

## A REVISION OF *CHIRITA* SECT. *LIEBIGIA* (*GESNERIACEAE*)

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*Chirita* sect. *Liebigia* (*Gesneriaceae*), endemic to Sumatra, Java and Bali, is revised, paying particular attention to inflorescence and anther characters, the latter being illustrated. Whereas a previous worker considered the section to consist of the single species *C. asperifolia*, the present revision recognizes 12 species. Six are newly described (*C. adenonema*, *C. dissimilis*, *C. leuserensis*, *C. praeterita*, *C. tenuipes* and *C. tobaënsis*), and *C. blumei* var. *cordifolia* is given specific rank as *C. neoforbesii*. Notes on the history and nomenclature of sect. *Liebigia* are given in an appendix by B.L. Burtt.

*Keywords.* Bali, *Chirita*, *Gesneriaceae*, Java, *Liebigia*, Malesia, new species, Sumatra, taxonomy.

### INTRODUCTION

The species of *Chirita* D. Don clustered around *C. asperifolia* (Blume) B.L. Burtt, and that occur in Sumatra, Java and Bali, form a well-marked group of coarse woody herbs, thus differing in habit from the rest of the genus. The heterogeneity of *Chirita* has long been known and Endlicher (1841) created the new genus *Liebigia* Endl. to accommodate what is now known as *C. asperifolia* (see Appendix, p. 386). In 1883 Clarke reduced this to sect. *Liebigia* (of *Chirita*). The reinstatement of *Liebigia* at this time is undesirable when the decisive characters of *Chirita* itself are uncertain.

These coarse herbs, so alike in general facies and all reduced to *C. asperifolia* by Wood (1974), fall into two groups distinguished essentially on the form of the anthers: anthers more or less round in outline and lacking an apiculus, as opposed to anthers cordate in outline with a conspicuous apiculus (Fig. 1). Among individual species, the anthers display differences in indumentum that can be very striking.

Species with rounded anthers mostly have hairy calyces (hairs sometimes wanting in *C. asperifolia*) and lack keels on the floor of the corolla tube. Species with cordate, apiculate anthers have glabrous calyces often associated with two keels on the floor of the corolla tube. *Chirita leuserensis* Hilliard and *C. tenuipes* Hilliard, both ill known, appear to lack keels.

Twelve species are recognized here: 1. *C. asperifolia* (Blume) B.L. Burtt, 2. *C. neoforbesii* Hilliard, 3. *C. praeterita* Hilliard, and 4. *C. limans* (Miq.) B.L. Burtt have rounded anthers; 5. *C. dissimilis* Hilliard, 6. *C. polyneura* Miq., 7. *C. glabra* Miq., 8.

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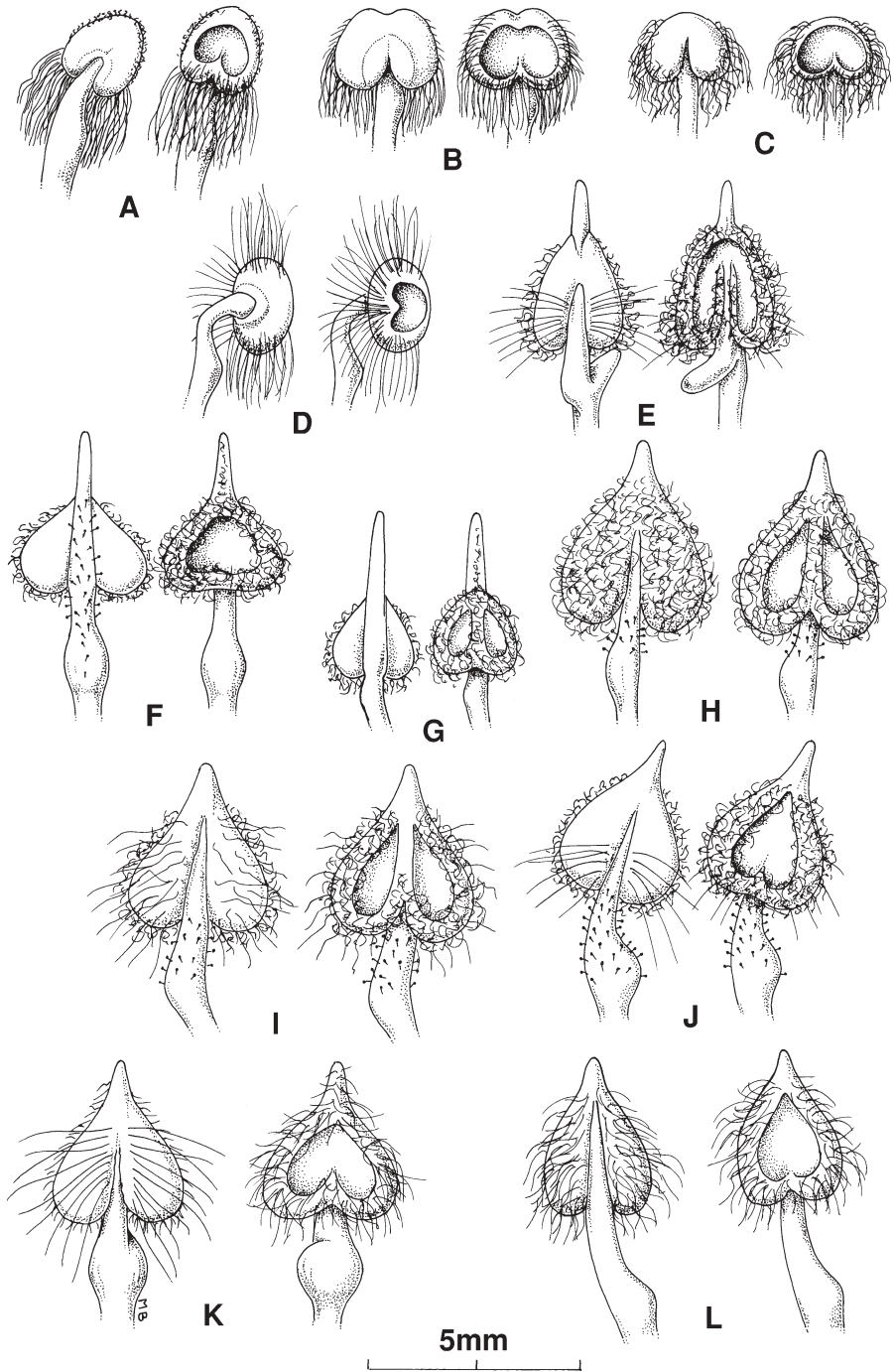


FIG. 1. Front and back views of anthers in sect. *Liebigia*. A, *C. asperifolia*; B, *C. neoforbesii*; C, *C. praeterita*; D, *C. limans*; E, *C. dissimilis*; F, *C. polyneura*; G, *C. glabra*; H, *C. horsfieldii*; I, *C. tobaënsis*; J, *C. adenonema*; K, *C. leuserensis*; L, *C. tenuipes*.

*C. horsfieldii* R. Br., 9. *C. tobaënsis* Hilliard, 10. *C. adenonema* Hilliard, 11. *C. leuserensis* Hilliard and 12. *C. tenuipes* have cordate, apiculate anthers.

The form of the inflorescence can be useful in distinguishing species. In *C. asperifolia* and *C. tenuipes* the peduncles spring from an axillary brachyblast (short shoot). These brachyblasts carry minute rudimentary leaves, and may give rise to tufts of peduncles (up to nine seen in *C. asperifolia*, five in *C. tenuipes*), making both these species particularly easy to recognize. In all other species, one or two, rarely three, peduncles arise directly from the leaf axil. The number of flowers in a cyme can be reduced to one in most species; one to four is common, while *C. leuserensis* may have five and *C. adenonema* nine.

Only three species have been recorded from Java, namely *C. asperifolia*, *C. horsfieldii* and *C. praeterita*. The latter is ill known but occurs in at least Preanger district; it is allied to *C. asperifolia*. All collections of *C. asperifolia* have come from a relatively small area around Bogor. No collections of *Chirita* have been seen from the mountains in Banten district of westernmost Java, yet *C. asperifolia* is found on Krakatau and in southwestern Sumatra. It is interesting that specimens from Krakatau, roughly equidistant from the two large islands, have appressed hairs on the stems, commonplace in Sumatra, but unknown in Java, where the hairs are always patent; this suggests that Krakatau was colonized from Sumatra, not Java. *Chirita asperifolia* is the only species common to both Java and Sumatra, and is one of only two species recorded from the southwestern part of Sumatra, where it is relatively widespread down the west coast mountains from the hinterland of Bencoelen southeast to Mt. Tanggamus. *Chirita neoforbesii* is known with certainty only from Mt. Dempo; its closest ally is *C. asperifolia*.

Sumatra is clearly under-collected. No specimens have been seen from the mountains between Benkulu (Benkoelen), known since earliest colonial times, and the much-visited area around Mt. Kerinci (Korintji etc.); then there is another gap, broken only by an isolated collection of *C. polyneura* on Bukit Sangir, before a cluster of species on the mountains surrounding Bukittinggi (Fort de Kock). These are *C. dissimulans*, *C. glabra*, *C. limans* and *C. polyneura*; *C. limans* and *C. glabra* are known to range as far south as the environs of Mt. Kerinci.

Travelling northwards, there is another distributional gap before reaching Lake Toba, with *C. tobaënsis* on its encircling mountains and as far north as Kutatjane. More than one species may occur there; see the discussion under *C. tobaënsis*. *Chirita leuserensis* is known only from the G. Leuser nature reserves to the northwest of Lake Toba, and *C. tenuipes* from only the Sikundur Forest Reserve northwest of Medan. Thence follows another gap until the environs of Lake Tawar are reached, whence comes the distinctive *C. adenonema*, known also from the eastern side of Lake Toba (see discussion) but not from the very considerable intervening area, which appears to lack any practicable route through its tangle of mountains.

The possibility of hybridization is mentioned under *C. polyneura* and *C. tobaënsis*. Careful recording of the colour of the corolla and its markings may prove helpful in delimiting species.

## TAXONOMY

**Chirita** sect. **Liebigia** (Endl.) C.B. Clarke in DC., Monogr. phan. 5: 122 (1883) (see Appendix). *Liebigia* Endl. (1841).

Type species: *Liebigia speciosa* (Blume) Endl. (= *Chirita asperifolia* (Blume) B.L. Burt).

Coarse herbs, leaves opposite, subequal, more or less asperous above. Flowers in reduced cymes, axillary, sometimes arising from a small brachyblast; bracts paired, either linear-lanceolate and margins not contiguous or broadly lanceolate to suborbicular, margins of each pair contiguous and often partly connate; calyx bilabiate in *C. limans*, otherwise subequally 5-lobed; corolla tube ventricose on anticous side; limb bilabiate; stamens 2, anthers cohering face to face at tips. Fruit an elongate capsule splitting into 2 valves; seeds minute, ellipsoid.

