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# OLD WORLD *GESNERIACEAE* IX: MISCELLANEOUS SPECIES OF *CYRTANDRA* IN BORNEO

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New descriptions, followed by discussion, are given for the following species described by Kraenzlin: *Cyrtandra cerea*, *C. foveolata*, *C. megalocrater*, *C. prostrata*, *C. quinquenotata*, *C. robusta*, *C. strictipes*; *C. populifolia*, as enumerated by Kraenzlin, is a misdetermination. *Cyrtandra paxiana* and *C. serratobracteata* are also re-described, and one recently discovered new species, *C. crockeriana*, is established.

*Keywords*. Borneo, *Cyrtandra*, *Gesneriaceae*, new species.

## INTRODUCTION

Both Lauterbach and Kraenzlin described a number of species of *Cyrtandra* J.R. & G.Forst. based upon specimens collected by Hubert Winkler in SE Kalimantan in 1908 and by Hans Winkler in SW Kalimantan in 1924–25. The correct application of these names has often been difficult, the difficulty compounded by the fact that Kraenzlin's descriptions, and the affinities he gave, are often misleading.

In this paper, the species are arranged, not alphabetically as in the Abstract, but so placed that, where possible, related species follow each other. The sequence runs: *C. robusta* Kraenzl., *C. megalocrater* Kraenzl. (closely allied); *C. serratobracteata* Lauterb., *C. cerea* Kraenzl. (closely allied); *C. foveolata* Kraenzl.; *C. quinquenotata* Kraenzl., *C. crockeriana* Hilliard & B.L.Burtt (allied); *C. prostrata* Kraenzl., *C. paxiana* Lauterb. (allied). Lastly, two oddments: first *C. strictipes* Kraenzl., second the misapplication by Kraenzlin of the name *C. populifolia* Miq. to two different collections, one of which is *C. bracheia* B.L.Burtt, the other *C. subgrandis* B.L.Burtt (= *C. grandis* Kraenzl., non Blume).

**Cyrtandra robusta** Kraenzl., Mitt. Inst. Allg. Bot. Hamburg 7: 112 (1927).
Lectotype (chosen here): [Kalimantan] West-Borneo, auf dem Bukit Mehipit [0°33′S, 112°41′E], um 800m, 9 xii 1924, *Hans Winkler* 663 (HBG, isolecto. E). Syntype: Auf dem Bukit Mulu [0°31′S, 112°43′E], um 600–700m, 1 xii 1924, *Hans Winkler* 451a (HBG, photocopy E).

Herb, whole plant glabrous, 1–3 simple stems from a woody stock c.15mm diam., stems decumbent, rooting, to c.700mm tall, 6–10mm diam., leafy only in upper part. *Leaves* many, crowded, opposite, isophyllous, largest 130–300 × 54–95mm, elliptic, gradually tapering to a narrowly cuneate base, apex gradually acuminate, margins

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subentire to distinctly serrate, lateral veins 9–10 each side of midrib, tertiary veins pinnate but obscure; petiole c.40–65mm long. *Inflorescence* a many-flowered tightly congested cyme held within a cupule formed by two fused bracts, solitary in axils of leaves near apex of stem. *Peduncle* 5–12mm, very stout. *Bracts* white or yellowish, c.32–37 × 32–37mm, fused almost to apex to form a leathery cupule. *Pedicels* c.1mm, very stout. *Calyx* almost tubular, initially enveloping young corolla, 8mm long, tube 6.5mm, lobes 5, subequal, c.1.5 × 1.2mm, deltoid, slightly hooded and drawn out into a short beak. *Corolla* pure bright yellow or greenish, c.34mm long, tube 28mm, narrowly cylindric in lower half, abruptly expanded and funnel-shaped in upper half, anticous lip c.6 × 10mm, anticous lobe c.3 × 4mm, posticous lobes c.2.5 × 3mm, all rounded. *Stamens* inserted 22mm above base of tube, 4mm long, twisted once near base, anthers 1.5 × 1.2mm, cohering apically face to face; lateral staminodes 1mm, inserted 19mm above base of tube; posticous staminodes 0.5mm. *Disc* 1.5 × 1mm, cupular. *Ovary* c.6 × 1mm. *Style* 17mm. *Stigmatic lobes* c.1 × 1mm. *Fruit* (only one seen) 11 × 5mm, pericarp verrucose.

*Other specimens examined.* KALIMANTAN. Kalteng, Samba, 0°45′28.5″S, 112°51′17.3″E, 260m, 30 i 1995, *Jarvie & Ruskandi* 5576 (A, E). Tumbang Tubus, 0°45′S, 112°51′E, 150m, 8 i 1983, *Veldkamp* 8124 (L) (included with reservation as corolla not checked).

Kraenzlin described the flowers of *C. robusta* as about 8mm long, whereas they are 30–35mm long. The whole plant is glabrous, even the corolla being so. The general affinity of *C. robusta* is with *C. burbidgei* C.B.Clarke, from Sabah, which has similar glabrous corollas, but is easily distinguished by its softly hairy leaves and bracts. Winkler recorded 'Blüte rein hellgelb, Brakteen weiss', which may be translated as 'flowers pure bright yellow, bracts white'. On the other hand, Jarvie & Ruskandi recorded 'bracts yellow, corolla light green', Veldkamp 'bracts and corolla white'. The bracts of *C. burbidgei* are white, the corolla greenish-white to pale sulphur yellow.

At the same time that he described *C. robusta*, Kraenzlin described a second species, *C. megalocrater* (see below), which is undoubtedly very closely allied to *C. robusta*.

