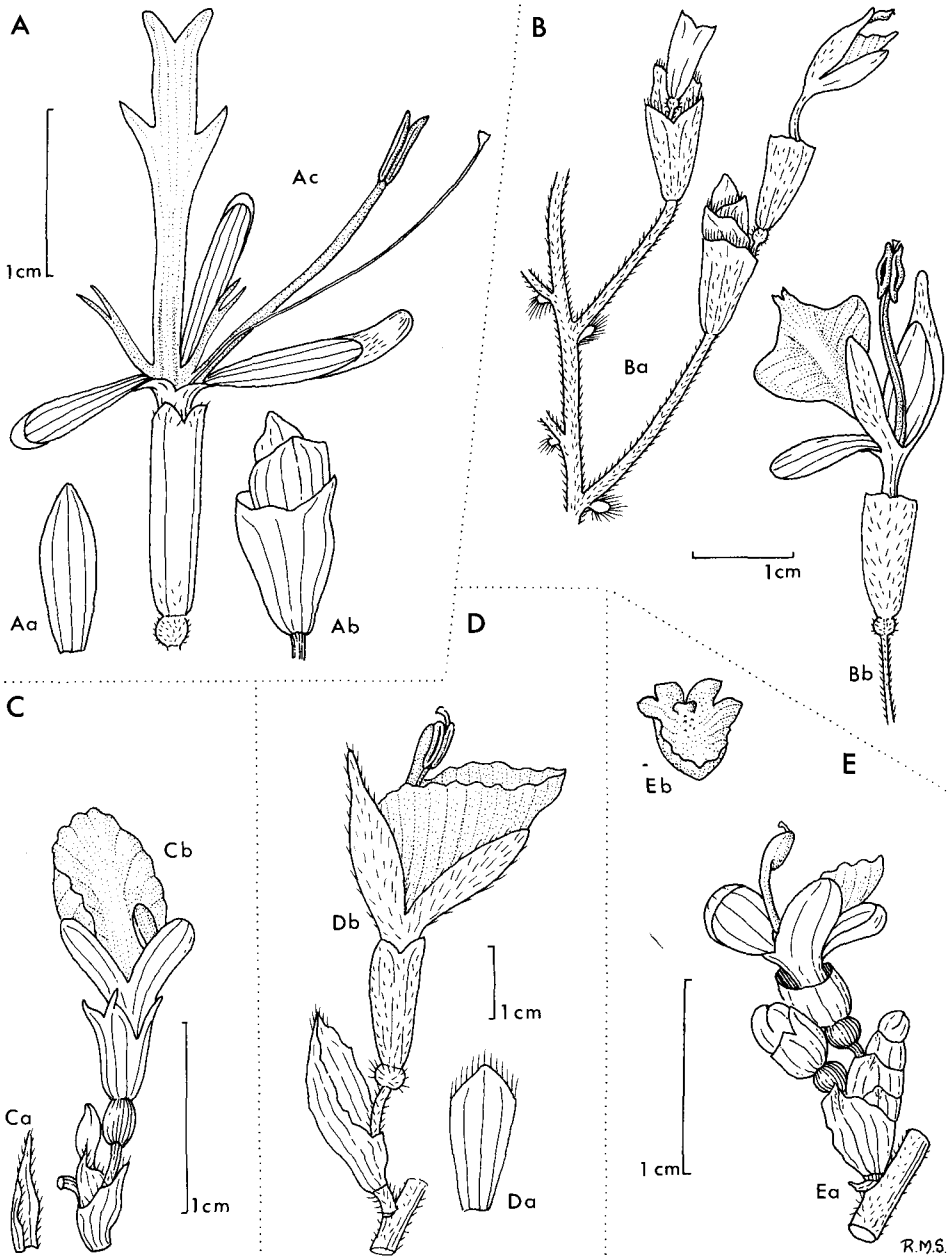


FIG. 7. *Alpinia* subgen. *Alpinia* sect. *Allughas*. A, *A. denticulata* (subject. *Odontyrium*): Aa, bract; Ab, young cincinnus; Ae, flower. B, *A. siemundii* (subject. *Allughas*): Ba, part of main axis showing bracts and two cincinni; Bb, flower. C, *A. modesta* (subject. *Caerulea*): Ca, bract; Cb, cincinnus and mature flower. D, *A. pahangensis* (subject. *Allughas*): Da, bract; Db, cincinnus and mature flower. E, *A. conchigera* (subject. *Strobilia*): Ea, cincinnus and mature flower; Eb, labellum. All from dried material, except C (spirit).

Type species: *A. sumatrana* (Miq.) K. Schum. in Bot. Jahrb. 27: 291 (1899).

Other species: *A. conchigera* Griff., **Fig. 7E**; *A. siamensis* K. Schum.; ?*A. mannii* Baker.

Distribution: The Andamans, Indo-China, Thailand, Malaysia, Indonesia (Sumatra).

Map 13.

Subsect. *Strobidia* is closely allied to subsect. *Allughas*, differing in the smaller flowers and the rounded, not pointed, dorsal petal.

Sect. **Allughas** subsect. **Caeruleae** R. M. Smith, **subject. nov.**

Syn.: [*Alpinia* sect. *Hellenia* K. Schum., Pflanzenr. Zing. 312 (1904)—
p.p. excl. type.]

[*Alpinia* sect. *Allughas* K. Schum., op. cit. 344—p.p. excl. type.]

Petalum dorsale plus minusve rotundatum; labellum non valde concavum, callo absente. *Capsula* caerulea.

Type species: *A. caerulea* Bentham, Fl. Austr. 6: 265 (1873). **Fig. 1Bf.**

Other species: *A. arundelliana* (F. M. Bailey) K. Schum.; *A. hylandii* R. M. Smith; *A. modesta* (F. Muell.) K. Schum. **Fig. 7c.**

Distribution: Australia, New Guinea. **Map 14.**

The distribution of sect. *Allughas* is made somewhat disjunct by the inclusion of these Australian plants. However, subsect. *Caeruleae* is closely allied to subsects *Allughas* and *Strobidia*, differing from the former in the smaller flowers and non-pointed dorsal petal and from the latter in the absence of a callus at the base of the lip. The blue capsules of subsect. *Caeruleae* are unique in the section. It is probable that *A. caerulea* also occurs in Papua New Guinea but further material is needed to verify this.

KEY TO THE SECTIONS OF SUBGENUS DIERAMALPINIA

1. Filament subapically dentate; stigma \pm clavate with a rounded orifice ventrally or sub-ventrally, or geniculate, the orifice at the tip; labellum linear or oblong; bracts usually inconspicuous, rarely (*A. macrocephala*) involucre-like; inflorescence, as far as is known, never monoecious _____ **Pycnanthus**
- Filament edentate; stigma expanded, often rigid with an elliptic orifice on the ventral face, rarely funnel-shaped; labellum never linear, usually more or less triangular or oblong; bracts conspicuous or not, often persistent; inflorescence sometimes monoecious _____ **2**
2. Base of labellum and filament joined into a distinct tube above the insertion of the petals; stigma, as far as known, funnel-shaped; sometimes monoecious _____ **Eubractea**
- Base of lip and filament not so joined; stigma rigid with a ventral orifice; monoecious or not _____ **3**
3. Bracts usually small or absent; filament broad, well formed;

- monoecism always displayed, only the first, rarely the second flower of the cincinnus producing fruit _____ **Myriocrater**
- Bracts almost always conspicuous, usually persistent; anther sessile or subsessile (except in *A. carolinensis*); plants, as far as known, never monoecious _____ **Dieramalpinia**

Sect. **Pycnanthus** K. Schum., Pflanzenr. Zing. 346 (1904); R. M. Smith in Notes RBG Edinb. 36: 273 (1978); A. C. Smith, Fl. Vitiens. Nova 1: 202 (1979).

Syn.: *Hellwigia* Warb. in Bot. Jahrb. 13: 279, 451 (1891). Type: *H. pulchra* Warb. = *Alpinia pulchra* (Warb.) K. Schum.

Alpinia subgen. *Monanthocrater* (Val.) Loesener, Pflanzenfam. ed. 2, 15a: 618 (1930). Type: *Alpinia odontonema* K. Schum.

Alpinia sect. *Amomiceps* K. Schum. Pflanzenr. Zing. 350 (1904)—p.p. incl. lectotype (selected here): *A. macrocephala* K. Schum.

Alpinia sect. *Monanthocrater* Val. in Nova Guinea (Botanique) 8: 951 (1913). Lectotype (selected here): *Alpinia odontonema* K. Schum.

Alpinia sect. *Hellwigia* (Warb.) Loesener op. cit. 619. Type: *Alpinia pulchra* (Warb.) K. Schum.

[*Eriolopha* Ridley in Hooker's Icon. Pl. 31: t.3067 (1916) & in Trans. Linn. Soc. (Bot.) 217 (1916)—p.p. excl. type.]

[*Alpinia* sect. *Hellenia* K. Schum., Pflanzenr. Zing. 312 (1904)—p.p. excl. type.]

Inflorescence erect or pendulous, branched or unbranched. *Bracts* small and inconspicuous or apparently absent, occasionally well formed, rarely involucre-like; bracteoles tubular. *Flowers* borne singly or in cincinni; calyx not unilaterally split; labellum linear or narrowly oblong; lateral staminodes absent; filament usually well formed, always subapically dentate, anther rarely crested; stigma clavate with a rounded orifice subventrally or geniculate, the orifice at the tip; epigynous glands massive, splitting irregularly. *Capsule* spherical.

Lectotype species: *A. boia* Seeman, Fl. Vit. 290, t.88 (1868).

Distribution: New Guinea, the Bismarck Archipelago, New Hebrides, Fiji and Samoa.

Map 18.

KEY TO THE SUBSECTIONS OF SECT. PYCNANTHUS

1. Bracts usually small and inconspicuous, never involucre-like; labellum strap-shaped or oblong _____ **Pycnanthus**
- Bracts large and involucre-like; labellum linear with a small expanded petaloid apex _____ **Amomiceps**

Sect. **Pycnanthus** K. Schum. subsect. **Pycnanthus** R. M. Smith, *stat. nov.*

Syn.: *Hellwigia* Warb. in Bot. Jahrb. 13: 279, 451 (1891).

Eriolopha Ridley in Hooker's Icon. Pl. 31: t.3067 (1916) & in Trans. Linn. Soc. Bot. 9: 217 (1916)—p.p. excl. type.

Alpinia subgen. *Monanthocrater* (Val.) Loesener, Pflanzenfam. ed. 2, 15a: 618 (1930).

Alpinia sect. *Monanthocrater* Val. in Nova Guinea (Botanique) 8: 951 (1913).

Alpinia sect. *Hellwigia* (Warb.) Loesener, Pflanzenfam. ed. 2, 15a: 619 (1930).

Bracts usually small and inconspicuous, occasionally apparently absent. *Flowers* borne singly or in cincinni; labellum linear or narrowly oblong; filament always with subapical teeth.

Lectotype species: *A. boia* Seeman, Fl. Vit. 290 (1868). **Figs 2F, 8C.**

Other species: *A. acuminata* R. M. Smith; *A. albipurpurea* (van Royen) R. M. Smith; *A. athroantha* Val.; *A. conglomerata* R. M. Smith; *A. divaricata* Val.; *A. dyeri* K. Schum.; *A. hageana* R. M. Smith; *A. himantoglossa* Ridley; *A. horneana* K. Schum., **Fig. 1Aj**; *A. inaequalis* (Ridley) Loesener, **Fig. 1Ah**; *A. nidus-vespae* Raynal; *A. odontonema* K. Schum.; *A. parksii* A. C. Smith; *A. porphyrea* R. M. Smith; *A. pulchra* (Warb.) K. Schum., **Fig. 2E**; *A. rigida* Ridley; *A. samoensis* Reinecke, **Fig. 1Ai**; *A. singuliflora* R. M. Smith, **Fig. 1Ak**; *A. stenobracteolata* R. M. Smith, **Fig. 8A**; *A. subverticillata* Val.; *A. velveta* R. M. Smith; *A. vitiensis* Seeman; *A. wernerii* Val.; *A. womersleyi* R. M. Smith.

Distribution: as for the section. **Map 18.**

This is a well-defined group characterized by the small subapical teeth on the usually well-formed filament. In the majority of the species the stigma is clavate with a rounded orifice and often well exerted from the thecae. In *A. boia*, *A. horneana*, *A. parksii* (all from Fiji), *A. nidus-vespae* (New Hebrides) and *A. samoensis* it is geniculate and very similar to the stigmas of *Psychanthus* and some *Riedelia*.

Sect. **Pycnanthus** subsect. **Amomiceps** (K. Schum.) R. M. Smith, **stat. nov.**

Syn.: *Alpinia* sect. *Amomiceps* K. Schum., Pflanzenr. Zing. 350 (1904)—p.p. incl. type.

Inflorescence massive, tightly congested. *Bracts* large and involucre-like; labellum linear, the apex expanded into a small petaloid area.

Lectotype species: *A. macrocephala* K. Schum., Pflanzenr. Zing. 350 (1904). **Fig. 1Al.** Monotypic.

Distribution: Fiji. **Map 18.**

The large congested inflorescence gives *A. macrocephala* an aspect quite unlike the species of subsect. *Pycnanthus*. However, the presence of teeth on the well-formed filament and the clavate stigma indicate that *A. macrocephala* is correctly placed within sect. *Pycnanthus*. Schumann also included the not closely related *A. capitellata* Jack in his sect. *Amomiceps*, this species is here placed in subgen. *Alpinia* sect. *Allughas*.

Sect. **Eubracteata** K. Schum., Pflanzenr. Zing. 352 (1904).

Syn.: [*Alpinia* sect. *Dieramalpinia* K. Schum. in Bot. Jahrb. 27: 272, 286 (1899)—p.p. excl. type.]

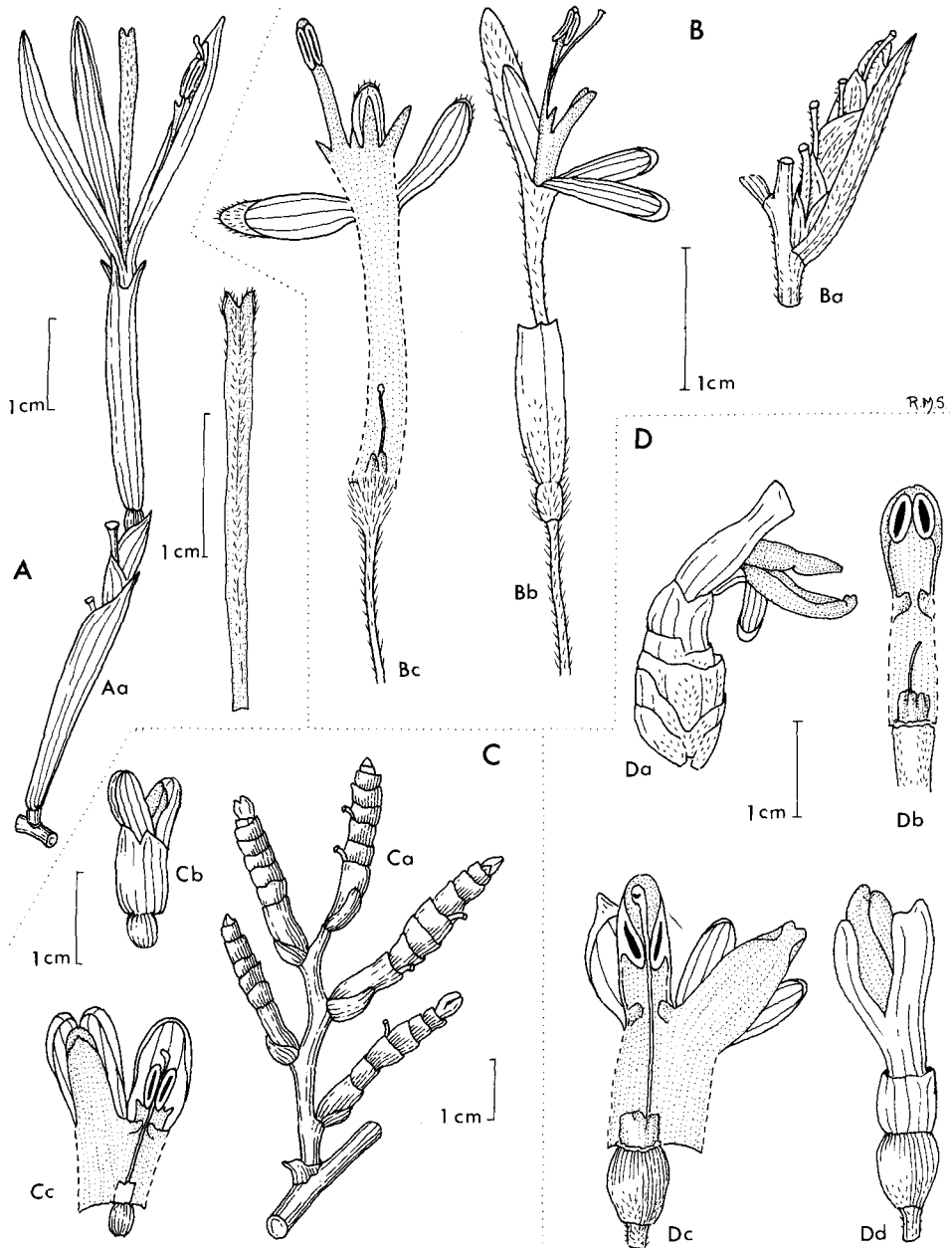


FIG. 8. Subgen. *Dieramalpinia*. A, *A. stenobracteolata* (sect. *Pycnanthus*): Aa, cincinnus and mature flower; Ab, labellum. B, *A. rufa* (sect. *Eubracteae*): Ba, part of main axis with old cincinnus; Bb, flower; Bc, flower, dissected. C, *A. boia* (sect. *Pycnanthus*): Ca, lateral branch with cincinnati; Cb, flower; Cc, flower, dissected. D, *A. laxiseconda* (sect. *Myriocrater*): Da, cincinnus; Db, stamen and pistil of male flower; Dc, female flower, dissected; Dd, flower. A, D, spirit material, B, C, dried material.

[*Alpinia* sect. *Oligocinnus* K. Schum., Pflanzenr. Zing. 359 (1904)—p.p. excl. type.]

Inflorescence erect, unbranched. *Bracts* conspicuous, not always persistent. *Flowers* in upper half of cincinni sometimes functionally male (not observed in *A. eubractea*); calyx not deeply split unilaterally; base of labellum connate to the base of the filament into a distinct tube above the petals; free part of labellum deeply bilobed or entire; lateral staminodes present or not; stigma small, perhaps funnel-shaped; epigynous glands free from each other. *Capsule* spherical.

Type species: *A. eubractea* K. Schum., Pflanzenr. Zing. 353 (1904); R. M. Smith in Notes RBG Edinb. 40: 531, f.1 (1983). **Figs 1Ad, 2G.**

Other species: *A. beamanii* R. M. Smith, **Fig. 1Ae**; *A. rufa* Presl, **Fig. 8B.**

Distribution: Sulawesi, Borneo, the Philippines. **Map 16.**

The Philippine *A. rufa* and *A. beamanii* (Borneo) are very closely allied. *A. eubractea* deviates in the entire labellum, ecristate anther and more or less acute rather than long-cucullate dorsal petal.

Sect. **Myriocrater** K. Schum., Pflanzenr. Zing. 356 (1904); Burt & Smith in Notes RBG Edinb. 32: 29 (1972); R. M. Smith in op. cit., 35: 195 (1977).

Syn.: *Alpinia* sect. *Monopleura* K. Schum., Pflanzenr. Zing. 361 (1904).

Type: *A. monopleura* K. Schum.

[*Alpinia* sect. *Dieramalpinia* K. Schum. in Bot. Jahrb. 27: 272, 286 (1899)—p.p. excl. type.]

[*Alpinia* sect. *Oligocinnus* K. Schum., Pflanzenr. Zing. 357 (1904)—p.p. excl. type.]

Inflorescence often pendulous, sometimes with lateral branches at the base. *Bracts* absent or minute, rarely conspicuous and persistent; bracteoles tubular, telescoping. *Cincinni* sometimes secund on the main axis; all but the first or, rarely the second flower functionally male; calyx not deeply split unilaterally; labellum more or less oblong; lateral staminodes present; filament well formed; anther of hermaphrodite flower usually crested; stigma prominent, hard, glabrous; epigynous glands massive, splitting irregularly.

Type species: *A. myriocratera* K. Schum. in Bot. Jahrb. 27: (290) (1899) & Pflanzenr. Zing. 356 (1904).