*Key to species*

- 1a. Anthers rounded, without an apiculus \_\_\_\_\_ 2  
 1b. Anthers cordate, with a distinct apiculus \_\_\_\_\_ 5
- 2a. Bracts linear-lanceolate, not contiguous; calyx distinctly 2-lobed \_\_\_\_\_  
 \_\_\_\_\_ **4. C. limans**
- 2b. Bracts broadly lanceolate to suborbicular, margins of each pair contiguous, sometimes partly connate; calyx distinctly 5-lobed \_\_\_\_\_ 3
- 3a. Peduncles 2–9 in each leaf axil, springing from a small brachyblast \_\_\_\_\_  
 \_\_\_\_\_ **1. C. asperifolia**
- 3b. Peduncles 1 or 2 in each leaf axil, springing directly from axil (no brachyblast)  
 \_\_\_\_\_ 4
- 4a. Bracts ovate-oblong, c.10 × 8mm, membranous, margins cohering, with delicate hairs to 0.8mm long outside, inside glabrous \_\_\_\_\_ **2. C. neoforbesii**
- 4b. Bracts ovate-acuminate, c.6.5–7 × 2.6–3mm, foliaceous, margins not cohering, outside coarse hairs to 0.5mm long, inside minute coarse hairs on upper part  
 \_\_\_\_\_ **3. C. praeterita**
- 5a. Vegetative parts conspicuously pubescent \_\_\_\_\_ 6  
 5b. Vegetative parts very sparsely hairy \_\_\_\_\_ 10
- 6a. Bracts 5–10mm broad, tightly embracing calyx; filaments glabrous; hairs on stem strongly appressed \_\_\_\_\_ **5. C. dissimilis**
- 6b. Bracts (7–)10–20mm broad, inflated at maturity (that is, standing away from calyx); filaments glandular at least at apex; hairs on stem patent \_\_\_\_\_ 7
- 7a. Anthers either glabrous on the backs (except for minute glandular hairs on the connective), or with long (to 2mm) delicate hairs fringing the connective (careful observation needed) \_\_\_\_\_ 8

- 7b. Anthers with matted crimped hairs on the backs \_\_\_\_\_ 9
- 8a. Anther connective glandular-puberulous, without fringe of long hairs; hairs on stem 2–3mm long \_\_\_\_\_ **6. *C. polyneura***
- 8b. Anther connective without glandular hairs, but with fringe of delicate acute hairs to 2mm long; hairs on stem to 1–1.5mm long \_\_\_\_\_ **10. *C. adenonema***
- 9a. Keels on floor of corolla tube obscure, c.4mm long; both faces of anthers thickly clad in white, matted crimped hairs \_\_\_\_\_ **8. *C. horsfieldii***
- 9b. Keels on floor of corolla tube conspicuous, c.7mm long; inner face of anthers thickly clad in white, matted crimped hairs, outer face with crimped rufous (at least when dry) hairs adjacent to connective \_\_\_\_\_ **9. *C. tobaënsis***
- 10a. Peduncles filiform (c.0.2–0.4mm in diam.), 1-flowered, springing from small axillary brachyblast \_\_\_\_\_ **12. *C. tenuipes***
- 10b. Peduncles stouter (c.1mm in diam.), 1–5-flowered, springing directly from leaf axil (no brachyblast) \_\_\_\_\_ 11
- 11a. Leaf margins crenulate-serrulate, lateral veins 6–8 each side of midrib; bracts c.5–8 × 7.5–8mm; anther with apiculus accounting for half its length, connective glabrous \_\_\_\_\_ **7. *C. glabra***
- 11b. Leaf margins subentire, lateral veins 10 or 11 each side; bracts c.12–16 × 10–16mm; anther with short apiculus, long delicate hairs fringing connective \_\_\_\_\_ **11. *C. leuserensis***

**1. *Chirita asperifolia*** (Blume) B.L. Burt, Notes Roy. Bot. Gard. Edinburgh 24: 41 (1962). **Fig. 1A.**

Type: Java, *Blume* (L).

Syn.: *Agalmyla asperifolia* Blume, Bijdr. Ned. Ind. 767 (1826).

*Busea? asperifolia* (Blume) Miq., Fl. Ind. Bat. 2: 733 (1858).

*Dichrotrichum asperifolium* (Blume) C.B. Clarke in DC., Monogr. phan. 5: 54 (1883).

*Tetradema asperifolium* (Blume) Schltr., Notizbl. Bot. Gart. Mus. Berlin 7: 361 (1920).

*Didymocarpus barbatus* Jack, Trans. Linn. Soc. London 14: 38 (1825), non *Chirita barbata* Sprague. Type destroyed (see text below).

*Tromsdorffia speciosa* Blume, Bijdr. Ned. Ind. 763 (1826), non *Chirita speciosa* Kurz. Type: *Blume* (L).

*Liebigia speciosa* (Blume) Endl., Gen. Suppl. 1: 1407 (1841).

*Chirita blumei* C.B. Clarke in DC., Monogr. phan. 5: 122 (1883). Type as for *Tromsdorffia speciosa*.

*Chirita spectabilis* Miq., Fl. Ind. Bat. Suppl. 564 (1861). Type: Sumatra, prov. Palembang, prope Muara-duwa, *Teysmann* (fragment L).

*Chirita forbesii* S. Moore, J. Bot. Lond. 37: 175 (1899). Type: Sumatra, Mt. Tengamoes [G. Tangamus 5°25'S, 104°42'E], Lampongs, 3000ft, 1881, *Forbes* 1830 (holo. BM; iso. L, FI [n.v., photo. E]).

*Chirita forbesii* Ridl., J. Straits Branch Roy. Asiat. Soc. 44: 60 (1905), non S. Moore (1899). Type: Sumatra, near G. Meraksa [c.3°45'S, 103°E], Lintang river, 900ft, flowers white, *Forbes* 2579 (BM, lecto.).

*Chirita ridleyana* S. Moore, J. Bot. 63 (Suppl.): 74 (1925). Type as for *C. forbesii*.

Coarse herb or subshrub, stems 0.5–2m long, scarcely branched, villous, hairs patent or sometimes curving upwards (Sumatra), acute, to 1.5–2.5mm long, underlain by minute hairs, glabrescent. *Leaves* opposite, anisophyllous (mostly one c. half size of other), largest c.100–240 × 55–115mm, narrowly to broadly elliptic or ovate, slightly falcate or not, apex acuminate, base equal or unequal, cuneate to rounded, margins obscurely crenulate or serrulate, lateral veins 10–14, upper surface clad in coarse, harsh acute hairs to 1.5–3mm long, each with a conspicuous multicellular cushion-base, lower surface with more delicate hairs to 1–2mm long; petiole 10–50mm, hairs coarse, patent, acute. *Inflorescence*: 2–9 filiform peduncles from very short axillary brachyblasts, 1- or 2-flowered, occasionally 3- or 4-flowered; peduncles c.18–33mm long, scattered acute hairs to 0.5mm. *Bracts* paired, initially enfolding buds, c.4.5–10 × 4–8mm, ovate to suborbicular, apiculate, margins connate up to c. half their length, occasionally scarcely joined, base circumscissile, soon caducous, outside glabrous to sparsely and shortly hairy, inside clad in globular glands. *Pedicels* c.5–17mm long, with sparse short acute hairs. *Calyx* funnel-shaped, initially enfolding corolla, tube c.6–8mm long, 5-lobed, lobes 3–6 × 2–4mm, deltoid, anticous ones smaller than posticous and often partly connate, outside glabrous to sparsely and shortly hairy, inside conspicuous globular glands. *Corolla* c.33–45mm long, tube c.27–33mm, narrowly cylindrical at base then abruptly dilated and ventricose on anticous side, bilabiate, anticous lobe c.7–10 × 7–11mm, posticous lobes 5–6 × 6–11mm, all lobes suborbicular, glabrous to sparsely and obscurely hairy outside, glabrous inside except for large patch of minute glandular hairs on roof of tube near mouth, lobes white, tube purple, with 2 pale yellow lines on floor. *Stamens* 2, inserted c.10mm above base of tube, filaments c.11–13mm long, slightly swollen in upper part, glabrous except immediately adjacent to anthers, anthers included, c.1–2 × 1–2mm, suborbicular, cohering face to face, densely and conspicuously bearded at base, the hairs sometimes extending to apex of filament, purple when fresh, rufous when dry, short white-woolly hairs crowded on outer margins of thecae; lateral staminodes c.6–7mm long, crowned with a tuft of hairs; posticous staminode less than 1mm. *Disc* c.2 × 2mm, cupular. *Ovary* c.22 × 1.4mm, glandular-pubescent but glabrous on stipe. *Style* c.1mm. *Stigma* c.1 × 2mm, composed of two rounded lobes (fish-tailed). *Capsule* c.50–90mm long, more or less square in section, splitting into 2 valves. *Seeds* c.0.25mm long, elliptic.

*Selected specimens seen*. SUMATRA. Kepahiang [3°39'S, 102°34'E], *de Voogd* 1298 (L); Moeara doea [Muaradua, 4°32'S, 104°05'E], *de Voogd* 395 (L); NW side of Lake Ranau [4°50'S, 103°55'E], near Banding Agoeng [Agung], *Steenis* 3257 (L); Bukit Sipulang [5°03'S, 104°04'E], *Afriastini* 665 (L); Liwa [5°04'S, 104°06'E], *de Voogd* 40 (K, L).

KRAKATAU. Krakatau, *Boedijn* 2909 (L).

JAVA. Nanggoeng [Nanggung], Mt. Merapa [6°36'S, 106°32'E], *Steenis* 17363 (L); Tjibodas [Cibodas] [6°33'S, 106°40'E], G. Gede, *van Ooststroom* 13123 (L), *ibid.*, *Boerlage* s.n. (K, L), *ibid.*, *Woods* 1071 (E); G. Salak [6°42'S, 106°44'E], Tjapus [Capus] stream, *Schiffner* 2550 (L), *ibid.*, *Cronk* 169 (E), *ibid.*, *Murata et al.* 1751 (K, L); Kota Batu [6°38'S, 106°51'E], *Raap* 83 (L); Gadok [6°39'S, 106°51'E], Tjiboeloe [Cibulu], *Backer* s.n. (K, L); Tangkoeban [Tangkuban] [6°44'S, 107°36'E], *Veen* 5956 (L).

For misuse of the name *Agalmyla asperifolia* see Appendix (p. 386).

The only species in this Sumatran–Javan group with anthers similar in size and shape to *C. asperifolia* is *C. limans*, but the anthers differ in details of indumentum (Fig. 1A,D). Also, *C. limans* is easily recognized by its small linear-lanceolate bracts and short, upward-pointing, strongly appressed hairs on the stem.

The relatively small, almost round anthers of *C. asperifolia*, thickly bearded at the base, are completely distinctive and permit accurate determination of specimens. For example, the isotype of *C. spectabilis* in the Leiden herbarium is fragmentary and comprises a drawing of a leaf, a capsule and a bract, together with a bud that includes bract, calyx and corolla scarcely damaged by insect predation, ample to determine the specimen unequivocally as *C. asperifolia*. However, in very young buds (of the order 1–1.5mm long) the tufts of hairs at the base of the anthers may not yet be developed. This is so in the type of *C. asperifolia* as well as that of *C. ridleyana*. In the latter, only anthers in young buds, on peduncles as yet scarcely developed, have been seen, but other characters, including several peduncles arising from brachyblasts, permit a confident reduction of the name to synonymy.

Spencer Moore (1899) described *C. forbesii* as a species 'treacherously like *C. blumei* Clarke [in synonymy above] but the free bracts must keep it out of *Liebigia*'. Forbes' collection in the Natural History Museum (BM), which bears Spencer Moore's hand, does indeed have the bracts free or very nearly so (they may be joined for c.0.5mm) but an isotype in Leiden has at least one pair of bracts joined for c.2mm, while some on the type of *C. blumei* are joined for c.1.5mm. No weight can be placed on this character nor on Moore's other supposed differences: 'corolla a little shorter and narrower in the tube', 'anthers smaller and bearded on the connective', and 'subterete capsule' (the latter is imaginary). Forbes' collection has no locality, but during 1881–2 he climbed Mt. Dempo and visited Lake Ranau, both inside the geographical range of *C. asperifolia*.