**Cyrtandra megalocrater** Kraenzl., Mitt. Inst. Allg. Bot. Hamburg 7: 111 (1927); B.L.Burtt, Notes Roy. Bot. Gard. Edinburgh 30: 35 (1970) excluding specimens cited from Sarawak.
Lectotype (chosen here): [Kalimantan] West Borneo, um unteren Serawai [river, c.0°32′S, 112°42′E], um 80m, Ufer, 10 i 1925, *Hans Winkler* 1261 (HBG, isolecto. E). Syntypes: Auf dem Bukit Mulu [c.0°31′S, 112°42′E], um 600–700m, 1 xii 1924, *Hans Winkler* 451 (HBG); im Westen des Bukit Mulu [c.0°31′S, 112°42′E], um 250m, 5 i 1925, *Hans Winkler* 1215 (HBG).

*Cyrtandra megalocrater* is very closely allied to *C. robusta*, described above. They are identical in habit and foliage excepting that the leaves of *C. megalocrater* have only seven lateral veins each side of the midrib whereas there are nine to ten in

*C. robusta*. Bracts and calyx are identical and so are the size and form of the corolla (very narrowly cylindric in lower half, funnel-shaped in upper). However, Winkler recorded the corolla colouring of his three specimens of *C. megalocrater* as follows: no. 1261 'Blute gelb, seiliche und obere Petala in den freien Zipfeln gelbrot'; no. 451 'Blute gelb'; no. 1215 'Blute rot?'. So there would appear to be some red in the corolla of two of the specimens, whereas the lectotype of *C. robusta* has pure yellow flowers. The syntype of *C. robusta* is *Winkler* 451a from Bukit Mulu, no colour recorded, whereas *Winkler* 451, same locality and a syntype of *C. megalocrater*, was recorded as yellow. Pure yellow as opposed to red and yellow was one of two characters used by Kraenzlin to distinguish *C. robusta* and *C. megalocrater*; the other was an imaginary difference in the shape of the cupule.

One feature that Kraenzlin did not mention is that the upper part of the corolla of *C. megalocrater* is clad in hairs c.0.6mm long, whereas that of *C. robusta* is wholly glabrous. Whether two species are present needs further investigation.

*Burtt & Martin* B4827 mentioned with reservation under *C. megalocrater* (Burtt, 1970, above) is an undescribed species with flowers only half the size of those of *C. megalocrater* and *C. robusta*, a differently shaped corolla tube, and corolla villous outside (silky hairs c.2mm long). It needs further investigation in conjunction with allies including *C. farinosa* C.B.Clarke.

**Cyrtandra serratobracteata** Lauterb., Bot. Jahrb. 44: 53 (1910).
Type: SE Borneo [Kalimantan], zwischen Semurung [c.1°58′S, 115°55′E] und Sungai Tarik, 18 vii 1908, *Hubert Winkler* 3027 (iso. WRSL, holo. destroyed in Berlin fire).

Herb, stem c.150mm long, 5–8mm diam. at base, base woody, rooting, whole plant glabrous. *Leaves* mainly on upper part of stem, opposite, isophyllous, largest c.300 × 63–92mm, elliptic, apex gradually acute, base narrowly cuneate, running down petiole in narrow wings, margins subentire to serrate, lateral veins 9–11 each side of midrib, tertiary veins ± pinnate; petiole on fully mature leaves c.20–65mm. *Inflorescence* an axillary dichasial cyme, flowers many. *Peduncle* c.7–10mm. *Bracts* greenish-white or bright white, c.27 × 18–20mm, ovate in outline, narrowed to a broad base, partly adnate to primary branches of dichasium, margins sharply serrate, hydathode at tip of each tooth, bracteoles progressively smaller. *Pedicels* 5–8mm in fruit. *Calyx* 5-lobed nearly to base, lobes c.2.5 × 1mm in well-grown bud, narrowly elliptic, tip minutely hooded. *Corolla* white, two dark (presumably yellow/orange in life) bands from anticous sinuses down tube to point of insertion of stamens, 6mm long *in well-grown bud* (most information from *Mogea* 3888, there being only very young buds on the type), tube 3.5mm, cylindric at base then abruptly expanded, anticous lip 2.5 × 5.2mm, anticous lobe 1.8 × 2mm, posticous lobes 1.5 × 1.2mm, all lobes rounded, corolla glabrous outside, inside with a patch of minute glandular hairs below posticous sinus. *Stamens* inserted 2.5mm above base of tube, filaments 0.8mm, anthers 1 × 0.8mm, lateral staminodes 0.5mm, posticous staminode wanting. *Disc* 1.5mm long, fleshy, either unilateral or reduced to a rim on

one side of ovary, well developed on other. *Ovary* 4.5 × 1.5mm (*not* bud, where whole gynoecium measured 3.5mm), glabrous. *Style* 3mm, glandular-puberulous. *Stigmatic lobes* 0.7 × 1mm. *Fruit* c.10 × 4.5mm, pericarp verrucose. *Seeds* 0.25 × 0.2mm, not fully ripe.

*Other specimens examined.* CENTRAL KALIMANTAN. Bukit Raya, SE side, 0°50′S, c.112°50′E, c.1000–1200m, 3 xii 1982, *Mogea* 3888 (L).

