ALPINIA SECT. PYCNANTHUS AND ITS NEW GUINEA SPECIES

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ABSTRACT. The New Guinea species of *Alpinia* (Zingiberaceae) sect. *Pycnanthus* (incl. sect. *Monanthocrater*) are reviewed. Eighteen taxa are discussed and keyed out; there are 6 new species. (*A. conglomerata*, *singuliflora*, *hagena*, *womersleyi*, *porphyrea* and *stenobracteolata*); most of the species are illustrated. The need for accurate field observations and comprehensive herbarium material is stressed; currently many of the taxa cannot be specifically named and have to be dealt with informally.

Alpinia subgenus *Dieramalpinia* K. Schum., which is characterized by tubular bracteoles (secondary bracts), was subdivided by Schumann (1904) into 12 sections. In a previous paper (Smith 1975) the largest of these, *Eubractea*, was reviewed and notes were given on sects *Guillainia*, *Amomiceps*, *Javana* and *Medusula*. Of the remaining sections, *Myriocrater* (including *Monopleura* K. Schum.) has recently been revised (Smith 1977).

The present paper is concerned with the second largest of Schumann's sections, namely *Pycnanthus*, which is distributed from New Guinea south and east to Fiji and Samoa. Only those species which occur in New Guinea are dealt with in detail here; these seem to form a natural group, to which sect. *Monanthocrater* Valeton must be added.

Originally, Schumann's sect. *Pycnanthus* comprised 6 species: *A. pulchra* Stapf from New Guinea and the Solomons, *A. stapfiana* K. Schum. (=*A. pulchra*) from Shortland Island, *A. boia* Seem., *A. hemsleyana* K. Schum. and *A. horneana* K. Schum. from Fiji and *A. dyeri* K. Schum. and *A. samoensis* Reinecke from Samoa. The section was characterized by the paniculate inflorescence, bearing condensed cincinni of tubular-bracteolate flowers. Primary bracts are either small or entirely absent. *A. boia* Seem. is here proposed as the lectotype of the section.

Several species have since been added to it: *A. divaricata* Val. (syn. *A. kermesina* Ridl.); *A. subverticillata* Val.; *A. werneri* Val., and *A. rigida* Ridl., all from New Guinea, *A. nidus-vespae* Raynal from the New Hebrides, and *A. parksii* A. C. Smith from Fiji. *A. rechingeri* Gagnep. from Shortland Island is the same as *A. pulchra* and the New Guinea *A. inaequalis* (Ridl.) Loesen. is included here, being transferred from sect. *Psychanthus*.

Study of type material of most of these species shows that, with few exceptions, the New Guinea plants form a distinct group characterized by the erect, linear, labellum which is rather fleshy, often more or less emarginate at the apex, and usually narrows towards the base. No lateral lobes (staminodes) are formed. In the fully developed flowers the stigma is frequently exserted beyond the thecae and the usually emarginate anther connective is only occasionally prolonged into a short crest. The filament is elongated, much exceeding the anther in length, and subapical teeth are invariably present. Only 3 species show marked deviation from these characters and all of these occur on Mt Carstenz in Irian Jaya (W Irian). They are *A. divaricata*, *A. rigida* and *A. inaequalis*: in the first 2 the filament, although clearly dentate, is extremely short and the labellum in *A. rigida* is

almost oblong with thin margins but thickened centrally and at the apex. *A. inaequalis*, which is unique in this section in having the inflorescence reduced to 2, perhaps 3, several-flowered cincinni, has an elongated filament and narrow labellum with thin undulating margins.

In the Fijian, Samoan and New Hebridean species of sect. *Pycnanthus* the labellum is almost always ovate to oblong and incurved at the margins and apex. In *A. boia*, *A. nidus-vespae* and *A. hemsleyana* small lateral staminodes are present at the base of the lip; these are absent in *A. samoensis* but all species have short, dentate filaments. *A. parksii* is rather different; here the filament is elongate and edentate, the labellum linear but with incurved margins. Both *A. horneana* and *A. dyeri* were described from flowerless collections and no further material has been seen.

In all the species mentioned so far the manner in which the flowers are produced from a succession of tightly clasping tubular bracteoles is very reminiscent of sect. *Myriocrater*, and the flower of *A. nidus-vespae* is remarkably similar to that of, for example, *A. laxisecunda* Burtt & Smith. But sect. *Pycnanthus*, as far as is known, lacks the monoecism associated with sect. *Myriocrater*. Similar tightly-clasping bracteoles also occur in some members of *Eriolopha* Ridl., in the species placed in *Alpinia* sect. *Eubractea* subsect. *Kolowratia* by Valeton, and probably in some members of *Alpinia* sect. *Oligocincinnus* K. Schum. The problems surrounding these groups which arise mainly from lack of, or poor, type material have already been discussed (Smith 1975).

Valeton's sect. *Monanthocrater* comprised 4 species, all from New Guinea: *A. athroantha* Val., *A. brevituba* Val., *A. condensata* Val. and *A. odontonema* K. Schum. *A. condensata*, the type of which has not been seen, was described from fruiting material and is excluded from this account. In the remaining species the labellum is exactly as in the majority of the New Guinea element of sect. *Pycnanthus*, the elongated filament is dentate subapically, but the tubular-bracteolate flowers are consistently borne singly on the main axis. Solitary flowers have been regarded as of some importance in the classification of *Alpinia*, but there is no justification for separating sectionally 2 groups with such similar floral structure. In fact, it is not always immediately apparent whether the flowers are borne in cincinni or not. In *A. sp.* (no. 17, below) the flowers appear to be solitary but dissection shows the presence of 2 further bracteoles each enclosing what is probably an abortive flower. The same situation possibly occurs in *A. hagena*. Unfortunately both plants are as yet known only from single collections.

Collectors notes on flower and fruit colour have been included in the following account but should be viewed with caution. Apparent conflict in flower colour within a species may be due to lack of fully opened flowers and bracteole and calyx colour being noted rather than that of the corolla which in most species is white with red or purple tips on at least some of the parts. Notes on fruit colour also vary. Fruits are almost always black when ripe but have often been collected whilst still red. One exception is *A. subverticillata* whose fruits, white or yellow at first, become blue with age.

The provisional nature of some of the following notes reflects the inadequacy of available herbarium material. Decisions cannot be reached until better specimens are available, and this will require a deliberate and concentrated effort: it is unlikely to be brought about by casual collecting.

Alpinia section **Pycnanthus** K. Schum., Pflanzenr. Zing. 346 (1904).
Syn.: *Hellwigia* Warb. in Bot. Jahrb. 13:279, 451 (1891).
Alpinia sect. *Monanthocrater* Val. in Nova Guinea (Botanique) 8:951 (1913).
Lectotype: *A. boia* Seem., Fl. Vitiens. 290, t. 88 (1865–73).

Emended diagnosis. Inflorescence usually paniculate, often strongly so; primary bracts absent or small and inconspicuous; flowers subtended by tubular bracteoles, borne singly or in few- to many-flowered cincinni; labellum flat, strap-shaped or oblong often with incurved margins and apex; filament almost always dentate.

Distribution: New Guinea, Solomon Is., New Hebrides, Fiji, Samoa.

KEY TO THE SPECIES OF ALPINIA SECT. PYCNANTHUS IN NEW GUINEA

1a Flowers borne singly on the main axis, sometimes clustered; leaves petiolate or not 2
1b Flowers in few- to many-flowered cincinni; leaves always distinctly petiolate 7
2a Main axis of the inflorescence very short (c. 2 cm) bearing 2(–3) congested branches; ligule 5–7·5 cm long; calyx teeth at least 5 mm long . . . . . 1. *A. athroantha*
2b Main axis of the inflorescence elongated, if branched then branches remote from each other; ligule not exceeding 2·5 cm; calyx teeth less than 5 mm 3
3a Branches of the inflorescence well formed, stout, rather remote (2–5 cm apart); bracteoles membranous and more or less inflated or sub-coriaceous; calyx shallowly 3-lobed; no anther-crest . 4
3b Branches of the inflorescence weakly formed or absent; bracteoles membranous, never inflated; calyx lobes usually with subulate tips; anther-crest well-formed . . . 6. *A.* agg. sp. aff. *A. singuliflora*
4a Flowers (or pairs of flowers) arising 2–3 mm apart, densely clustered on short (to 3 cm) branches; bracteoles turbinate, more or less inflated . . . . . 2. *A. conglomerata*
4b Flowers (or pairs of flowers) arising at least 5 mm apart, branches up to 8 cm long; bracteoles cupular, never inflated, sub-coriaceous . 5
5a Upper surface of leaves with a ridged appearance . 4. *A.* sp. aff. *A. odontonema*
5b Upper surface of leaves smooth 6
6a Leaves with 2–4 cm petioles; inflorescence branches divaricate . . . . . 3. *A. odontonema* (*A. brevituba*?)
6b Leaves sessile; inflorescence branches held at c. 45° to the main axis . . . . . 5. *A. singuliflora*
7a Inflorescence reduced to 2(–3) cincinni . . 7. *A. inaequalis*
7b Inflorescence usually strongly paniculate, if unbranched then main axis elongated; cincinni numerous 8