*Didymocarpus barbatus* Jack lacks a type, but his detailed description fits *C. asperifolia*, and includes 'filaments of both [anthers] are furnished at the summit with a tuft of wool'. Van Steenis notes, 'William Jack collected from 1819 to 1822 north of the Ranau region in the Residency of Benkoelen (Benkulu); his valuable collection perished in the *Fame* catastrophe' (van Steenis, 1945, p. 337).

*Chirita asperifolia* is the only species in this group known to occur on both Java and Sumatra. Its full range appears to be from around Kepahiang near Benkulu (Benkoelen) in the Barisan range, south and east to the environs of Muaradua, Lake Ranau, Bukit Sipulang and Liwa, Krakatau (in the Sunda Straits), and then Java,

with most collections around Bogor or Gunung Gede (Cibodas), with one slightly further east at Tankuban. No collections have been seen east of 108°E.

This species is easily recognized not only by its distinctive anthers, but also by the tufts of peduncles arising from short axillary brachyblasts; these are sometimes minutely leafy. Similar brachyblasts have been noticed only in *C. tenuipes*, which otherwise differs from *C. asperifolia* in many characters.

*Chirita asperifolia* is a forest plant, occurring in open places and along margins, also on river banks and cliffs, between c.500 and 1400m above sea level.

## 2. *Chirita neoforbesii* Hilliard, nom. et stat. nov. Fig. 1B.

A *C. asperifolia* (Blume) B.L. Burt pubescentia glandulosa praesertim in axibus inflorescentiae bracteis calyce corolla induta (nec pilis eglandulosis tantum), pedunculis in axillis foliorum solitariis (nec pluribus in brachyblasto parvo), antheris albo-barbatis in marginibus exterioribus et ad basin faciei interioris thecarum (nec basi crista pilorum coloratorum praeditis).

Type: Sumatra, hills at foot of Mt. Dempo, Passoemah, 4000ft, 1881, flowers purple, *H.O. Forbes* 2244 (holo. BM; iso. L, 2 sheets, one with full label written by Forbes, FI n.v., photo. E).

Syn.: *Chirita blumei* C.B. Clarke var. *cordifolia* S. Moore, *J. Bot* 63 (Suppl.): 74 (1925), type as above; non *C. cordifolia* W.T. Wang, *Bull. Bot. Res. North-East Forest Inst.* 1(4): 51 (1981).

'Shrub, spreading and descending' (Forbes), height unknown, stems thickly clad in patent hairs c.0.5–2mm long, mixed acute and gland-tipped, glandular particularly on young parts. *Leaves* opposite, anisophyllous (one up to c. half size of other), largest 90–145 × 50–68mm, ovate, apex acuminate, base more or less equal, truncate-cordate, margins subentire to crenate-serrulate, lateral veins 9, upper surface scabrid, clad in acute hairs to 1mm long from a multicellular cushion-base, well scattered among crowded bases, each tipped with a minute acute hair, lower surface softly pubescent with fine acute hairs to 1mm long (on young leaves in particular there may be gland-tipped hairs to 1.5mm long on both surfaces and margins); petiole c.12mm, thickly clad in acute hairs to 2mm, sometimes with gland-tipped hairs as well. *Inflorescences* solitary in each leaf axil, cymose, basically with flowers paired at apex of peduncle, flanked each side by an axis terminating in a 3-flowered cyme; peduncle c.40–75mm long, both it and axes thickly clad in mixed acute and gland-tipped hairs to 1.2mm. *Bracts* paired, initially enfolding buds, at maturity remaining joined c. halfway, c.10 × 8mm, oblong-obovate, outside with plentiful fine acute hairs to 0.8mm mixed with gland-tipped ones, inside glabrous. *Pedicels* of primary pair of flowers 10–15mm long, in ultimate cymes shorter, all densely pubescent, hairs mostly glandular. *Calyx* funnel-shaped, initially enclosing corolla, tube c.9mm long, lobes c.4–5 × 2–3.5mm, deltoid, outside densely pubescent, hairs to 1.2mm, mixed acute and gland-tipped, inside with relatively large-headed glandular hairs c.0.1mm long. *Corolla* 'purple' (Forbes), c.45mm long, tube c.30mm, narrowly



cylindric at base then abruptly dilated and ventricose on anticous side, bilabiate, anticous lobe  $c.9 \times 13$ mm, posticous lobes  $c.9 \times 13$ mm, all lobes suborbicular, corolla pubescent outside, hairs mixed acute and gland-tipped to  $c.0.5$ mm long, together with scattered gland-tipped hairs to 2mm long, these most plentiful on lower part of tube, inside glabrous except for patch of minute glandular hairs on roof of tube. *Stamens* 2, inserted  $c.10$ mm above base of tube, filaments  $c.13$ mm long, slightly swollen above the middle, glabrous; anthers included,  $c.2 \times 2.5$ mm, suborbicular, cohering face to face, outside glabrous, inside densely white-bearded, hairs at base to 2mm long,  $c.2$ mm on margins of thecae; lateral staminodes  $c.2$ mm long crowned with tuft of long hairs; posticous staminode not seen. *Disc*  $c.1.2 \times 2.2$ mm, cupular. *Ovary*  $28 \times 1.2$ mm, style  $c.2.2$ mm, both glandular puberulous; stipe short, glabrous. *Stigma*  $c.1.5 \times 3$ mm, composed of two rounded lobes (fish-tailed). *Capsule* (immature)  $c.80 \times 2$ mm.

The description above is based on the type collection, comprising three good sheets. A collection made by T.J. Stomps (*Stomps* s.n., L) is probably conspecific with Forbes' plant, although it is more villous, the stems being clad in acute hairs to 4mm long and the upper leaf surface is thickly clad in acute hairs to 2mm long, soft to the touch, and thus contrasting with the scabrid leaf surface of *Forbes* 2244; the leaf margin is distinctly serrate (not obscurely so), but little weight can be placed on this character. The Stomps collection agrees with the type perfectly in inflorescence, bracts, calyx, corolla and anthers, also the glandular indumentum. Nearly ripe capsules are present, and there are several loose corollas in the pocket on the sheet.

Unfortunately, the provenance of Stomps' collection is in doubt. The typed label gives the locality as 'Sumatra's Oostkus, waarschijnlijk G. Sibajak'. This mountain lies at  $3^{\circ}11'N$ ,  $98^{\circ}31'E$ , roughly 1000km from G. Dempo at  $4^{\circ}02'S$ ,  $103^{\circ}09'E$ . But Stomps also visited Sumatra's west coast (Fl. Mal. 1: 508, 1950), including Bukittinggi (Fort de Kock  $0^{\circ}19'S$ ,  $100^{\circ}22'E$ ) roughly half that distance northwest of G. Dempo; many collections of several species of *Chirita* have been made in the vicinity of Bukittinggi. This problem serves to emphasize that knowledge of *Chirita* in Sumatra is still elementary.

*Chirita neoforbesii* was originally described as a variety of *C. blumei*, that is *C. asperifolia*, and that is where its affinity lies. It differs from *C. asperifolia* in its glandular indumentum (uncommon in this group of species), in its peduncles solitary in the upper leaf axils (not several springing from a brachyblast), and in its anthers being densely long-bearded on the margins and at the base of the inner face of the thecae; the beard is white (not coloured).

The epithet '*cordifolia*', an apt one, is not available at species rank. Two species of *Chirita* have previously been named after H.O. Forbes, an eminent traveller and collector in the Malay Archipelago towards the end of the nineteenth century, but have passed into synonymy. This is an opportunity to commemorate him. His book, *A Naturalist's Wanderings in the Eastern Archipelago* (1885), is not only interesting and informative but also provides a detailed map of southern Sumatra showing his itinerary.

**3. *Chirita praeterita* Hilliard, sp. nov. Fig. 1C.**

A *C. neoforbesii* Hilliard caulibus pilis parcioribus brevioribus ad 1mm longis (nec 2mm), pilis in pagina superiore foliorum ad 0.3mm longis (nec pilis densis ad 1.2mm longis), bracteis foliaceis (nec membranaceis) inter se liberis (nec connatis) externe et in marginibus pilis grossis ad 0.5mm longis (nec pilis tenuibus ad 0.8mm) in dimidio inferiore glabris (nec omnino glabris) distinguitur.

Type: Java, Mt. Mandala, zone trop., c.800–1200m, 8 xii 1908, *Collector unknown* in herb. d'Alleizette S393 (holo. L).

Coarse branched herb, height unknown, stems scabrid, clad in coarse acute hairs to 1mm well scattered among much shorter hairs, these mostly comprising a cushion-base tipped with a minute point, some gland-tipped hairs present, particularly on young parts. *Leaves* opposite, subequal to anisophyllous, then one as little as half size of other, largest 100–175 × 50–75mm, ovate, apex long-acuminate, base more or less rounded, oblique or not, margins obscurely to distinctly serrulate, lateral veins 8 or 9, upper surface scabrid, clad in coarse acute hairs to 0.5mm long well scattered among much shorter hairs similar to those on stem; margins with plentiful acute curved hairs to c.0.8mm, gland-tipped hairs occasionally present, lower surface softly pubescent, hairs to c.0.5mm; petiole c.7–18mm long, thickly clad in acute hairs to 1mm, sometimes gland-tipped hairs as well. *Inflorescence* cymose, lax, peduncles solitary or paired in each leaf axil, 2–4-flowered; peduncle c.30–70mm long, both it and axes thinly clad in acute hairs to 0.3mm, mostly much shorter, together with scattered gland-tipped hairs. *Bracts* paired, quickly caducous and only 3 pairs seen, c.6.5–7 × 2.6–3mm (possibly growing larger), leaf-like, lower margins contiguous but not connate, lower half of bract concave, enfolding buds, concavity glabrous, upper half with coarse acute hairs to c.0.1mm, outside and on margins with coarse acute hairs to 0.5mm with some gland-tipped hairs. *Pedicels* 4–18mm long, pubescent, hairs to 0.5mm, mixed acute and gland-tipped. *Calyx* funnel-shaped, initially enclosing corolla, tube c.4–6mm long, lobe c.2–3 × 2mm, deltoid, outside with acute hairs to 0.5mm mixed with a few gland-tipped, inside minute glandular hairs. *Corolla* c.40mm long, tube c.28mm, narrowly cylindric at base, then abruptly dilated and ventricose on anticous side, bilabiate, anticous lobe 8 × 10mm, posticous lobes 8 × 9mm, lobes suborbicular, corolla pubescent outside, hairs mixed acute and gland-tipped to 0.8mm, inside glabrous except for minute glandular hairs on roof of tube. *Stamens* 2, inserted c.10mm above base of tube, filaments c.13mm long, slightly swollen above the middle, glabrous; anthers included, c.1.5 × 2mm, suborbicular, cohering face to face, outside glabrous except on lateral margins of thecae, there and inside densely bearded with white woolly hairs; lateral staminodes c.2mm long, crowned with a tuft of long hairs, posticous staminode c.1mm. *Disc* 2 × 1.8mm, cupular. *Ovary* c.22 × 1mm, *style* c.2mm, both glandular-pubescent; stipe short, glabrous. *Stigma* c.1.5 × 2mm, composed of 2 rounded lobes (fish-tailed). *Capsules* (2 seen) c.80 × 2.5mm. *Seeds* shed.

*Additional specimens.* JAVA. Preanger, Pangentjongen [probably close to Cibodas], 19 i 1897, *Koorders* 26014 $\beta$  (L); 'Sumatra' [but surely Java], *Korthals* s.n. (L).

Only scanty material of *C. praeterita* (Latin *praetero* = to escape notice) has been seen: *Koorders* 26014 bears several peduncles, but only one calyx and ovary; *Korthals* s.n. has only old capsules, although calyces are fortunately still present. Flower colour was not recorded, but those on the type have dried with a purplish tube and a pale limb. Also, *Korthals*' specimen has no locality and the printed label records 'Sumatra'. This is surely a misuse of the label, just as *Korthals* 162 (*C. limans*) is labelled 'Java', when its provenance is Sumatra.