Lauterbach's description of the flower is very misleading; he saw no open flower, but went on to say 'versimile vix 2–3mm longa' (probably scarcely 2–3mm long). He was looking at a very young bud! A fully open flower has still not been seen, only a bud on the point of opening (*Mogea* 3888), that being 6mm long. The species is in the affinity of *C. disparoides* B.L.Burtt from Sarawak, with corolla 14mm long, which is about the size the mature flower of *C. serratobracteata* can be expected to attain. This must be borne in mind when reading the formal description above.

Both *C. serratobracteata* and *C. disparoides* have deeply serrate bracts and the tips of the calyx lobes minutely hooded, as well as similar flowers, but *C. serratobracteata* is entirely glabrous, which at once distinguishes it from *C. disparoides* and its allies. Its closest ally is *C. cerea* (below), which is also glabrous.

**Cyrtandra cerea** Kraenzl., Mitt. Inst. Allg. Bot. Hamburg 7: 106 (1927).
Type: West Borneo [Kalimantan] auf dem Bukit Raja [c.0°40′S, 112°45′E], 17 xii 1924, *Hans Winkler* 928 (holo. HBG).

Herb, all vegetative parts glabrous, stem c.300–400mm long, 7–10mm diam. at base, woody, base decumbent, rooting, then ascending, lower part leafless, marked with large leaf scars c.10–20mm apart. *Leaves* few, crowded at apex of stem, opposite, strongly anisophyllous, minor leaves stipule-like, c.14–18 × 4–5mm at half-clasping base, rapidly tapering to apex; major leaves 190–225 × 85–120mm, broadly elliptic to broadly ovate, apex somewhat abruptly acute to shortly acuminate, base broadly to narrowly cuneate, oblique or not, margins obscurely to distinctly serrate, lateral veins 7, curving sharply upwards and then running parallel to margins, tertiary veins pinnate, lesser veins coarsely reticulate; petiole 140–185mm long, more or less terete then suddenly expanded to the broad half-clasping base. *Inflorescence* a many-flowered, very condensed dichasial cyme, solitary in each leaf axil. *Peduncle* 4–10mm. *Bracts* waxy yellow, c.(20) 26–28 × (4) 26–28mm, ovate in outline, narrowed to a broad base partly adnate to the primary branches of the dichasium, margins entire, slightly undulate; bracteoles similar but progressively smaller. *Pedicels* 5–7mm. *Calyx* 5-lobed nearly to base, lobes 5–5.5 × 1.2–1.5mm, oblong-elliptic, tips minutely hooded, glabrous. *Corolla* white speckled dark red at base of lower lip and in the throat, 20mm long, tube 14mm, cylindric in lower half, abruptly expanded in upper, anticous lip 6 × 10mm, anticous lobe 4 × 3mm, posticous lobes 3 × 3mm, all lobes rounded, corolla minutely papillose outside, inside glabrous. *Stamens* inserted 8mm above base of tube, filaments 5mm long, anthers 1.4 × 1mm,

cohering face to face by minute apiculi; lateral staminodes 1.2mm long, posticous staminode 0.5mm. *Disc* 1.2 × 1.2mm, unilateral. *Ovary* c.3.5 × 1mm, glabrous. *Style* 5.5mm, puberulous. *Stigmatic lobes* c.1.2 × 0.5mm, minutely puberulous on backs. *Fruit* c.14 × 4.5mm, pericarp verrucose.

*Other specimens examined.* KALIMANTAN. Gunong Damoes [c.0°30′S, 109°45′E], 1893–94, *Hallier* 609 (L).

Kraenzlin claimed to have seen neither calyx nor corolla of *C. cerea*. However, the type comprises three good sheets with many inflorescences bearing innumerable buds and fruits; a quick look revealed a perfect flower. In the type specimen, the bracts are roughly as broad as long, the bracteoles being only slightly smaller; in the *Hallier* specimen quoted above, the bracts are very much smaller, c.20 × 4mm. No open flowers are present, but there are buds and a fruit, the buds showing clearly the red speckling on the lower lip. The narrow bracts are judged to be a minor variation without taxonomic significance.

The relationship of *C. cerea* and *C. serratobracteata* is close: both are almost entirely glabrous, calyx, corolla, androecium and gynoecium are strikingly similar, and so are the bracts. The bracts of *C. cerea* are entire and straw-coloured (whence the epithet *cerea*), those of *C. serratobracteata* sharply serrate, greenish-white or bright white; the corolla of *C. cerea* is speckled red at the base of the lower lip, in contrast to the two dark (orange/brown in life?) bands in *C. serratobracteata*. In *C. cerea*, the petioles are remarkably long (85–120mm) and wingless, whereas in *C. serratobracteata* they are c.20–65mm long and narrowly winged by the decurrent leaf bases.

**Cyrtandra foveolata** Kraenzl., Mitt. Inst. Allg. Bot. Hamburg 7: 107 (1927).
Type: West Borneo [Kalimantan], am Sungai Obat [c.0°55′N, 113°16′E], um 100m, 31 i 1925, *Hans Winkler* 1367 (holo. HBG, photo. E).