8a Filament short (c. 2 mm); dorsal corolla lobe with an elongated, solid, apex 9
8b Filament elongated, equal to or longer than the anther; dorsal corolla lobe, if elongated, hollow at the apex 10
9a Calyx lobes triangular; anther-crest 0 . . . . 8. *A. divaricata*
9b Calyx lobes subulate, anther-crest present . . . . 9. *A. rigida*
10a Cincinni 2–3-flowered, sometimes only the first flower developing; leaves 3–5 cm wide 11
10b Cincinni 5–∞-flowered; leaves usually at least 8 cm wide . . 12
11a Bracteoles to 3 cm long, glabrous, more or less inflated, bilobed; leaves narrowly lanceolate (to 30 × 3 cm) . . . 10. *A. hagena*
11b Bracteoles to 2·5 cm long, pubescent, funnel-shaped, truncate; leaves lanceolate (to 35 × 5 cm) . . . . . 18. *A. sp.*
12a Inflorescence with 2–3(–5) stout branches; cincinni forming congested heads 13
12b Inflorescence strongly paniculate; cincinni, or clusters of cincinni well-spaced 14
13a Lamina to 25 × 8 cm; calyx lobes terminating in fleshy, subulate (6 mm) tips . . . . . 11. *A. womersleyi*
13b Lamina 1 m × 15 cm; calyx lobes not subulate . 12. *A. porphyrea*
14a Inflorescence clothed with conspicuous shaggy pubescence . . . . . 13. *A. werneri*
14b Inflorescence glabrous or, if pubescent, hair not conspicuously shaggy 15
15a Lamina up to 2 m long; bracteoles always densely pubescent; fruit yellow or white at first, turning blue . 14. *A. subverticillata*
15b Lamina rarely exceeding 1 m in length; bracteoles glabrous or pubescent; fruit red, turning black 16
16a Bracteoles (before the fruit begins to develop), funnel-shaped, rarely more than 2 cm long; anther with a rather inconspicuous bilobed crest; calyx shallowly 3-lobed . . . 15. *A. pulchra*
16b Bracteoles (before the fruit begins to develop) narrow, up to 3 cm long, widening little at the mouth; anther-crest 0; calyx lobes with subulate tips 17
17a Inflorescence with very short inconspicuous pubescence or more or less glabrous; calyx 2·5–3 cm long, subulate tips to 4 mm; ovary glabrous . . . . . 16. *A. stenobracteolata*
17b Inflorescence conspicuously pubescent; calyx not exceeding 1 cm, subulate tips c. 2 mm long; ovary pubescent . . 17. *A.* sp. aff. *stenobracteolata*

GROUP A. Flowers borne singly.

1. Alpinia athroantha Val. in Nova Guinea (Botanique) 8:952, t. 171 (1913). Syntypes. Irian Jaya: valley of the North River, 1912, *Versteeg* 1438 (K, L); *von Römer* 409 (L), 398, 470 (*n.v.*).
IRIAN JAYA: Beaufort River, 17 xi 1912, *Pulle* 355 (L).

A. athroantha is characterized by the very short inflorescence branches (there are 2 in the *Versteeg* specimens), their axes concealed by densely clustered flowers. Each branch is subtended by a large membranous sheath.

No mature flowers were available, but the calyx has long subulate teeth and there is a short, pubescent, bilobed anther-crest. The subsessile leaves are hairy on the midrib below and at the margins, from 30–35 × 6–8 cm and the areolate sheath terminates in an unusually long (5–7·5 cm) membranous ligule. The globose-elliptic fruit (1 × c. 1·2 cm) is, according to Versteeg, red at first, then blue [blue-black?].

2. Alpinia conglomerata R. M. Smith, **species nova** floribus solitariis in ramis brevibus inflorescentiae densis *A. athroanthae* similis, sed axi principali elongato et bracteolis inflatis differt. Fig. 2A.

Herba laxa, ad 2 m alta. *Folia* vaginis glabris; ligula ad 1 cm, pubescens, integra; petioli 2·5–3·5 cm longi; lamina 30–40 × 4–6 cm, anguste lanceolata, basi angustata et paulo inaequilateralis, apice subacuminata, supra glabra et luteo-viridis, subtus parce pubescens et griseo-viridis. *Inflorescentia* 26 cm longa (parte florifera 12 cm), valida, ramos 4 densifloros inter se c. 3 cm distantes gerens; rami c. 4 × 3 cm. *Bracteolae* glabrae, tubulares, 10–13 × 4–6 mm, membranaceae, inflatae, truncatae, haud (ut videtur) unilateraliter fissae. *Flores* (vix maturi) c. 2 cm longi, pedicellis c. 4 mm; calyx pallide aurantiacus, ad 1 cm, glaber, obscure 3-lobus, truncatus; corolla alba tubo 3–4 mm, lobis 10–13 mm lanceolatis aequalibus; labellum lineare, lobis aequalibus, leviter emarginatum, medio (et parce ad margines) pubescens; stamen labellum plus minusve aequans, filamento c. 4 mm dentibus subapicalibus; anthera dorso pubescens, emarginata; ovarium glabrum; glandes epigynae c. 1 mm, carnosulae. *Fructus* ignotus.

PAPUA. Eastern Highlands distr. Minj, confluence Warapuri and Kosi rivers, Wahgi, Jimi Divide, 6° 10′ S 144° 50′ E, flowers white, calyx pale orange, 2500 m, 4 ix 1963, *van Royen*, NGF 18154 (holo. LAE).

As yet known only from the type collection, the inflorescence of *A. conglomerata* consists of 4 short (c. 3 cm) branches arising about 3 cm from each other on the stout main axis. The white flowers are densely arranged and each is accompanied by a more or less inflated bracteole. As in *A. athroantha* the flowers examined were not fully mature but the strap-shaped labellum could be clearly seen. The emarginate anther is pubescent on the reverse. The leaves are petiolate (petioles 2·5–3·5 cm), the lamina measures 30–40 × 4–6 cm and is lightly pubescent below. There is a 5–7 mm pubescent, entire, ligule.

3. Alpinia odontonema K. Schum., Fl. Deutsch. Schutzgeb. Nachtr., 95 (1905). Fig. 1A.

?Syn.: *Alpinia brevituba* Val. in Nova Guinea (Botanique) 8:953 (1913). Type. New Guinea, West: Hellwig Mts, 1600 m, *von Römer* 1190 (*n.v.*).

Type. Papua: Bismarck Mts, *Schlechter* 13952 (*n.v.*).

The following material probably belongs here:—PAPUA: Sepik distr., Atup Creek, near Telefomin, 5° 05′ S 141° 30′ E, in forest, flowers white with purple tips, fruit black, 2500 m, 10 i 1965, *Henty*, NGF 20931 (LAE); Southern Highlands distr., Ialibu, rain forest, flowers greenish-white, tips pink-purple, lip deep purple, 2200 m, 12 ix 1967, *Womersley & Woolliams*,