The relationship of *C. praeterita* appears to lie with *C. neoforbesii*: they have similar anthers but they differ not only in indumentum, particularly on stems and peduncles (both shorter and sparser in *C. praeterita*), but most markedly in their bracts. Those of *C. praeterita* fall very quickly, but fortunately a young inflorescence with three pairs of bracts survives on the type sheet. They are distinctly foliaceous, being ovate-acuminate, the pairs not cohering at the base; the outer surface and margins are clad in coarse acute hairs. This is in contrast to the bracts of *C. neoforbesii*, which are ovate-oblong, membranous, cohere along the margins (as in most species under discussion here), and are clothed outside in delicate hairs. The inside of the bracts of *C. praeterita* are glabrous below, where they embraced the buds, but the free part above is clad in minute coarse hairs, unique among the species dealt with here. The bracts of *C. neoforbesii* are glabrous within.

We have been unable to trace Mt. Mandala (type locality), but G. Mandalawangia lies at 6°46'S, 106°57'E, near Bogor, and there is another at 7°05'S, 107°51'E. Gunung Mandalagiri lies at 7°21'S, 107°48'E. It is therefore possible that *C. praeterita* occurs in the mountains around Bogor and/or in Preanger Province, and that is where it should be sought.

**4. *Chirita limans* (Miq.) B.L. Burtt, Notes Roy. Bot. Gard. Edinburgh 21: 196 (1954). Fig. 1D.**

Type: Sumatra, uit de Kloof van de Singalang, cor[olla] caerulea, *Teysmann* H.B. 2002 (U, fragment L).

Syn.: *Bilabium limans* Miq., Fl. Ind. Bat. 2: 730 (1858).

*Chirita bilabium* C.B. Clarke in DC., Monogr. phan. 5: 127 (1883), nom. illegit.

*Roettlera limans* (Miq.) Kuntze, Revis. Gen. Pl. 2: 476 (1891).

Herb or subshrub, stems simple or branched, 15cm–2m long, clad in coarse acute hairs to 0.5–0.8mm long, upward-pointing and appressed, rarely patent. *Leaves* opposite, slightly to strongly anisophyllous, largest 55–150 × 20–47mm, elliptic to narrowly ovate, apex acuminate, base cuneate, margins serrulate, lateral veins 9 or 10, upper surface clad in harsh, coarse acute hairs to c.0.8mm long, with or without a multicellular cushion-base, lower surface clad in much finer hairs to 0.8–1mm long; petiole 5–45mm long, hairs more or less appressed, acute. *Inflorescence*: 1 or occasionally 2 peduncles in each leaf axil, mostly 1-flowered, rarely 2-flowered, peduncles c.5–15mm long, hairs more or less appressed, acute, to 0.5mm. *Bracts*

paired, c.6–9 × 1–2mm, linear-lanceolate, soon caducous, glabrous inside, outside upward-pointing acute hairs to 0.5mm. *Pedicels* 3–10mm, pubescent; hairs acute, upward-pointing, appressed. *Calyx* white, translucent, bilabiate, initially enfolding corolla, tube 7–10mm, funnel-shaped, lobes 2, 7–10 × 4–10mm, deltoid, strongly apiculate, outside and margins clad in acute, upward-pointing hairs to 0.5mm, inside very minutely gland-dotted. *Corolla* c.44–53mm long, tube 29–38mm, narrowly cylindrical at base (10mm long) then funnel-shaped, ventricose on anticous side, bilabiate, anticous lobe c.9–10 × 10–13mm, posticous lobes c.8–9 × 9–10mm, all lobes suborbicular, glabrous outside, inside with glandular-puberulous patch on roof of tube, lobes ‘deep blue-violet’ or white, tube paler. *Stamens* 2, inserted c.10mm above base of tube, filaments c.11–14mm, swollen below the anthers, glabrous, anthers 1.25–1.5 × 2.25–2.5mm, elliptic, cohering face to face at their tips, thecae densely bearded nearly all over, hairs c.2mm long, rufous when dry; lateral staminodes 6–9mm long crowned with a tuft of hairs; posticous staminode c.1mm. *Disc* c.1 × 1mm, cupular. *Ovary* c.20 × 0.8mm, shortly stipitate, glandular-puberulous, stipe glabrous. *Style* c.3–5mm, glandular-puberulous. *Stigma* c.1.25–1.5 × 2.25–3mm, composed of 2 rounded lobes (fish-tailed). *Capsule* c.83–120mm long, more or less square in section, splitting into 2 valves. *Seeds* c.0.25mm long, ellipsoid.

*Specimens seen.* SUMATRA. G. Singgalang [0°24'S, 100°21'E], *Schiffner* 2553 (L), *ibid.*, *Beccari* 37 (L); Ajer [stream] Mantjoer [Mancur] [lower slopes of G. Singgalang?], *Beccari* 746 (L); Lembah Anai (Anai waterfall), between Padang and Bukittinggi, *Cronk* 72 (E), *ibid.*, *Cronk* 81 (E); G. Merapi [0°23'S, 100°28'E], *Bünnenmeijer* 4794 (L), 1261 (L), 4487 (L); Mt. Sago [0°14'S, 100°38'E], *Maradjo* 150 (L); G. Marapalam [not traced], *Kleinhoonte* 557 (L). Without precise locality: *Korthals* s.n. (L); *sine coll.* 162 (L).

The anthers of *C. limans* are of the same type as those of *C. asperifolia* in that they are relatively small and rounded, completely lacking an apiculus. They differ in details of indumentum (Fig. 1D). *Chirita limans* is further distinguished from *C. asperifolia* by the short appressed (rarely spreading) hairs on stems, petioles, peduncles and pedicels, peduncles usually solitary in the leaf axils from which they spring directly (no brachyblasts), linear-lanceolate bracts that are always free from each other, bilabiate calyx, and (sometimes) blue-violet corolla lobes.

*Borssum Waalkes* 2865 (L), collected between Kaju Arau and Bukit Sipatai (precise locality G. Talang, c.1°06'N, 102°12'E, fide de Wilde, L), c.1000m, 3 vii 1953, differs from typical *C. limans* in its denser indumentum, the hairs spreading, not appressed, and white flowers, although there are too few records of flower colour to be certain that this is not a variable character. In all essential characters, the specimen is indistinguishable from *C. limans*.

*Chirita limans* is known only from the mountains north to northeast of Padang, Sumatra, including G. Singgalang and G. Merapi.

##### 5. *Chirita dissimilis* Hilliard, *sp. nov.* Fig. 1E.

A *C. polyneura* Miq. caulibus pilis ascendentibus arcte appressis ad 1mm longis (nec pilis patentibus 2–3mm) indutis; pedunculis 8–18mm longis (nec 12–45mm), bracteis

ellipticis 5–10mm latis calycem arcte amplectentibus (nec bracteis suborbicularibus 10–20mm latis inflatis), antheris pilis paucis acutis c.1.5mm longis in marginibus connectivorum exceptis in dorso et filamentis glabris (nec connectivo glanduloso-puberulo pilis breviter deorsum in filamentis extendentibus) distinguenda.

Type: Sumatra, west coast, Umbilin, c.400m, 24 vi 1953, *Borssum Waalkes* 2281 (holo. L, 2 sheets; iso. K).

Coarse herb or subshrub, height unknown, branched, stems thickly clad in strongly appressed, crowded, upward-pointing, curved acute hairs to 1mm long. *Leaves* opposite, anisophyllous, one leaf c. one-third or more the size of the other; largest leaves 70–125 × 27–46mm, elliptic, apex acute to shortly acuminate, base cuneate, margins serrulate, lateral veins 10–12, upper surface clad in coarse acute hairs to 1mm long somewhat scattered among many much shorter hairs, lower surface densely pubescent, hairs much finer, to c.0.8mm long; petiole 15–25mm long, hairy as stem. *Inflorescence*: usually 1, occasionally 2, peduncles in each leaf axil, mostly 1-flowered, occasionally 2- or 3-flowered, peduncles 8–18mm long, with acute hairs to c.0.5mm. *Bracts* paired, tightly embracing calyx, 11–17 × 5–10mm, elliptic, apex subacute, margins connate at least halfway along one margin, free or shortly connate on other, outside and on margins with acute hairs to 0.15–0.4mm long, inside glabrous. *Calyx* funnel-shaped, tube c.10mm long, lobes c.5–7 × 3–4mm, deltoid, outside glabrous, inside with minute globular glands on tube. *Corolla* c.40mm long, tube 28mm, cylindrical at base then abruptly ventricose on anticous side, limb bilabiate, anticous lobe c.9 × 11mm, posticous lobes c.8 × 10mm, all lobes suborbicular, corolla white, glabrous outside, inside with palate of glandular hairs c.0.1mm long on roof of tube, 2 keels (invaginations) c.5mm long on floor of tube at level of anthers. *Stamens* 2, inserted c.10mm above base of tube, filaments c.11mm long, swollen below the anthers, anthers included, c.4 × 3mm, conspicuously apiculate, cohering face to face by tips of apiculi, densely white-woolly on inner face, outer face glabrous except for a few delicate acute hairs to c.1.5mm long fringing the connective, lateral staminodes 4–5mm long, posticous staminode c.0.5mm. *Disc* 1.1 × 1.25mm, cupular. *Ovary* c.19 × 0.8mm, glandular puberulous, stipe short, glabrous. *Style* c.3mm, glandular. *Stigma* c.1.25 × 3mm, composed of 2 suborbicular lobes (fish-tailed). *Capsules* 50–85 × 1.8–2.2mm. *Seeds* c.0.5 × 0.15mm, ellipsoid.

*Specimens seen*. SUMATRA. Mt. Singalang, viii 1883, *Burck* 13 (L); G. Malintang, c.1900m, 1 viii 1918, *Bünne-meijer* 4224 (L); Residentie Sumatra West Kust, bij Atar [vicinity of Bukittinggi], 350m, 22 viii 1932, *Kleinhoonte* 543 (L).

*Chirita dissimilis* is sympatric with *C. polyneura*, *C. glabra* and *C. limans* in the mountainous area around Bukittinggi (Fort de Kock), inland from Padang on the west coast of Sumatra. *Chirita limans* at once stands apart by virtue of its rounded (not apiculate) anthers, as well as details of bracts, calyx and corolla. *Chirita polyneura* and *C. glabra* both have the broadly ovate to suborbicular inflated bracts common to all the species with apiculate anthers, with the exception of *C. dissimilis*, where the bracts are elliptic, a character suggesting the epithet 'dissimilis'. *Chirita*

*dissimilis* is further distinguished from *C. polyneura* by the relatively short, appressed, upward-pointing hairs on the stem, generally shorter peduncles, and lack of glandular hairs on the connective and adjacent part of the filament. *Chirita glabra* is easily distinguished, *inter alia*, by its almost glabrous stems and leaves, as well as the remarkably long apiculus on the anthers.

Borssum recorded 'steep slope; in shade' and 'Herb, flowers white', the only information available on ecology and colour of the flowers.

**6. *Chirita polyneura* Miq., Fl. Ind. Bat. 2: 728 (1858). Fig. 1F.**

Type: Sumatra, in de kloof van den Singalang, *Teysmann* HB 2000 et 2001 (holo. U, n.v.; iso. L, both numbers written on sheet).

Syn.: *C. polyneura* Miq. var. *albiflora* Miq., loc. cit. Type: Sumatra, kloof van den Singalang, *Teysmann* HB 1199 (holo. U, n.v.; iso. L).