Herb, stem simple, c.100–450 × 3–6mm, woody, base or almost whole stem decumbent, rooting, stoloniferous, villous, hairs c.1–2mm long, purplish-red when young. *Leaves* opposite, isophyllous, few crowded at apex of stem, largest leaves 100–220 × 30–80mm, elliptic, apex gradually acute, base narrowly cuneate, decurrent down petiole in very narrow wings (to c.1–1.5mm broad), margins obscurely to distinctly serrate, lateral veins 7–9, tertiary veins pinnate, lesser veins coarsely reticulate, upper surface clad in coarse hairs c.2–3mm long, gradually glabrescent, in dry leaves surface pockmarked with pits c.0.25–0.5mm diam. (easily seen with a ×10 hand lens), lower surface with coarse hairs to c.2mm long, dense over veins, scattered on blade; petiole 40–90mm long, villous. *Inflorescence*: few-flowered, very congested dichasial cymes, solitary in each leaf axil, patent hairs to c.1mm long thickly distributed on receptacle. *Peduncle* 6–10mm long, densely pubescent. *Bracts* c.15–25 × 7–14mm, ovate in outline, laciniate, coarse hairs to 2mm long on backs and margins, inside glabrous. *Pedicels* 4–6mm, few appressed hairs. *Calyx* 5-lobed

nearly to base, tube c.0.5mm, lobes c.3 × 0.8–1.2mm, narrowly deltoid, tips minutely hooded, with coarse hairs to 1mm long outside. *Corolla* white, dark orange/brown patch at base of lower lip, 25–28mm long, tube 20–23mm, very narrowly funnel-shaped, anticous lip c.5–8 × 10–12mm, anticous lobe 3–5 × 4–5mm, posticous lobes c.4–5 × 4–4.5mm, all lobes rounded, corolla pubescent outside, hairs c.0.5mm long, acute, inside lobes thickly clad in minute, relatively large-headed, glandular hairs extending into throat. *Stamens* inserted 17–20mm above base of tube, filaments c.1.5mm long, anthers 1.8 × 1mm, cohering face to face by minute apiculi; lateral staminodes 1mm long, posticous staminode 0.5mm. *Disc* 2.5 × 1mm, unilateral, fleshy. *Ovary* c.2 × 1mm, glabrous. *Style* c.11.5–16mm, glabrous or with a few delicate hairs. *Stigmatic lobes* c.1.5–1.8 × 1mm. *Fruit* 7–10 × 3–5mm, pericarp verrucose.

*Other specimens examined.* KALIMANTAN. P.B.U. base camp and environs [Barito Ulu, c.0°15′S, 114°E], 13 vi 1990, *Ridsdale* PBU550 (L). Serawai, Uut Labang, 0°36′6″S, 112°38′56″E, 750m, 6 x 1995, *Church et al.* 2208 (A).

SARAWAK. [SE end Hose Mts.] Melinau Community Forest, Nanga Tunoh base camp, 3 viii 1967, *Burtt & Martin* B4777 (E). Gunung Gaharu [c.1°10′N, 110°34′E], 1 viii 1962, *Burtt* B2672 (E). Balang/Balleh watershed ridge, extreme headwaters Balleh river, 1°35′N, 114°30′E, 16 vii 1969, *Anderson* S28746 (E). SE end Hose Mts., Bukit Semako, c.2°6′N, 113°42′E, 16 viii 1967, *Burtt & Martin* B4944 (E). Bintulu distr., c.8km E from Minah Camp, along survey route from Sungai Minah, 19 x 1963, *Hirano & Hotta* 407 (E, KYO).

The relationship of *C. foveolata* lies, not with *C. dajakorum* Kraenzl. (= *C. latens* C.B.Clarke), *C. strictipes* and *C. longicarpa* Merrill, as Kraenzlin claimed, but with *C. andersonii* B.L.Burtt. Florally, they are strikingly similar, both having, *inter alia*, laciniate bracts, corolla with a remarkably narrow tube and lobes thickly clad in relatively large-headed glandular hairs, stamens inserted almost in the mouth of the tube, disc unilateral and very fleshy. Both also have tracheiodal sclereids in the hypodermis of the leaf (M.H. Bokhari, see Acknowledgements), which probably account for the dry upper leaf surface being patterned with relatively large pits (easily seen with a × 10 lens). They differ markedly in habit, *C. foveolata* being an almost stoloniferous herb with erect or decumbent stems, *C. andersonii* an acaulescent rosette plant. *Cyrtandra andersonii* is currently known only from Bukit Gaharu in southern Sarawak, c.1°N, 110°48′E.

Winkler, followed by Kraenzlin, described the flowers as white with pale brown flecks above the entrance to the corolla tube. He was probably referring to the large glandular heads of the hairs on the inside of the corolla lobes, which are often orange or buff-coloured.

**Cyrtandra quinquenotata** Kraenzl., Mitt. Inst. Allg. Bot. Hamburg 7: 105 (1927); B.L.Burtt, Notes Roy. Bot. Gard. Edinburgh 30: 37 (1970).
Type: West Borneo [Kalimantan], Bukit Bidang Menabai [c.0°35′S, 112°40′E], 700m, 12 xii 1929, *Hans Winkler* 787 (holo. HBG, photo. E).

Herb, stem c.1m tall, 6mm diam. at base, base decumbent, rooting, woody, upper leafy part, c.3mm diam., densely pubescent, hairs coarse, brown, patent, 1–2mm