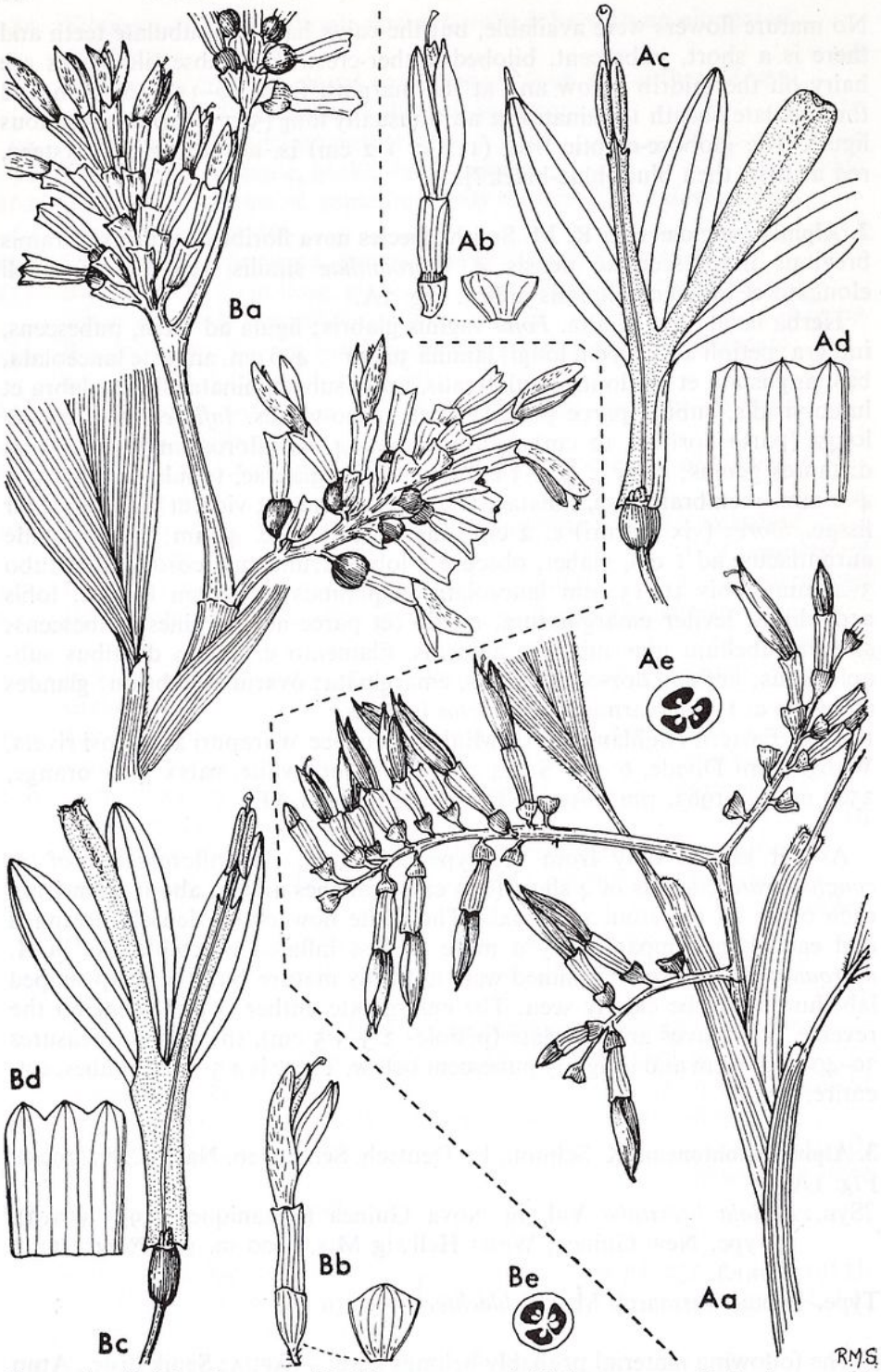

FIG. 1. A. *Alpinia odontonema* K. Schum.: a, partial inflorescence × ⅔; b, flower with bracteole *in situ* and dissected × 1; c, corolla, dissected × 2; d, calyx, dissected × 2; e, ovary in T.S. × 4 (from LAE 24989). B. *A. singuliflora* R. M. Smith: a, partial inflorescence × ⅔; b, flower with bracteole *in situ* and dissected × 1; c, corolla, dissected × 2; d, calyx, dissected × 2; e, ovary in T.S. × 4 (from the type collection). Both from dried material.

NGF 24989 (LAE); Morobe distr., Angabena ridge, along rd from Aseki-Menyana, 7° 20′ S 146° 10 ′E, montane forest, perianth white, very red tip, 550 m, 6 i 1972, *Streimann & Stevens*, LAE 53877 (LAE, E).

Schumann's description states that *A. odontonema* has petiolate, narrowly lanceolate leaves, an inflorescence which is always overtopped by the uppermost leaf and consists of two wide spreading branches. The singly borne flowers are well-spaced on the axis and lie in short cupular bracteoles; the corolla tube does not exceed the truncate calyx and the linear labellum, which widens towards the pilose apex, equals the stamen in length. There is no anther-crest. Apart from the presence of an emarginate ligule the material cited above does not differ seriously from Schumann's description. Valeton saw no material of *A. odontonema* and his *A. brevituba* may be conspecific.

4. Alpinia sp. aff. **odontonema**

PAPUA: Southern Highlands distr., near Ialibu, 6° 10′ S 144° 05′ E, forest, flowers white with purple tips, 3000 m, 22 vi 1969, *Coode, Wardle & Katik*, NGF 40326 (LAE, E); Morobe distr., Zatari, 6° 25′ S 146° 60′ E, rain forest, flowers white tipped purple, fruits immature, yellowish, 1800 m, 25 ii 1965, *van Royen & Millar*, NGF 15677 (LAE).

In the mature inflorescence these collections show the strongly divergent branching which characterizes *A. odontonema*. The leaves, however, are strictly sessile. The texture of the lamina is interesting: the upper surface has a conspicuously ridged appearance lacking in *A. odontonema*. Reference to the field note of NGF 15677 which states 'leaves . . . slightly folded', indicates that this ridging is not the result of drying and if the character is constant throughout a population this may represent a new species.

5. Alpinia singuliflora R. M. Smith, **species nova** inflorescentia valde ramosa et floribus solitariis bracteolis cupularibus praeditis *R. odontonemati* similis, sed habitu robustiore, foliis sessilibus, et ramis inflorescentiae minus divaricatis magis floriferis differt. Fig. 1B.

Herba erecta ad 2 m alta. *Folia* vaginis marginibus conspicue pubescentibus; ligula ad 5 mm, emarginata, pubescens; lamina sessilis, 30–40 × 7–9 cm, lanceolata, attenuata, apice abrupte acuminata et breviter pubescens. *Inflorescentia* ad 20 cm longa, rhachide glabra, ramis lateralibus 2–3 validis 5–8 cm; flores solitarii vel binati, inter se 5 mm distantes, ad 40 per ramum. *Bracteolae* tubulari-cupulares, 5–8 mm longae, truncatae, in uno latere nervo breviter apiculato, tandem fissae, basi paulo pubescentes. *Flores* fere ad 4 cm longi, pedicellis 5–8 mm; calyx 1·5 cm, leviter trilobus, glaber; corollae tubus 1 cm longus; lobi c. 1·5 cm, lanceolati, inter se subaequales, dorsalis saltem parum pubescens; labellum lobis aequale, lineare, emarginatum, apice et dorso parum pubescens; stamen labello plus minusve aequale, filamento 1·3–1·5 cm dentibus subapicalibus; anthera dorso dense pubescens, connectivo emarginato pubescente; ovarium glabrum; glandes epigynae 1–2 mm, carnosae. *Fructus* globosus, immaturus, viridis.

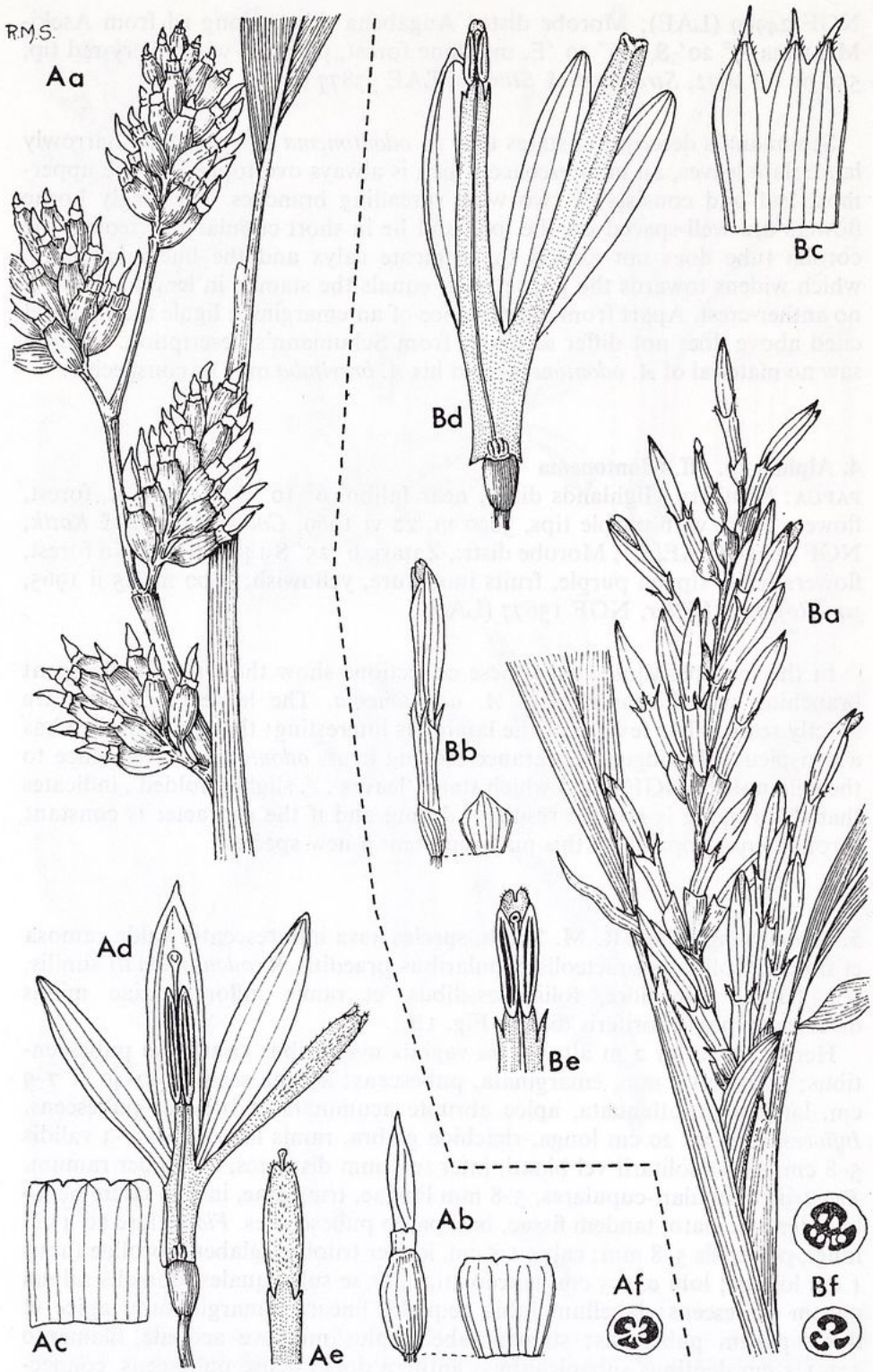

FIG. 2. A. *Alpinia conglomerata* R. M. Smith: a, inflorescence × ⅔; b, flower with bracteole in situ and dissected × 1; c, calyx, dissected × 2; d, corolla, dissected × 2; e, back view of anther × 3; f, ovary in T.S. × 3 (from the type collection). B. *A. sp. agg. aff. A. singuliflora*: a, inflorescence × ⅔, b, flower with bracteole *in situ* and dissected × 1; c, calyx, dissected × 2; d, corolla, dissected × 2; e, anther × 4; f, ovary in T.S. × 3 (perfectly trilocular at base only) (from NGF 40216). A from dried material, B from spirit material.