*C. spectabilis* var  $\beta$ ? *pedicellata* C.B. Clarke in DC., Monogr. phan. 5: 124 (1883). Type: Sumatra, Mt. Singalang, 1700m, *Beccari* s.n. (FI, n.v.). See discussion below.

*C. alba* Ridl., J. Fed. Malay St. Mus. 8: 68 (1917). Type: Sumatra, Korinchi [Kerinci], Siolak Daras, 3000ft, 19 iii 1914, *Robinson & Kloss* 25 (BM).

?*C. glabra* Miq. var. *intermedia* Ridl., J. Fed. Malay St. Mus. 8(4): 68 (1917). Type: Sumatra, Barang Bharu, W side Barisan Range, 4000ft, *Robinson & Kloss* s.n. (iso. K).

Coarse herb or subshrub, main stem c.2m tall, clad in coarse patent acute hairs to 2–3mm long thickly underlain by very short hairs to c.0.1mm. *Leaves* opposite, slightly anisophyllous or not, largest 105–220 × 42–90mm, elliptic, slightly falcate or not, apex acuminate, base cuneate, often unequal, margins crenulate-serrulate, lateral veins 11–18, upper surface clad in coarse, harsh acute hairs to 1–2mm long scattered among others to c.0.15mm, all arising from multicellular cushion-bases, lower surface densely pubescent, hairs much finer, to c.1mm long; petiole c.13–40mm long, with patent acute hairs to 1mm. *Inflorescence*: 1–3 peduncles in each leaf axil, 2–4-flowered, peduncles c.12–45mm long, with patent acute hairs to 1mm. *Bracts* white or greenish-white, paired, c.12–18 × 10–20mm, suborbicular, inflated, margins initially entirely connate and enfolding very young corollas, later connate more or less halfway, base circumsessile, outside finely pubescent, hairs to c.1mm, inside glabrous. *Pedicels* 4–10mm, glabrous. *Calyx* white, translucent, funnel-shaped, tube c.10mm long, lobes c.5–8 × 3.5–4mm, deltoid, anticous lobes sometimes wholly connate thus forming a 2-lipped calyx, outside glabrous. *Corolla* c.40mm long, tube 26mm, cylindric at base then abruptly expanded and ventricose on anticous side, limb bilabiate, anticous lobe c.11 × 12mm, posticous lobes c.8 × 11mm, all lobes suborbicular, corolla glabrous outside, inside with a conspicuous palate of gland-tipped hairs 0.1–0.3mm long on roof of tube, white, pale yellow in throat (once recorded as 'light green mouth'), 2 keels (invaginations) c.4mm long on floor of tube at level of anthers. *Stamens* 2, inserted c.10mm above base of tube, filaments c.11mm

long, swollen below the anthers, anthers included, c.4 × 3mm, c. half the length a conspicuous apiculus, thecae cordate, eventually confluent, densely white-woolly on inner face only, the hairs extending along a groove to apex of apiculus, anthers cohering face to face by tips of apiculi, connective glandular-puberulous on outside, hairs extending down filament to a median position on swelling, rest of filament glabrous; lateral staminodes c.4mm long, the swollen tip glandular; posticous staminode c.1mm long. *Disc* 1.5 × 2mm, cupular. *Ovary* c.20 × 1.25mm, glandular-puberulous, stipe short, glabrous or not. *Style* c.2mm, glandular. *Stigma* c.2 × 4mm, composed of 2 suborbicular lobes (fish-tailed). *Capsules* 50–120 × 2mm. *Seeds* c.0.3mm long, ellipsoid, reticulate.

*Specimens seen.* SUMATRA. G. Singgalang [0°14'S, 100°36'E], *Schiffner* 2554 (L); Mt. Sago [0°14'S, 100°38'E], *Meijer* 5304 (L), *Meijer* 4004 (L); Lambah Anai (Anai waterfall), between Padang and Bukittinggi, *Cronk* 85 (E); Padang, *Beccari* 779 (L); Ayer Mancior, 360m, viii 1878, *Beccari* 518 (K); Fort de Kock [0°12'S, 100°22'E], *Bünnenmeijer* 1304 (L); Sulitajer [Sulit stream, c.0°37'S, 100°38'E], *Borssum* 2533 (L); Btg. Sangir [1°12'S, 101°21'E], Kayu Aro Korinci, *Dransfield* 2673 (L); G. Tudjuh [1°42'S, 101°25'E], Korinci region, *Meijer* 7286 (L); *Meijer* 7285 (L). See comments below. Without precise locality [but wider environs Bukittinggi]: *Korthals* 665 (L), *Korthals* s.n. (L).

The type specimens of *C. polyneura* (from G. Singgalang, at the northern end of the range of the species) and *C. alba* (from Siolakdaras, at the southern end of the range) match each other precisely. Several collectors have recorded corollas wholly white, except for yellow in the throat, and it is suggested that the record 'albo-caerulea' on one of Teysmann's two collections from Mt. Singgalang is possibly a mistake, although *Cronk* 85 records 'flowers white . . . the prominent "hump" over style is coloured violet; this is the only colour on the flower', which could account for Teysmann's note. The plant has often been recorded as growing in ravines or gorges, near waterfalls, between c.400 and 1000m above sea level.

I have not seen the type of *C. spectabilis* var. *pedicellata* C.B. Clarke, which Beccari collected on Mt. Singgalang. Four species in sect. *Liebigia* are known from this mountain, namely *C. limans*, *C. glabra*, *C. polyneura* and *C. dissimilis*. Clarke's description 'caulis . . . a pilis albis patentibus e tuberculo ortis dense setulosus' and 'folia . . . supra villosa . . . subtus molliter pilosa' rules out *C. limans* and *C. glabra* as well as *C. dissimilis*, where the hairs on the stem are upward-pointing and strongly appressed. However, the description accords well with the vegetative parts of *C. polyneura*. Clarke (1883) knew *C. spectabilis* (conspecific with *C. asperifolia*) only from Miquel's description, saw neither bracts, calyx nor corolla of Beccari's plant, and had reservations about its placement. I judge it to be best placed in synonymy under *C. polyneura*, type locality Mt. Singgalang, well outside the range of *C. asperifolia*.

Ridley described *C. glabra* var. *intermedia* as 'intermediate between *C. glabra* typical and *C. horsfieldii*'. The type specimen of the variety came from Barang Bharu, not precisely traced but in the vicinity of Mt. Kerinci. Both *C. glabra* and *C. polyneura* have been recorded from this area; *C. horsfieldii* is endemic to

central and eastern Java. If *C. glabra* var. *intermedia* is of hybrid origin, then it is *C. glabra* and *C. polyneura* that are the likely parents. The plant differs from *C. glabra* most strikingly in its anthers, which lack the extraordinary long apiculus characteristic of that species; instead, they resemble those of *C. polyneura*, as do the bracts and calyces. Its leaves are only scantily hairy in comparison with those of typical *C. polyneura*, but closely approach those of *Meijer* 7285 and 7286 (enumerated above), also from the environs of Mt. Kerinci. Whether or not Robinson & Kloss's plant and those of *Meijer* are of hybrid origin cannot be determined in the herbarium.

Three more collections suggest the possibility of hybridization being a factor worth consideration. *Binnenmeijer* 3784 (L) was collected on G. Malintang; *Binnenmeijer* 1304 (L) (same locality) is normal *C. polyneura*. In the former the anthers are mostly highly teratological (five pairs examined) but one nearly normal pair is apiculate. The calyx is hairy, although species with apiculate anthers all have glabrous calyces. *Chirita limans* has hairy calyces and, although not recorded from G. Malintang itself, is endemic to the same general area, which suggests that *Binnenmeijer* 3784 may represent *C. polyneura* × *C. limans*. *Binnenmeijer* 4440 (L), from G. Malintang, also has hairy calyces, but the hairs on the stem are appressed, not spreading, as in his 3704, and the anthers resemble those of *C. dissimilis* (hairs on stem appressed). However, the bracts are broad and inflated, as in *C. polyneura*. Could this plant represent *C. dissimilis* × *C. limans*?

*Burck* 15 (L) came from Mt. Singgalang. It has some of the characters of *C. dissimilis*, including upward-pointing appressed hairs on the stem, and bracts c.5–10mm broad (*Burck* 13, L, from the same locality, is *C. dissimilis*). The calyx is hairy, characteristic of *C. limans* (type locality G. Singgalang), which also has appressed hairs on the stem, but bracts only 1–2mm broad. The anthers, seen only in very young bud, appear to lack pollen, may be rounded at the apex, and are glabrous. *Burck* 15 possibly represents *C. dissimilis* × *C. limans*, but *C. polyneura* and *C. glabra* also grow on Mt. Singgalang.

**7. *Chirita glabra* Miq., Fl. Ind. Bat. 2: 729 (1858); C.B. Clarke in DC., Monogr. phan. 5: 125 (1883). Fig. 1G.**

Type: Sumatra, op den Talang bij Solok, *Teysmann* H.B. 2007 (holo. U, fragment L).

Coarse herb, height unknown, stems branched, glabrous. *Leaves* opposite, slightly anisophyllous, largest 70–100 × 30–45mm, elliptic, slightly falcate or not, apex acuminate, base cuneate to rounded, equal or unequal, margins crenulate-serrulate, lateral veins 6–8, upper surface scabridulous, hairs sometimes reduced to basal multicellular cushions or wanting, with few acute hairs to 1mm along margins or wanting, lower surface glabrous or with few scattered hairs; petiole 10–20mm, glabrous. *Inflorescence*: 2 filiform peduncles from each leaf axil, 2- or 3-flowered, peduncles 17–30mm long, glabrous. *Bracts* paired, c.5–8 × 7.5–8mm, suborbicular, margins not or shortly connate, base circumsissile, glabrous. *Pedicels* 4–25mm, glabrous. *Calyx* inflated, balloon-like, lobes infolded in bud but not cohering, tube



c.7mm long, lobes c.4–6 × 4.5–6mm, broadly elliptic, apex rounded to subacute, glabrous. *Corolla* blue or blue and white (see discussion below), c.35mm long, tube 25mm, cylindrical at base then abruptly ventricose on anticous side with 2 keels (invaginations) c.6mm long, probably yellow, limb bilabiate, anticous lobe c.6 × 9mm, posticuous lobes c.5 × 8mm, all subglobose, corolla glabrous outside, inside with a conspicuous patch of large-headed glands on roof of tube near mouth. *Stamens* 2, included, inserted c.10mm above base of tube, filaments c.11mm long, swollen below the anthers, glabrous; anthers c.4 × 2mm, only half the length fertile, cordate, tipped by a stout apiculus by which anthers cohere at their tips, thecae white-woolly on inner face, the hairs extending along a groove to tip of apiculus, outer face glabrous; lateral staminodes c.4mm long, tips much expanded; posticuous staminode c.1mm. *Disc* 1.5 × 2.8mm, cupular. *Ovary* c.22 × 1mm, glandular-puberulous, stipe short, glabrous. *Style* c.2mm, glandular-puberulous. *Stigma* c.1.8 × 3.6mm, composed of 2 rounded lobes (fish-tailed). *Capsule* (immature) c.90mm long.

*Specimens seen.* SUMATRA. G. Singgalang [0°24'S, 100°21'E], *Beccari* 72 (K, L); G. Merapi [0°23'S, 100°28'E], *Alston* 13682 (L), *ibid.*, *Borssum* 2154 (K, L), *ibid.*, *Matthew* s.n. (K); Sungei Kambang [1°42'S, 100°42'E], Koerintji [Kerinci], *Jacobson* 2493 (L). Without precise locality [but fide Korthals near Bukittinggi]: *Korthals* 79 (L), *ibid.*, *Korthals* 239 (L).