Other species: *A. aenea* Burt & Smith; *A. biakensis* R. M. Smith; *A. celebica* K. Schum.; *A. coeruleo-viridis* K. Schum.; *A. conferta* Burt & Smith; *A. edanoi* R. M. Smith; *A. eremochlamys* K. Schum.; *A. gigantea* Bl.; *A. laxiseconda* Burt & Smith, **Figs 1Af, 2D, 8D**; *A. monopleura* K. Schum., **Fig. 1Ag**; *A. novae-hibernica* Burt & Smith; *A. regia* R. M. Smith; *A. salamonensis* Burt & Smith; *A. unilateralis* Burt & Smith; *A. vulcanica* Elmer.

Distribution: The Philippines, Sulawesi, the Moluccas, the Bismarck Archipelago (absent from the New Guinea mainland) and the Solomons. **Map 17.**

Valeton, although he did not publish his findings, was the first to observe the monoecism which is consistent throughout sect. *Myriocrater*. The section includes some of the largest known species of *Alpinia*, several of which may approach a height of 10m.

Sect. **Dieramalpinia** K. Schum. in Bot. Jahrb. 27: 272, 286 (1899).

Syn.: *Eriolopha* Ridley in Hooker's Icon. Pl. 31: t.3067 (1916) & Trans. Linn. Soc. Bot. 9: 217 (1916)—p.p. incl. type: *E. flagellaris* Ridley = *Alpinia flagellaris* (Ridley) Loesener.

?*Elmeria* Ridley in Elmer, Lfts Philipp. Bot. 2: 603 (1909)—non *Elmera* Rydb. (1905). Type: *E. bifida* Ridley = *Alpinia paradoxa* (Ridley) Loesener.

?*Adelmeria* Ridley in op. cit. 603. Type: *A. bifida* Ridley = *Alpinia paradoxa* (Ridley) Loesener.

Alpinia sect. *Oligocinnus* K. Schum., Pflanzenr. Zing. 359 (1904)—p.p. incl. lectotype (selected here): *Alpinia strobilacea* K. Schum.

?*Alpinia* sect. *Cylindrobotrys* K. Schum., op. cit. 356. Type: *Alpinia cylindrocephala* K. Schum.

Alpinia sect. *Eubracteae* subsect. *Eustales* Val. in Nova Guinea (Botanique) 8: 943 (1913). Type: *A. eustales* K. Schum. = ? *A. papuana* Scheffer.

[*Alpinia* sect. *Eubracteae* K. Schum., Pflanzenr. Zing. 352 (1904)—p.p. excl. type.]

[*Alpinia* sect. *Kolowratia* (Presl) Loesener, Pflanzenfam. ed. 2 15a: 621 (1930)—p.p. excl. type.]

[*Alpinia* sect. *Eubracteae* subsect. *Kolowratia* (Presl) Val. in Nova Guinea (Botanique) 8: 943 (1913)—p.p. excl. type.]

[*Alpinia* sect. *Kolowratia* subsect. *Guillainia* (Vieill.) Loesener Pflanzenfam. ed. 2, 15a: 621—p.p. excl. type.]

[*Alpinia* sect. *Kolowratia* subsect. *Eukolowratia* Loesener op. cit. 622—p.p. excl. type.]

Inflorescence often pendulous, unbranched. *Braets*, almost without exception, large and often brightly coloured, sometimes hiding the main axis, always persistent. *Calyx* usually distinctly three-lobed, the lobes often elongate; labellum narrowly oblong to more or less triangular; lateral staminodes usually absent; anther more or less sessile (except in *A. carolinensis*), usually crested; stigma prominent, rigid, sometimes hairy; epigynous glands massive, splitting irregularly. *Capsule* usually spherical, occasionally ellipsoid.

Type species (selected here): *A. oceanica* Burkill in Proc. Camb. Philos. Soc. 9: 93 (1896). **Figs 1Aa, 2A.**

Other species: *A. arfakensis* K. Schum.; *A. bodenii* R. M. Smith, **Fig. 9c**; *A. calycodes* Val.; *A. carinata* Val.; *A. carolinensis* Koidz., **Figs 2c, 9D**; ? *A. chaunocolea* K. Schum.; *A. cylindrocephala* K. Schum.; *A. dasystachys* Val.; *A. densiflora* K. Schum.; *A. domatifera* Val., **Fig. 1Ab**; *A. euastra* K. Schum.; *A. flagellaris* (Ridley) Loesener; ? *A. gigantifolia* (Elmer) R. M. Smith; *A. gracillima* Val.; *A. jankowskii* Val.; *A. juliformis* (Ridley) R. M. Smith; *A. kiungensis* R. M. Smith, **Figs 2B, 9A**; *A. klossii* (Ridley) R. M. Smith; *A. leptostachya* Val.; ? *A. luteocarpa* Elmer; *A. manostachys* Val.; *A. (Guillainia) minor* Ridley; *A. multispicata* (Ridley) Loesener; ? *A. musaefolia* Ridley;

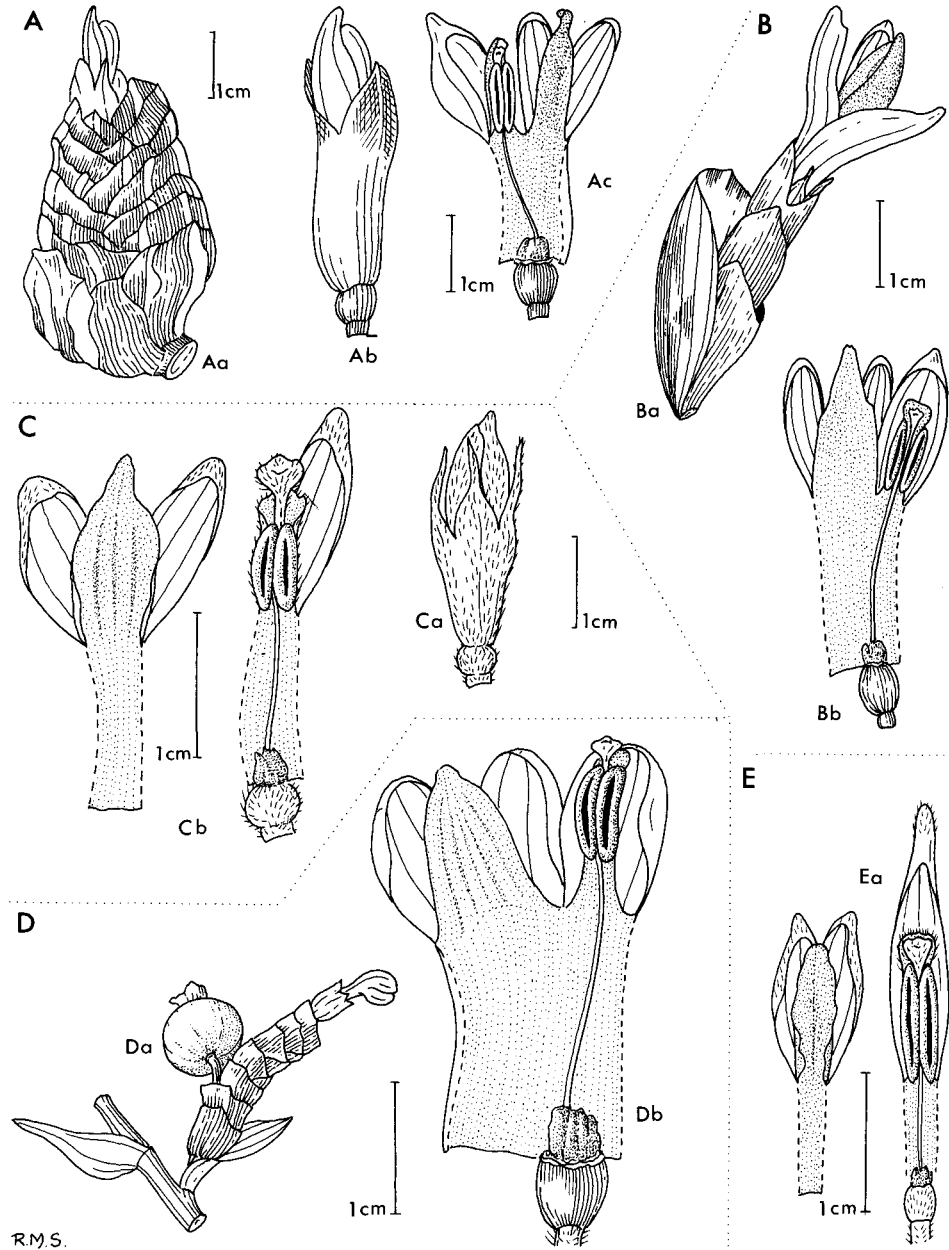


FIG. 9. Subgen. *Dieramalpinia* sect. *Dieramalpinia*. A, *A. kiungensis*: Aa, cincinnus showing tubular bracteoles (bract removed); Ab, flower, bracteole removed; Ac, flower, dissected. B, *A. vittata*: Ba, cincinnus with bract, showing tubular bracteoles; Bb, flower, dissected. C, *A. bodenii* (*Eriolopha sericea*): Ca, flower; Cb, flower, dissected. D, *A. carolinensis*: Da, part of main axis showing bracts and a cincinnus; Db, flower, dissected. E, *A. platylopha*: Ea, flower, dissected. A, B, D, spirit material, C, E from dried material.

A. nutans (L.) Roscoe; ? *A. oblonga* (Merr.) Loesener; *A. oligantha* Val.; *A. papuana* Scheffer; ? *A. paradoxa* (Ridley) Loesener; *A. pinetorum* (Ridley) Loesener; *A. platylopha* (Ridley) Loesener, **Fig. 9E**; *A. porphyrocarpa* Ridley; *A. rosacea* Val.; *A. schultzei* Lauterb. ex Val.; *A. sericiflora* K. Schum.; *A. strobilacea* K. Schum.; *A. superba* (Ridley) Loesener; *A. tristachya* (Ridley) Loesener; *A. valetonia* Loesener; *A. vittata* Bull, **Fig. 9B, Plate 1A**.

Distribution: New Guinea, the Bismarck Archipelago, Indonesia, the Carolines and the Philippines. **Map 15**.

The lectotype of subgenus *Dieramalpinia*, *A. oceanica* Burkill, is a well known species common at low altitudes throughout the Bismarck Archipelago; it is apparently absent from the New Guinea mainland. A closely related species (and one that may not be specifically distinct) is the variegated *A. vittata* which has been known in cultivation for over a century.

Many of the species listed above are badly known and no type material remains extant. Much of *Eriolopha* Ridley is placed here and some of these plants with their remote, 'catkin-like' cincinni (e.g. *E. flagellaris*) are superficially unlike the more tightly congested inflorescences of, say, *A. kiungensis* and *A. superba*. Nonetheless, as far as is known, all the species of sect. *Dieramalpinia* show conformity in labellum shape, stigma type and in the toothed calyx which does not split unilaterally.

As has been mentioned above, monoecism has been found in *Dieramalpinia*. In some species, for instance *A. tristachya* Ridley, flowers have been found with badly formed stigmas and shorter than normal styles. In all cases, however, dissection of the corresponding ovaries show ovules to be present.

APPENDIX I

Alpinia Roxb. in *Asiat. Res.* 11: 350 (1810)—nom. cons.

Type species: *Alpinia galanga* (L.) Sw.

Frequently-used references in this Appendix have been abbreviated as follows:

Burt & Smith in *Notes RBG Edinb.* = Burt & Smith, *Notes*.

Elmer, A. in *Leaflets Philipp. Bot.* = Elmer, *Lflts*.

Loesener, L. *Planzenfam.* ed.2, 15a = Loesener (1930).

Schumann, K. in *Bot. Jahrb.* 27 = K. Schum. (1899).

——, *Pflanzenr. Zing.* = K. Schum. (1904).

Smith, R. M. in *Notes RBG Edinb.* = Smith, *Notes*.

Valeton, T. in *Nova Guinea (Botanique)* 8 = Val. (1913)

—— in *Bot. Jahrb.* 52 = Val. (1914).

Note: Throughout this Appendix the herbarium location of type material is given only if this has been seen.

POSITION OF THE SECTIONS AND SUBSECTIONS WITHIN THE SUBGENERA:

Subgen. **ALPINIA**Sect. **ALPINIA**Subsections: *Alpinia**Presleia**Paniculatae**Cenolophon**Catimbium**Probolocalyx*Sect. **DIDYMANTHUS**Sect. **KOLOWRATIA**Sect. **FAX**Sect. **GUILLAINIA**Sect. **ARCTIFLORAE**Sect. **ALLUGHAS**Subsections: *Allughas**Odontyrium**Strobidia**Caeruleae*Subgen. **DIERAMALPINIA**Sect. **PYCNANTHUS**Subsections: *Pycnanthus**Amomiceps*Sect. **EUBRACTEA**Sect. **MYRIOCRATER**Sect. **DIERAMALPINIA**

SPECIES

The following is a list of all species names employed in *Alpinia*, accepted names being given in bold.

abundiflora Burt & Smith, Notes 34: 179, f.5 (1979) (*Amomum floribundum* (Thwaites) Trimen)—Sri Lanka. Type: *Thwaites* 3374 (PDA, K). Sect. *Fax*.

acuminata R. M. Smith, see p. 63 (*Rhynchanthus papuanus* Gilli—non *Alpinia papuana* R. Scheffer)—New Guinea. Type: *Gilli* 440 (W). Sect. *Pycnanthus* subsect. *Pycnanthus*.

acrostachya Steudel, Nomencl. Bot. ed. 2, 1: 62 (1840) = **Etingera elatior** (Jack) R. M. Smith.

aenea Burt & Smith, Notes 32: 42 (1972)—Indonesia. Type: *Sands* 595 (K, E). Sect. *Myriocrater*.

affinis Ridley in J. Bot. 24: 357 (1886) = **Riedelia affinis** (Ridley) K. Schum.

africana Ridley in Bol. Soc. Brot. 6:203 (1887) = ? **Renalmia grandiflora** Bak.—non *R. africana* Benth.

- agiokuensis* Hayata, Icon. Pl. Formos. 9: 118 (1920)—Taiwan. Type: Hayata s.n. = **A. japonica** (Thunb.) Miq.
- alba* (Bl.) Dietr., Syn. Pl. 1: 45 (1839) (based on *Elettaria alba* Bl.—non *Alpinia alba* (Retz.) Roscoe (1807) = ? **Etlingera** sp.
- alba* (Retz.) Roscoe in Trans. Linn. Soc. 8: 346 (1807)—Malaysia. Type: König s.n. = **A. galanga** (L.) Sw.
- alata* Dietr., Syn. Pl. 1: 45 (1839)—China. = **A. bracteata** Roscoe (1814)—non Roxb. (1820).
- albertisii* K. Schum., 279 (1899) = **Riedelia albertisii** K. Schum.
- albida* (Elmer) Loesener, 620 (1930)—Philippines. Type: Elmer 15912 (BM, K) = **A. oblonga** (Merr.) Loesen.
- albipurpurea** (van Royen) R. M. Smith, see p. 64 (*Kolowratia albipurpurea* van Royen, Alp. Fl. New Guin. 2: 890, f.298, 1979)—New Guinea. Type: *van Balgooy* 583 (L). Sect. *Pycnanthus* subsect. *Pycnanthus*.
- allughas* (Retz.) Roscoe in Trans. Linn. Soc. 8: 346 (1807)—Sri Lanka. Type: König s.n. = **A. nigra** (Gärtner) B. L. Burtt.
- (*Adelmeria*) **alpina** Elmer, Lfts 8: 2885 (1915)—Philippines. Syntypes: Elmer 10642; 10534. Subgenus *Dieramalpinia* sect. ?
- angustifolia* K. Schum., 279, f.2j (1899)—Borneo. Type: *Beccari* 3602 (FIR) = **A. glabra** Ridley.
- annabellae* Ridley in J. Bot. 63: Suppl. 121 (1925) = **Plagiostachys** sp. probably **P. uviformis** (L.) Loesener.
- antillarum* Roemer & Schultes, Syst. Veg. 1: 20 (1817) = **Renealmia jamaicensis** (Gärtner) Horan.
- apoensis** Elmer, Lfts, 8: 2888 (1915)—Philippines. Type: *Elmer* 11889 (BM, K, US—all veg). Imperfectly known species. Sect. ?
- aquatica** (Retz.) Roscoe in Trans. Linn. Soc. 8: 346 (1807)—Malaysia. Type: König s.n., specimen lost (Type of *Martensia* Giseke). Sect. *Alpinia* subsect *Presleia*. **Fig. 5f.**
- arctiflora** F. Muell., Fragm. 8: 25 (1873)—Australia. Lectotype: *Dal-lachy* s.n. (MEL). Sect. *Arctiflora*. **Fig. 6B.**
- arfakensis** K. Schum., 296 (1899)—New Guinea. Type: *Beccari* s.n. Sect. *Dieramalpinia*.
- argentea** (Burtt & Smith) R. M. Smith in Bot. J. Linn. Soc. 85: 69 (1982)—Borneo. Type: *Burtt & Martin* B5166 (E). Sect. *Alpinia* subsect. *Cenolophon*. (Illustr., *Notes* 31: 213, f.12). **Fig. 5E.**
- aromatica* Aublet, Hist. Pl. Guiane 1: 3 (1775) = **Renealmia guianensis** Maas.
- aromatica* Jacq., Fragm. Bot. 53, t.74, 75 (1809) = **Renealmia occidentalis** (Sw.) Sweet.

- arundelliana** (F. M. Bailey) K. Schum., 318 (1904)—Australia. Type: *Bailey* s.n.(K). Sect. *Alpinia* subsect. *Caeruleae*. (Illustr., *Fl. Austr.* 45: 30 f.26K-O).
- assimilis** Ridley in J. Str. Br. Roy. Asiat. Soc. 27: 166 (1899)—Malaysia. Type: *Ridley* s.n. Sect. *Alpinia* subsect. *Catimbium*.
- athroantha** Val., 952, f.171 (1913)—New Guinea. Syntypes: *Versteeg* 1438 (L, K); *von Römer* 409 (L), 398, 470. Sect. *Pycnanthus* subsect *Pycnanthus*.
- aurantiaca** Ridley in J. Fed. Mal. States Mus. 4:78 (1909)—Malaysia. Type: *Wallich* 6575 (K) = **A. rafflesiana** Wall. ex Baker.
- auriculata** Roscoe, Monandr. Pl. Scitam., t. 74 (1825)—origin unknown. Type: Cult. Liverpool. ? = **A. calcarata** Roscoe. Sect. *Alpinia* subsect *Catimbium*.
- babeldoabensis** (Kaneh.) Hosok. Reference to combination not traced. Name listed by Fosberg, Sachet & Oliver in *Micronesia* 20 (1987). Based on *Languas babeldoabensis* Kaneh. in *Trans. Nat. Hist. Soc. Form.* 25: 7 (1935)—Palau. Syntypes: *Kanehira* 321, 2295. = **A. carolinensis** Koidz.
- bambusifolia** Liang & Fang in *Acta Phytotax. Sin.* 16: 77, f.1 (1978)—China. Type: *Fang Ding et al.* 3-0211. Sect. *Alpinia* subsect. *Alpinia*.
- beamanii** R. M. Smith, *Notes* 45: 345, f.1 (1989)—Borneo. Type: *Beaman* 8308 (E, K). Sect. *Eubracteae*.
- biakensis** R. M. Smith, *Notes* 35: 205 (1977)—Bismarck Archipelago. Type: *Kosterman & Soegang* 882 (L). Sect. *Myriocrater*.
- bicalyculata** Sessé & Moç., *Fl. Mex.* ed. 1, 3 (1894) = **Renealmia** sp.
- bifida** Warb. in *Bot. Jahrb.* 13: 275 (1891)—Oceania. Type: *Warburg* s.n. = **A. galanga**.
- (*Adelmeria*) **bifida** (Ridley) Ridley in *Elmer*, *Lfts* 2: 603 (1909)—Philippines. Type: *Elmer* 7706 (BM, K) = **A. paradoxa** (Ridley) Loesener.
- bilamellata** Makino in *Bot. Mag. Tokyo* 16: 51 (1902)—Type: *Tanaka* s.n. Sect. *Alpinia* subsect. *Alpinia*. (Illustr., Toyoda, *Fl. Bonin Is.* pl.104, 1981).
- biligulata** Val., 939, f.167B (1913)—New Guinea = **Psychanthus biligulata** (Val.) R. M. Smith in *Edinb. J. Bot.* 47: 81 (1990).
- bisulcata** Sessé & Moç., *Fl. Mex.* ed. 1, 3 (1894) = **Renealmia** sp.
- blepharocalyx** K. Schum., 334 (1904)—China. Type: *Henry* 11962 (K, E). Sect. *Alpinia* subsect. *Catimbium*. (Illustr., *Fl. Reipubl. Pop. Sin.* 16: f.28).
- blumei** Dietr., *Syn. Pl.* 1: 13 (1839)—Java. Type: *Blume* s.n. = **A. javanica** Bl.