PAPUA: Southern Highlands distr., creek N Onim hill S slope of Mt Giluwe 6° 10′ S 143° 59′ E, flowers red [calyx?], 2100 m, 28 xi 1973, *Croft et al.*, LAE 60850 (holo. E; iso. LAE); Chimbu distr., E Kuan, 6° 00′ S 145° 00′ E, rain forest on ridge, calyx pink, flowers white, 2800 m, 16 x 1969, *Millar*, NGF 38349 (LAE).

A. singuliflora has strictly sessile leaves and the inflorescence branches are considerably less divaricate than in *A. odontonema*. It is also a much more robust plant, further distinguished by the densely arranged, more numerous flowers and by the pubescence of sheath, ligule and parts of the inflorescence.

The following material differs in the less robust habit, shorter leaves (to 25 cm) and almost entirely glabrous sheaths and ligules. PAPUA: Eastern Highlands distr., Daulo Pass, Goroka-Kundiawa rd, 6° 55′ S 145° 10′ E, disturbed forest, flowers white, purple tip to perianth, fruit black, 2600 m, 27 v 1966, *Womersley*, NGF 24724 (LAE); 3 miles above Lufa, 6° 20′ S 145° 15′ E, Cunoniaceae and *Nothofagus* dominated forest, fruit red, 2800 m, 13 v 1966, *Streimann & Kairo*, NGF 27695 (LAE); ridge above Daulo, Chimbu divide, flowers greenish-white, 22 xi 1954, 2800 m, *Floyd & McKee*, NGF 6359 (LAE); *ibidem*, 16 xi 1954, *McKee*, NGF 1191 (LAE).

6. Alpinia sp. agg. aff. **A. singuliflora.** Fig. 2B.

The remaining material of sect. *Pycnanthus* in which the flowers are borne singly on the rhachis, must now be discussed. Almost all the collections seen are from the Southern, Western or Eastern Highlands of Papua and considerable variation may occur between these areas (and often between peaks in the same area). Probably more than a single species is involved but, for the time being, the different forms are simply listed informally together with brief descriptions and comments.

All are distinguished by the usually unbranched inflorescence; when lateral branches occur they are weakly formed with thin axes, but may occasionally elongate. The bracteoles are thinly membranous, usually conspicuously apiculate unilaterally, never inflated, and in all but a few collections the calyx lobes are prolonged into distinct subulate teeth. The anther connective is prolonged into a 1–2 mm bilobed crest. All have petiolate (rarely subsessile) leaves.

1. Leaves on short petioles of up to 2 cm; narrowly lanceolate, 50 × 5 cm, margin and midrib pubescent below; sheaths and emarginate ligule conspicuously pubescent, particularly at the margins; inflorescence more or less glabrous, calyx lobes forming distinctly subulate 2–4 mm tips.

PAPUA: Southern Highlands distr., Mt Ialibu, slope to SW of Repeater Station, 6° 15′ S 144° 04′ E, subalpine forest, common, flowers whitish, tipped purple, fruit black, 3350 m, 10 viii 1972, *Stevens & Foreman*, LAE 55850 (LAE, E); Mt Giluwe, 6° 05′ S 143° 33′ E, moss forest, flowers pink with crimson tip to style and black tip to labellum, fruit black, 3700 m, 18 vi 1969, *Coode & Katik*, NGF 40216 (LAE, E); *ibidem*, 6° 05′ S 143° 52′ E, moss forest, flower pink, fruit [immature] green, local name 'Kurubine', 3500 m, 15 vii 1967, *Coode & Waring*, NGF 29995 (LAE); walking track to Mt Giluwe, 6° 05′ S 143° 50′ E, edge of grassland and rain forest, flowers pink, fruit purple, 3700 m, 25 ix 1968, *Vandenberg, Katik & Kairo*, NGF 39753 (LAE); Chimbu distr., near walking track 1½ miles from field station,

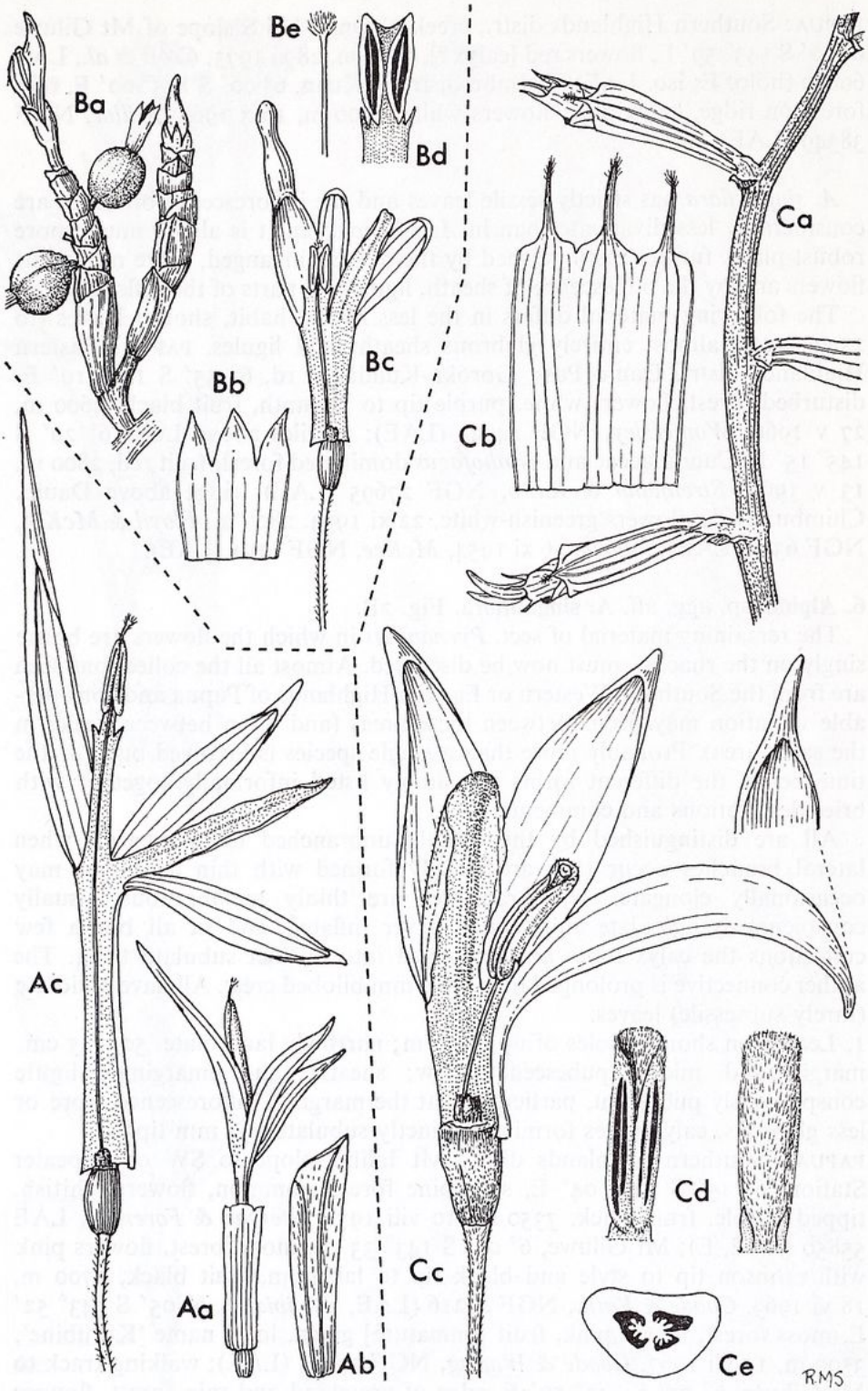

FIG. 3. A. *Alpinia inaequalis* (Ridl.) Loesen.: a, flower × 1; b, bracteole × 1; c, corolla, dissected × 2 (from the type collection). B. *A. divaricata* Val.: a, partial inflorescence, showing 2 cincinni × 1; b, calyx, dissected × 2; c, corolla dissected × 2; d, anther × 4; e, stigma × 4 (from a syntype collection, *Versteeg* 1657). C. *A. rigida* Ridl.: a, partial inflorescence × ⅔; b, calyx, dissected × 2; c, corolla, dissected × 2; d, anther from front and back, rear view showing teeth at base × 3; e, ovary in T.S. × 4 (from the type collection). All from dried material.

5° 45′ S 145° 05′ E, upper montane forest, flowers pale yellow, labellum purple, fruit black, 3700 m, 13 vi 1968, *Vandenberg*, NGF 39517 (LAE).

2. Leaves on petioles of up to 4·5 cm, lamina up to 35 × 6 cm, pubescent at the margin and on the midrib below; sheath and ligule pubescent, inflorescence pubescent, bracteoles conspicuously so; calyx lobes with short, 1–2 mm, densely pubescent subulate tips.