*Chirita glabra* is aptly named, as the vegetative parts, also bracts, calyx and corolla, are very nearly glabrous, although minute scabrid hairs may occur on the upper leaf surface and scattered hairs to 1mm long along the margins; occasionally there are a few well-scattered hairs on the lower surface. The anthers are remarkable in that the stout apiculus accounts for half their total length. The apiculus is longitudinally grooved on the inner face, the groove being filled with white woolly hairs similar to those covering the whole of the inner face of the thecae (Fig. 1G).

The flowers have variously been described as blue (*Alston* 13682) and indigo blue and white (*Borssum* 2154); *Matthew* s.n. from c.2100m on G. Merapi does not record colour, but the corolla has dried white with the lobes bordered blue, while his second collection, at c.1500m, records 'flowers blue and white'. The two keels on the floor of the tube are possibly yellow in life.

This species is known from several mountains along the Barisan range in western Sumatra: Singgalang, Merapi, Talang, and the Kambang stream, which appears to flow westwards from Mt. Kerinci, between 1400 and 2000m above sea level.

**8. *Chirita horsfieldii*** R. Br., On *Cyrtandr.* 117 (1839) and in Bennett & Brown, *Pl. Jav. Rar.* 117 (1840); C.B. Clarke in DC., *Monogr. phan.* 5: 123 (1883) excl. *Didymocarpus barbata* Jack and var. *scaberrima* (R. Br.) C.B. Clarke. **Fig. 1H.** Type: Java, 1814, *Horsfield* s.n. (BM).

Syn.: *Roettlera horsfieldii* (R. Br.) Kuntze, *Revis. gen. pl.* 2: 475 (1891).

*Chirita scaberrima* R. Br., On *Cyrtandr.* 117 (1839) and in Bennett & Brown, *Pl. Jav. Rar.* 117 (1840). Type: Java, *Horsfield* 'Cyrtandr. 5' (K).

*C. horsfieldii* R. Br. var. *scaberrima* (R. Br.) C.B. Clarke in DC., Monogr. phan. 5: 124 (1883).

*Liebigia bracteosa* Zoll. & Mor., Nat. en Geneesk. Archipel. Neerl. Indie 2: 574 (1845). Lectotype, chosen by Wood, 1974?, Java, *Zollinger* 2637 (P).

*Chirita bracteosa* (Zoll. & Mor.) Miq., Fl. Ind. Bat. 2: 728 (1858).

Coarse herb or subshrub sparingly branched from base and above, stems to 1.5m long, clad in acute patent hairs to 1mm long underlain by much shorter hairs, glabrescent. *Leaves* opposite, slightly anisophyllous, largest 85–175 × 50–75mm, elliptic, sometimes slightly falcate, apex acuminate, base cuneate to rounded, equal or unequal, margins crenulate-serrulate, sometimes obscurely so, lateral veins 10–12, upper surface clad in coarse harsh acute hairs to 1mm long with or without a multicellular cushion-base, scattered among hairs consisting largely of cushion-base only, lower surface clad in finer hairs to c.0.5mm long, occasionally longer on midrib; petiole 15–45mm long, hairs patent, acute. *Inflorescence*: 1 or 2 filiform peduncles in each leaf axil, 1- or 2-flowered, peduncles 15–45mm, patent acute hairs to 0.5mm. *Bracts* 'pale lilac', paired, initially enfolding buds, connate to c. halfway, suborbicular, somewhat inflated, 7–15 × 10–20mm, circumscissile at base, soon caducous, outside finely pubescent, hairs acute, to 0.8mm, inside with globular glands near base. *Pedicels* 5–9mm long, with patent acute hairs to 0.4mm. *Calyx* tinged purplish, funnel-shaped, 5-lobed, initially enfolding corolla, tube 10–13mm long, lobes 7–8 × 5–7mm, deltoid, anticous pair slightly smaller than posticous ones, outside glabrous, inside minute globular glands near base. *Corolla* c.35–54mm long, bilabiate, tube c.23–33mm, cylindric at base then abruptly ventricose on anticous side with 2 rudimentary keels c.4mm long adjacent to anthers, bilabiate, anticous lobe c.7–12 × 10–14mm, posticous lobes c.5–8 × 7–12mm, all lobes suborbicular, glabrous outside, inside with a palate of minute glandular hairs on roof of tube near mouth, lobes purple, tube palest yellow to whitish. *Stamens* 2, inserted c.10mm above base of tube, filaments c.10–12mm long, swollen immediately below anthers and there minutely glandular; anthers included, c.4–5 × 3–4mm, cordate, distinctly apiculate, cohering face to face by the apiculi, thecae densely white-woolly on both faces; lateral staminodes c.6mm long, crowned with a few hairs; posticous staminode c.2mm. *Disc* c.1.5 × 2.6mm, cupular. *Ovary* c.24mm long, glandular-puberulous, but stipe glabrous. *Style* c.2mm. *Stigma* c.3 × 4mm composed of 2 rounded lobes (fish-tailed). *Capsule* c.90–110mm long, more or less square in section, splitting into 2 valves. *Seeds* c.0.25mm long, ellipsoid.

*Selected specimens seen.* JAVA. G. Papandayan [7°20'S, 107°44'E], *Korthals* 788 (162) (L); G. Tjeremaj [6°54'S, 108°24'E], *Backer* 4811 (L); Mt. Slamet [7°14'S, 109°12'E], *Balgooy* 7366 (L); Banjumas [7°31'S, 109°17'E], Pringombo, *Koorders* 39181β (L); G. Telomojo [7°22'S, 110°24'E], Semarang, Sepakoeng, *Koorders* 29673β (K, L); G. Lawu [7°38'S, 111°11'E], *Brinkman* 746 and 746A (L); Saragan [7°40'S, 111°12'E], *Docters van Leeuwen* 13083 (L); G. Wilis [7°50'S, 111°45'E], *Koorders* 23283β (L); Poedjon [Pudjan 7°50'S, 112°28'E], *Rant* s.n. (L); G. Ijang [7°58'S, 113°38'E], *Steenis* 10825 (L).

BALI. Mt. Batoe Kage [8°20'S, 115°05'E], *de Voogd* 2088 (L); G. Agung [8°21'S, 115°26'E], *McDonald & Ismail* 4798 (E).

*Chirita horsfieldii* is easily distinguished from *C. asperifolia* (with which it has been much confused in recent years) by the shorter hairs on stems and leaves, only one or two peduncles springing directly from each leaf axil (no brachyblasts), larger and rounder bracts, longer calyx, differently coloured corolla, and anthers not only larger but also totally different in shape, indumentum and mode of cohesion.

The areas of the two species meet and possibly overlap at about 108°E, in western Java. *Chirita horsfieldii* appears to be confined to central and eastern Java, and Bali. The westernmost records seen are from G. Tjeremaj and G. Papandayan; only the latter lies slightly west of 108° longitude (7°20'S, 107°36'E). The easternmost record known for *C. asperifolia* is G. Tangkubariperatu, at 6°44'S, 107°44'E.

Specimens have been collected between 700 and c.2000m above sea level, but ecological information is scanty: 'steep slope, streamside', 'forest', and 'light forest'.

### 9. *Chirita tobaënsis* Hilliard, sp. nov. Fig. 11.

A *C. horsfieldii* R. Br. venis lateralibus foliorum 11–16 (nec 10–12), carinis in fundo corollae conspicuis 7mm longis (nec obscuris c.4mm longis), corolla alba in fauce pallide lutea (nec tubo albido vel pallide luteo, lobis purpureis), antheris in facie interna dense albo-lanatis, dorso pilis, crispis rufis praecipue in connectivo (nec utrinque albo-lanatis) distinguenda.

Type: Sumatra, Toba, Samosir, SW of Tuktuk, foot of waterfall among rocks, 1100m, 1 viii 1975, *Veldkamp* 7173 (holo. L).

Coarse herb or shrublet c.1–2m tall, stems thickly clad in acute hairs to 1–1.5mm long underlain by much shorter hairs. *Leaves* opposite, somewhat anisophyllous (one c. half size of other), largest 95–210 × 32–96mm, elliptic, slightly falcate or not, apex acuminate, base cuneate to rounded, margins serrate to serrulate, lateral veins 11–16, upper surface densely scabrid-pubescent, hairs acute, to 0.8–1.2mm long interspersed with much shorter hairs, lower surface densely clad in fine soft hairs to 1mm; petiole 12–55mm long, densely pubescent, hairs to 1mm. *Inflorescence*: 1 or 2 peduncles in upper leaf axils, 1- to 2-flowered, 10–35mm long, thickly clad in acute patent hairs to 1mm. *Bracts* 'pale green', paired, connate, enfolding bud, suborbicular, somewhat inflated, 10–18 × 12–20mm, circumscissile at base, outside well clad in acute hairs to 0.5–0.8mm long, inside minutely glandular on lower part. *Pedicels* 3–6mm long, glabrous or with few acute hairs to 1mm. *Calyx* pale green or almost white, initially enfolding corolla, tube 10–13mm long, 5-lobed, lobes 6 × 4–9mm, deltoid, outside glabrous, inside minutely gland-dotted in lower part. *Corolla* white with pale yellow throat, 43–54mm long, bilabiate, tube 28–29mm long, narrowly cylindrical near base then abruptly expanded upwards, ventricose on anticous side with two conspicuous keels c.7mm long lying level with anthers, anticous lobe 10–12 × 11–20mm, posticous lobes 7–13 × 10–12mm, all lobes suborbicular, corolla glabrous outside, inside with a large palate of glandular hairs to c.0.1mm long below posticous lip. *Stamens* 2, inserted 10–12mm above base of tube, filaments 11–13mm long, swollen immediately below the anthers and there minutely glandular; anthers included, 4 × 3–4mm, cordate, distinctly apiculate, cohering face to face by tips of

apiculi and intermingling of hairs on inner face, densely white-woolly inside, crimped rufous hairs to 3mm long outside, mainly along connective; lateral staminodes c.4–6mm long, crowned with tuft of hairs; posticous staminode 1–2mm. *Disc* 1–2 × 1.8–2.2mm, cupular. *Ovary* 20–33 × 1mm, glandular-puberulous except for glabrous stipe. *Style* c.4mm, hairy as ovary. *Stigma* c.2 × 3–4mm, composed of two rounded lobes (fish-tailed). *Capsule* 90–140 × 2mm. *Seeds* c.0.5 × 0.2mm, ellipsoid.

*Additional specimens.* SUMATRA. Atjeh [Aceh], Gunung Leuser Nature Reserves, c.35km NW of Kutatjane, Ketambe, valley of Lau Alas, near tributary of Lau Ketambe, 200–400m alt., 20 v 1972, *de Wilde & de Wilde-Duyfjes* 12164 (K, L), *ibid.*, 6 vi 1972, *de Wilde & de Wilde-Duyfjes* 12650 (K, L); Kampong Gumpang [3°44'N, 97°30'E], c.600m, 20 viii 1971, *Iwatsuki et al.* S590 (K, L); Kaban Djahe [3°06'N, 98°30'E], 19 v 1939, *Batten Pooll* s.n. (L), *ibid.*, 1918, *Bartlett & La Rue* 87 (L), *ibid.*, c.1200m, 20 i 1919, *Lörzing* 6212 (L); along road between Parapat [2°40'N, 98°56'E] and Pematang-siantar [2°57'N, 99°03'E], 400–1200m alt., 12 viii 1971, *Iwatsuki et al.* S189 (K, L); Siantar to Parapat, Simeloengeon [2°56'N, 98°37'E], *Yates* 1181 (K, L).