- blumei* K. Schum., 282 (1899)—Java.—non *A. blumei* Dietr. (1839).
Type: *Blume* s.n. = ***A. ludwigiana*** R. M. Smith.
- bodenii*** R. M. Smith, see p. 64 (*Eriolopha sericea* Ridley—non *Alpinia sericea* Ridley (1914)—New Guinea. Type: *Boden Kloss* s.n.(BM, K). Sect. *Dieramalpinia*. **Fig. 9C**.
- boia*** Seeman, Fl. Vit. 290, t.88 (1868)—Fiji. Type: *Seeman* 620 (K).
Sect. *Pycnanthus* subsect. *Pycnanthus*. (Illustr., A. C. Smith, *Fl. Vitien. Nov.* 1: f.52, 1979). **Fig. 8C**.
- boninsimensis*** Makino in Bot. Mag. Tokyo 16: 52 (1902)—Bonin Is.
Type: *Tanaka* s.n. Sect. *Alpinia* subsect. *Alpinia*. (Illustr., Toyoda, *Fl. Bonin Is.* Pl. 94, 1981).
- borneensis* Val. ex Gagnep. in Bull. Soc. Bot. Fr. 51: 448 (1904)—
Borneo. Type: Cult. Bogor, originally from Borneo = ***A. nieuwenhuizii*** Val.
- borraginoides*** K. Schum., 344, f.42,E,F (1904)—Burma. Type: *Huk* 55.
Sect. *Allughas* subsect. *Allughas*.
- brachypoda* K. Schum., 298 (1899) = ***Plagiostachys strobilifera*** (Baker)
Ridley.
- brachyanthera*** Merr. in Philipp. J. Sci., Bot. 10: 296 (1915)—Philippines.
Type: *Weber* 1571 (BM, K). Sect. *Alpinia* subsect. *Presleia*.
- bracteata*** Roscoe in Trans. Linn. Soc. 11: 281 (1814); Monandr. Pl.
Scitam. t.70 (1826)—China. Type: Ic. Stanley. Sect. *Alpinia* subsect.
Catimbium.
- bracteata* Roxb., Hort. Bengal 2 (1814)—nom. nud.; Fl. Ind. 1: 61
(1820)—E Himalayas—non *A. bracteata* Roscoe (1814). Type:
Cult. Calcutta (? BM). = ***A. blepharocalyx*** K. Schum.
- branderhorstii* Val., 941 (1913) = ***Psychanthus branderhorstii*** (Val.) R.
M. Smith in Edinb. J. Bot. 47: 81 (1990).
- brevilabris*** Presl, Reliq. Haenk. 1: 110 t.17 (1830)—Philippines. Type:
Haenke s.n. Sect. *Alpinia* subsect. *Presleia*.
- breviligulata*** Gagnep., Fl. Ind. Chin. 6: 88, f.9 (1809)—Vietnam. Type:
Bon s.n. Sect. *Alpinia* subsect. *Alpinia*.
- brevis*** Wu & Senjen in Acta. Phytotax. Sin. 16: 36, f.9 (1978)—China.
Type: *Zuo & Chen* 43711. Sect. *Alpinia* subsect. *Alpinia*.
- breviscapa* Poepp. & Endl., Nov. Gen. et Spec. 2: t.135 (1838)—Icon.
tantum, nom. inval. = ***Renealmia breviscapa*** Poepp. & Endl.
- brevituba* Val., 953 (1913)—New Guinea. Type: *von Römer* 1190 = ***A. odontonema*** K. Schum.
- burkillii* M. R. Henderson in Gard. Bull. Str. Settl. 4: 55 (1927)—
Malaysia. Type: *Henderson* SFN25080 (SING) = ***A. pahangensis***
Ridley.

- caerulea** Bentham, Fl. Austr. 6: 265 (1873)—Australia. Syntype: *Brown* 5605 s.n. (BM). Sect. *Allughas* subsect. *Caeruleae*. (Illustr., *Notes RBG Edinb.* 38: 522, f.3C).
- calcarata** Roscoe in Trans. Linn. Soc. 8: 347 (1807)—India, China. Type: Cult. Liverpool, no specimen extant. Sect. *Alpinia* subsect *Catimbium*. (Illustr., Roscoe *Monandr.* t.68, 1824).
- calycodes** K. Schum., 295, f.10 (1899)—New Guinea. Type: *Beccari* 589. Sect. *Dieramalpinia*.
- campanaria* Ridley in J. Str. Br. Roy. Asiat. Soc. 86: 308 (1922)—Malaysia. Type: *Ridley* s.n. (K). = **A. javanica** Bl.
- cannifolium* Ridley in J. Str. Br. Roy. Asiat. Soc. 32: 174 (1899)—Malaysia. Type: *Ridley* s.n. (K). = **A. vitellinum** var. **cannifolium** (Ridley) Holttum.
- capitellata** Jack, Mal. Misc., 2: n.7, 4 (1822)—Malaysia. Type: *Jacks.* s.n.. Sect. *Allughas* subsect. *Allughas*.
- cardamomum* (L.) Roxb. in Asiat. Res. 11: 356 (1810) = **Elettaria cardamomum** (L.) Maton.
- cardamomum medium* Roxb., Fl. Ind. 1: 72 (1820) = **Amomum costatum** (Roxb.) Baker.
- caribea* (Griseb.) O. Kuntze, Rev. Gen. 1: 690 (1891) = **Renealmia pyramidalis** (Lamarck) Maas.
- caribea* Gärtner, Fruct. Sem. Pl. 1: 36, t. 12 (1788) = **Renealmia pyramidalis** (Lamarck) Maas.
- carinata** Val., 945 (1913)—New Guinea. Syntypes: *Versteeg* 1271 (L), 1283 (L); *Branderhorst* 368 (L). Sect. *Dieramalpinia*. (Illustr., *Notes RBG Edinb.* 34: 162, f.3B).
- carnea* Griff., Not. Pl. Asiat. 3: 420 (1851)—Malaysia. Type: *Griffith* s.n. = **A. galanga** (L.) Sw.
- carolinensis** Koidz. in Bot. Mag. Tokyo 31: 233 (1917)—Caroline Is. Type: *Koidzumi* s.n. Sect. *Dieramalpinia*. **Fig. 9D.**
- caudata* Gagnep. in Bull. Soc. Bot. Fr. 31: 446 (1904)—ascribed to Borneo ?. Type: Cult. Bogor. = **A. romburghiana** Val.
- celebica** K. Schum., 362 (1904)—Sulawesi. Type: *Riedel* s.n. (K). Sect. *Myriocrater*.
- cernua* Sims in Bot. Mag. 44: t. 1900 (1817)—E Indies. Type: Cult. J. Walker = **A. calcarata** Roscoe.
- chaunocolea** K. Schum., 292 (1899)—New Guinea. Type: *Beccari* 7. Sect. *Dieramalpinia*.
- chinensis* auct.—non (Retz.) Roscoe (1807) = **A. suishaensis** Hayata.
- chinensis* (Retz.) Roscoe in Trans. Linn. Soc. 8: 346 (1807)—China. Type: *König* s.n. Cult. Malaya—specimen lost. Identity uncertain.

- chinensis* Vidal, Phan. Cuming. Philipp. 152 (1885); Rev. Pl. Vasc. Filip. 274 (1886)—Philippines—non *A. chinensis* (Retz.) Rosc. (1807) = ***A. cumingii*** K. Schum.
- chinghsiensis* Fang, Fl. China 16: 80 (1981)—China = ***A. jingxiense*** Fang (orth. syn.)
- chrysogynia* (K. Schum.) K. Schum., 365 (1904) = ? ***Amomum*** sp.
- chrysorachis*** K. Schum., [283 (1899)—nom. nud.]; 337 (1904)—Sulawesi. Type: *Sarasin* 829. Sect. *Alpinia* subsect. *Catimbium*.
- coccinea* (Bl.) Dietr., Syn. Pl. 1: 12 (1839) = ***Etingera punicea*** (Roxb.) R. M. Smith.
- coeruleoviridis*** K. Schum., [293, f.42H (1899)—nom. nud.]; 361 (1904)—Sulawesi. Type: *Sarasin* 829. Sect. *Myriocrater*.
- colossea* K. Schum., 289, f.3,j (1899)—New Guinea. Type: *Beccari* 192 = ***A. papuana*** R. Scheffer.
- comosa* Jacq., Coll. 4: 112 (1870) = ***Costus comosus*** (Jacq.) Roscoe.
- comosa* Ridley in J. Str. Br. Roy. Asiat. Soc. 32: 170 (1899)—Malaysia.—non *A. comosa* Jacq. (1870). Type: *Ridley* 4443 (K) = ***A. oxymitrum*** K. Schum.
- compta* K. Schum., 277, f.2,G (1899) = ***Psychanthus comptus*** (K. Schum.) R. M. Smith in Edinb. J. Bot. 47: 79 (1990).
- conchigera*** Griff., Not. Pl. Asiat. 3: 424, t.354 (1851)—Malaysia. Type: *Griffith* 5700 (K). Sect. *Alpinia* subsect. *Strobidia*. (Illustr., *Fl. Reipubl. Pop. Sin.* f.32, 1981).
- condensata*** Val., 953 (1913)—New Guinea. Syntypes: *von Römer* 1110, 1118. Imperfectly known species. (see Smith, Notes 36: 274, 1978).
- conferta*** Burt & Smith, Notes 32: 40, f.2A (1972)—Solomons. Type: *Corner* 107 (K, E). Sect. *Myriocrater*.
- congesta*** Elmer, Lflts 8: 2968 (1919)—Philippines. Type: *Elmer* 16144 (BM, K, L, US, all veg.). Sect. ? *Kolowratia*.
- conglomerata*** R. M. Smith, Notes 36: 277, f.2A (1978)—New Guinea. Type: *van Royen* NGF18154 (LAE). Sect. *Pycnanthus* subsect. *Pycnanthus*.
- copelandii*** Ridley in Philipp. J. Sci. 4: 184 (1909)—Philippines. Type: *Copeland* s.n.. Sect. *Alpinia* subsect. *Catimbium*.
- cordylinoides* Ridley in Trans. Linn. Soc. Bot. 9: 211 (1916) = ***Riedelia cordylinoides*** (Ridley) R. M. Smith, see p. 65.
- coriacea*** Wu & Senjen in Acta. Phytax. Sin. 16: 31, f.5 (1978)—China. Type: *How* 73508. Sect. *Alpinia* subsect. *Alpinia*. (Illustr., *Fl. Reipubl. Pop. Sin.* 16: f.24, 1981).
- coriandrifera*** Fang in Acta. Phytax. Sin. 16: 78, f.4 (1978)—China. Type: *Fang* 78908. Sect. *Alpinia* subsect. *Alpinia*.

- corneri** (Holttum) R. M. Smith, see p. 65—Malaysia. Type: SFN30506 (SING, K, E). Sect. *Alpinia* subsect. *Cenolophon*.
- cornucervi** Ridley in J. Str. Br. Roy. Asiat. Soc. 46: 243 (1906)—Borneo. Type: *Hewitt* s.n. (K, SING) = **A. aquatica** (Retz.) Roscoe.
- corollina** K. Schum. in Schum. & Lauterb., Fl. Deutsch. Sudsee 225: (1900) = **Riedelia corollina** (K. Schum.) Val.
- costata** Roxb., Pl. Coromand. 3: 48, t. 252 (1819) = **Amomum costatum** (Roxb.) Baker.
- cristata** Griff., Not. Pl. Asiat. 3: 421 (1851)—Malaysia. Type: *Griffith* s.n. = ? **A. zerumbet** (Pers.) Burt & Smith.
- cristata** Roxb. as listed by Schumann—typographical error = **Amomum costatum** (Roxb.) Baker.
- crocydocalyx** K. Schum., 281 (1899) = **Plagiostachys crocydocalyx** (K. Schum.) Burt & Smith.
- cumingii** K. Schum., 315 (1899)—Philippines. Type: *Cuming* 859 (BM, K). Sect. *Alpinia* subsect *Presleia*.
- cylindrocephala** K. Schum., [297 (1899)—nom. nud.]; 356, f.41, H, K (1904)—Sulawesi. Type: *Sarasin* 1243. Sect. *Dieramalpinia*.
- cylindrostachys** K. Schum., 299 (1899) = **Amomum coriaceum** R. M. Smith.
- dasystachys** Val., 946 (1913)—New Guinea. Syntypes: *von Römer* 1016, 1114, 1157. Sect. *Dieramalpinia* (may = **A. densiflora** K. Schum., see Smith, Notes 34: 185, 1975).
- decurva** Ridley in J. Bot. 29: 357 (1866) = **Riedelia decurva** (Ridley) Val.
- decurvata** Baker in Hook. f., Fl. Brit. Ind. 6: 257 (1892) = **Geostachys decurvata** (Baker) Ridley.
- decockii** Val., 948, f.170B (1913)—New Guinea. Type: *de Kock* 1911. Sect. *Dieramalpinia*.
- densibracteata** Wu & Senjen in Acta. Phytax. Sin. 16: 32, f. 6 (1978)—China. Type: *Zeng* 25332. Sect. *Alpinia* subsect. *Alpinia*. (Illustr., *Fl. Reipubl. Pop. Sin.* 16: f.24, 1981).
- densiflora** K. Schum., 292 (1899)—New Guinea. Type: *Beccari* 916. Sect. *Dieramalpinia*.
- densiflora** Gagnep. in Bull. Soc. Bot. Fr. 48: lxxxviii (1902)—Vietnam—non *A. densiflora* K. Schum. (1899). Type: *Bon* s.n. = **A. gagnepainia** K. Schum.
- densiflora** (Urban) Mosc., Cat. Fl. Doming. 88 (1943)—non *A. densiflora* K. Schum. = **Renealmia densiflora** Urban.
- densispicata** Hayata, Icon. Pl. Formos. 9: 119 (1920)—Taiwan. Type: *Sasaki* s.n. = **A. shimadai** Hayata.

- denticulata** (Ridley) Holttum in Gard. Bull. Sing. 13: 143 (1950)—Malaysia. Type: *Ridley* s.n. (K). Sect. *Allughas* subsect. *Odontyrium*. Fig. 7A.
- diffissa** Roscoe in Trans. Linn. Soc. 11: 281 (1815); Monandr. t.71 (1825)—China. Type: Ic. Stanley. Sect. *Alpinia* subsect. *Catimbium*.
- diracodes** Loesener, 614 (1930) = **Etlingera elatior** (Jack) R. M. Smith.
- divaricata** Val., 950, f.170C (1913)—New Guinea. Syntypes: *Versteeg* 1657 (K); *von Römer* 853. Sect. *Pycnanthus* subsect. *Pycnanthus*. (Illustr., *Notes RBG Edinb.* 36: 282, f.3B).
- diversifolia** (Elmer) Elmer, Lflts, 8: 2991 (1919)—Philippines. Type: *Elmer* 8853. Imperfectly known species based on *Vanoverbergia diversifolia* Elmer.
- dolichocephala** Hayata, Icon. Pl. Formos. 9: 119 (1920)—Taiwan. Type: *Hayata* s.n. Sect. *Alpinia* subsect. *Catimbium*.
- domatifera** Val., 955, f.172 (1913)—New Guinea. Type: *Gjellerup* 1022 (L). Sect. *Dieramalpinia*.
- dyeri** K. Schum., 349 (1904)—Samoa. Type: *Whitmee* 276. Imperfectly known species, see Christopherson in Bern. P. Bishop Mus. Bull. 128: 59 (1935). Probably sect. *Pycnanthus* subsect. *Pycnanthus*.
- edanoi** R. M. Smith, Notes 35: 200 (1977)—Sulawesi. Type: *Edaño* 7132 (L). Sect. *Myriocrater*.
- elatior** Jack, Malay. Misc. 2: 2 (1822) = **Etlingera elatior** (Jack) R. M. Smith.
- elegans** (Presl) K. Schum., 288 (1899)—Philippines. Type: *Haenke* s.n. Sect. *Kolowratia*. Fig. 4B.
- elmeri** R. M. Smith, see p. 64 (*A. longipetiolata* Elmer—1919, non Gagnep., 1909)—Philippines. Syntypes: *Elmer* 16167 (US), 16954 (BM, L). Sect. *Alpinia* subsect. *Presleia*.
- elwesii** Turrill in Bot. Mag. 142: t.8651 (1916)—Taiwan. Type: Hort. *Elwes* (K). Sect. *Alpinia* subsect. ? *Cenolophon*.
- emaculata** S. Q. Tong in Acta. Phytax. Sin. 27: 285, f.8 (1989)—China. Type: *Tong & Li* 24900. Sect. *Alpinia* subsect. *Catimbium*.
- engleriana** K. Schum. in Notizbl. Bot. Gart. Berlin.2: 102 (1898)—New Britain. Syntypes: *Dahl* 7; *Naumann* s.n. = **A. oceanica** Burkill.
- erecta** Steudel, Nomencl. Bot. ed.2: 62 (1840) = **A. calcarata** Roscoe.
- eremochlamys** K. Schum., [288, f.3,G (1899)—nom. nud.]; 362, f. 40,O,P (1904)—Sulawesi. Syntypes: *Sarasin* 412; *Meyer* s.n. Sect. *Myriocrater*.
- (*Kolowratia*) **eruciformis** Ridley in Philipp. J. Sci. 4: 182 (1909)—Philippines. Type: *Merrill* 5258 (US). Material inadequate. ? sect. *Kolowratia*.

- euastra** K. Schum., 296, f. 4, B (1899)—New Guinea. Type: *Beccari* 348. Sect. *Dieramalpinia*.
- eubractea** K. Schum., [289 (1899)—nom. nud.]; 353, f. 41, G (1904)—Sulawesi. Type: *Sarasin* 846. Sect. *Eubractea*. (Illustr., *Notes RBG Edinb.* 40: 532, f. 1, 1983).
- eustales** K. Schum., 288 (1899)—New Guinea. Type: *Beccari* 251 = **A. papuana** R. Scheffer.
- exaltata** (L. f.) Roemer & Schultes, *Syst.* 1: 21 (1817) = **Renecalmia alpina** (Rottb.) Maas.
- exostylis** K. Schum., 314 (1904)—Borneo. Type: *Korthals* s.n. (L). = **A. aquatica** (Retz.) Roscoe.
- fasciculata** Steudel, *Nomencl. Bot.* ed. 2, 1: 62 (1840) = ? **Amomum aromaticum**.
- fax** Burt & Smith, *Notes* 34: 177 (1975) (*Amomum involucreatum* (Thwaites) Trimen)—Sri Lanka. Type: *Thwaites* 3019 (PDA, BM, K). Sect. *Fax*.
- ferruginea** Steudel, *Nomencl. Bot.* ed. 2, 1: 62 (1840). Based on *Elettaria mollis* Bl. = ? **Etlingera** sp.
- fimbriata** Gagnep. in *Bull. Soc. Bot. Fr.* 51: 447 (1904)—? Taiwan. Type: Cult. Bogor. = **A. schumanniana** Val.
- flabellata** Ridley in *Philipp. J. Sci.* 4: 188 (1909)—Philippines, Japan. Syntypes: *Bureau Sci.* 2718, 2871; *Merrill* 1878, 2226. Sect. *Alpinia* subsect. *Presleia*.
- flagellaris** (Ridley) Loesener, 622 (1930)—New Guinea. Type: *Boden Kloss* s.n. (BM, K). Sect. *Dieramalpinia*. Type of *Eriolopha* Ridley. (Illustr., *Hooker's Icon. Pl.* 31: t. 3067, 1916).
- flava** Ridley in *J. Linn. Soc. Bot.* 42: 163 (1914)—Borneo. Type: *Gibbs* 4011 (BM, K) = **A. nieuwenhuizii** Val.
- flexistamen** K. Schum., 281 (1899)—Borneo. Type: *Beccari* 1491 (FIR). = **A. glabra** Ridley.
- floccosa** Val., 940 (1913) = **Psychanthus floccosus** (Val.) R. M. Smith in *Edinb. J. Bot.* 47: 81 (1990).
- floribunda** K. Schum., 439 (1904) = **Psychanthus floribundus** (K. Schum.) R. M. Smith in *Edinb. J. Bot.* 47: 80 (1990).
- fluviatilis** Hayata, *Icon. Pl. Formos.* 5: 227 (1913)—Taiwan. Type: *Hayata & Sasaki* s.n. = **A. schumanniana** Val.
- foetens** (Bl.) Dietr., *Syn. Pl.* 1: 12 (1839) = **Etlingera foetens** (Bl.) R. M. Smith.
- formosana** K. Schum., 283 (1899)—Taiwan. Syntypes: *Warburg* 9705, 10623, 10625. Sect. *Alpinia* subsect. *Catimbium*.