PAPUA: Southern Highlands distr., Mt Giluwe foothills, 6° 05′ S 143° 45′ E, regrowth beside road, flowers white, 3000 m, 17 ix 1968, *Coode & Katik*, NGF 40030 (LAE).

Perhaps distinct from the Mt Giluwe collections of group 1.

3. Leaves shortly petiolate (to 1 cm) up to 25 × 3·5 cm, densely pubescent on upper surface, glabrous or with some midrib hair below; sheath and ligule pubescent at margins, inflorescence more or less glabrous but bracteole ciliate edged and some pubescence on outside of corolla lobes; calyx lobes barely subulate, densely pubescent.

PAPUA: Southern Highlands distr., NE of Lei camp on SE slope of Mt Ambua, Tari, 5° 55′ S 143° 10′ E, edge of *Nothofagus* forest; flowers red-violet, fruit black, 2900 m, 10 viii 1966, *Frodin*, NGF 28314 (LAE); Western Highlands distr., Mt Hagen, 5° 35′ S 144° 05′ E, in moss forest, flowers magenta, tip of staminode black-purple, 3000 m, 18 vii 1970, *Stevens*, LAE 50266 (LAE, E).

4. Leaves subsessile, up to 35 × 5 cm, densely pubescent above, hairy on the midrib below; ligule and sheath hairy at the margins; inflorescence more or less glabrous, some pubescence on outside of corolla lobes, calyx lobes with long subulate (to 3 mm) glabrous teeth.

PAPUA. Eastern Highlands distr., north slopes of Mt Otto, 5° 58′ S 144° 28 ′E, sub-alpine forest, flowers cream, fruit dark red, 3500 m, 26 i 1970, *Johns & Noble*, NGF 47144 (LAE, E).

A further collection from the Eastern Highlands (*Stevens & Grubb*, LAE 54650, Mt Kerigomna) also has sessile leaves but the lamina is quite glabrous above and the subulate tips of the calyx lobes are much less pronounced.

GROUP B. Flowers in cincinni.

7. Alpinia inaequalis (Ridl.) Loesen., Pflanzenfam. 2 Aufl. 15a:614 (1930). Fig. 3A.

Basionym: *Psychanthus inaequalis* Ridl. in Trans. Linn. Soc. Bot. ser. 2 9:215 (1916).

Type. Irian Jaya: Mt Carstenz Expedition, camp VIb, 1300 m, vi 1913, *Boden Kloss* s.n. (BM, K).

Ridley's decision to raise *Alpinia* sect. *Psychanthus* K. Schum. to generic level is questionable, whatever the judgement on that point. It is clear that *A. inaequalis*, the only species described by Ridley in *Psychanthus*, is in no way related to the species placed in that section by Schumann and Valeton. Sect. *Psychanthus* belongs to subgenus *Alpinia* and therefore lacks tubular bracteoles; it is further characterized by the large, broad petaloid labellum and by the cymbiform, sometimes dentate, filament. The type material seen of *A. inaequalis* is less than satisfactory, but the unbranched inflorescence appears to consist of 2(–3)-cincinni. Each cincinni has at least 7 flowers and

the bracteoles are tubular. Such an inflorescence is, so far, unique in sect. *Pycnanthus* but the structure of the flower deems it justifiable to place the species in this section. The glabrous bracteoles are c. 5 cm long and do not expand greatly at the top; there is a truncate, obscurely 3-lobed calyx and an elongated dentate filament. The labellum is linear, centrally thickened, and appears to have undulating margins. The epithet was chosen by Ridley on account of the unequal corolla lobes; the dorsal lobe exceeds the laterals by more than $\frac{1}{3}$ and is long cucullate. The almost glabrous leaves (petiole to 6 cm) are up to 35 × 5 cm and there is 1–1·3 cm entire ligule.

8. Alpinia divaricata Val. in Nova Guinea (Botanique) 8:950 (1913). Fig. 3B.
Syn.: *A. kermesina* Ridl. in Trans. Linn. Soc. Bot. 9:214 (1916). Type: Irian Jaya; Mt Carstenz Expedition, Camp III, *Boden Kloss* s.n. (BM, K).
Syntypes. Irian Jaya: *Versteeg* 1657 (K); *von Römer* 835 (*n.v.*).

A. divaricata is superficially very similar to *A. pulchra*, but has considerably shorter petioles, an entirely glabrous inflorescence and well-developed triangular calyx lobes. Together with *A. rigida*, it is unique in sect. *Pycnanthus*: the filament is extremely short, c. 2 mm, although the lateral teeth are well formed, and the dorsal corolla lobe, which may in *A. divaricata* be twice the length of the lateral lobes, is, in its upper $\frac{1}{3}$ or $\frac{1}{2}$, prolonged into a *solid* cucullate appendage.

A. kermesina Ridl. is identical. Ridley's description reads 'tubular bracts containing only 2 flowers'; the type material shows cincinni of up to 6 flowers, and he obviously mistook the pubescent stigma for a 'large hairy staminal appendage'. The connective is, in fact, crestless.

9. A. rigida Ridl. in Trans. Linn. Soc. Bot. 9:214 (1916). Fig. 3C.
Syn.: *Eriolopha rigida* Ridl., *l.c.* 216.
Type. W Irian, Mt Carstenz Expedition, Camp VIa, 1000 m, ann. 1912–13, *Boden Kloss* s.n. (BM).

A. rigida is a much more robust plant than *A. divaricata*. The stout inflorescence is apparently unbranched and the 2–3-flowered cincinni arise at least 3 cm apart on the main axis. This is the only member of sect. *Pycnanthus* under review here in which the labellum is not linear; it is a rather oblong structure, extremely fleshy both centrally and at the apex, with membranous margins. The anther is almost sessile but subapical teeth are formed on the short filament. There is a well-formed, pubescent anther-crest.

The type specimen is designated '*Alpinia rigida* est *Eriolopha rigida*' in Ridley's hand and although the descriptions given by him in the same work are not quite identical there can be little doubt that both refer to the same plant.

10. Alpinia hagena R. M. Smith, **species nova** *A. womersleyi* ob ramos inflorescentiae duos et cincinnos paucifloros similis, sed cincinnis laxius dispositis et bracteolis inflatis bilobis differt. Fig. 4A.

Herba 1–1·3 m. *Folia* vaginis areolatis leviter (praecipue ad margines) pubescentibus; ligula 2–2·5 cm longa, glabra; petioli 2–3 cm; lamina 25–30 ×

2·5–3 cm, anguste lanceolata, subacuminata, ad basin attenuata, marginibus pubescentibus. *Inflorescentia* c. 10 cm longa, biramosa, primo bractea membranacea 10 cm longa obtecta; cincinni triflori (fortasse flore primo tantum evoluto), inter se 3 mm distantes. *Bracteolae* 2–2·5 (–3) cm longae, aliquantum inflatae, apice bilobae lobis parum pubescentibus. *Flores* roseo-albi apice purpurati, 4 cm longi; pedicelli 3 mm; calyx c. 2 cm, inaequaliter trilobus; corolla tubo 1 cm; lobi ad 2·5 cm, laterales anguste lanceolati, dorsalis multo latior; labellum loriforme, lobis aequilongum, apice emarginatum et pubescens; stamen labello paulo brevius, filamento 1–1·5 cm dentibus subapicalibus; anthera apice pubescens crista parva emarginata; ovarium glabrum; glandes epigynae, 1 mm, carnosae. *Fructus* atropurpureus (n.v.).

PAPUA. Western Highlands distr., Mt Hagen, 5° 35′ S 144° 05′ E, mossy forest, rather scarce, calyx pink, corolla pale pink almost white at top, tip of staminode deep purple, fruit purple black, 3100 m, 18 vii 1970, *Stevens*, LAE 50267 (holo. E; iso. LAE).

A. hagena is known from the type collection only. It is a small-leaved plant with distinctly tesellated sheaths and the inflorescence, which is subtended at the base by a large bract, has but 2 branches upon which the cincinni lie close together. The bracteoles are distinctive; they are up to 3 cm long, more or less inflated and distinctly bilobed. The cincinni are 3-flowered but probably only the first flower develops fully. According to the field note, the pale pink and white corollas are succeeded by a purple-black fruit; no capsules are present on the material at E.

11. Alpinia womersleyi R. M. Smith, **species nova** inflorescentia brevi congesta biramosa et calycis lobis subulatis *A. athroanthae* similis, sed floribus in cincinnos dispositis et ligula breviore pubescente differt. Fig. 4B.

Herba ad 1 m alta. *Folia* vaginis subareolatis parce, ad margines dense, pubescentibus; ligula 1–2 cm, integra, praecipue ad apicem pubescens; petioli 1–1·5 cm; lamina 20–25 × 5–8 cm, elliptica, apice abrupte et breviter cuspidata, ad basin attenuata, marginibus pubescentibus. *Inflorescentia* 5–6 cm longa, e vaginis foliorum summorum lamina carentibus et acuminatis vel lamina elliptica brevi ad 10 × 4 cm praeditis, e ramis duobus brevibus composita; cincinni dense congesti, minimum triflori. *Bracteolae* rubrae, c. 1·5 cm longae, breviter pubescentes, in altero latere carina ciliata praeditae, in altero ad medium fissae. *Pedicelli* ad 5 mm. *Calyx* 1–1·5 cm, lobis acuminibus subulatis 6 mm longis praeditis, glaber. *Corolla* rosea vel alba, c. 2 cm longa; tubus c. 1 cm; lobi c. 1·3 cm, late lanceolata dorsalis latissimus; labellum corollae lobis aequilongum, lineare, medio incrassatum, ad apicem undulatum. *Stamen* labello aequilongum, filamento 7 mm; anthera apice pubescens, emarginata. *Ovarium* glabrum; glandes epigynae c. 1 mm, carnosae. *Fructus* globosus, 5 mm diam., ruber (sed immaturus?).