long, underlain by shorter, appressed retrorse hairs, leaves persisting only on upper part of stem, lower part bare, nodes prominent. *Leaves* opposite, strongly anisophyllous, minor leaves c.8–20 × 6–10mm, cordate, more or less sessile, hairy as major leaves; largest major leaves c.112–185 × 62–90mm, broadly elliptic, broadest above the middle, apex somewhat abruptly acute, base cuneate, margins entire, lateral veins 10–12 each side of midrib, curving upwards and looping some distance from margin to link to vein above, tertiary veins almost invisible except near margins where they form a coarse reticulum, upper surface glabrous, closely patterned with vermiform sclereids present in the hypodermis (easily seen with a ×10 hand lens on the dried leaf), lower surface pubescent, hairs plentiful but blade visible, veins more densely hairy, these hairs to c.1.5mm long, coarse, brown; petiole 7–10mm, thickly clad in coarse brown patent hairs to 2mm long, some gland-tipped. *Inflorescence*: up to 3 flowers from a very small axillary brachyblast, confined to lower, leafless, part of stem, particularly where decumbent and rooting. *Bracts* c.3 × 0.8mm, well clad in brown hairs c.0.5mm long. *Pedicels* c.25–40mm long, well clad in patent coarse brown hairs to 2mm long, some gland-tipped. *Calyx* c.20mm long, tube 12mm, lobes 5, subequal, c.8 × 2.5–3mm, upper half needle-like, margins tightly infolded (probably cohering in bud to enclose the young corolla), lower half deltoid, outside patent coarse brown hairs to 2mm long, some gland-tipped, inside scattered acute hairs to 0.5mm long, smaller downwards and mingled with many globular glands. *Corolla* c.50mm long, almost white outside, inside clear yellow with orange and brown flecks on the anticous lip, tube 37mm, cylindric below, abruptly widening upwards, anticous limb c.13 × 18mm, anticous lobe 9 × 8mm, posticous lobes c.6 × 5mm, corolla densely hairy outside, hairs c.1mm long, composed of 2 or 3 relatively big globose cells surmounted by a 5–6-celled normal hair, gland-tipped, inside a dense patch of similar, much smaller (c.0.6mm) hairs below the posticous sinus, others scattered all over inflated part of tube. *Stamens* inserted 23mm above base of tube, filaments 11mm long, twisted once near base, anthers 3 × 1.5mm, cohering face to face by prominent ligatures, thecae not confluent, connective and upper half of filaments thickly clad in hairs c.0.5mm long, similar to those on outside of corolla; lateral staminodes 5mm, posticous staminode 2mm. *Disc* c.2 × 2mm, cupular. *Ovary* c.10 × 1mm, densely and minutely papillose, some short hairs at apex. *Style* 12mm, glandular-puberulous, hairs to 0.8mm. *Stigmatic lobes* c.2 × 1mm, glandular-puberulous outside. *Fruit* not seen.

*Cyrtandra quinquenotata* is notable for the remarkable hairs on both surfaces of the corolla and on the filaments and anthers; these give the outer surface of the dried, pressed, corolla an almost crystalline look and immediately distinguish the species from its three named allies, *C. gibbsiae* S.Moore, *C. elatostemoides* Elmer and *C. gillettiana* B.L.Burtt, and another, *C. crockeriana*, newly described here, a group distinguished by the vermiform sclereids in the hypodermis of the leaf (in a dried leaf, easily seen with a ×10 lens as closely set bars).

Other characteristics of the group as a whole are habit (lower part of stem decumbent, rooting, leafless, flowers few at each node, springing from a small brachyblast), calyx embracing the young corolla, splitting as that develops into five strongly beaked lobes roughly half as long as the tube, corolla about 50mm long, white or whitish with yellow/orange/brown markings on the lower lip and throat, sometimes with mauve/magenta tints as well, anther thecae not confluent, connective and upper part of filament glandular or verrucose, disc cupular, ovary and style variously pubescent, stigmatic lobes large, spathulate, fruit c.25–30 × 4mm, pericarp verrucose.

Kraenzlin described the fruit as 'ellipsoidea 1.2cm longa, 5mm crassa', but he was looking at a corolla bud! We have as yet seen no other specimen of *C. quinquenotata*.

**Cyrtandra crockeriana** Hilliard & B.L.Burtt, **sp. nov.** *C. gillettianae* B.L.Burtt affinis sed foliis distinguenda, majoribus usque ad 130 × 30mm (nec 250 × 40mm) acumine apicale ad 7mm longo (nec ad 30mm) marginibus serrulatis (nec integris) distinguenda.
Type: Sabah, Tunggol Forest Reserve, km45, Penampang–Tambunan road, 9 ix 1991, *Fidilis Krispinus* SAN 131339 (holo. SAN).

Herb to c.300mm tall, stems several from base, simple, bases decumbent, soon leafless, rooting, densely pubescent, hairs patent, c.1mm long, brown when dry, purple when fresh, some gland-tipped or all acute, leaves eventually confined to upper part of stem. *Leaves* opposite, strongly anisophyllous, minor leaves c.12–14 × 3–7mm, otherwise as major leaves, largest major leaves 65–130 × 22–30mm, elliptic, apex gradually long-acuminate, base narrowly cuneate, margins minutely serrulate (each tooth a dark hydathode), main lateral veins 9–10 each side of midrib, tertiary veins pinnate, upper surface glabrous, closely patterned with vermiform sclereids present in the hypodermis (easily seen with a × 10 hand lens on dried leaf), lower surface and margins with coarse hairs to 2mm long, a few gland-tipped or not, dense only over veins; petiole 3–10mm long, pubescent, hairs patent, brown (purple when fresh), a few gland-tipped or not. *Inflorescence*: 1–3 flowers from a very small axillary brachyblast, confined to lower, leafless, part of stem. *Bracts* (few seen) c.2–3 × 0.5mm, brown-hairy. *Pedicels* c.12–14mm long, well clad in brown patent hairs c.1mm long, some gland-tipped. *Calyx* c.11mm long, tube 5mm, lobes 5, subequal, c.6 × 2mm, upper two-thirds needle-like, initially cohering strongly and enfolding the young corolla, lower part deltoid, outside and margins of lobes with rather coarse acute gland-tipped hairs to 1mm long, inside minute globular glands. *Corolla* 'whitish', c.45mm long (only a fragmentary, withered one seen), outside glandular-pubescent, hairs c.1mm long, inside a patch of minute glandular hairs below posticous sinus, similar hairs on floor of tube in throat. *Stamens*: filaments c.10mm long, strongly twisted, anthers 3 × 1.5mm, cohering face to face by prominent ligatures, thecae not confluent, connective densely fringed with glandular hairs c.0.3mm long; lateral staminodes c.4mm long, posticous staminode 1mm. *Disc* 1.5 × 2mm, cupular. *Ovary* c.15 × 1mm merging gradually into style c.18mm long, ovary