- foxworthyi** Ridley in Philipp. J. Sci. 4: 189 (1909)—Philippines. Type: *Foxworthy* 772 (K). Sect. *Alpinia* subsect. *Presleia*.
- fraseriana** Oliver in Hooker's Icon. Pl. 16: t.1567 (1887)—Borneo. Syntypes: *Fraser* s.n. (K); *Burbidge* s.n. = **A. aquatica** (Retz.) Roscoe.
- fusiformis** R. M. Smith, Notes 34: 156, f.2 (1975)—New Guinea. Type: *Womersley* NGF17732 (LAE). Sect. *Guillainia*.
- gagnepainii** K. Schum. 342 (1904)—Vietnam. Type: *Bon* s.n. Sect. *Alpinia* subsect. *Cenolophon*.
- galanga** (L.) Sw., Obs. Bot. 6 (1791)—India. Type: no specimen at LINN. Sect. *Alpinia* subsect. *Alpinia*. Type of *Alpinia* Roxb. (Illustr. Notes 31: 187, f.3B, 1972; *Fl. Reipubl. Pop. Sin.* 16: f.21, 1981).
- gigantea** Bl., Enum. Pl. Jav. 59 (1827)—Moluccas. Type: *Reinwardt* s.n. (L). Sect. *Dieramalpinia*.
- gigantea** F. Vill. in Blanco, Fl. Philipp. ed.3, nov. app. 225 (1883) = **A. elegans** (Presl) K. Schum.
- gigantifolia** (Elmer) R. M. Smith, see p. 65 (*Adelmeria gigantifolia* Elmer)—Philippines. Syntypes: *Elmer* 14603, 16154. Sect. *Dieramalpinia*.
- gjellerupii** Val., 938, f.167A (1913) = **Psychanthus gjellerupii** (Val.) R. M. Smith in Edinb. J. Bot. 47: 80 (1990).
- glabra** Ridley in J. Str. Br. Roy. Asiat. Soc. 32: 168 (1899)—Borneo. Type: *Haviland* 444 (K). Sect. *Alpinia* subsect. *Probolocalyx*. (Illustr., Notes RBG Edinb. 42: 285 f.6, 1985). **Fig. 5G**.
- glabrescens** Ridley in Philipp. J. Sci. 4: 185 (1909)—Philippines. Type: *Mearns* 3141. Sect. *Alpinia* subsect. *Catimbium*.
- globosa** (Lour.) Horan., Prod. Monogr. Scitam. 34 (1862)—Vietnam. Type: *Loureiro* s.n. Sect. *Alpinia* subsect. *Alpinia*.
- gracilis** Rolfe in J. Linn. Soc. 21: 316 (1884)—nom. nud.—Philippines = **A. elegans** (Presl) K. Schum.
- gracillima** Val., 948 (1913)—New Guinea. Syntypes: *von Römer* 763, 1108. Sect. *Dieramalpinia*.
- graminea** Ridley in Philipp. J. Sci. 4: 189 (1909)—Philippines. Type: *Everett* 7267. Sect. *Alpinia* subsect. *Presleia*.
- graminifolia** Fang & Lo in Acta. Phytotax. Sin. 16: 78, f.2 (1978)—China. Type: *Lo* 5070. May = **A. officinarum** Hance. Sect. *Alpinia* subsect. *Cenolophon*.
- grandiceps** Ridley in J. Str. Br. Roy. Asiat. Soc. 50: 148 (1908)—Borneo. Type: *Hewitt* s.n. (K). = **A. capitellata** Jack.
- grandis** K. Schum. in Notizbl. Bot. Gart. Berlin 2: 103 (1898)—Bismarck Archipelago. Syntypes: *Dahl* s.n.; *Naumann* s.n.; *Lauterbach* 160 = **A. purpurata** (Vieill.) K. Schum.

- granumparadisi* Moon, Cat. Pl. Ceylon 1 (1824)—nom. nud. = **Aframomum** sp.
- guandongensis** Senjen & Chen in Guihaia 8: 317 (1988)—China. Type: *Senjen, Chen & Fang 3722*. Sect. *Alpinia* subsect. *Alpinia*.
- guinanensis** Fang & Chen in Guihaia 2: 135, f.1 (1982)—China. Type: *Chen et al. 2-287*. Sect. *Alpinia* subsect. *Catimbium*.
- haenkei** Presl, Symb. Bot. 66, t. 43 (1832-33)—Philippines. Type: *Haenke s.n.* Sect. *Alpinia* subsect. *Catimbium*.
- hageana** R. M. Smith, Notes 36: 284, f.4A (1978)—New Guinea. Type: *Stevens LAE50267* (E, LAE). Sect. *Pycnanthus* subsect. *Pycnanthus*.
- hainanensis** K. Schum., 335 (1904)—Hainan. Type: *Henry 8773* (K). Sect. *Alpinia* subsect. *Catimbium*.
- hansenii** R. M. Smith in Bot. J. Linn. Soc. 85: 70, f.17B (1982)—Borneo. Type: *Hansen 439* (C). Sect. *Alpinia* subsect. *Cenolophon*.
- havilandii** K. Schum., 329 (1904)—Borneo. Type: *Haviland 1233* (K). Sect. *Alpinia* subsect. *Cenolophon*. (Illustr., *Notes RBG Edinb.* 42: 280, 1985).
- hellwigii* K. Schum., 320 (1904) = **Psychanthus hellwigii** (K. Schum.) R. M. Smith in *Edinb. J. Bot.* 47: 80 (1990).
- hemsleyana* K. Schum., 348 (1904)—Fiji. Type: *Seeman 620* = **A. boia** Seeman.
- hemisphaerica* (Bl.) Dietr., Syn. Pl. 1: 13 (1839) = **Etingera hemisphaerica** (Bl.) R. M. Smith.
- henryi** K. Schum., 335 (1904)—China. Type: *Henry 8402* (K). Sect. *Alpinia* subsect. *Catimbium*.
- hibinoi** Masamune in Trans. Nat. Hist. Soc. Taiwan 33: 108 (1943)—Taiwan. Type: *Hibino s.n.* Imperfectly known species.
- himantoglossa** Ridley in Trans. Linn. Soc. Bot. 9: 212 (1916)—New Guinea. Type: *Boden Kloss s.n.* (BM, K). Sect. *Pycnanthus* subsect. *Pycnanthus*.
- hirsuta** (Lour.) Horan., Prod. Monogr. Scitam. 34 (1862)—Vietnam. Type: ? *Loureiro s.n.* Imperfectly known species. Sect. ? *Alpinia* subsect. *Catimbium*.
- hokutensis* Hayata, Icon. Pl. Formos. 9: 120 (1920)—Taiwan. Type: *Shimada s.n.* = **A. intermedia** Gagnep.
- hookeriana* Val. in Bull. Inst. Bot. Buitenz. 20: 81 (1904). Type: Cult. Bogor. = **A. latilabris** Ridley.
- horneana** K. Schum., 349 (1904)—Fiji. Type: *Horne s.n.* Sect. *Pycnanthus* subsect. *Pycnanthus*. (Illustr., A. C. Smith, *Fl. Vit. Nov.* 1: f.3).
- hulstijnii** Val. in Bull. Jard. Bot. Buitenz. sér 3, 5: 344, t.39 (1923)—Sulawesi. Type: Cult. Bogor.(L). Sect. *Alpinia* subsect. *Catimbium*.

- humilis* Teysm. & Binn. in Naturk. Tijdschr. Ned.-Indië. 24: 327 (1862)—Java. Type: *Teysmann* s.n. = **A. sumatrana** (Miq.) K. Schum.
- humilis* Vell., Fl. Flum. 1: t.4 (1827) = **Renealmia** sp.
- hylandii** R. M. Smith, Notes 38: 523, f.3A (1980)—Australia. Type: *Hyland* 9630 (QRS). Sect. *Allughas* subsect. *Caeruleae*.
- iboensis* Val., 60, f.2,G-M (1914) = **Psychanthus iboensis** (Val.) R. M. Smith in Edinb. J. Bot. 47: 80 (1990).
- illustris** Ridley in Philipp. J. Sci. 4: 185 (1909)—Philippines. Type: *Foxworthy* 514 (K). Sect. *Alpinia* subsect. *Catimbium*.
- inaequalis** (Ridley) Loesener, 614 (1930)—New Guinea. Type: *Boden Kloss* s.n. (BM, K). Sect. *Pycnanthus* subsect. *Pycnanthus*. (Illustr., *Notes RBG Edinb.* 36: 282, f.3A, 1978).
- intermedia** Gagnep. in Bull. Soc. Bot. Fr. 48: lxxxiii (1902)—Japan. Type: *Ferrie* s.n. (K). Sect. *Alpinia* subsect. *Alpinia*.
- involutrata* Griff., Not. Pl. Asiat. 3: 422 (1851)—Malaysia. Type: *Griffith* s.n. (K) = **A. javanica** Bl.
- iriomotensis* Masamune in Trans. Nat. Hist. Soc. Formos. 24: 217 (1934)—Japan. Type: *Masamune* s.n. = **A. flabellata** Ridley.
- jamaicensis* Gärtner, Fruct. Sem Pl. 1: 36, t.12 (1788) = **Renealmia jamaicensis** (Gärtner) Horan.
- jankowskii** Val., 956 (1913)—New Guinea. Type: *Jankowski* 176. Sect. *Dieramalpinia*.
- japonica** (Thunb.) Miq. in Ann. Mus. Bot. Lugd.-Bat. 3: 140 (1867)—Japan. Type: *Thunberg* s.n. Sect. *Alpinia* subsect. *Alpinia*.
- javanica** Bl., Enum. Pl. Jav. 59 (1827)—Java. Type: *Blume* s.n. (L, K). Sect. *Allughas* subsect. *Allughas*. (Illustr., *Henderson, Mal. Wild Fl.*, Monocot. f.87, 1954).
- javanica* (Bl.) Dietr., Syn. Pl. 1: 13 (1839)—based on *Diracodes javanica* Bl.—non *A. javanica* Bl. (1827) = **Etingera elatior** (Jack) R. M. Smith.
- jinxiensis** Fang in Acta. Phytotax. Sin. 18: 224 (1980)—China. Type: *Lu & Fang* 23675. Sect. *Alpinia* subsect. *Alpinia*.
- juliformis** (Ridley) R. M. Smith, see p. 65—New Guinea. Type: *Boden Kloss* s.n. (BM, K). Sect. *Dieramalpinia*.
- kainantensis** Masamune in Trans. Nat. Hist. Soc. Taiwan 33: 28 (1943)—Hainan. Type: *Masamune & Fukuyama* 174. Imperfectly known species.
- katsumadai** Hayata, Icon. Pl. Formos. 5: 224 (1915)—Hainan. Type: *Katsumada* s.n. Sect. *Alpinia* subsect. *Catimbium*. (Illustr., *Fl. Reipubl. Pop. Sin.* 16: f.30, 1981).

- kawakamii* Hayata, Icon. Pl. Formos. 5: 222 (1915)—Taiwan. Type: *Kawakami* 4917 = **A. copelandii** Ridley.
- kelugensis* Hayata, Icon. Pl. Formos. 5: 227, f.79C (1915)—Taiwan = **A. intermedia** Gagnep.
- kermesina* Ridley in Trans. Linn. Soc. Bot. 9: 214 (1916)—New Guinea. Type: *Boden Kloss* s.n. (K) = **A. divaricata** Val.
- kiungensis** R. M. Smith, Notes 34: 163, f.3A (1975)—New Guinea. Type: *Streimann & Lelean* NGF34126 (E, LAE). Sect. *Dieramalpinia*.
- kiushiana** Kitamura in Bot. Mag. Tokyo 14: 37 (1946)—Japan. Type: *Tashiro* s.n. Sect. *Alpinia* subsect. *Alpinia*.
- klossii** (Ridley) R. M. Smith, see p. 65—New Guinea. Type: *Boden Kloss* s.n. (BM). Sect. *Dieramalpinia*.
- koidzumiana* Kitamura in Bot. Mag. Tokyo 14: 36 (1946)—Japan. Type: *Koidzumi* s.n. = **A. flabellata** Ridley.
- korthalsii* K. Schum., 327 (1904)—Borneo. Syntypes: *Beccari* 3557; *Motley* 234 (K). = **A. mutica** Roxb.
- koshuensis* Hayata, Icon. Pl. Formos. 5: 227 (1915)—Taiwan. Type: *Kato* s.n. = **A. formosana** K. Schum.
- kumatake* Makino in Bot. Mag. Tokyo 16: 49 (1902)—Japan. Type: *Matsumura & Okubo*, cult. Japan, originally from China = **A. formosana** K. Schum.
- kusshakuensis* Hayata, Icon. Pl. Formos. 9: 121 (1920)—Taiwan. Type: *Hayata* s.n. = **A. uraiensis** Hayata.
- kwangsiensis** Wu & Senjen in Acta. Phytotax. Sin. 16: 35, f.9 (1978)—China. Type: *Liang & T.L. Wu* 32226. Sect. *Alpinia* subsect. *Catimbium*. (Illustr., *Fl. Reipubl. Pop. Sin.* 16: 29, 1981).
- laosensis* Gagnep. in Bull. Soc. Bot. Fr. 43: 133 (1906)—Laos. Type: *Pavie* s.n. = **A. conchigera** Griff.
- latifolia* Willd. ex Korn. in Bull. Soc. Nat. Mosc. 23: 1: 130 (1862) = **Calathea latifolia**
- latilabris** Ridley in J. Str. Br. Roy. Asiat. Soc. 32: 168 (1899)—Malaysia. Type: Cult. Calcutta. Sect. *Alpinia* subsect. *Catimbium*. (Illustr., *Bot. Mag.* t.6908—as *A. mutica*, 1886).
- lauterbachii** Val., 65, f.3M-R (1914)—Bismarck Archipelago. Type: *Peekel* 127. Sect. *Alpinia* subsect. *Presleia*.
- laxiflora* Gagnep. in Bull. Soc. Bot. Fr. 48: lxxxviii (1901)—Vietnam. Syntypes: *Talmy* 233; *Lefevre* 209, 121; *Chaper* s.n. (Borneo) = **A. mutica** Roxb.
- laxiseconda** Burtt & Smith, Notes 32: 39, f.1B (1972)—Solomons. Type: *Sore* 2316 (K, E). Sect. *Myriocrater*. **Fig. 8D.**

- leptosolena* K. Schum., 312 (1904) = **Leptosolena haenkei** Presl.
- leptostachya** Val., 947, f.170A (1913)—New Guinea. Type: *Versteeg* 1642 (L). Sect. *Dieramalpinia*.
- ligulata** K. Schum., 275 (1899)—Borneo. Syntypes: *Beccari* 987 (FIR), 1307(FIR). Sect. *Alpinia* subsect. *Paniculatae*. (Illustr., *Notes RBG Edinb.* 42: 277, f.4A, 1985).
- linguiformis* Roxb., *Fl. Ind.* 1:73 (1820) = **Etingera linguiformis** (Roxb.) R. M. Smith.
- longipetiolata* Elmer, *Lfts* 8 : 2969 (1919)—Philippines—non *A. longipetiolata* Gagnep. (1906). Syntypes: *Elmer* 1617 (US), 16954 (BML). = **A. elmeri** R. M. Smith.
- longipetiolata* Gagnep. in *Bull. Soc. Bot. Fr.* 53: 134 (1906) = **Renealmia** sp.
- longilora* Ridley in *J. Bot.* 51: 247 (1913) = **Burbidgea longilora** (Ridley) R. M. Smith.
- ludwigiana** R. M. Smith, see p. 64 (*A. blumei* K. Schum.—non Dietr.)—Java. Type: *Blume* s.n. (L). Sect. *Guillainia*.
- luteocarpa** Elmer, *Lfts* 10: 3803 (1939)—Philippines. Type: *Elmer* 17926 (BM, K, L—all veg., US poor). Sect. ? *Dieramalpinia*.
- maclurei** Merr. in *Philipp. J. Sci.* 21: 338 (1922)—Hainan. Type: *Maclure* 8963 (K, E). Sect. *Alpinia* subsect. *Alpinia*. (Illustr., *Fl. Reipubl. Pop. Sin.* 16: f.23, 1981).
- macrantha* R. Scheffer in *Ann. Jard. Buitenz.* 1: 56 (1876) = **Riedelia macrantha** (R. Scheffer) K. Schum.
- macrantha* Poepp. & Endl., *Nov. Gen. et Spec.* 2: t.134 (1838) Icon. tantum, nom. inval. = **Renealmia alpina** (Rottb.) Maas.
- macrocarpa* Gagnep. in *Bull. Soc. Bot. Fr.* 53: 136 (1906)—Kampuchea. Syntypes: *Pierre* s.n. (K, veg.); *Hahn* s.n.; *Godefroy* s.n. = **A. oxymitra** K. Schum.
- macrocarpa* Val., 944, f.169A (1913)—New Guinea—non *A. macrocarpa* Gagnep. (1906). Syntypes: *Versteeg* 1270 (L, K); *Branderhorst* 356 (L); *von Römer* 538 = **A. valetonia** Loesener.
- macrocephala** K. Schum., 350 (1904)—Fiji. Type: *Horne* s.n. (K). Sect. *Pycnanthus* subsect. *Amomiceps*. (Illustr., A. C. Smith, *Fl. Vitien. Nov.* 1: f. 56,57, 1979).
- macrocephala* Hayata, *Icon. Pl. Formos.* 5: 223 (1915)—Taiwan—non *A. macrocephala* Gagnep. (1904). Syntypes: *Hayata & Sasaki* s.n.; *Hayata & Takeo* s.n. = **A. sessiliflora** Kitamura.
- macropycnantha* Val., 940, f.168A (1914). = **Psychanthus macropycnanthus** (Val.) R. M. Smith in *Edinb. J. Bot.* 47: 81 (1990).

- macroscaphis** K. Schum., 284 (1899)—Philippines. Type: *Warburg* 1888. Sect. *Alpinia* subsect. ? *Catimbium*.
- macrostemon** K. Schum., 297 (1899) = **Geocharis macrostemon** (K. Schum.) Holttum.
- macrostephana** (Baker) Ridley in J. Str. Br. Roy. As. Soc. 32: 175 (1899)—Malaysia. Type: *King's collector* 1905 (SING, K). Sect. *Alpinia* subsect. *Cenolophon*.
- macroura** K. Schum. in Bot. Tidsskr. 24: 268 (1902)—Thailand. Type: *Schmidt* 642 (K, veg). Sect. *Alpinia* subsect. *Catimbium*.
- maculata** Roscoe in Trans. Linn. Soc. 8: 347 (1907). Type: Cult. Liverpool. Imperfectly known species.
- magnifica** Roscoe, Monandr. Pl. Scitam. t.75 (1828) = **Etlingera elatior** (Jack) R. M. Smith.
- malaccensis** (Burm.) Roscoe in Trans. Linn. Soc. 8: 345 (1808)—Indo-Malaysian. Type: Rumphius, Herb. Amboin. 5: t. 71 (1747). Sect. *Alpinia* subsect. *Catimbium*. (Illustr., *Bot. Reg.* t.328, 1818).
- malaccensis** Presl, Reliq. Haenk. 1: 110 (1830)—Philippines—non *A. malaccensis* (Burm.) Roscoe (1808). Type: *Haenke* s.n. = **A. haenkei** Presl.
- mannii** Baker in Hook. f., Fl. Brit. Ind. 6: 253 (1892)—Andamans. Type: *King's collector* 390 (K). Sect. *Allughas* subsect. ? *Strobidia*.
- manostachys** Val., 949 (1913)—New Guinea. Type: *von Römer* 1153. Sect. *Dieramalpinia*.
- martinii** R. M. Smith, Notes 42: 281, f.5C (1985)—Borneo. Type: *Burt & Martin* B4989 (E). Sect. *Alpinia* subsect. *Cenolophon*.
- media** Sprengel, Syst. Veg. 1: 14 (1825) = **Amomum costatum** Roxb.
- mediomaculata** Hayata, Icon. Pl. Formos. 9: 122 (1920)—Taiwan. Type: *Hayata* s.n. = **A. shimadai** Hayata.
- melanocarpa** (Teysm. & Binn.) Ridley in J. Str. Br. Roy. As. Soc. 32: 163 (1899)—Malaysia, Indonesia. Type: Cult. Bogor = **A. aquatica** (Retz.) Roscoe.
- melichroa** K. Schum., 364 (1904) = ? **Amomum**.
- mesana** Horan., Prodr. Monogr. Scitam. 27 (1862)—sphalm. neesiana = **Zingiber macrostachyum** Dalziel.
- mesanthera** Hayata, Icon. Pl. Formos. 5: 225 (1915)—Taiwan. Type: *Hayata* s.n. = ? **A. zerumbet** (Pers.) Burt & Smith.
- microlophon** Ridley in J. Str. Br. Roy. Asiat. Soc. 54: 58 (1909)—Borneo. Type: *Brookes* s.n. (K). Sect. *Allughas* subsect. *Allughas*.
- (*Guillainia*) **minor** Ridley in Trans. Linn. Soc. Bot. 9: 216 (1916)—New Guinea—non *A. minor* (Bl.) Dietr. (1839). Type: *Boden Kloss* s.n. (BM, K). Sect. *Dieramalpinia*. It has already been pointed out