*Chirita tobaënsis* is known only from Sumatra, and the type was collected on the island of Samosir in Lake Toba. There are three other unequivocal collections from the eastern and northern environs of the lake, three more from Kaban Djahe, and three from the general area of Kutatjane. The critical characters of the species are the villous stems, leaves densely scabrid-pubescent above, conspicuous keels on the floor of the corolla tube (in sharp contrast to the scarcely developed keels on the tube of *C. horsfieldii*), and possibly the colour of the flowers, a character of potential value but seldom recorded by collectors. *Chirita horsfieldii* is known only from Java and Bali.

The corolla of typical *C. tobaënsis* is white with a pale yellow blotch in the throat, as recorded in the type collection and by Dr and Mrs de Wilde, who made the two most northerly collections in the valley of the Lau Alas, a tributary of the Lau Ketambe. In this area they made two further collections, a few kilometres apart, of another *Chirita* strikingly different from *C. tobaënsis* in the colour of its corolla: white, lobes dark bright purple. This plant and two further collections, *de Wilde & de Wilde-Duyfjes* 13631 and 13726 (K, L), differ further from typical *C. tobaënsis* in the indumentum of the stems and upper leaf surface, where hairs c.0.8–1mm long are well scattered among many minute hairs. A third collection, *de Wilde & de Wilde-Duyfjes* 14713 (L), is in young bud only; it came from G. Mamas, c.5km southwest from the mouth of Lau Ketambe, c.30km north-northwest of Kutatjane, at 1200–1500m. *Argent* 9917 (E), from Ketambe Research Station, is in young bud and fruit. These last two collections both record the bracts and calyx as very pale green or greenish-white.

*Alston* 14982 (L), from Lae [stream] Pondon, east of Sidikalang [2°45'N, 98°19'E], is recorded as having 'flowers blackish crimson with white throat'. It is otherwise indistinguishable from *C. tobaënsis*. Sidikalang lies west of the northern end of Lake Toba; I have seen no other collection from this area.

The problem is compounded by specimens collected in Sibolangit Garden and the general area around Berastagi. The following specimens differ from typical *C. tobaënsis* in the colour of the flowers, where that is known, and sometimes in the presence of small scattered hairs on the calyx: *Lörzing* 12076 (L), cultivated in Sibolangit Garden from the Karohochebene, corolla lobes with deep violet margin, otherwise almost white. *Lesger* 297 (L), Karohochebene, bei Berastagi, längs, wegen 15 ix 1918, also records flowers white with violet border. *Docters van Leeuwen* 12770 (L), Sibolangit, does not record colour, nor do *Iwatsuki et al.* 462 (L), near Berastagi, 29 viii 1971, *Lörzing* 4949 (L), Karohoogvlakten by Goeroesinga, c.1250m, 14 iii 1917, and *Bartlett & La Rue* 256 (= *Galoengi* 262) (L), G. Toemanggoe [c.3°13'N, 98°13'E], 2 vii 1918. Ridley collected two specimens on the road to Berastagi and noted 'these two species are very different in appearance in life, the white flowered one being much larger and more shrubby than the smaller deep blue flowered one, but from book descriptions [of *C. blumei* and *C. horsfieldii*, the names he used] and herbarium specimens it is not easy to distinguish them' (Ridley, 1923, p. 80).

*Lörzing* 12075 (L), Sibolangit, 23 ix 1927, recorded as cultivated and naturalized, has white flowers and a branched inflorescence, thereby differing from *C. tobaënsis*; *Beumée* 848 (L), Sibolangit, 10 xii 1928, also has a branched inflorescence, but flower colour is not recorded. Could hybridization between a native species and one introduced from elsewhere be a factor worth consideration? Clearly some careful fieldwork is needed in the Leuser Nature Reserves and neighbouring Sibolangit and Berastagi.

#### 10. *Chirita adenonema* Hilliard, sp. nov. Fig. 1J.

A *C. tobaënsis* Hilliard inflorescentia ramosa usque 9-flora (nec semper 1–2-flora) corolla interne pilis glanduloso-puberulis in fascia lata circum tubum c.10–13mm supra basin et prorsum in tecto tubi extendentibus (nec corolla interne glabra pilis in tecto tubi exceptis), filamentis plerumque omnino glanduloso-puberulis (nec ad apicem tantum), anteris dorso pilis paucis longis tenuibus praecipue ad margines connectivi (nec pilis grossis valde crispatis bene indutis) distinguitur.

Type: Sumatra, Atjeh [Aceh], en route Bireuen to Takingeun, 700–800m, edge of forest along road, 4 ix 1971, *K. Iwatsuki*, *G. Murata*, *J. Dransfield* & *S. Saerudin* 1752 (holo. L).

*Note:* measurements in parentheses refer to plants from the Lake Toba area.

Coarse shrubby herb to at least 1.5m tall, stem clad in acute hairs to 1–1.5mm long scattered among much shorter ones, long hairs more or less curved, slightly spreading to strongly upward-pointing and appressed. *Leaves* opposite, anisophyllous (one c. half size of other), largest 100–190 × 46–70mm, elliptic or oblong-elliptic, apex acuminate, base more or less rounded, oblique or not, margins serrulate, lateral veins 8–15, upper surface with acute hairs to 1mm long, scattered among plentiful, much shorter, asperous ones, lower surface with dense fine acute hairs to c.1.5mm,

longest over midrib. *Inflorescence* a dichasial cyme with up to 9 flowers, one or occasionally two in each leaf axil, peduncle 30–50mm (17–25mm) long, thickly clad in acute curved hairs 0.5–1mm together with much shorter ones. *Bracts* paired, 19–25 × 19–22mm (7–10 × 11–14mm), suborbicular, shortly connate at base but entirely so in bud, inflated, circumscissile at base, outside with acute hairs to 0.8–1mm long, inside very minutely gland-dotted in lower part. *Pedice*l 3–7mm long, glabrous or nearly so. *Calyx* maroon (one record only), funnel-shaped, tube 10–16mm (9–10mm), lobes 10–13 × 6–7mm (7–10 × 6–7mm), deltoid, outside glabrous (sometimes with minute scattered hairs), inside minutely gland-dotted in lower half. *Corolla* white, lobes margined deep blue-purple (one record only), 43–52mm long, tube 29–30mm, base narrowly cylindrical, abruptly ventricose upwards, saccate on posticous side, with 2 prominent keels c.7mm long on anticous side, limb bilabiate, anticous lobe 14 × 20mm (9–10 × 12–15mm), posticous lobes 13 × 16mm (8 × 10mm), all lobes suborbicular, corolla glabrous outside, inside with a conspicuous patch of glandular hairs to c.0.25mm long on roof of tube, hairs running thence down tube and then spreading right round tube above and below insertion of filaments. *Stamens* 2, included, filaments c.12mm long, inserted 10–13mm above base of tube, swollen below the anthers, glandular-puberulous throughout, hairs to c.0.2mm (hairs sometimes partially or wholly wanting except at apex); anthers c.4 × 3mm, cordate, distinctly apiculate, cohering face to face by tips of apiculi and intermingling of white woolly hairs on inner face, outside glabrous except for delicate hairs to 2mm long mainly fringing connective; lateral staminodes c.6mm long tipped with a tuft of hairs, posticous staminode c.1mm long. *Disc* c.1 × 2mm, cupular. *Ovary* c.20 × 1mm, densely glandular-puberulous, stipe short, glabrous. *Style* c.2.5–5mm, glandular-puberulous. *Stigma* c.1.5 × 3mm, composed of two suborbicular lobes (fish-tailed). *Capsules* 60–95 × 2–2.5mm.

*Additional specimens.* SUMATRA. Takigeun, near level of Lake Tawar, 6 i 1932, *Bangham & Bangham* 686 (K); Atjeh, Boer ne Bias [N of Takingeun], 1300m, 31 viii 1932, *Steenis* 6157 (L); Atjeh, Gajolanden, from Pending via Oreng to Gadjah, c.800m, 26 ii 1937, *Steenis* 9323 (K, L); Toba (E of Dolok Si Manoek-manoek, near headwaters of Aek Mandosi), vicinity of Taloen na Oeli, 1–6 x 1936, *Rahmat Si Boeea* 10186 (L); Toba, Dolok Sopo Raso (a mountain in a bend of the headwater of Aek Mandosi, south of Taloen na Oeli), 20 x – 7 xii 1936, *Rahmat Si Boeea* 10771 (L); Toetopan, 4–11 xi 1933, *Rahmat Si Boeea* 5894 (L), *ibid.*, *Rahmat Si Boeea* 6106 (L); Toba, Tapanoeli, Porsea to Toetoeapan (Tutupan), 2 iv 1927, *Yates* 2296 (L); Tobing [2°22'N, 99°13'E], *Junghuhn* 115A (L).

The relationships of *C. adenonema* appear to lie with *C. tobaënsis*, the most striking differences between them being the simple (not branched) inflorescence of *C. tobaënsis* and the want of a broad band of glandular hairs around the lower part of the interior of the corolla tube, the possession of crimped rufous hairs on the backs of the anthers, and possibly the lack of purple on the corolla lobes in *C. tobaënsis*.

*Chirita adenonema* (Greek = glandular filaments) is known from four collections made in the general area of Lake Tawar in Aceh (Atjeh), northernmost Sumatra, and another seven in a small area immediately east of the southern half of Lake

Toba. In all the specimens from Aceh the filaments and staminodes are glandular-puberulous along their entire length; similar glandular hairs extend from the base of the posticous lip down the roof of the corolla tube almost to its base, and extend round the tube in a band c.10mm broad above and below the insertion of the filaments. Mr and Mrs Bangham described the corolla as white, the lobes margined deep blue-purple.

Of the specimens from the vicinity of Lake Toba, only three have the filaments glandular throughout (*Rahmat Si Boeea* 5894 and 6106, and *Junghuhn* 115A); in *Rahmat Si Boeea* 5975, the hairs run down only the posticous side of the filaments, in *Rahmat Si Boeea* 10771, hairs are plentiful only at apex and base, whereas in *Yates* 2296 hairs are very scanty. In all the specimens, however, there is a band of glandular hairs around the inside of the corolla tube. This character is unique to *C. adenonema*, and in my opinion overrides variation in the degree of hairiness on the filaments, as well as a minor discrepancy in the calyx. No collector recorded colour of flowers in specimens from Lake Toba.

In specimens from Lake Tawar, the calyx is glabrous; in those from Lake Toba, small well-scattered hairs are often present. Also, the peduncle is shorter in the southern plants. In characters of stem, leaves and anthers, all specimens are indistinguishable.

#### 11. *Chirita leuserensis* Hilliard, sp. nov. Fig. 1K.

A *C. glabra* Miq. pilis dispersis in caulibus et foliis (nec glabra nec fere glabra), venis lateralibus foliorum c.10–11 (nec 6–8), bracteis 12–16 × 10–16mm (nec 5–8 × 7.5–8mm) dorso pilis dispersis (nec glabris) calyce c.18mm longo (nec 12mm), antheris pilis 2–3mm longis in dorso ad connectivum marginalibus (nec glabris) differt.

Type: Sumatra, Atjeh [Aceh], G. Leuser Nature Reserves, c.3°N, 97°50'E, Alas river valley, near mouth of Bengkong-Renun river, c.50km S of Kutacane, 50–125m, 5 vii 1979, *de Wilde & de Wilde-Duyfjes* 18519 (holo. L).