PAPUA: Western Highlands distr., Kopiago, 5° 22′ S 142° 33′ E, *Castanopsis* forest, bracts red, perianth pink, 1000 m, 31 x 1968, *Womersley, Vandenberg & Galore*, NGF 37268 (holo. LAE); Batene, off Tari rd, 8 miles from Kopiago, 5° 22′ S 142° 33′ E, fruit red, 1400 m, 30 x 1968, *Womersley, Vandenberg & Galore*, NGF 39929 (LAE).

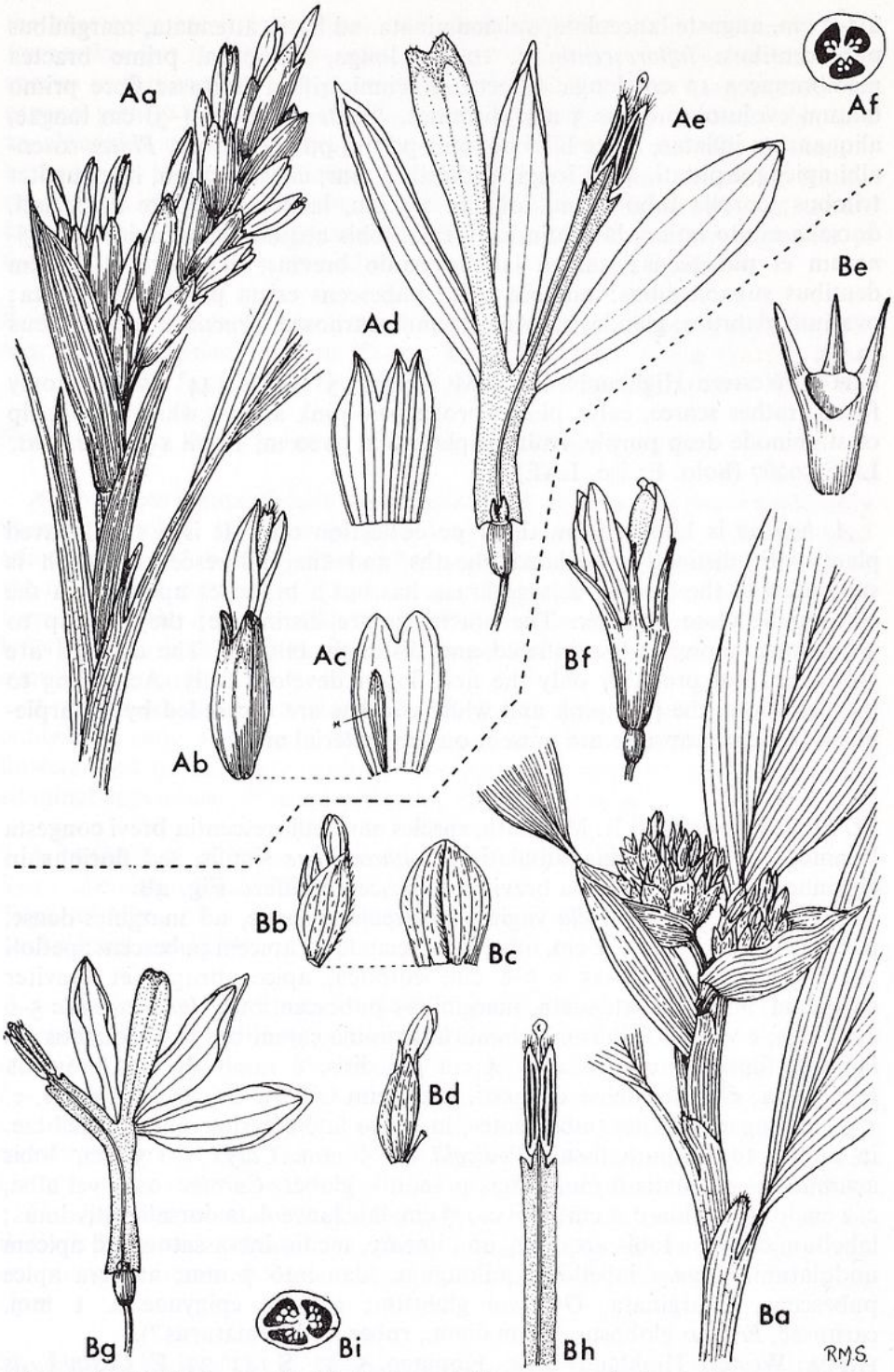

FIG. 4. A. *Alpinia hagena* R. M. Smith: a, inflorescence × ⅔; b, cincinnus × 1; c, first bracteole dissected (first flower removed) showing second bracteole* which encloses rudimentary ? second flower × 1; d, calyx, dissected × 2; e, corolla dissected × 2; f, ovary in T.S. × 6 (from the type collection). B. *A. womersleyi* R. M. Smith: a, inflorescence × ⅔; b, cincinnus × 1; c, bracteole, dissected × 1; d, remainder of cincinnus, first bracteole removed × 1; e, calyx × 2; f, flower × 2; g, corolla dissected × 2; h, stamen × 4 (fr m the type collection). Both from dried material.

In general facies *A. womersleyi* closely resembles *A. athroantha*. The inflorescence consists of 2 short branches bearing densely congested flowers and both species have long subulate calyx lobes. In *A. womersleyi*, however, the flowers arise in cincinni, there is no prominent anther-crest, the ligule, which is glabrous and up to 7 cm long in *A. athroantha*, is pubescent and 1–2 cm in length, and the leaves have pubescent margins and are glabrous below.

The bladeless leaf sheaths which usually occur at the base of the inflorescence in sect. *Pycnanthus* are developed in *A. womersleyi* into small broadly elliptic leaves and bear rudimentary ligules.

It is a pleasure to name this species after Mr J. S. Womersley, lately Chief of the Forestry Department's Botany Division at Lae. Without his co-operation throughout the years, much recent work on *Alpinia* would have been impossible.

12. Alpinia porphyrea R. M. Smith, **species nova** ob flores in capitulis cincinnorum congestis *A. womersleyi* affinis, sed inflorescentia elongata ramis distantibus habitu robustiore et calycis lobis haud subulatis differt. Fig. 5A.

Herba 2·5 m alta. *Folia* vaginis glabris; ligula c. 1·5 cm longa, emarginata pubescens; petioli ad 15 cm; lamina ad 100 × 10–15 cm, lanceolata, basi rotundata et inaequilateralis, apice ignota, subtus pubescens. *Inflorescentia* ad c. 20 cm, rhachide valida velutina ramos etiam velutinos 3(–6), 4–6 cm longos inter se distantes gerente, ramis capitulo denso 3 × 2·5 cm cincinnorum terminatis. *Flores* rubro-purpurei, in cincinnos saltem 6-floros dispositi; bracteolae tubulares, ad 1 cm, carinatae, glabrae; pedicelli 4–6 mm; calyx vix 1 cm, leviter trilobus; corolla tubo 7–9 mm longo, lobis 8–10 mm ovatis apice rotundatis; labellum lobis corollae plus minusque aequilongum, lineare, emarginatum. *Stamen* aequilongum, filamento dentato 5 mm; anthera pubescens; crista parva emarginata. *Ovarium* 3 cm, glabrum; glandulae epigynae carnosae, 1·5 mm. *Fructus* (fide lectoris) atropurpureus. IRIAN JAYA: Beriat, ± 12 km S of Teminaboean, not rare, flowers entirely reddish-purple, fruits black-purple, 10 m, 20 iv 1958, *Kalkman* 6262 (holo. **L**).

Easily distinguished from the preceding species by the stout elongated inflorescence and much larger leaves.

13. Alpinia werneri Val. in Bot. Jahrb. 52:69 (1914). Fig. 5B.
Syntypes. Papua: Gelustation, Finisterre Mts, 1000 m, viii 1907, *Werner* 170 (*n.v.*); Kami Mts, *Schlechter* 17654 (K).

This species is immediately recognized by the long shaggy hairs which clothe the 6 cm ligule, bracteoles and outside of the corolla lobes. The inflorescence branches are well-formed, c. 0·5 cm in diameter and the cincinni which are subverticillate are from 3–5-flowered.

14. Alpinia subverticillata Val. in Nova Guinea (Botanique) 8:950 (1913). Fig. 5C.
Syntypes. Irian Jaya: s.l., *Versteeg*, 1606 (K); flores lutei, fructus caerulei, s.l., *Versteeg* 1416 (L).