- (Smith, 1975: 164) that the type of *Guillainia minor* (and the original description) is unsatisfactory. The species may be synonymous with either *A. roseacea* Val. or *A. superba* (Ridley) Loesen.
- minor* (Bl.) Dietr., Syn. Pl. 1: 12 (1839) = **Hornstedtia minor** (Bl.) K. Schum.
- minuta* (Bl.) Dietr., Syn. Pl. 1: 12 (1839) = ? **Globba orixensis** Roxb.
- modesta** (F. Muell.) K. Schum., 318 (1904)—Australia. Type: *Dallachy* s.n. (MEL). Sect. *Allughas* subsect. *Caeruleae*. Fig. 7C.
- mollis* Dietr., Syn. Pl. 1: 12 (1839)—non *A. mollis* Presl (1830) = ? **Etlingera**.
- mollis** Presl, Reliq. Haenk. 110 (1830)—Philippines. Type: *Haenke* s.n. Doubtful species. Type not found (*vide* K. Schum.).
- mollissima** Ridley, Fl. Mal. 5: 339 (1925)—Malaysia. Type: SFN10838 (SING, K). Sect. *Alpinia* subsect. *Cenolophon*.
- moluccana* Gagnep. in Bull. Soc. Bot. Fr. 48: xc (1902)—Moluccas. Type: *Gaudichaud* 101 = **A. nutans** (L.) Roscoe.
- monopleura** K. Schum., [287 (1899)—nom. nud.]; 361 (1904)—Sulawesi. Type: *Sarasin* 219. Sect. *Myriocrater*.
- multicaulis* Roemer & Schultes, Syst. Veg. 1: 21 (1817) = **Renealmia guianensis** Maas.
- multispicata** (Ridley) Loesener, 622 (1930)—New Guinea. Type: *Boden Kloss* s.n. (BM). Sect. *Dieramalpinia*.
- murdochii** Ridley in J. Str. Br. Roy. Asiat. Soc. 44: 196 (1905)—Malaysia. Type: *Murdoch* s.n. (SING, K). Sect. *Allughas* subsect. *Allughas*.
- musaeolia** Ridley in Elmer, Lflts 2: 604 (1909). Philippines. Type: *Elmer* 9539 (BM, K, L). Sect. ? *Myriocrater*.
- mutica** Roxb. in Asiat. Res. 11: 354 (1810)—Malaysia. Type. Cult. Calcutta, originally collected from Penang. Sect. *Alpinia* subsect. *Catimbium*. (Illustr., Roscoe *Monandr.* t.69, 1824).
- myriocratera** K. Schum., 290, f.3K (1899)—Moluccas. Type: *Beccari* s.n. Sect. *Myriocrater*.
- nanchuanensis** Z. Y. Zhu in *Guihaia* 7: 295, f.1 (1987)—China. Type: *Zhang* 183. Sect. ? *Alpinia* subsect. *Alpinia*.
- neesiana* Graham, Cat. Pl. Bombay 207 (1839)—nom. nud. = **Zingiber macrostachyum** Dalziel.
- neragaimae* Gilli in Ann. Naturh. Mus. Wien 84: 43 (1983) = **Psychanthus neragaimae** (Gilli) R. M. Smith in *Edinb. J. Bot.* 47: 81 (1990).
- nidus-vespae** A. & J. Raynal in *Adansonia* 13: 63, f.2 (1977)—New Hebrides. Type: *Raynal* 16379 (E). Sect. *Pycnanthus* subsect. *Pycnanthus*.

- nigra** (Gärtner) B. L. Burtt, Notes 35: 213 (1977)—Sri Lanka, India.
Type: *Cardamomum zeylanicum fructu rotundo nigro, in caulium summitate* Hermann, Parad. Bot. 320, 1689. No specimen in Herb. Hermann. Sect. *Allughas* subsect. *Allughas*. (Illustr., *Fl. Reipubl. Pop. Sin.* 16: f.31, 1981).
- nieuwenhuizii** Val. in Bull. Inst. Buitenz. 20: 86 (1904).—Borneo. Type: *Nieuwenhuis* s.n. Sect. *Alpinia* subsect. *Paniculatae*. (Illustr., *Ik. Bog.* 2: t.192, 1906).
- nimmonii** Graham, Cat. Pl. Bombay 206 (1839) = **Zingiber nimmonii** Dalziel.
- nobilis** Ridley in J. Str. Br. Roy. Asiat. Soc. 32: 169 (1899)—Malaysia.
Type: *Ridley* 4617 (K). = **A. malaccensis** var. **nobilis** (Ridley) Holttum.
- novae-hiberniae** Burtt & Smith, Notes 32: 38 (1972)—New Ireland.
Type: Sands 857 (K, E). Sect. *Myriocrater*.
- novae-pommeraniae** K. Schum., 285, f.3C (1899)—New Britain. Syn-
types: *Dahl* 131; *Warburg* 16158. Sect. *Alpinia* subsect. *Catimbium*.
Fig. 5B.
- nutans** (L.) Roscoe in Smith, Exot. Bot. 2: 93 (1805)—Moluccas. Type:
Globba silvestris major Rumph., Herb. Amb. 6: 140 t. 62,63, (1750)
in explicatione tab. t. 63, sphalmate pro *Globba silvestris minor*
distincta habetur. Sect. *Dieramalpinia*. (Illustr., *Notes RBG Edinb.*
34: pl.7, 1975).
- nutans** K. Schum., Fl. Kais. Wilh. Land 28 (1889)—Mioko, Ker-
awara—non *A. nutans* (L.) Rosc. Type: *Hollrung* 844 = **A. oceanica**
Burkill
- oblonga** (Merr.) Loesener, 620 (1930)—Philippines. Type: *Vanoverberg*
3108. Sect. ? *Dieramalpinia*.
- oblongifolia** Hayata, Icon. Pl. Formos. 5: 215 (1915)—Taiwan. Type: ?
Hayata s.n. = **A. intermedia** Gagnep.
- occidentalis** Sw., Prodr. 2 (1788) = **Renalmia occidentalis** (Sw.)
Sweet.
- oceanica** Burkill in Proc. Camb. Phil. Soc. 9: 2, 93 (1895)—New Britain.
Type: *Hollrung* 844 (K). Sect. *Dieramalpinia*. (Illustr., *Notes RBG*
Edinb. 34: 168, f.4, 1975).
- odontonema** K. Schum. in Schum. & Lauterb., Fl. Deutsch. Schutzgeb.
Nachtr. 95 (1905)—Bismarck Archipelago. Type: *Schlechter* 1395.
Sect. *Pycnanthus* subsect. *Pycnanthus*. (Illustr., *Notes RBG Edinb.*
36: 278 f. 1A, 1978).
- officinarum** Hance in J. Linn. Soc. 13: 6 (1873)—Hainan. Type: *Hance*
16866 (K). Sect. *Alpinia* subsect. *Cenolophon*. (Illustr., *Bot. Mag.*
t.6995, 1888).

- oligantha** Val., 957 (1913)—New Guinea. Type: *Versteeg* 1656. Sect. *Dieramalpinia*.
- orchiodes** K. Schum., 278 (1899) = **Riedelia orchiodes** (K. Schum.) Val.
- orthostachys** K. Schum., [281 (1899)—nom. nud.]; 330 (1904)—Sulawesi. Type: *Sarasin* 687. Sect. *Alpinia* subsect. *Cenolophon*.
- oxymitra** K. Schum. in Bot. Tidsskr. 24: 268 (1902)—Thailand. Type: *Schmidt* s.n. Sect. *Alpinia* subsect. *Cenolophon*.
- oxyphylla** Miq. in J. Bot. Neerl. 1:93 (1861)—China. Type: Herb. Krone (U, photo K). Sect. *Alpinia* subsect. *Cenolophon*. (Illustr., *Fl. Reipubl. Pop. Sin.* 16: f.33, 1-3, 1981).
- pacoseroca** Jacq., *Fragm.* 54, t. 17 (1809) = **Reealmia alpina** (Rottb.) Maas.
- padacanca** Val. in Bull. Jard. Bot. Buitenz. sér.3, 5: 344 (1923)—Sulawesi. Type: *Bequin* 988. Sect. *Alpinia* subsect. *Cenolophon*.
- pahangensis** Ridley in J. Fed. Mal. States Mus. 10: 154 (1920)—Malaysia. Type: *Evans* s.n. (K). Sect. *Allughas* subsect. *Allughas*. **Fig. 7D**.
- pallida** (Bl.) Dietr., *Syn. Pl.* 1: 12 (1839) = **Etlingera solaris** (Bl.) R. M. Smith.
- paludosa** (Bl.) Dietr., *Syn. Pl.* 1: 12 (1839) = **Hornstedtia paludosa** (Bl.) K. Schum.
- papilionacea** K. Schum., *Fl. Kais. Wilh. Land* 29 (1889); 278, t.2H (1899) = **Psychanthus papilionaceus** (K. Schum.) R. M. Smith in *Edinb. J. Bot.* 47: 80 (1990).
- papuana** R. Scheffer in *Ann. Jard. Bot. Buitenz.* 1: 56 (1876)—New Guinea. Type: *Teysmann* s.n. Sect. *Dieramalpinia*.
- paradoxa** (Ridley) Loesener, 620 (1930)—Philippines. Type: *Elmer* 6629 (K). Sect. ? *Dieramalpinia*.
- parksii** (Gillespie) A. C. Smith in *Sargentia* 1: 7 (1942)—Fiji. Type: *Parks* 20379. Sect. *Pycnanthus* subsect. *Pycnanthus*. (Illustr., A. C. Smith, *Fl. Vitien. Nov.* 1: f.54, 1979).
- parviflora** Rolfe in *J. Linn. Soc.* 21: 316 (1884) = **Plagiostachys** sp.
- pauciflora** (Griseb. ex Peters.) O. Kuntze, *Rev. Gen.* 1: (1891) = **Reealmia jamaicensis** (Gärtner) Horan.
- pectinata** Ridley in *Holth., Blumea* 5: 168 (1942)—nom. nud.—Talaud Is. Syntypes: *Lam* 2585(L, K), 2808. = **A. eremochlamys** K. Schum.
- pedicellata** Val., 60, f.2,A-F (1914) = **Psychanthus pedicellatus** (Val.) R. M. Smith in *Edinb. J. Bot.* 47: 80 (1990).
- peekelii** Val., 62, f.3A-G (1914) = **Psychanthus peekelii** (Val.) R. M. Smith in *Edinb. J. Bot.* 47: 80 (1990).
- pelecystyla** K. Schum., 277, f.2F (1899) = **Psychanthus pelecystylus** (K. Schum.) R. M. Smith in *Edinb. J. Bot.* 47: 81 (1990).

- (*Languas*) **pendula** Quisumb. & Merr. in Philipp. J. Sci. 37: 138 (1928)—Philippines. Type: *Ramos* 43328. Sect. ?
- penduliflora** Ridley in Elmer, Lflts 2: 517 (1909)—Philippines. Type: *Elmer* 7288 (K). Sect. ? *Dieramalpinia*.
- pennicellata** Roscoe in Trans. Linn. Soc. 9: 280 (1814); Monandr., t.72 (1827)—China. Type: Ic. Stanley. Sect. *Alpinia* subsect. *Catimbium*.
- petiolata** Baker in Hook. f., Fl. Brit. Ind. 6: 255 (1892)—Malaysia. Type: *King's collector* 6357 (SING, K). Sect. *Alpinia* subsect. *Cenolophon*.
- philippensis* Ridley in Bull. Bur. Gov. Lab. Philipp. Islands 35: 86 (1905)—Philippines. Syntypes: *Barnes* 144 (K); *Borden* 1203; *Elmer* 6089 = **A. haenkei** Presl.
- phoenicia* Kamphoevener ex Kurz in J. Asiat. Soc. Bengal 45: 154 (1844)—nom. nud.—Nicobars = ? **A. manni** K. Schum.
- pinga* (Bl.) Dietr., Syn. Pl. 1: 12 (1839) = **Hornstedtia pinga** (Bl.) Val.
- pinetorum** (Ridley) Loesener, 620 (1930)—Philippines. Type: *Elmer* 8548 (K). Sect. ? *Dieramalpinia*.
- pinnanensis** Wu & Senjen in Acta. Phytotax. Sin. 15: 34, f.8 (1978)—China. Type: *Wang* 5298. Sect. *Alpinia* subsect. *Alpinia*. (Illustr., *Fl. Reipubl. Pop. Sin.* 16: f.25,1-4, 1981).
- (*Languas*) **pintatubensis** Elmer, Lflts, 9: 3225 (1934)—Philippines. Type: *Elmer* 22058 (BM). Described from fruiting material and considered by Elmer to be close to *A. flabellata* Ridley (sect. *Alpinia* subsect. *Presleia*). Since the character of the labellum cannot be checked, no new combination has been made.
- platytilus** K. Schum., 334 (1904)—China. Type: *Henry* 12227 (K, E). Sect. *Alpinia* subsect *Catimbium*.
- platylopha** (Ridley) Loesener, 622 (1930)—New Guinea. Type: *Boden Kloss* s.n. (BM). Sect. *Dieramalpinia*.
- platynema* K. Schum., 438 (1904) = **Psychanthus platyneus** (K. Schum.) R. M. Smith in Edinb. J. Bot. 47: 82 (1990).
- plectophylla* K. Schum., 273, f.2A (1899) = **Riedelia macrantha** (Scheff.) K. Schum.
- plumieri* Krause in Beih. Bot. Centralblatt 32. 2: 338 (1914) = **Renalmia pyramidalis** (Lam.) Maas.
- polyantha** Fang in Acta. Phytotax. Sin. 16: 78, f.3 (1978)—China. Type: *Fang et al.* 33298. Sect. *Alpinia* subsect. *Alpinia*.
- polycarpa* K. Schum., 298 (1899) = **Amomum polycarpum** (K. Schum.) R. M. Smith.

- porphyrea** R. M. Smith, Notes 36: 287, f.5A (1978)—New Guinea. Type: *Kalkman* 6262 (L). Sect. *Pycnanthus* subsect. *Pycnanthus*.
- porphyrocarpa** Ridley in Trans. Linn. Soc. Bot. 9: 231 (1916)—New Guinea. Type: *Boden Kloss* s.n. (BM, K). Sect. *Dieramalpinia*.
- presliana** Steudel, Nomencl. Bot. ed 2, 1: 62 (1840) = **Renealmia cernua** (Sw. ex Roemer & Schultes) Macbride.
- pricei** Hayata, Icon. Pl. Formos. 5: 219 (1915)—Taiwan. Type: *Price* 1912. Sect. *Alpinia* subsect. *Cenolophon*.
- psilogyna** Fang in Acta. Phytotax. Sin. 16: 78, f.5 (1978)—China. Type: *Wei & Fang* 32310. Sect. *Didymanthus*.
- pteroalyx** K. Schum., 332 (1904) = **Riedelia pterocalyx** (K. Schum.) Val.
- pteroarpa** K. Schum., 332 (1904) = **Psychanthus pterocarpus** (K. Schum.) R. M. Smith in Edinb. J. Bot. 47: 82 (1990).
- ptychanthera** K. Schum., 280 (1899)—Borneo. Type: *Beccari* 2450 (FIR). Sect. *Alpinia* subsect. *Cenolophon*.
- pubiflora** K. Schum., 313 (1904)—Philippines. Type: *Barclay* s.n. (K). Sect. *Alpinia* subsect. *Presleia*.
- pulchella** (K. Schum.) K. Schum., 276, f.2E (1899)—New Guinea. Type: *Hollrung* 368. Sect. *Alpinia* subsect. *Presleia*.
- pulcherrima** Ridley in J. Fed. Mal. States. Mus. 4: 79 (1909)—Malaysia. Type: *Ridley* 13850 (K). Sect. *Alpinia* subsect. *Cenolophon*.
- pulchra** (Warb.) K. Schum., 348 (1904)—New Guinea. Type: *Warburg* s.n. Type of *Hellwigia* Warb. Sect. *Pycnanthus* subsect. *Pycnanthus*. (Illustr., *Notes RBG Edinb.* 36: 290 f.6A, 1978).
- pumila** Hook. f. in Bot. Mag. 111: t.6832 (1885)—China. Type: *Ford* s.n. (K, BM). Sect. *Didymanthus*. **Fig. 6A.**
- punicea** Roxb., Fl. Ind. 1: 71 (1820) = **Etingera punicea** (Roxb.) R. M. Smith.
- purpurata** (Vieill.) K. Schum., 323 (1904)—Melanesia. Type: *Vieillard* 1360. Sect. *Guillainia*. (Illustr., *Notes RBG Edinb.* 34: f.1, 1975). **Fig. 6C.**
- pyramidata** Bl., Enum. Pl. Java 58 (1830)—Java. Type: *Blume* s.n. = **A. galanga** (L.) Sw.
- quadriloba** Ridley in Kew Bull. 90 (1926)—Sumatra. Type: *Boden Kloss* 14724 (K) = **A. aquatica** (Retz.) Roscoe.
- racemigera** F. Muell., Fragm. 8: 27 (1827) = **Psychanthus racemiger** (F. Muell.) R. M. Smith in Edinb. J. Bot. 47: 82 (1990).
- racemosa** L., Sp. Pl. 1: 2 (1753) = **Renealmia pyramidalis** (Lam.) Maas.
- racemosa** Sw., Observ. Bot. 4 (1791) = **Renealmia jamaicensis** (Gärtner) Horan.

- rafflesiana** Wall. ex Baker in Hooker's Icon. Pl. 20: t.1963 (1891)—Malaysia. Type: *Wallich* 6575 (K). Sect. *Allughas* subsect. *Allughas*.
- rechingeri** Gagnep. in Bull. Soc. Bot. Fr. 55: 432 (1908)—Solomons. Type: *T. & K. Rechinger* 3859 = **A. pulchra** (Warb.) K. Schum.
- regia** R. M. Smith, Notes 35: 203 (1977)—New Guinea. Type: *Bequin* 1234 (L). Sect. *Myriocrater*.
- renealmia** Sm. in Rees, Cyclop. 39 (77): 14 (1818) = **Renealmia alpina** (Rottb.) Maas.
- reticosa** Ridley in J. Str. Br. Roy. Asiat. Soc. 46: 243 (1906)—Borneo. Type: *Ridley* s.n. (K) = **A. ligulata** K. Schum.
- rheedii** Wight, Icon. Pl. Ind. Orient t.2026 (1853)—Malabar. Type: *Wight* s.n. = **A. galanga** (L.) Sw.
- rigida** Ridley in Trans. Linn. Soc. Bot. 9: 216 (1916)—New Guinea. Type: *Boden Kloss* s.n. (BM). Sect. *Pycnanthus* subsect. *Pycnanthus*. The same species is also described (*op. cit.*) under *Eriolopha rigida* Ridley. (Illustr., *Notes RBG Edinb.* 36: 282 f.3C, 1978).
- roemeri** Val., 941 (1913) = **Psychanthus roemeri** (Val.) R. M. Smith in *Edinb. J. Bot.* 47: 82 (1990).
- rolfei** K. Schum., 368 (1904) = **Plagiostachys rolfei** (K. Schum.) Ridley.
- romblonensis** Elmer, Lfts 8: 2889 (1915)—Philippines. Type: *Elmer* 12050 (L). Sect. *Alpinia* subsect. *Presleia*.
- romburghiana** Val. in Bull. Inst. Buitenz. 20: 83 (1904)—Malay Archipelago. Type: Cult. Bogor (L). Sect. *Alpinia* subsect. *Catimbium*. (Illustr., *Jc. Bog.* 2: t. 193, 1906).
- rosacea** Val., 945, f.169B (1913)—New Guinea. Syntypes: *Versteeg* 1227 (K), 1655 (L, K); *Branderhorst* 333. Sect. *Dieramalpinia*.
- roscoeana** Steudel, Nomencl. Bot. ed. 2, 1: 63 (1840) a renaming of *A. bracteata* Roscoe—non Roxb.
- rosea** Elmer, Lfts 8: 2890 (1915)—Philippines. Type: *Elmer* 12509 (L). Sect. *Alpinia* subsect. *Presleia*.
- rosella** Ridley in J. Str. Br. Roy. Asiat. Soc. 32: 164 (1899)—Borneo. Type: *Hose* s.n. (K) = **A. aquatica** (Retz.) Rosc.
- roxburghii** Sweet, Hort. Brit. ed.1, 390 (1827)—Ind. Or. = **A. bracteata** Roscoe.
- rubella** Ridley in Bot. Jahrb. 44: 529 (1910)—Borneo. Type: *Winkler* 3095. = **A. aquatica** (Retz.) Roscoe.
- (*Cenolophon*) **rubrum** Bl.—Sulawesi—Type: *Reinwardt* s.n., specimen lost. Type of *Cenolophon* Bl., not sect. *Cenolophon* K. Schum. = **Alpinia rubricaulis** K. Schum.
- rubra** (Bl.) Dietr., Syn. Pl. 1: 12 (1839) = **Hornstedtia rubra** (Bl.) Val.
- rubricaulis** K. Schum., [281 (1899)—nom. nud.]; 330 (1904)—Sulawesi.