minutely papillose, style glandular-puberulous, hairs c.0.5mm. *Stigmatic lobes* 3.5 × 1.6mm, spathulate, glandular-puberulous on backs. *Fruit* 30 × 4.5mm, pericarp verrucose, minutely papillose.

*Other specimens examined.* SABAH. Sinsuron road, 850–900m, 5°40′N, 116°22′E, 3 viii 1998, *Mendum et al.* 24 (E).

*Cyrtandra crockeriana* is known from two collections made on the Crocker range in western Sabah. Its closest ally in this distinctive group of species with vermiform sclereids in the hypodermis of the leaf appears to be *C. gillettiana* currently known only from the SE end of the Hose Mountains in SE Sarawak. Their leaves are of similar shape and indumentum but those of *C. crockeriana* are only half the size of those of *C. gillettiana* (up to 130mm long, not 250mm), the apical acumen is about 7mm long (not 30mm) and the margins are distinctly serrulate (not entire). Comparison of their flowers is difficult as we have seen only a fragmentary corolla and very young buds of *C. crockeriana*.

**Cyrtandra prostrata** Kraenzl., Mitt. Inst. Allg. Bot. Hamburg 7: 104 (1927).
Type: West Borneo [Kalimantan], im Westen des Bukit Mulu [0°31′S, 112°43′E], um 250m, 5 i 1925, *Hans Winkler* 1181 (holo. HBG, photo. E).

Stout herb, stem c.700mm to 1.5m long, up to 15mm diam., most of it strongly decumbent, stoloniferous, rooting, sending up occasional, new simple flowering stems, uppermost leafy part pilose, hairs coarse, brown, c.1.5mm long, lower part glabrous. *Leaves* few at apex where stem turns more or less erect, strongly anisophyllous, minor leaf c.13–17 × 3–4mm, lanceolate, petiole 3–4mm, or stipule-like, quickly caducous, largest major leaves c.180–310 × 55–110mm, obovate, apex long-acuminate, base cuneate-cordate, oblique, margins serrate in upper half, sometimes obscurely so, serrulate to entire in lower half, lateral veins 9–14 each side of midrib, tertiary veins subscalariform, upper surface glabrous at maturity, blade on lower surface sparsely pubescent, veins densely so, coarse brown hairs to 3mm long on midrib, shorter on lesser veins; petiole 20–50mm long, hairy as midrib. *Inflorescences* axillary on lower, leafless part of stem, flowers few, fascicled. *Bracts* 4–8 × 0.25–1mm, a pair subtending each pedicel, well clad in patent brown hairs to 1mm long. *Pedicels* c.25–35mm at maturity, hairy as bracts. *Calyx* purplish-red, c.12–14mm long, tube 9mm, lobes 5, subequal, 4–5 × 3–4mm, deltoid, initially cohering to enclose corolla bud, each tipped outside with a small dark horn, pilose, hairs coarse, brown, to 2mm long, inside glabrous. *Corolla* variously described as ‘dark yellowish-red’ (Winkler), ‘orangeish red, inner faces of lobes tinged yellow’, ‘bright red’, c.38mm long, tube 30mm, anticous lip 8 × 16mm, anticous lobe 6 × 6mm, posticous lobes 5 × 5mm, all lobes suborbicular, corolla densely pubescent outside, hairs to 1.5mm, inside minutely gland-dotted down to insertion of stamens. *Stamens* inserted c.17mm above base of tube, filaments c.12mm, strongly coiled and retracted after anthesis, anthers 3–4 × 2mm, thecae not confluent, triangular in outline with conspicuous apiculus (extension of connective), connective glabrous or with minute

hairs on appendage; lateral staminodes 2mm, posticous staminode not seen. *Disc* 3–3.5 × 2–2.5mm, cupular. *Ovary* 6 × 1.5mm, minutely papillose, crowned with a conspicuous coma, hairs c.1.5mm long. *Style* 18–19mm, pubescent. *Stigmatic lobes* 3–3.5 × 2mm, spathulate, stigmatic papillae conspicuous. *Fruits* c.21–25 × 6mm, pericarp verrucose. *Seeds* c.0.3 × 0.15mm, testa red-brown.

*Other specimens examined.* KALIMANTAN. 150km NE of Pontianak, G. Bentuang area, 5–10km N of Masa village, 0°52′N, 100°26′E, 120m, 10 vi 1989, *Burley et al.* 2463 (E, L). Tembawang Ngira [0°49′N, 111°29′E], 20 v 1993, *Wil de Jong* 347 (L). Headwaters of S. Kahayan, 5km NE of Harawu village, Nyoohoy tributary, 0°28′S, 113°44′E, c.28m, 25 iii 1988, *Burley et al.* 414 (E). Serawai, Uut Labang, 0°36′6.1″S, 112°38′56.2″E, 750m, 6 x 1995, *Church et al.* 2197 (E); ibid., 1000m, 10 x 1995, *Church et al.* 2385 (A); ibid., 1000m, 9 x 1995, *Church et al.* 2339 (E). Sintang, Bukit Baka National Park, along Sungai Ella, 0°37′S, 112°15′E, 280m, 2 xi 1993, *Church* 489 (E). Bukit Raya . . . area, upper Samba river, 60–80km NNW of Tumbang Samba, c.0°50′S, 112°50′E, 150m, 25 xi 1982, *Mogea* 3661 (L).