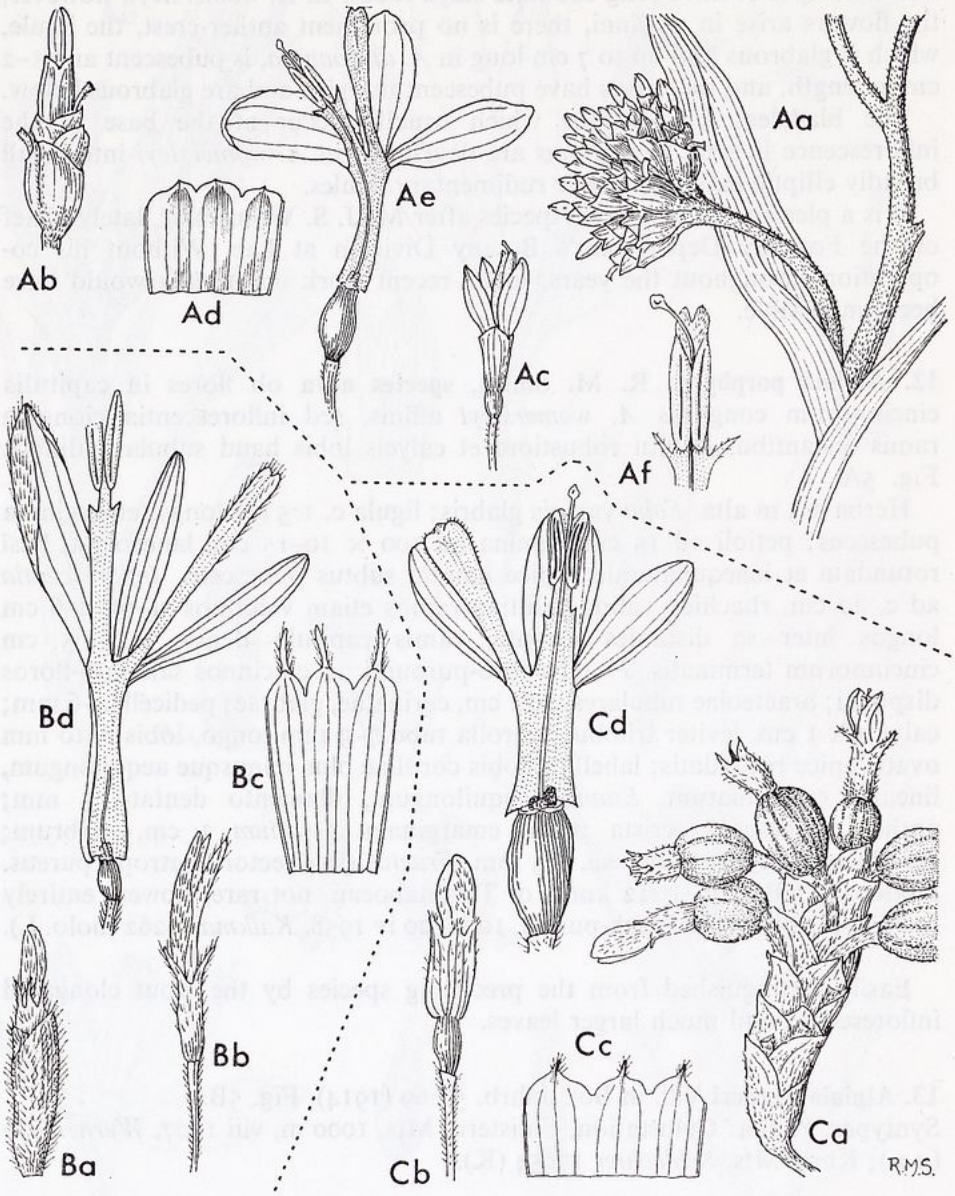

FIG. 5. A. *Alpinia porphyrea* R. M. Smith: a, lower part of inflorescence showing first branch × ⅔; b, cincinnus × 1; c, flower × 1; d, calyx, dissected × 2; e, corolla, dissected × 2; f, anther × 4 (from the type collection). B. *A. werneri* Val.: a, cincinnus × 1; b, flower × 1; c, calyx, dissected × 2; d, corolla, dissected × 2 (from a syntype collection, *Schlechter* 17654). C. *A. subverticillata* Val.: a, cincinnus × ⅔; b, flower × 1; c, calyx, dissected × 2; d, corolla, dissected × 2. (a from a syntype collection, *Versteeg* 1606, b-d from LAE 51716). All from dried material.

Additional material. PAPUA: Western distr., Kiunga, 6° 10′ S 141° 20′ E, fruit yellow white turning bluish, 6 viii 1971, 30 m, *Streimann*, LAE 51716 (LAE); near Ingembit village, 5° 38′ S 141° 00′ E, fruit white, 160 m, 16 vi 1967, *Henty, Ridsdale & Galore*, NGF 33060 (LAE).

A. subverticillata is probably the largest of the New Guinea sect. *Pycnanthus* species. The leaves which are pubescent below, may be up to 2 m long, have petioles of up to 18 cm and there is a conspicuously lanate ligule. All parts of the inflorescence are pubescent and the calyx is distinctly 3-lobed. In the early stages the fruit is white or yellow becoming blue in maturity.

15. Alpinia pulchra (Warb.) K. Schum. in Pflanzenr. Zing. 348 (1904). Fig. 6A.

Basionym: *Hellwigia pulchra* Warb. in Bot. Jahrb. 13:279, 451 (1891). Type of *Hellwigia* Warb., *l.c.*

Syn.: *A. stapfiana* K. Schum. in Pflanzenr. Zing. 347 (1904). Type. Shortland Is., *Guppy* 103 (K).

A. rechingeri Gagnep. in Bull. Soc. Bot. France 55:432 (1908). Type. Shortland Is., *K. & L. Rechinger* 3859 (P).

Type. Papua: Sattelberg, *Warburg* (n.v.).

Material seen. PAPUA: Milne Bay district; Abilete, Rossel Island, 11° 20′ S 154° 10′ E, flowers red, fruit black when ripe, 65 m, 6 xi 1965, *Henty*, NGF 27048 (LAE); Yongga Bay north coast, Rossel Island, 11° 18′ S 154° 09′ E, 5 m, 2 iv 1969, *Mann*, NGF 43296 (LAE); Misima Island, Bwagaio hinterland near goldmine, 10° 40′ S 152° 50′ E, disturbed forest along creek, flowers red, 130 m, 25 x 1971, *Streimann & Lelean*, LAE 52686(LAE, E); Mt Garatun, above Agaun Station, 9° 58′ S 149° 12′ E, disturbed *Castanopsis* forest, flowers red, fruit red, 1220 m, 29 i 1973, *Stevens*, LAE 58091 (LAE, E). BOUGAINVILLE: Tonelei, 6° 44′ S 155° 55′ E, slope in rain forest, flowers white, fruit red to black when ripe, s.l., 9 viii 1969, *Coode, Dockrill & Foreman*, NGF 40389 (LAE, L, E). BRITISH SOLOMON ISLAND PROTECTORATE: Guadalcanal, Monitor Creek, Hidden Valley, common, flowers white, fruit scarlet then black, 230 m, 5 vii 1965, *Whitmore*, RSS 6024 (K, E).

A. pulchra is the only member of sect. *Pycnanthus* dealt with here to extend beyond the New Guinea mainland. It shows some variation in indumentum: the leaves are always pubescent on the midrib below and at the margins but occasionally the entire lower surface is hairy. Similarly the ligule may be glabrous but is not usually so. The strongly branched inflorescence which, as in *A. divaricata* has red-brown or pink branches, is always shortly pubescent but may become more or less glabrous and bears many-flowered (at least 9) cincinni. *A. pulchra* is most readily distinguished from the more westerly *A. subverticillata* (no. 14) on its smaller, less pubescent bracteoles and obscurely or shallowly 3-lobed calyx. The anther-connective is prolonged into a bilobed rather inconspicuous crest.

It is regrettable that *A. pulchra* has not been re-collected from the type locality but there can be little doubt that the specimens collected from Milne Bay represent the same species. The Shortland Island species and the collections from Bougainville and Guadalcanal are clearly the same thing.