- Type: *Sarasin* 202. Sect. *Alpinia* subsect. *Cenolophon* (Illustr., *Notes RBG Edinb.* 34: pl.3,4, 1975 as *Cenolophon rubrum*).
- rubromaculata** S. Q. Tong in Acta. Phytotax. Sin. 27: 284, f.7 (1989)—China. Type: *Tong & Li* 24892. Sect. *Alpinia* subsect. *Catimbium*.
- rufa** (Presl) K. Schum., 293 (1899)—Philippines. Type: *Haenke* s.n. Sect. *Eubractea*. **Fig. 8B.**
- rufescens** K. Schum., 322 (1904)—Sri Lanka. Type: *Thwaites* 3732 (PDA, K, BM). Sect. *Fax*.
- ruiziana** Steudel, Nomencl. Bot. ed 2, 63 (1840) = **Renealmia racemosa** Poepp. & Endl.
- salamonensis** Burt & Smith, Notes 32: 41, f.2B (1972)—Solomons. Type: *Corner* 143 (K, E). Sect. *Myriocrater*.
- samoensis** Reinecke in Bot. Jahrb. 25: 597, f.10 (1898)—Samoa. Type: *Reinecke* 301. Sect. *Pycnanthus* subsect. *Pycnanthus*.
- sanderiae** Sander in Gard. Chron. 33: 245 (1903)—New Guinea. Type: Cult. Ghent = **A. vittata** Bull.
- sasakii** Hayata, Icon. Pl. Formos. 5: 220 (1915)—Taiwan. Type: *Sasaki* s.n. = **A. pricei** Hayata.
- satsumensis** Gagnep. in Bull. Soc. Bot. Fr. 4: 247 (1902)—Japan. Type: Cult., *Exposition de 1889*. = **A. formosana** K. Schum.
- scabra** (Bl.) Baker in Hook. f., Fl. Brit. Ind. 6: 256 (1892)—Indonesia. Type: *Blume* s.n. Sect. *Alpinia* subsect. *Presleia*.
- schlechteri** K. Schum., 438 (1904) = **Psychanthus schlechteri** (K. Schum.) R. M. Smith in Edinb. J. Bot. 47: 80 (1990).
- schultzei** Lauterb. ex Val. in Bot. Jahrb. 52: 69 (1914)—New Guinea. Type: *Schultze* 270. Sect. *Dieramalpinia*.
- schumanniana** Val. in Bull. Inst. Buitenz. 20: 84 (1904)—Taiwan. Type: Cult. Bogor. Sect. *Alpinia* subsect. *Catimbium*.
- (*Languas*) **scorpoidea** Quisumb. & Merr. in Philipp. J. Sci. 37: 139 (1928)—Philippines. Type: *Ramos & Edano* (K). Probably sect. *Dieramalpinia*. Labellum not described, no flowers on K material.
- scyphonema** K. Schum., 438 (1904) = **Psychanthus scyphonemus** (K. Schum.) R. M. Smith in Edinb. J. Bot. 47: 80 (1990).
- secunda** Baker in Hook. f., Fl. Brit. Ind. 6: 257 (1892) = **Geostachys secunda** (Baker) Holttum.
- secundiflora** Ridley in J. Str. Br. Roy. Asiat. Soc. 32: 165 (1899) = **Geocharis secundiflora** (Ridley) Holttum.
- seimundii** Ridley in J. Str. Br. Roy. Asiat. Soc. 86: 309 (1922)—Malaysia. Type: *Seimund* s.n. (K). Sect. *Allughas* subsect. *Allughas*. **Fig. 7B.**

- sericea* Ridley in J. Linn. Soc. 42: 163 (1914)—Borneo. Type: *Gibbs* 3025 (BM, K) = **A. latilabris** Ridley.
- (*Eriolopha*) *sericea* Ridley in Trans. Linn. Soc. Bot. 9: 221 (1916)—New Guinea—non *A. sericea* Ridley (1914). Type: *Boden Kloss* s.n. (BM, K) = **A. bodenii** R. M. Smith.
- sericiflora** K. Schum., 294 (1899)—Bismarck Archipelago. Type: *Beccari* 7. Sect. *Dieramalpinia*.
- serrulata* Willd. ex Steudel Nomencl. Bot. ed. 2, 1: 63 (1840) = **Renalmia** sp.
- sessiliflora** Kitamura in Bot. Mag. Tokyo 54: 39 (1946)—*A. macrocephala* Hayata non K. Schum.—Taiwan. Syntypes: *Hayata & Sasaki* s.n.; *Hayata & Takeo* s.n. Sect. *Alpinia* subsect. *Catimbium*.
- sessilis* König in Retz., Obs. Bot. 3: 64 (1783) = **Kaempferia galanga** L.
- seticalyx* (Ridley) Loesener, 620 (1930)—New Guinea. Type: *Boden Kloss* s.n. (K) = **A. strobilacea** K. Schum.
- shimadai** Hayata, Icon. Pl. Formos. 5: 219 (1915)—Taiwan. Syntypes: *Shimada* s.n.; *Sasaki* s.n. Sect. *Alpinia* subsect. ? *Cenolophon*.
- siamensis** K. Schum., 357 (1904)—Thailand. Type: *Schomburgk* 123 (K). Sect. *Allughas* subsect. *Strobidia*.
- sibuyanensis** Elmer, Lfts 8: 2891 (1915)—Philippines. Type: *Elmer* 12316 (BM, K, L, all fruiting). Sect. *Alpinia* subsect. *Preslea*.
- silvicola* Britton in Bull. Torr. Bot. Cl. 48: 329 (1922) = **Renalmia thyrsoidea** (Ruiz & Pav.) Poepp. & Endl.
- simsii* Gasp., Obsv. Boccodifalc. 4: (1833). Type: Cult. Real Orto Botanico Boccadifalco Palermo = **A. calcarata** Roscoe.
- singuliflora** R. M. Smith, Notes 36: 277, f.1B (1978)—New Guinea. Type: *Croft et al* LAE 60850 (E, LAE). Sect. *Pycnanthus* subsect. *Pycnanthus*.
- solaris* (Bl.) Dietr., Syn. Pl. 1:12 (1839) = **Etingera solaris** (Bl.) R. M. Smith.
- speciosa* (Bl.) Dietr., Syn. Pl. 1: 13 (1839) = **Etingera elatior** (Jack) R. M. Smith.
- speciosa* (Wendl.) K. Schum., 339 (1904)—China—non *A. speciosa* Dietr. (1839). Type: Wendl., Sert. Hannov. 4: 3, t.19 (1798) = **A. zerumbet** (Pers.) Burtt & Smith.
- spicata* Jacq., Select. Stirp. Amer. Hist. t.1 (1763) = **Costus spicatus** (Jacq.) Sw.
- spicata* Presl, Reliq. Haenk. 1: 356 (1830)—non *A. spicata* Jacq. (1763) = **Renalmia cernua** (Sw. ex Roemer & Schultes) Macbride.
- spicata* Roxb. in Asiat. Res. 11: 356 (1810); Fl. Ind. 1: 68 (1820)—

- Sumatra—non *A. spicata* Jacq. (1763). Type: Cult. Calcutta. Imperfectly known species. ? = *A. calcarata* Roscoe.
- spiralis* Jacq., Pl. Hort. Schoenbr. 1: 1 (1797) = *Costus spiralis* (Jacq.) Roscoe.
- squarrosa* Gilli in Ann. Naturh. Mus. Wien. 84: 44 (1983)—New Guinea. Type: *Gilli* 534 (W) = *A. stenobracteolata* R. M. Smith.
- stachyoides** Hance in J. Linn. Soc. 13: 126 (1873)—China. Type: *Hance* 1231 (K). Sect. *Alpinia* subsect. *Alpinia*. **Fig. 5C.**
- stapfiana** K. Schum., 347 (1904)—Solomons. Type: *Guppy* 103 (K) = *A. pulchra* (Warb.) K. Schum.
- stenobracteolata** R. M. Smith, Notes 36: 287, f.6B (1978)—New Guinea. Type: *Millar* NGF37800 (LAE). Sect. *Pycnanthus* subsect. *Pycnanthus*. **Fig. 8A.**
- stenostachys* K. Schum., 289 (1899); emend. Val. in Bot. Jahrb. 52: 67 (1914)—New Guinea. Type: *Schlechter* 17082 [?] = ? *Psychanthus*.
- striatum* Link, Enum. Hort. Berol Alt. 1: 5 (1821) = **Amomum compactum** [Sol. ex] Maton.
- strobilacea** K. Schum., 295 (1899)—New Guinea. Type: *Beccari* 552. Sect. *Dieramalpinia*.
- strobilifera* Baker in Kew Bull. 225 (1898) = **Plagiostachys strobilifera** (Baker) Ridley.
- strobilifera* Poepp. & Endl., Nov. Gen. et Spec. 11: t.136 (1838) Icon. tantum, nom. invalid. = **Renealmia cernua** (Swartz ex Roemer & Schultes) Macbride.
- strobiliformis** Wu & Senjen in Acta. Phytotax. Sin. 16: 33, f.7 (1978)—China. Type: *Chang* 12575. Sect. *Alpinia* subsect. *Alpinia*. (Illustr., *Fl. Reipubl. Pop. Sin.* 16: f.25,5-6, 1981).
- subfusicarpa** Elmer, Lflts 8: 2892 (1915)—Philippines. Type: *Elmer* 10506 (BM, K, L, US). Imperfectly known species.
- submutica* K. Schum., 280 (1899)—? Java. Type: *Teysmann* 2040. Imperfectly known species; see Burt & Smith, Notes 34: 111 (1975) and Kooders, Exkurs.-Fl. Java 1: 334 (1911).
- subspicata** Val., 65, f.3H-L (1914)—New Guinea. Type: *Schlechter* 16990. Sect. *Alpinia* subsect. *Presleia*.
- subverticillata** Val., 950 (1913)—New Guinea. Syntypes: *Versteeg* 1606 (K), 1416 (L). Sect. *Pycnanthus* subsect. *Pycnanthus*. (Illustr., *Notes RBG Edinb.* 36: 288, f.5C, 1978).
- suishaensis** Hayata, Icon. Pl. Formos. 9: 123 (1920)—Taiwan. Type: *Hayata* s.n. (*A. chinensis* auctt.—non (Retz.) Rosc.). Sect. *Alpinia* subsect. *Alpinia*. (Illustr., *Hayata, Icon. Pl. Formos.* 5: 217 f.79f,g, as *Alpinia* sp.)

- sumatrana** K. Schum., 291 (1899)—Sumatra. Type: *Teysmann* 4436 (K). Sect. *Allughas* subsect. *Strobidia*.
- superba** (Ridley) Loesener 622 (1930)—New Guinea. Type: *Boden Kloss* s.n. (BM, K). Sect. *Dieramalpinia*.
- takaminei** Masamune in Trans. Nat. Hist. Soc. Formos. 29: 57 (1939)—Japan. Type: ? *Takamine* s.n. = ? **A.intermedia** Gagnep. (see Walker, Fl. Okinawa & S Ryukyu 328, 1976).
- tarakoensis** Masamune, Short Fl. Formos. 280 (1936) n.v.—Taiwan. Type: ? = **A. pricei** Hayata.
- tamacuensis** R. M. Smith in Bot. J. Linn. Soc. 85: 71, f.17C (1982)—Borneo. Type: *Argent & Coppins* 1180 (E). Sect. *Alpinia* subsect. *Cenolophon*.
- tephrochlamys** Lauterb. & Schum., Fl. Schutzgeb. Südsee 226 (1900). = **Psychanthus tephrochlamys** (Lauterb. & Schum.) R. M. Smith in Edinb. J. Bot. 47: 82 (1990).
- thyrsoides** Steudel, Nomencl. Bot. ed. 2, 1: (1840) = **Renealmia thyrsoides** (Ruiz & Pav.) Poepp. & Endl.
- tomentosa** (Bl.) Dietr., Syn. Pl. 1: 12 (1839) = **Hornstedtia tomentosa** (Bl.) Bakh. f.
- tonkinensis** Gagnep. in Bull. Soc. Bot. Fr. 48 (1902)—Vietnam. Type: *Bon* 5094. Sect. *Alpinia* subsect. *Alpinia*.
- tonrokuensis** Hayata, Icon. Pl. Formos. 9: 123 (1920)—Taiwan. Type: *Hayata* s.n. Imperfectly known species (see Fl. Taiwan 840, 1978).
- trachyascus** K. Schum., 336 (1904)—Philippines. Type: *Warburg* 14584. Sect. *Alpinia* subsect. ? *Catimbium*.
- trichocalyx** Val., 63 (1914) = **Psychanthus trichocalyx** (Val.) R. M. Smith in Edinb. J. Bot. 47: 82 (1990).
- tricolor** Sander in Illustr. Wiener Gartenzeit. 28: 263 (1903); Gard. Chron. 33: 245. Solomons. Type: Cult. Ghent. = **A. vittata** Bull.
- tristachya** (Ridley) Loesener, 622 (1930)—New Guinea. Type: *Boden Kloss* s.n. (BM, K). Sect. *Dieramalpinia*.
- tubulata** Ker Gawl. in Bot. Reg. t.777 (1824) = **Renealmia alpina** (Rottb.) Maas.
- unilateralis** Burt & Smith, Notes 32: 39, f.1B (1972)—Solomons. Type: *Corner* 106 (K, E). Sect. *Myriocrater*.
- uraiensis** Hayata, Icon. Pl. Formos. 5: 224 (1915)—Taiwan. Type: *Shimada* s.n. Sect. *Alpinia* subsect. *Catimbium*.
- wiformis** (L.) Horan., Prodr. Monogr. Scitam. 35 (1862) = **Plagiostachys uviformis** (L.) Loesen.
- valetoniana** Loesener, 622 (1930)—New Guinea. Syntypes: *Versteeg* 1270 (L, K); *Branderhorst* 365 (L); *von Römer* 538 (*A. macrocarpa* Val. non Gagnep.). Sect. *Dieramalpinia*.

- vanoverbergii** Merr. in Philipp. J. Sci. 7: 75 (1912)—Philippines. Type: *Vanoverberg 573* (K). Sect. *Kolowratia*. **Fig. 4A.**
- velveta** R. M. Smith, see p. 63 (*Kolowratia velutina* van Royen, 1979—non *A. velutina* Ridley, 1921)—New Guinea. Type: *Brass 30553* (L). Sect. *Pycnanthus* subsect. *Pycnanthus*.
- velutina** Ridley in J. Nat. Hist. Soc. Siam 4: 123 (1921)—Vietnam. Type: *Boden Kloss* s.n. (BM). Sect. *Alpinia* subsect. *Alpinia*. May = *A. breviligulata* Gagnep. var. *compacta* Gagnep. (*Kolowratia*) *velutina* van Royen, Alp. Fl. New Guin. 2: 887, f.297 (1979)—non *A. velutina* Ridley—New Guinea. Type: *Brass 30553* (L) = **A. velveta** R. M. Smith.
- ventricosa** (Griseb.) O. Kuntze, Rev. Gen. 1: 690 (1891) = **Renealmia jamaicensis** (Gärtner) Horan.
- versicolor** K. Schum., [280 (1899)—nom. nud.]; 332, f.39Q (1904)—Sulawesi. Syntypes: *Warburg 15735*; *Sarasin 202*. Sect. *Alpinia* subsect. *Cenolophon*.
- viridiflora** Griff., Not. Pl. Asiat. 3: 420, 423 (1851)—Malaysia. Type: *Griffith* s.n. = **A. galanga** (L.) Sw.
- vitellina** (Lindley) Ridley in J. Str. Br. Roy. Asiat. Soc. 32: 173 (1899)—Malaysia. Type: Cult. R.H.S.Gdns. Sect. *Alpinia* subsect. *Cenolophon*. (Illustr., *Bot. Reg.* t.52, 1847).
- vitiensis** Seeman, Fl. Vit. 290, t.87 (1868)—Fiji. Type: *Seeman 621* (K). Sect. *Pycnanthus* subsect. *Pycnanthus*. (Illustr., A. C. Smith, *Fl. Vitien.* Nov. f.55, 1971).
- vittata** Bull, Cat. no 83: 4 (1873)—Polynesia. Type: *Micholtz* s.n.—no specimen. Sect. *Dieramalpinia*. **Fig. 9B.**
- vulcanica** Elmer, Lflts 8: 2971 (1919)—Philippines. Type: *Elmer 16168*. Sect. *Myriocrater*.
- walang** (Bl.) Dietr., Syn. Pl. 1: 13 (1839) = **Etlingera walang** (Bl.) R. M. Smith.
- warburgii** K. Schum., [281 (1899)—nom. nud.]; 330 (1904)—Sulawesi. Type: *Warburg 15763*. Sect. *Alpinia* subsect. *Cenolophon*.
- wenzlii** Merr. in Philipp. J. Sci. 9: 353 (1914)—Philippines. Type: *Wenzl 623* (BM). Sect. *Alpinia* subsect. *Presleia*.
- wernerii** Lauterb. ex Val., 69 (1914)—New Guinea. Syntypes: *Werner 170*; *Schlechter 17564* (K). Sect. *Pycnanthus* subsect. *Pycnanthus*. (Illustr., *Notes RBG Edinb.* 36: 288, f.5B, 1978).
- womerslyi** R. M. Smith, Notes 36: 285, f.4B (1978)—New Guinea. Type: *Womersley et al. NGF37286* (LAE). Sect. *Pycnanthus* subsect. *Pycnanthus*.
- wrayi** King ex Baker in Hook. f., Fl. Brit. Ind., 6: 252 (1892)—Malaysia. = **A. vitellina** (Lindley) Ridley.

- zerumbet** (Pers.) Burt & Smith, Notes 31: 204, f.10 (1972)—China.
 Type: Wendl., Sert. Hannov. 4: 3, t. 19 (1798). Sect. *Alpinia* subsect.
Catimbium. (Illustr., *Fl. Reipubl. Pop. Sin.* 16: f.27, 1981).
zingiberina Hook. f. in Bot. Mag. 113: t. 6944 (1887)—Thailand. Type:
 Cult. Kew (K) = *A. galanga* (L.) Sw.

APPENDIX 2

KEY TO THE TERMINALLY-FLOWERED GENERA OF TRIBE ALPINEAE

1. Neotropical and African plants _____ **Renealmia**
 — Asiatic plants _____ 2
2. Leaves cordate to subsagittate; lip connate intramarginally to
 the base of the much elongated *Globba*-like filament (Burma, N
 Thailand) _____ **Pommereschea**
 — Leaves and lip not as above _____ 3
3. Inflorescence breaking through the leaf sheaths laterally
 just above ground level, often mucilaginous; lip
 not showy _____ **Plagiostachys**
 — Inflorescence rarely breaking through the leaf sheaths laterally;
 if so then towards the apex of the well-developed stem, never
 mucilaginous and lip showy _____ 4
4. Lip reduced to a minute triangular appendage
 (Sino-Burmese) _____ **Rhynchanthus**
 — Lip well formed _____ 5
5. Petals strap-shaped, lip held erect encircling the exerted filament
 (Burma) _____ **Stadiochilus**
 — Petals never strap-shaped, the dorsal one usually \pm hooded; lip
 sometimes erect, if so then filament not exerted _____ 6
6. Flowers to 12cm long; corolla tube very slender, exerted from
 the calyx for more than half its length (Philippines) — **Leptosolena**
 — Flowers not exceeding 6cm; corolla tube rarely long exerted
 from the calyx _____ 7
7. Lip much shorter than the petals and joined to the filament into
 a short tube at the base, free part held erect; bracteoles absent
 (Borneo) _____ **Burbidgea**
 — Lip usually exceeding or \pm the same length as the petals, if
 shorter and held erect then plants with tubular bracteoles _____ 8
8. Lip cup-shaped; stigma small, geniculate (New Guinea,
 Australia) _____ **Psychanthus**
 — Lip horizontal, pendulous, convolute or erect, never cup-shaped;
 stigma various _____ 9
9. Calyx falling with the flower (New Guinea) _____ **Riedelia**
 — Calyx at least partially persistent on fruit _____ **Alpinia**

IMPORTANT NEW SYNONYMY IN ALPINIA

A. suishaensis Hayata, Icon. Pl. Formos. 9: 123 (1920).

Type: Taiwan; Suisha, Holisha, Musha, *Hayata* s.n. (n.v.).