Coarse shrubby herb to 1–1.5m tall, stem clad in scattered, upward-curving acute hairs to 0.8–1mm long. *Leaves* opposite, anisophyllous (one c. half to two-thirds size of other), largest 112–160 × 38–77mm, elliptic, slightly falcate or not, apex acuminate, base cuneate, unequal, margins subentire, hairy, lateral veins c.10–11, upper surface with well-scattered acute hairs to 1.5mm long from multicellular cushions, cushions with a minute, few-celled asperous tip plentiful, lower surface with few acute hairs to 1mm mainly on midrib, more plentiful towards margins, minute asperous hairs plentiful; petiole 20–30mm long, clad in few acute hairs. *Inflorescence*: 1 or 2 peduncles in leaf axils, mostly c.20–40 × 1mm, rarely also a more slender subsidiary peduncle c.10–15mm long, 1–5-flowered, with few well-scattered acute hairs to c.0.5mm long. *Bracts* paired, c.12–16 × 10–16mm, suborbicular to broadly ovate and then apiculate, shortly connate at base (entirely connate in young bud), inflated, circumscissile at base, with few acute hairs to 0.1mm scattered outside, glabrous inside. *Pedicel* c.3–8mm long, glabrous. *Calyx* pale green to white, inflated, more or less funnel-shaped, tube c.11mm long, lobes 6–9 × 5mm, deltoid,

glabrous. *Corolla* white, c.38mm long (only one mature flower seen), tube 26mm, narrowly bulbous at base, abruptly ventricose upwards, saccate on anticous side, keels wanting, limb bilabiate, anticous lobe  $7 \times 10$ mm, posticous lobes  $7 \times 10$ mm, all lobes suborbicular, corolla glabrous outside, inside with a conspicuous patch of minute gland-tipped hairs on roof of tube. *Stamens* 2, included, inserted 11mm above base of tube, filaments 13mm long, swollen below the anthers, glabrous; anthers  $4 \times 3$ mm, cordate, distinctly apiculate, cohering face to face by tips of apiculi and intermingling of hairs, outside with delicate acute hairs 2–3mm long fringing connective, otherwise glabrous, inside densely white-bearded, hairs crimped when dry; lateral staminodes 4mm long, posticous staminode 1mm. *Disc*  $1.5 \times 2$ mm. *Ovary* c. $20 \times 2$ mm, densely pubescent, hairs gland-tipped. *Style* c.2mm, pubescent as ovary. *Stigma* c. $2 \times 4$ mm, composed of 2 suborbicular lobes (fish-tailed). *Capsules* not seen.

*Additional specimen.* SUMATRA. G. Leuser Nature Reserves, Alas river valley, near mouth of Renun river, c.50km S of Kutacane, 200m, 20 vii 1979, *de Wilde & de Wilde-Duyfjes* 18903 (L).

*Chirita leuserensis*, so far known only from the Alas river valley in the western part of the G. Leuser Nature Reserves, is allied to *C. tenuipes* (see below) from those same reserves, but further north and more to the east. Both species grow at remarkably low altitudes, only 50–400m above sea level. See further under *C. tenuipes*.

Both *C. leuserensis* and *C. tenuipes* are in the general affinity of *C. glabra*, known only from much further south, along the Barisan range, between c.1400 and 2000m above sea level.

## 12. *Chirita tenuipes* Hilliard, sp. nov. Fig. 1L.

A *C. leuserensi* Hilliard pedunculis e brachyblastis parvis axillaribus orientibus (nec brachyblastis absentibus) unifloris (nec plurifloris) filiformibus ad c.0.5mm diam. (nec crassioribus c.1mm diam.), bracteis 5–10  $\times$  3–10mm (nec c.12–16  $\times$  10–16mm) distinguenda.

Type: Sumatra, Atjeh, G. Leuser Nature Reserves, c. $3^{\circ}55'N$ ,  $98^{\circ}05'E$ , c.75km WNW of Medan, Sikundur Forest Reserve, 50m, Bestiang river, 4 viii 1979, *de Wilde & de Wilde-Duyfjes* 19361 (holo. L, iso. K).

Coarse herb 40cm–2m in height, branches decumbent or pendent, stem clad in scattered patent hairs to 1.5–2m long, acute or some gland-tipped (as in type specimen), glabrescent. *Leaves* opposite, anisophyllous (one c. half as long as other), largest 110–190  $\times$  50–90mm, elliptic or oblong-elliptic, apex acuminate, base cuneate to rounded, equal or unequal, margins serrulate to entire, lateral veins 8–11, upper surface with scattered acute hairs to 1–2mm long, glabrescent, minute hairs (multicellular cushions with asperous tips) plentiful, persistent, lower surface sparsely hairy over veins, blade subglabrous, hairs acute or some gland-tipped; petiole 14–30mm long, clad in patent acute hairs to 1–1.5mm, some gland-tipped in type. *Inflorescence*: 1–5 filiform (diam. c.0.2–0.4mm) 1-flowered peduncles from a small



axillary brachyblast, 5–23mm long, clad in patent acute hairs to 1mm, some gland-tipped in type. *Bracts* paired, 5–10 × 3–10mm, broadly ovate, apiculate, connate at circumscissile base, with scattered hairs outside. *Pedicels* 2–5mm long, glabrous or with a few hairs. *Calyx* whitish to purplish, inflated, tube 6–10mm long, lobes 5–9 × 4–5mm, deltoid, initially connate, glabrous. *Corolla* pale yellow or tinged with purple (details below), 30–36mm long, tube 23–27mm, narrowly cylindrical at base, abruptly ventricose above on anticous side, keels wanting, limb bilabiate, anticous lobe 5–7 × 7–8mm, posticous lobes 4–6 × 6.5–8mm, all lobes suborbicular, corolla glabrous outside, inside with a conspicuous patch of minute glandular hairs on roof of tube. *Stamens* 2, included, inserted 13–16mm above base of tube, filaments 7mm long, swollen below the anthers, glabrous; anthers 3–4 × 2–2.5mm, cordate, distinctly apiculate, cohering face to face by tips of apiculi and intermingling of hairs, both faces well clad in white hairs; lateral staminodes 3.5–7mm long, crowned with a tuft of hairs; posticous staminode 1–1.2mm. *Disc* 1–1.5 × 1.2–2mm, cupular. *Ovary* 16–18 × 0.8–1mm, densely puberulous, hairs mostly acute, a few gland-tipped. *Style* 3–4mm, hairy as ovary. *Stigma* 1–2 × 2.2–3mm, composed of two suborbicular lobes (fish-tailed). *Capsules* (2 seen) 70–80 × 2mm. *Seeds* shed.

*Specimens seen.* SUMATRA. Aceh, Gunung Leuser National Parks, Sekundur Forest Reserve, upper Besitang river area, Langkat, c.3°55'N, 98°E, 50–100m, 11 viii 1991, *de Wilde & de Wilde-Duyffes* 21347 (L), *ibid.*, 5 viii 1991, *de Wilde & de Wilde-Duyffes* 21266 (L); Bukit Lawang, Bohorok, Langkat, 400m, 19 ii 1973, *Soedarsono* 299 (K, L); Bohorok, Bukit Lawang, Alur batu tajam, 250m, 31 i 1980, *Wiriadinata & Maskuri* 575 (K), *ibid.*, Parawisata, 250m, 24 i 1980, *Wiriadinata & Maskuri* 516 (K).

The remarkably slender, 1-flowered peduncles springing from small axillary brachyblasts make *C. tenuipes* easily recognizable and suggest the epithet. This combination of characters at once separates *C. tenuipes* from *C. leuserensis*, which has stouter, several-flowered peduncles arising directly from the leaf axil. The two species otherwise resemble each other vegetatively, particularly in their sparse indumentum. They differ further in the indumentum on the backs of the anthers. *Chirita leuserensis* only has hairs 2–3mm long fringing the connective, whereas in *C. tenuipes* the backs are densely bearded in the type specimen; in the other material seen, the hairs are more plentiful towards the outer margins of the thecae.

The colour of both calyx and corolla clearly varies in *C. tenuipes*. Unfortunately, *C. leuserensis* is currently known only from the type collection, where the corolla was recorded as white. The de Wildes collected *C. tenuipes* three times in the Sikundur Forest Reserve, upper Bestiang river area: 19361 'calyx purple-lilac to whitish, corolla pale yellow-white, inside bright light yellow'; 21347 'calyx green purple, corolla purple-red and pale yellow'. Wiriadinata & Maskuri collected the species twice on Bukit Lawang (in the same general area as the de Wildes): 516 'flowers white'; 575 'calyx pink, corolla reddish'. Soedarsono 299, also from Bukit Lawang, recorded 'flower axillary, reddish-purple; perianth yellow pink (below) and reddish pink (above)'.

This species and *C. leuserensis* grow at remarkably low altitudes compared with others in the group, between 50 and 400m above sea level, along stream-sides, in forest.

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#### APPENDIX

#### NOTES ON THE HISTORY AND NOMENCLATURE OF *CHIRITA* SECT. *LIEBIGIA*, AND THE TWO SPECIES FIRST DESCRIBED

B. L. BURTT

Blume (1826) established the genus *Tromsdorffia* for two species (*T. speciosa* and *T. ?elongata*) from the Dutch East Indies, but he was not aware that the name had already been used by J.J. Bernhardt in 1800 for a genus of *Compositae* (now = *Hypochoeris* L.), and again by Martius for a genus of *Amaranthaceae*, which was published April–June 1826, a few months before Blume published his own genus in July–December 1826. Over the years there have been several variant spellings of these genera: *Tromsdorfia*, *Tromsdorffia* and *Trommsdorfia*. These have all, quite correctly, been treated as homonyms. Robert Brown (1839) retained Blume's genus, but, curiously, only for the doubtful *T. ?elongata* (now *Agalmyla elongata* (Blume) B.L. Burttt; see Hilliard & Burttt, 2002, p. 126). He listed *T. speciosa*, which is the accepted type of the genus (Farr *et al.*, 1979), as a possible synonym of his own *Chirita horsfieldii*, but it is now placed under *C. asperifolia* (see below).

The illegitimate *Tromsdorffia* Blume was renamed *Liebigia* by Endlicher (1841), and then reduced to *Chirita* sect. *Liebigia* by C.B. Clarke (1883); the epithet of the type species, *speciosa*, being preoccupied in *Chirita*, Clarke renamed the plant *C. blumei* and it has been known in cultivation by that name.

During his work on *Gesneriaceae* for the *Flora of Java*, Bakhuizen (1950) realized that the type specimen of *Agalmyla asperifolia* Blume had not been marked up in the Leiden herbarium; he therefore made an intensive and successful search. It consisted of leaves and flowers of a species of *Chirita* and, mounted on the same sheet, an old dried capsule of

*Agalmyla*. Although Blume made no mention of the fruit in his description, it must surely have been its presence on the same sheet that led him to refer the leaves and flowers to *Agalmyla*. Bakhuizen considered that *Chirita* could not be separated as a genus from *Didymocarpus*, and therefore transferred the epithet *asperifolia* to that genus (Bakhuizen, 1950). It has since been transferred to *Chirita* (no. 1 in the present revision). The name replaces *Chirita blumei* C.B. Clarke.

Reverting to C.B. Clarke's treatment, two points need to be noted. Of the six species that Clarke included in sect. *Liebigia* only four (*C. blumei*, *C. glabra*, *C. horsfieldii* and *C. spectabilis*) really belong there; *C. zollingeri* belongs to sect. *Microchirita* and *C. humilis* has been referred to the genus *Henckelia* Spreng., which has recently been revived for most of the Malesian species of *Didymocarpus* (Weber & Burtt, 1998). The second point is that Clarke made a separate section in *Chirita* for Miquel's monotypic genus *Bilabium*. Following a common custom of the time he renamed the single species *Bilabium limans* as *Chirita bilabium*. This is nomenclaturally illegitimate, and the species will be found in the enumeration under its original epithet '*limans*' (species no. 4), Dr Hilliard having shown that in all features except the small bracts and the bilabiate calyx it is a good member of sect. *Liebigia*.

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