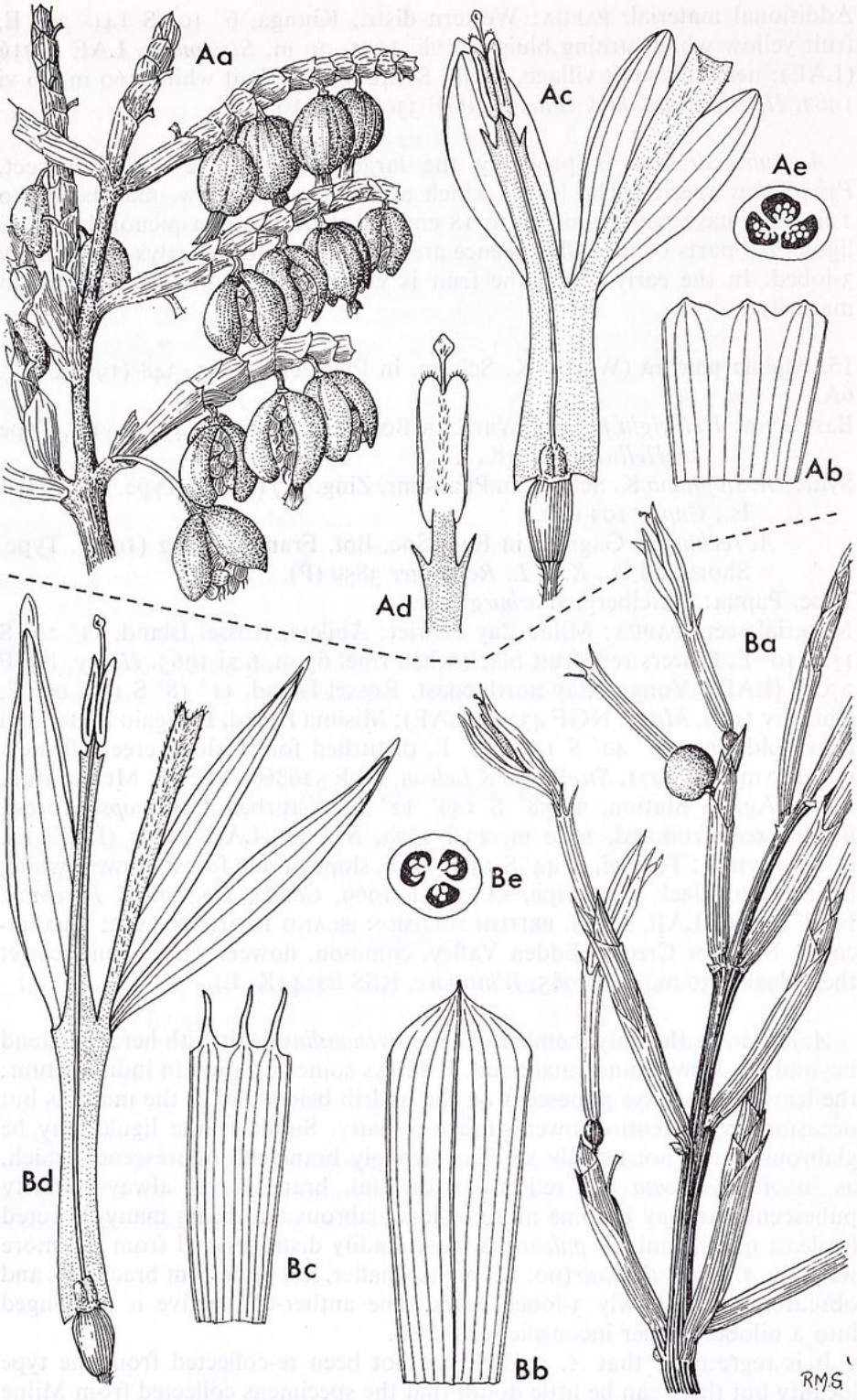

FIG. 6. A. *Alpinia pulchra* (Warb.) K. Schum.: a, fruiting branch × ⅔; b, calyx, dissected × 2; c, corolla, dissected × 2; d, anther, from the back × 4; e, ovary in T.S. × 4 (from NGF 40389). B. *A. stenobracteolata* R. M. Smith: a, branch of inflorescence × ⅔; b, bracteole, dissected × 2; c, calyx, dissected × 2; d, corolla, dissected × 2 (from the type collection). Both from dried material.

A. pulchra is a low altitude species and the inclusion above of LAE 58091 (Mt. Garatun, 1220 m) is therefore questionable. However, from the dried material, this collection cannot be separated from the other citations.

16. Alpinia stenobracteolata R. M. Smith, **species nova** foliis longe petiolatis, inflorescentia valide paniculata et colore fructus. *A. pulchra* similis, sed cincinnis paucifloris, bracteolis longis angustis et calycis lobis longe subulatis differt. Fig. 6B.

Herba ad 4 m alta. *Folia* vaginis glabris vel pubescentibus; ligula 1–1·5 cm longa, integra, marginibus ciliatis vel omnino pubescens; petioli 5–10 cm longi; lamina 40–60 × 9–12 cm, lanceolata, caudato-acuminata, plerumque apice marginibusque interdum etiam in pagina inferiore pubescens. *Inflorescentia* ad c. 30 cm longa, valde paniculata, ramis breviter pubescentibus interdum glabris; vagina magna membranacea suffultis; bracteae primariae minutae, raro 5 mm longae; cincinni saltem triflori, subsessiles; bracteolae anthesi (2–)2·5–3·5 cm longae, basi 3–4 mm latae, ore paulo ampliatae (5–6 mm), plus minusve glabrae vel parce pubescentes, carinatae, apiculo unilaterali praeditae. *Calyx* 2–3 cm longus, glaber, lobis in apiculos subulatos ad 4 mm longos productis. *Corolla* 4–6 cm longa, plerumque extra paulo pubescens; tubus 2–3 cm longus; lobus dorsalis 2–3 cm, cucullatus, laterales breviores; labellum lobis lateralibus paulo brevius, emarginatum, saltem ad apicem leviter pubescens. *Stamen* 2–2·5 cm, filamento c. 1·5 cm dentibus subapicalibus; anthera profunde emarginata. *Ovarium* glabrum, 3–4 mm longum; glandulae epigynae c. 2 mm, carnosae, coalitae. *Fructus* ovatus, 2 × 1 cm, ruber tandem nigrescens.

PAPUA: Chimbu distr., Koronge River, 3° 00′S 144° 50′ E, rain forest, flowers white, tipped red, 3000 m, 27 viii 1968, *Millar*, NGF 37800 (holo. LAE); Western Highland distr., 2 miles E of Tabigua Airstrip Jimi Patrol Post, flower stem deep pink, shading to yellow at end of flowers, local name Timbai, 1300 m, 17–25 i 1969, *Hainsworth* 115 (LAE); Jimi valley, secondary forest, flowers reddish, 1600 m, local name Gungulakka, *Street & Manner* 182 (LAE); Southern Highlands distr., Koroba, Hedemari, disturbed forest on limestone; flowers yellow-green, red tipped, fruit red to black, local name Kwoiyubukunu tubunali, 2500 m, 4 vii 1972, *Powell* 2439 (LAE).

Unlike *A. pulchra* and *A. subverticillata*, *A. stenobracteolata* is a montane species. It shows some variation in indumentum density but the long, narrow bracteoles, up to 3·5 cm long and expanding very little towards the mouth, are distinctive and quite unlike any of the preceding species. As the inflorescence matures, the bracteoles split and, in dried material at least, appear much broader. The flowers are the largest of the section, up to 6 cm long and the lobes of the long narrow calyx terminate in conspicuous (to 4 mm) subulate teeth. There is probably no anther-crest.

17. Alpinia sp. aff. **stenobracteolata**

PAPUA: Eastern Highlands distr., 10 miles SE of Obura, 6° 40′ S 146° 00′ E, primary forest, fruit red, 3300 m, *Hays* 287 (LAE); near Okapa, 3000 m, 2 iii 1966, *Hornibrook* 102 (LAE); *ibidem*, *Hornibrook* 108 (LAE); Aijura ,8 vii 1954, *Womersley*, NGF 6016 (LAE); Morobe distr., Kaindi, above Wau, 7° 20′ S 146° 45′ E, *Nothofagus* forest, flowers creamy white, fruit dark wine

red, 3500 m, 22 v 1963, *van Royen*, NGF 16294 (LAE); Snake river, vicinity Mapos, ix–x 1964, *Hooley* 49 (LAE); Central distr., W slope of Lake Myola No. 2, flowers pink/red, fruit deep red, 1800 m, 18 ix 1973, *Croft & Lelean* 34715 (LAE, E); *ibidem*, flowers light green, fruit glossy deep red, 13 ix 1973, *Croft & Lelean* 34559 (LAE, E).

The above collections, all from montane regions, may represent another undescribed species. All show, at least in the young inflorescence, the elongated narrow bracteoles of *A. stenobracteolata* and all have subulate (but less conspicuously so) calyx teeth. While inflorescence indumentum in *A. stenobracteolata* is inconspicuous or entirely absent, here the inflorescence is clearly pubescent, usually throughout all parts, and the ovary (and the young fruit), is pubescent. The flowers are shorter, particularly the calyx which does not exceed 1 cm. The plants from the Eastern Highlands form a very distinct group but at the southern limit of its range *A.* sp. aff. *stenobracteolata* becomes rather more variable. A single collection, omitted from the above exemplifies this: LAE 58090 collected from 1220 m on Mt Garatun, and from the same locality as LAE 58091, referred to above under *A. pulchra*, shows signs of a small anther-crest; and although the inflorescence is pubescent, there is a glabrous ovary.

18. Alpinia sp. (sect. *Pycnanthus*).
PAPUA: Central distr., E slopes to Lake Myola No. 1, 9° 09′ S 147° 45′ E, 2 m, flowers light pinkish green, fruit dark glossy green, 2100 m, 28 ix 1973, *Croft & Lelean*, NGF 34932 (LAE, E).

This single collection indicates that the dividing line between plants in which the flowers arise singly on the main inflorescence branches and those in which they are borne in cincinni is less than clear-cut.

It is a small-leaved plant, lamina up to 30 × 5 cm, with 2–5 cm petioles and ligules up to 1 cm long. The inflorescence is strongly branched, much in the manner of *A. pulchra*, but the pubescent, funnel-shaped bracteoles (to 2·5 cm long) arise in clusters on the branches and appear to enclose but a single flower. In fact, these bracteoles subtend what seems to be an aborted cincinnus for a second and third bracteole can clearly be seen. Apparently only the first flower develops and without dissection, the plant might easily be taken for a single-flowered species. More material, plus field observations would be welcome.

Acknowledgments

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