Syn.: *A. chinensis* auct. non (Retz.) Roscoe in Trans. Linn. Soc. 8: 346 (1807).

A. sp. Hayata, Icon. Pl. Formos. 5: 217 (1915).

The identity of *A. chinensis* (Retz.) Roscoe remains problematic. It was based on a plant collected by König from Malaya, said to have been cultivated in Chinese gardens for medicinal use. König's specimens were lost at sea but lengthy descriptions of his plants were published (Retz., Obs. Bot. 3: 65, 1783). That of his 'Languas chinensis, Malaya Sina Languas, ...'—later validated by Retzius (*Heritiera chinensis* Retz., Obs. Bot. 6, 1791) has points in common with both *A. calcarata* Roscoe and *A. officinarum* Hance but fits neither conclusively.

Bentham was in error in applying Retzius' epithet to his Hong Kong plants; Schumann realized this, although he did not alter the name and placed 'Languas chinensis', inexplicably, in synonymy under *A. allughas* (= *A. nigra* (Gärtner) B. L. Burt). Since then *A. chinensis* (Retz.) Roscoe has been misapplied by various authors, including the recent Flora of China where *A. suishaensis* is given as a synonym. Although I have not seen the type, there is good reason to believe that *A. suishaensis* is the correct name for Bentham's and for Schumann's plant. It is a very small-flowered species, of delicate habit (plants from Hong Kong are in cultivation at Edinburgh), closest to *A. intermedia* Gagnep., with which it shares a more or less similar distribution. *A. intermedia* is a much more robust species with leaves up to 8cm wide (those of *A. suishaensis* do not exceed 3.5mm), and correspondingly larger flowers with a shortly unguiculate, rather than sessile labellum.

NEW NAMES IN ALPINIA

Alpinia acuminata R. M. Smith, **nom. nov.**

Type: Papua New Guinea, W Highlands, wood between Laiagan and Kandep, 3100m, 11 ii 1974, *Gilli* 440 (W).

Syn.: *Rhynchanthus papuanus* Gilli in Ann. Naturh. Mus. Wien 84: 46 (1983)—non *Alpinia papuana* R. Scheffer (1876).

Alpinia velveta R. M. Smith, **nom. nov.**

Type: Papua New Guinea, Mt Wilhelm, E slopes, 3000m, *Brass* 30553 (L).

Syn.: *Kolowratia velutina* van Royen in Alpine Fl. New Guinea 2: 887, t.297 (1979)—non *Alpinia velutina* Ridley (1921).

Both *A. acuminata* and *A. velveta* belong to the well-defined *Alpinia* sect. *Pycnanthus* subsect. *Pycnanthus* and are most closely allied to *A. singuliflora* R. M. Smith.

***Alpinia ludwigiana* R. M. Smith, nom. nov.**

Type: Java, without precise locality, *Blume* s.n. (L).

Syn.: *Hellenia bracteata* Bl., Enum. Pl. Jav. 60 (1827)—non *Alpinia bracteata* Roxb. (1811, 1820) nec *Alpinia bracteata* Rosc. (1814).

Alpinia blumei K. Schum. in Bot. Jahrb. 27: 282 (1899) & Pflanzenz. Zing. 324 (1904)—non *A. blumei* Dietr. (1839).

Since it was Schumann's intention to honour Carl Ludwig Blume, and since the existence of *A. carolinensis* disallows the adoption of Blume's first Christian name as the new epithet, the great Dutch botanist's second given name is taken up for this species.

A. ludwigiana is imperfectly known, but the type material shows a plant with large bracts and the remnants of slender corolla tubes. For these reasons the species has been placed in *Alpinia* sect. *Guillainia* (Smith, 1975: 156).

***Alpinia bodenii* R. M. Smith, nom. nov. Fig. 9C.**

Type: Irian Jaya; Mt Carstenz expedition, 1912–13, camp VIa, 1300m, *Boden Kloss* s.n. (BM, K).

Syn.: *Eriolopha sericea* Ridley in Trans. Linn. Soc. Bot. 9: 221 (1916)—non *Alpinia sericea* Ridley (1914).

A. bodenii belongs to sect. *Dieramalpinia*.

***Alpinia elmeri* R. M. Smith, nom. nov.**

Syntypes: Philippines; Luzon, Mt Bulusan, v 1916, Elmer 16167; *ibidem*, viii 1916, Elmer 16954 (BM, L, U, US).

Syn.: *Alpinia longipetiolata* Elmer in Lfts Philipp. Bot. 8: 2969 (1919)—non *A. longipetiolata* Gagnep. (1906).

The BM type material of *A. elmeri* is poor, but the description of the flowers, in particular the quadrate labellum, indicate that the species belongs to sect. *Alpinia* subsect. *Presleia*.

NEW COMBINATIONS IN ALPINIA

***Alpinia albipurpurea* (Van Royen) R. M. Smith, comb. nov.**

Basionym: *Kolowratia albipurpurea* Van Royen, Alpine Flora of New Guinea 2: 890, f.298 (1979).

Type: Papua New Guinea; Piundaunde valley, *van Balgooy* 583 (L).

A. albipurpurea belongs to the clearly defined sect. *Pycnanthus* subsect. *Pycnanthus* which is well characterized by the subapically dentate filament and strap-shaped to oblong labellum.

Amongst the specimens cited by van Royen several have been previously referred to *A. sp. agg. aff. singuliflora* R. M. Smith in *Notes RBG Edinb.* 36: 281 (1978). These are LAE 54650 (LAE); NGF 39753 (LAE); NGF 40216 (LAE, E); NGF 55850 (LAE, E); NGF 39517 (LAE); NGF 29995 (LAE). Van Royen has also cited LAE 50267 (the

type number of *A. hageana* R. M. Smith—holo. E, iso. LAE) under *A. albigurpurea*, presumably in error for LAE 50266.

Alpinia corneri* (Holtum) R. M. Smith, *comb. nov.

Basionym: *Cenolophon corneri* Holtum in Gard. Bull. Sing. 13: 139 (1950).

Type: W Malaysia, Trengganu, Kemaman, B Kajang, *Corner* SFN 30506 (SING, K, E).

The reasons for not accepting *Cenolophon* Bl. at generic level have been discussed elsewhere (Smith, 1982: 69).

Alpinia gigantifolia* (Elmer) R. M. Smith, *comb. nov.

Basionym: *Zingiber gigantifolia* Elmer, Lflts Philipp. Bot. 8: 2916 (1918).

Syntypes: Philippines, Luzon, prov. Sorsogon, Mt Bulusan, v 1916, *Elmer* 14603 (n.v.); *ibidem*, *Elmer* 16154 (n.v.).

Syn.: *Adelmeria gigantifolia* (Elmer) Elmer, *op. cit.* 2963.

The sectional position of *A. gigantifolia* is problematic. A further collection, *Elmer* 16153 (K) shows large bracts and slightly elongate fruit. It is tentatively placed in sect. *Dieramalpinia*.

Alpinia juliformis* (Ridley) R. M. Smith, *comb. nov.

Basionym: *Eriolopha juliformis* Ridley in Trans. Linn. Soc. Bot. 9: 219 (1916).

Type: Irian Jaya, Mt Carstenz expedition, 1912–1913, *Boden Kloss* s.n. (BM, K).

Alpinia klossii* (Ridley) R. M. Smith, *comb. nov.

Basionym: *Eriolopha klossii* Ridley in Trans. Linn. Soc. Bot. 9: 220 (1916).

Type: Irian Jaya, Mt Carstenz expedition, 1912–1913, *Boden Kloss* s.n. (BM, K).

Both *A. juliformis* and *A. klossii* are placed in sect. *Dieramalpinia*.

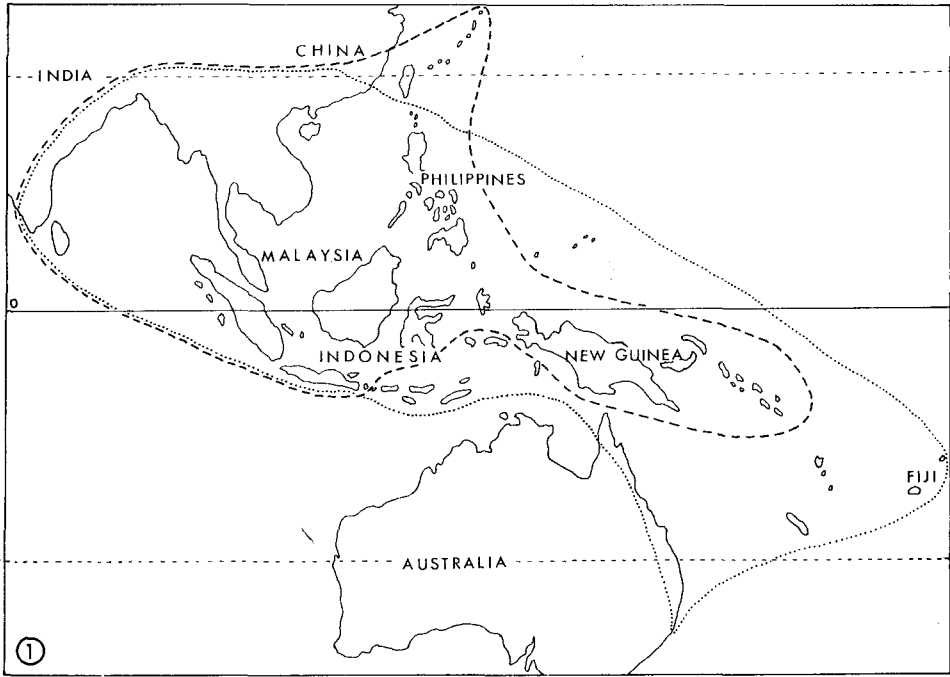
NEW COMBINATIONS IN GENERA OTHER THAN ALPINIA

Riedelia cordylinoides* (Ridley) R. M. Smith, *comb. nov.

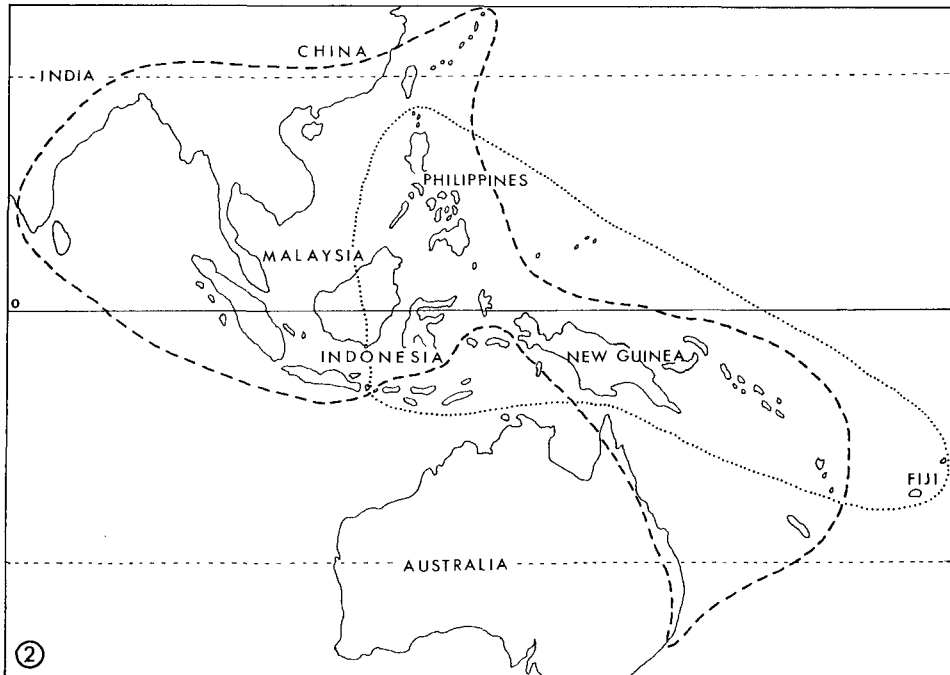
Basionym: *Alpinia cordylinoides* Ridley in Trans. Linn. Soc. Bot. 9: 211 (1916).

Type: Irian Jaya; Mt Carstenz expedition, *Boden Kloss* s.n. (BM).

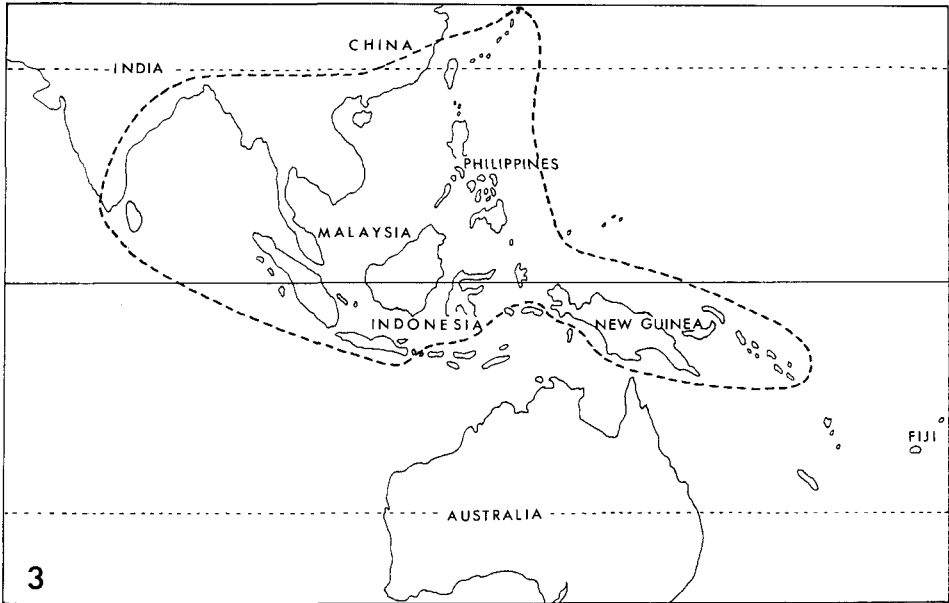
R. cordylinoides belongs to the large *Riedelia* sect. *Schefferia*.



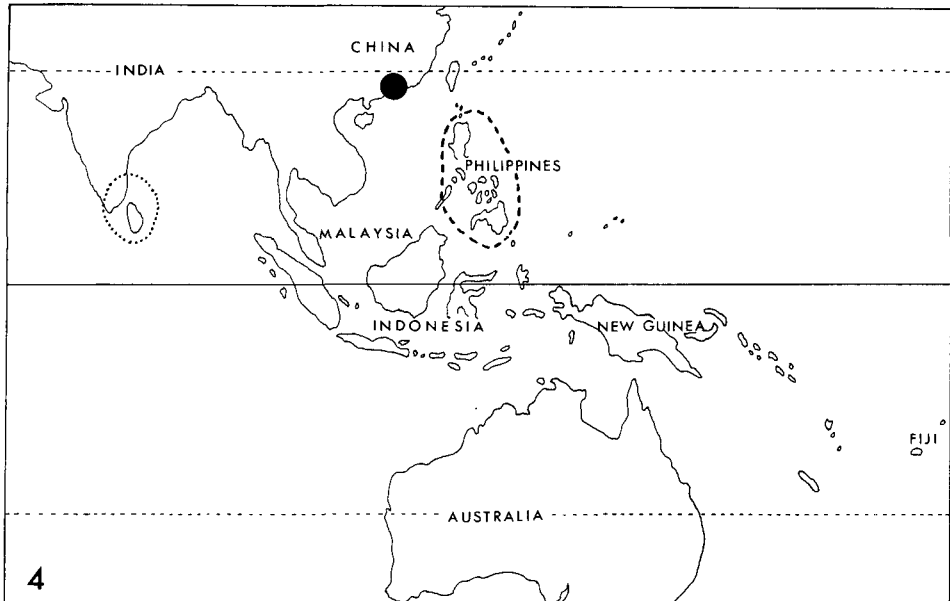
MAP 1. *Alpina* Roxb. (K. Schumann, 1904—errors made by him with regard to the structure of the bracteoles have been corrected). Subgenus *Alpina* (including subgenera *Catimbium*, *Probolocalyx* & *Rhizalpinia* p.p.) ----; Subgenus *Dieramalpinia* ...



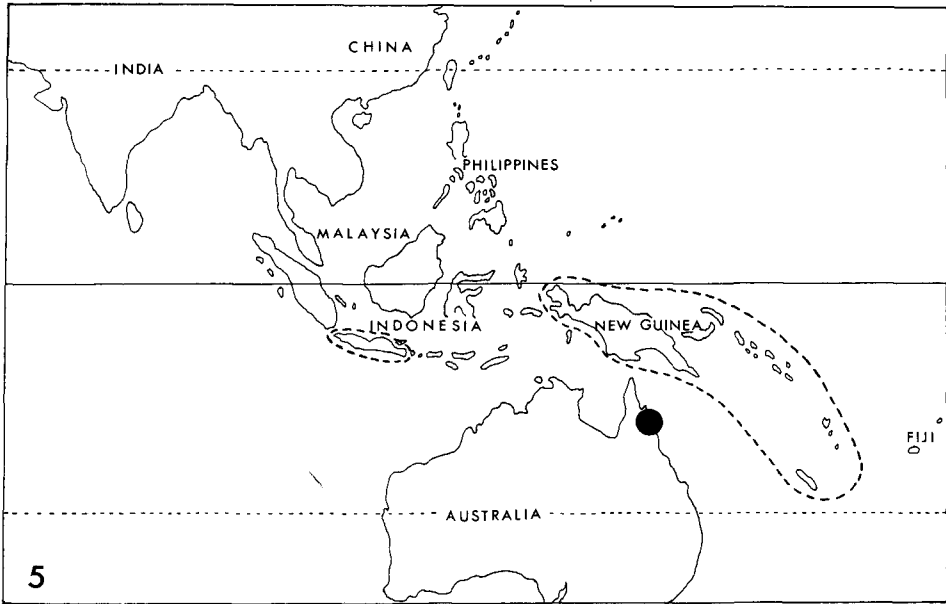
MAP 2. *Alpina* Roxb. (R. M. Smith, 1990). Subgenus *Alpina* ----; Subgenus *Dieramalpinia* ...



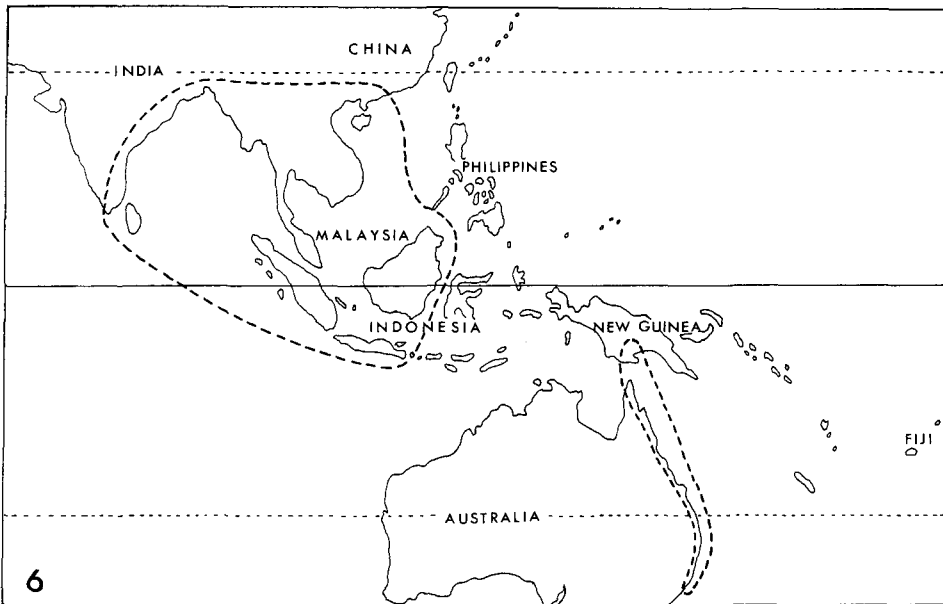
MAP 3. Subgen. *Alpinia* sect. *Alpinia* ----



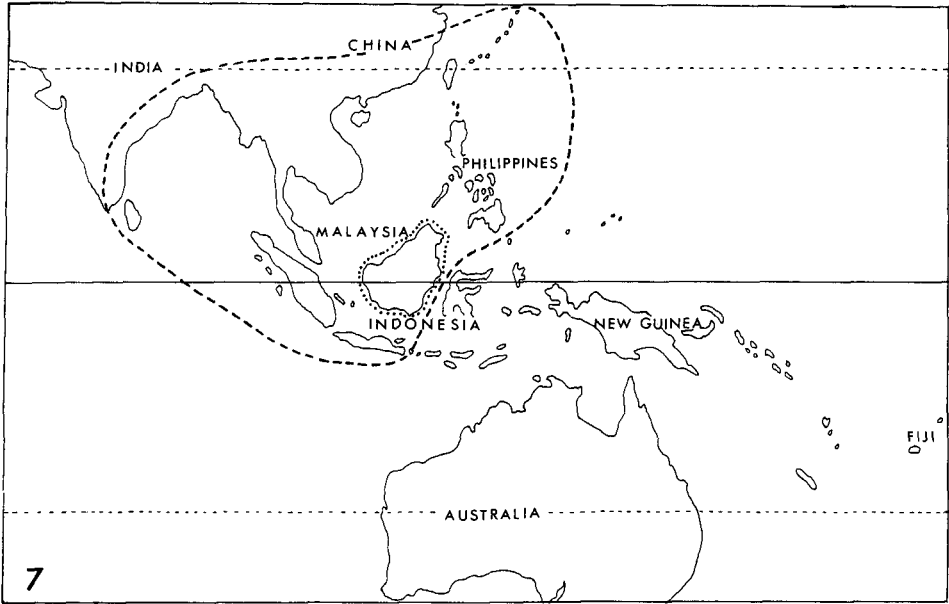
MAP 4. Subgen. *Alpinia* sect. *Didymanthus* ●; Subgen. *Alpinia* sect. *Kolowratia* ----; Subgen. *Alpinia* sect. *Fax* ...