The relationship of *C. prostrata* lies, not with *C. basiflora* C.B.Clarke as Kraenzlin suggested, but with *C. radiciflora* C.B.Clarke and its immediate allies, which have in common fascicled flowers, very small bracts, almost tubular shortly lobed calyx, each lobe tipped outside with a small dark horn, anthers triangular in outline, thecae not confluent, connective projecting up into a conspicuous apiculus, disc cupular, ovary papillose and crowned with a conspicuous coma of relatively long hairs, style pubescent, stigmatic lobes relatively large, spathulate, stigmatic papillae conspicuous, fruits c.20–30 × 6mm, pericarp verrucose.

It is easily distinguished from *C. radiciflora* by its strongly anisophyllous leaves, base of major leaves cordate (not cuneate) and corolla wholly shades of red (not three lower lobes stained blood red, two upper lobes creamy white).

*Cyrtandra prostrata* appears to be widely spread in western Kalimantan, in primary and secondary forest.

**Cyrtandra paxiana** Lauterb., Bot. Jahrb. 44: 540 (1910).
Type: SE Borneo [Kalimantan], zwischen Batu Babi [1°45′S, 115°40′E] und Lumowia [c.1°44′S, 115°46′E], 10 vii 1908, *Hubert Winkler* 2818 (holo. WRSL, iso. BM, photo. E).

Stout herb, stem to 1m long, up to c.10mm diam. near base, lower part decumbent, rooting, uppermost leafy part fulvo-pubescent, hairs coarse, to c.1mm long. *Leaves* few, opposite, strongly anisophyllous, minor leaf stipule-like, c.14 × 2mm, lanceolate, fulvo-pubescent on back, largest major leaves c.215–230 × 56–65mm, broadest above the middle, apex abruptly long-acuminate, base cuneate, margins serrate, lateral veins c.14 each side of midrib, tertiary veins scalariform, upper surface glabrous except for minute hairs inside base of channelled midrib, lower surface glabrous between veins, veins patent-pubescent, hairs to c.0.8mm on midrib, shorter elsewhere, both midrib and laterals raised; petiole c.9mm, hairy as midrib, channelled above. *Inflorescence* axillary, on lower leafless part of stem, several flowers in succession from a small brachyblast. *Bracts* paired at base of each pedicel,

c.4 × 0.5mm, linear, pubescent. *Pedicels* c.8–22mm (longest in fruit), puberulous. *Calyx* c.15–18 × 10mm, campanulate, inflated, tube c.10–11mm, lobes 5, c.5–7 × 3–4mm, deltoid, apiculate, both surfaces patent-puberulous. *Corolla* 'weissgelb' (cream-coloured?), c.35mm long, tube c.25mm, lower 10mm narrowly cylindric, then abruptly inflated, anticous lip c.9 × 18mm, anticous lobe 8 × 6mm, posticous lobes c.6 × 5mm, all lobes rounded, whole corolla puberulous outside, glabrous inside except for patch of hairs below posticous sinus. *Stamens* inserted 15mm above base of tube, filaments c.10mm long, strongly coiled post anthesis, anthers 4 × 2.5mm, deltoid in outline, 1mm of length a prominent apiculus almost orbicular at apex, anther thecae not confluent, connective pubescent on margins. *Disc* c.2.2 × 2mm, cupular. *Ovary* 5 × 2mm, very minutely puberulous, crowned with a coma of relatively long hairs. *Style* 19mm, pubescent, acute hairs to 0.5mm, also on backs of stigmatic lobes. *Stigmatic lobes* 4 × 2mm, spathulate. *Fruit* c.20 × 5.5mm, pericarp verrucose. *Seeds* immature.

No further specimens of *C. paxiana* have been found among the material currently available to us. The species is in the general affinity of *C. radiciflora* and *C. prostrata* (above), but differs from both, *inter alia*, in its inflated calyx lacking a horn on the backs of the lobes, and in its cream-coloured flowers, not red and cream as in *C. radiciflora* nor wholly shades of red as in *C. prostrata*.

**Cyrtandra strictipes** Kraenzl., Mitt. Inst. Allg. Bot. Hamburg 7: 109 (1927).
Type: West Borneo [Kalimantan], auf dem Bukit Raja [0°40′S, 112°41′E] um 1250m, Urwald, 17 xii 1924, *Winkler* 918 (holo. HBG, 2 sheets).