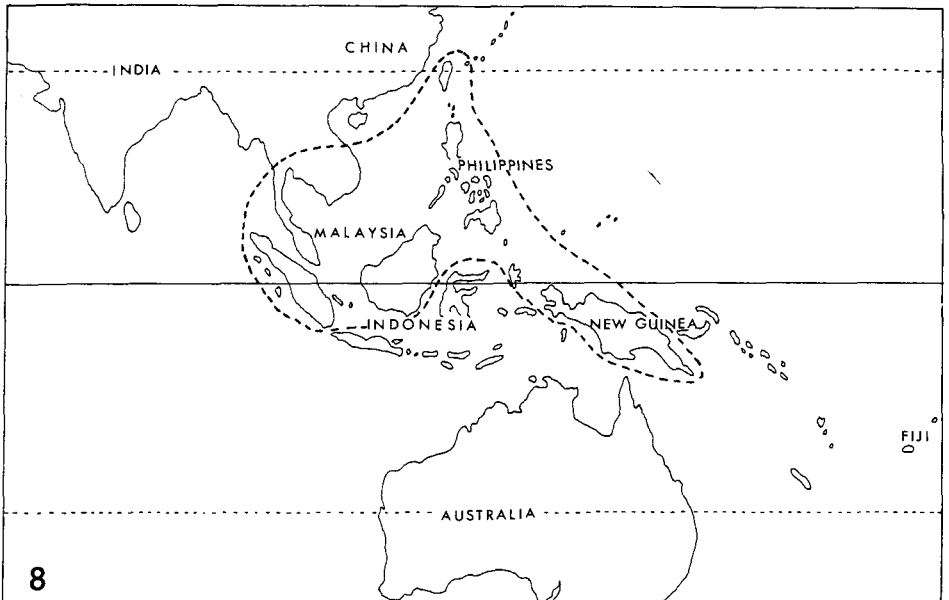
MAP 5. Subgen. *Alpinia* sect. *Guillainia* ----; Subgen. *Alpinia* sect. *Arctiflorae* ●.



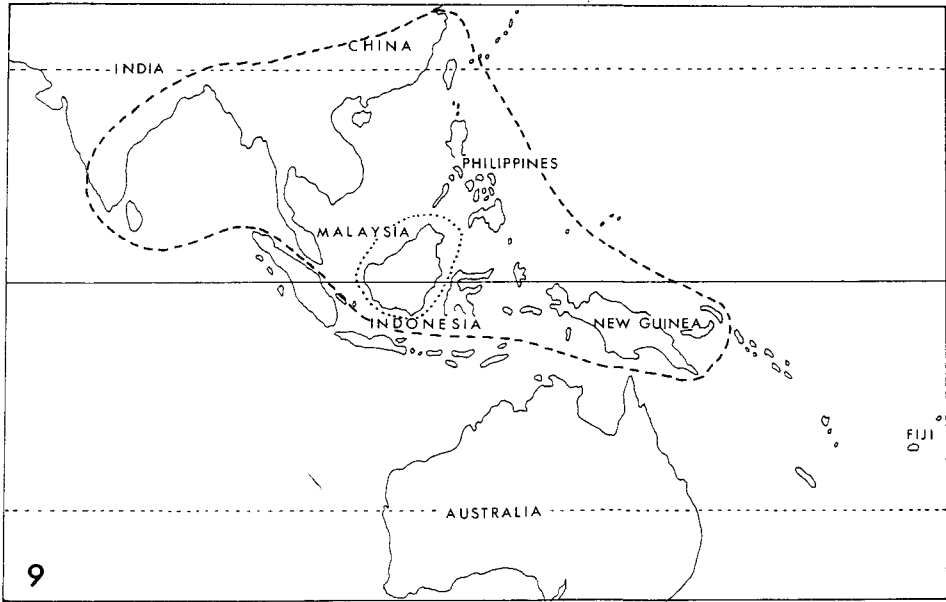
MAP 6. Subgen. *Alpinia* sect. *Allughas* ----.



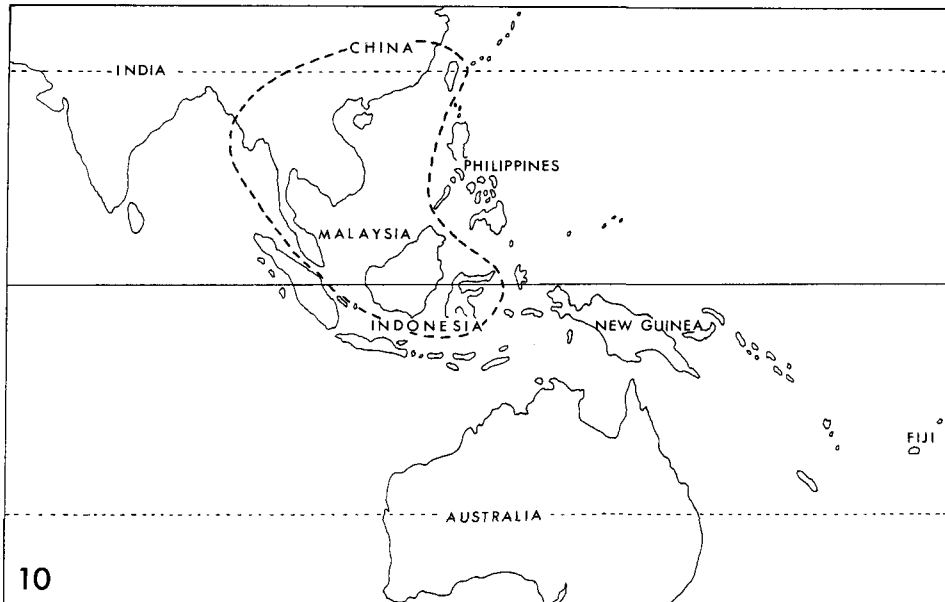
MAP 7. Sect. *Alpinia* subsect. *Alpinia* ----; Sect. *Alpinia* subsect. *Paniculatae* ...



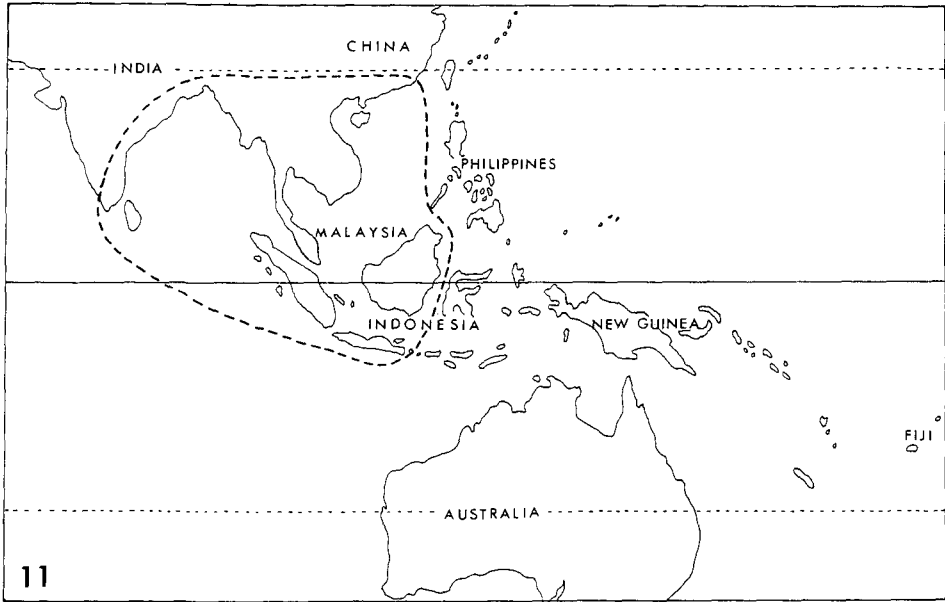
MAP 8. Sect. *Alpinia* subsect. *Presleia* ----.

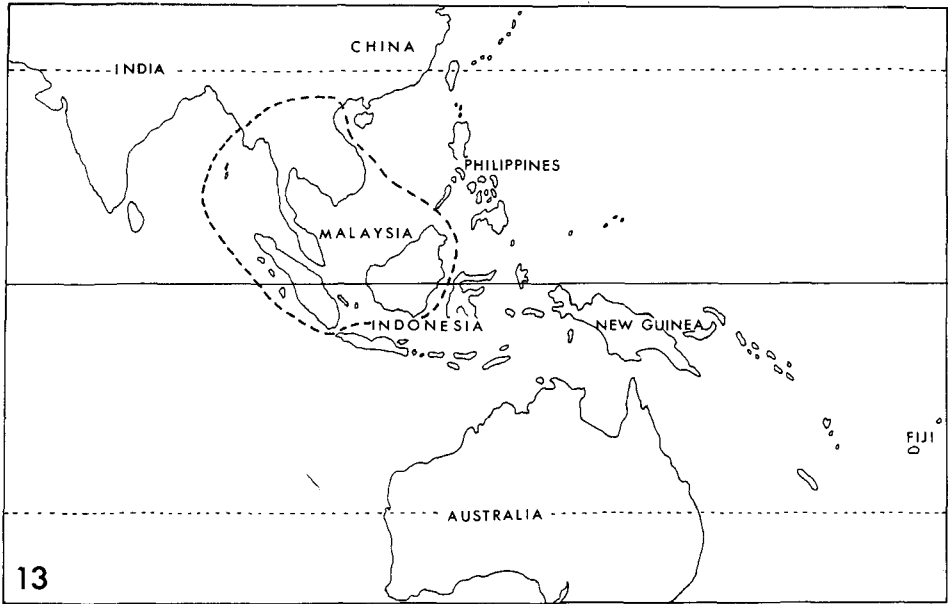


MAP 9. Sect. *Alpinia* subsect. *Catimbium* ----; Sect. *Alpinia* subsect. *Probolocalyx* ...

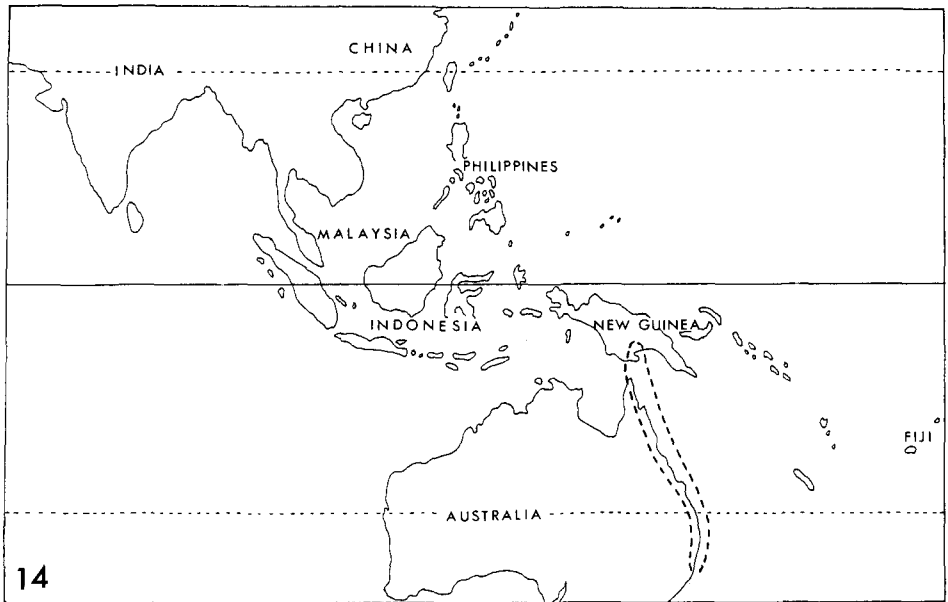


MAP 10. Sect. *Alpinia* subsect. *Cenolophon* ----.

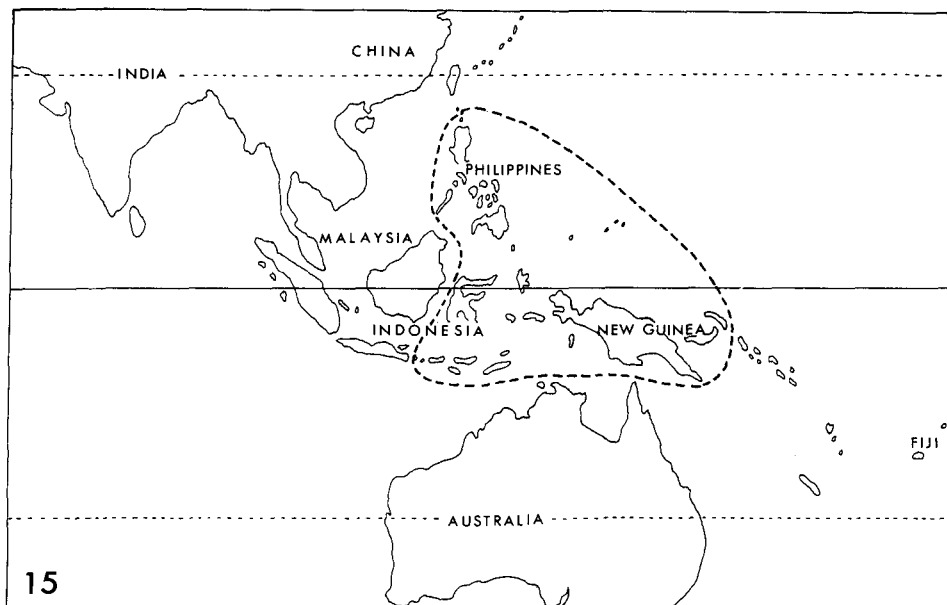
MAP 11. Sect. *Allughas* subsect. *Allughas* ...MAP 12. Sect. *Allughas* subsect. *Odontyrium* ●.



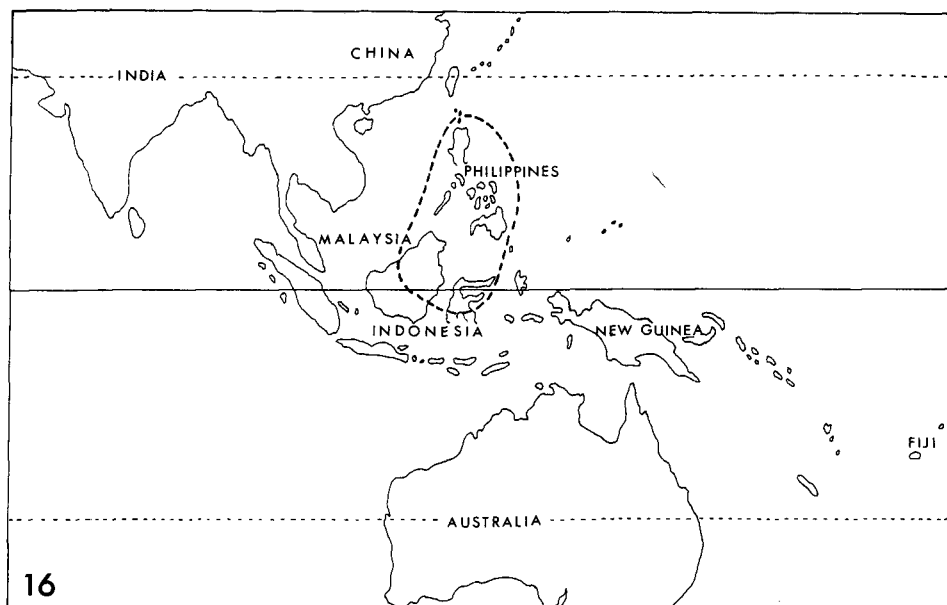
MAP 13. Sect. *Allughas* subsect. *Strobidia* ----.



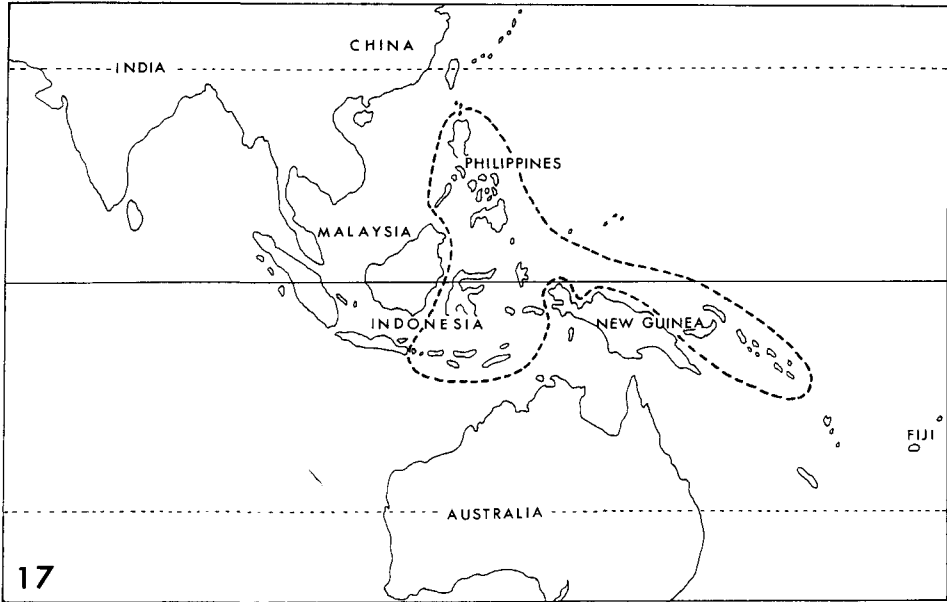
MAP 14. Sect. *Allughas* subsect. *Caerulea* ----.



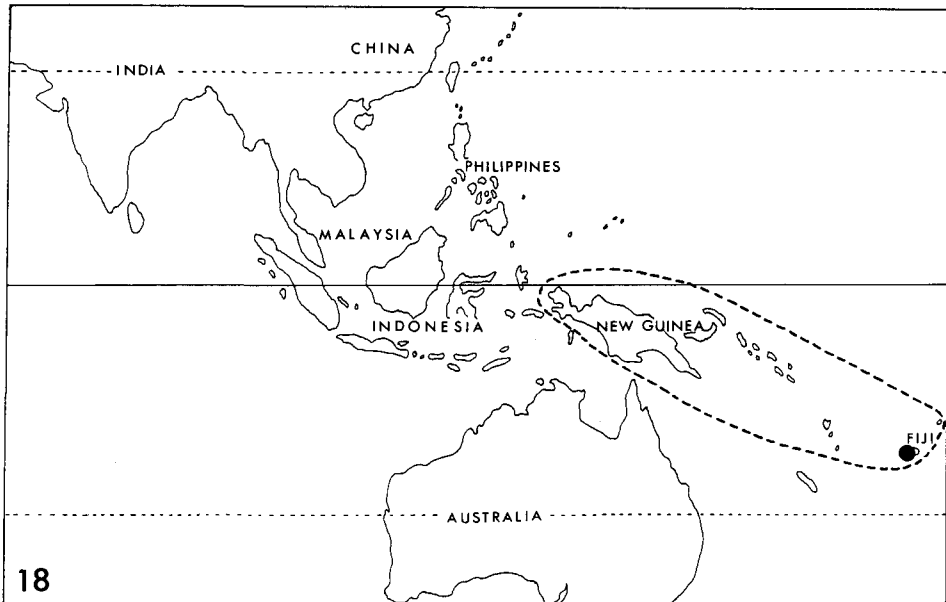
MAP 15. Subgen. *Dieramalpinia* sect. *Dieramalpinia* ----.



MAP 16. Subgen. *Dieramalpinia* sect. *Eubracteata* ----.



MAP 17. Subgen. *Dieramalpinia* sect. *Myriocrater* ----.



MAP 18. Subgen. *Dieramalpinia* sect. *Pycnanthus*: subsection *Pycnanthus* ----; subsection *Amomiceps* ●.

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