Herb?, stem (two severed ones seen) c.100mm long, one 5mm, one 8mm diam., woody, nodes 8–10mm apart, minutely appressed-pubescent at apex, quickly glabrescent, leaves crowded at apex. *Leaves* opposite, strongly anisophyllous, minor leaves stipule-like, c.17mm long, base half-clasping, c.5mm broad, abruptly contracted into a rod-like upper portion c.10mm long, all parts minutely appressed-puberulous, largest major leaves 135–170 × 67–80mm, broadly elliptic, apex somewhat abruptly acute, base rounded, distinctly to obscurely oblique, margins obscurely toothed (distinctly so in young leaves), each tooth a hydathode, lateral veins 7 each side of midrib, curving upwards and terminating in margins, tertiary veins reticulate, upper surface smooth, glabrous, margins densely puberulous, lower surface densely puberulous in young leaves, hairs fine, rufous, in mature leaves hairs confined to veins, blade glabrous, finely pustulate; petiole c.110–170mm long, densely puberulous, partially glabrescent. *Inflorescence*: flowers apparently solitary in leaf axils, but scars on receptacle suggest one or two more, peduncle very stout, 2–3mm long. *Bracts* not seen. *Pedicels* c.15mm long, densely pubescent, hairs rufous, slightly crisped. *Calyx* c.22mm long, tube 11mm, lobes 11 × 4mm, triangular, with glabrous membranous margins infolded in bud, the 5 lobes then cohering and enclosing the young corolla, only the thick median keels visible, keels and tube densely pubescent outside, glabrous inside. *Corolla* 'white, throat yellow', c.43mm

long, tube 25mm, funnel-shaped, anticous limb c.15 × 27mm, anticous lobe 13 × 11mm, posticous limb c.15 × 16mm, lobes c.15 × 8mm, all lobes broadly elliptic, corolla silky villous outside, inside glabrous except for a band of obtuse hairs c.1mm long below the posticous sinus. *Stamens* inserted 18mm above base of tube, filaments c.8mm long, thickened about the middle and there strongly twisted once, anthers 2.2 × 1.6mm, thecae not confluent, copiously bearded at apex and base, anthers facing each other but possibly not cohering; lateral staminodes 6mm long, tips curled over; posticous staminode wanting. *Disc* 2 × 2.3mm, cupular. *Ovary* c.11 × 1.5mm, distinctly compressed, glabrous except for hairs where it tapers into the style. *Style* c.12mm long, villous. *Stigmatic lobes* c.1.25 × 1.5mm, but lobing scarcely discernible at maturity. *Fruit*: only a partially developed one seen, this dorsoventrally compressed with a distinct ridge along both margins, pericarp verrucose.

*Cyrtandra strictipes* was chosen to lectotypify sect. *Radicicaules* Kraenzl., which was then reduced, with reservations, to synonymy under sect. *Decurrentes* C.B.Clarke (Burtt, 1990, p. 203). Now that a flower of *C. strictipes* has been examined in detail, this reduction proves to be mistaken: *C. strictipes* has two characters that we are as yet unable to match in *Cyrtandra*, namely strongly bearded anthers and dorsoventrally compressed ovary. Unfortunately, no fully formed fruit is present, but the very young one seen shows compression, the development of two longitudinal ridges, and verrucose pericarp (Fig. 1).

The plant has been fully described because of Kraenzlin's errors and omissions. He described the ovary as 'ovatum' and 'dense pilosum' whereas it is narrowly elliptic, compressed and glabrous, the style as 'glabre' whereas it is pilose; he did not describe the bearded anthers.

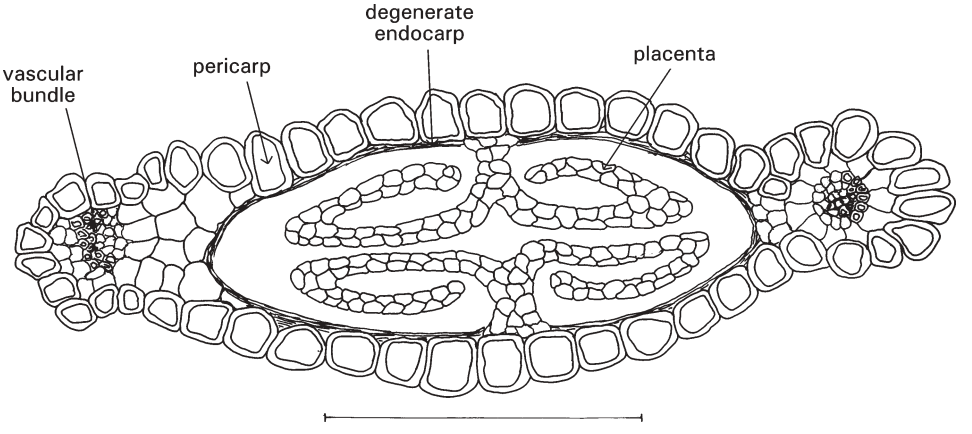


FIG. 1. Diagram of transverse section of young fruit of *Cyrtandra strictipes*, the extreme compression being an artefact of the embedding and sectioning process; seeds omitted. Scale bar = 1mm.

**Cyrtandra bracheia** B.L.Burtt, Notes Roy. Bot. Gard. Edinburgh 30: 28 (1970). *C. populifolia* sec. Kraenzl., Mitt. Inst. Allg. Bot. Hamburg 7: 111 (1927) p.p. non Miq., Fl. Ind. bat. 2: 741 (1858).

In his account of Hans Winkler's specimens from Kalimantan, Kraenzlin cited *Winkler* 1191 (from Bukit Mulu, 0°31′S, 112°43′E) as *C. populifolia*, described from Java, and not hitherto recorded from Borneo. The specimen proves to be *C. bracheia* B.L.Burtt, which is widespread in the SW half of Sarawak and hence clearly spreads across the border into W Kalimantan.

Kraenzlin cited a second specimen, *Winkler* 1329 from Bukit Obat, c.0°55′N, 113°16′E, which is *C. subgrandis* B.L.Burtt (Burtt, 1970), a new name for *C. grandis* Kraenzl., a later homonym of *C. grandis* Blume; *C. subgrandis* occurs in the southern half of Sarawak as well as in Kalimantan.

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