

STUDIES IN THE GESNERIACEAE OF THE OLD WORLD  
XLIV: NEW AND LITTLE-KNOWN SPECIES OF CYRTANDRA,  
CHIEFLY FROM SARAWAK

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ABSTRACT. Seventeen new species of *Cyrtandra* are described from Sarawak (one extending to Brunei) and four existing species are annotated; one transfer is made from *Didymocarpus* (*D. vulpinus* Kr.); *C. gracilentia* Kr. is excluded from the Bornean list as the type locality is in Sumatra; *C. verrucosissima* Kr. is identified as *Didymocarpus crinitus* Jack; *C. decurrens* var. *wallichii* C.B. Cl., from the Malay Peninsula, is raised to specific rank.

It has become increasingly clear in recent years that *Cyrtandra* has a huge representation on the island of Borneo. Every new collecting trip produces several specimens that cannot be identified with any known species. In this vast sea of *Cyrtandra* there are at present far too few fixed reference points, named species, to permit even partial determinations of much of the material. For nearly 150 entities that I provisionally recognize there are only 72 names, including those proposed earlier in this series (*Notes R.B.G. Edinb.* 30:23-42, 1970): of these 72 perhaps 10 disappear into synonymy. The need to establish additional named species is evident.

There are one or two general points of interest, detailed in the notes on the species, that may be mentioned here. The first two concern ecological relationships. A small group of allied species has emerged: *C. mirabilis* C.B.Cl. is found on granite rocks, whereas two new ones, *C. ammitophila* and *C. calciphila*, are found on sandstone and limestone respectively (see under *C. calciphila* for discussion). This group emphasises how the diverse geology of Sarawak contributes to its richness in species. Another small group comprises *C. dilatata* C.B.Cl., a denizen of shady river-banks, and two new lime-loving species, *C. incrustata* and *C. spelaea*. *C. incrustata* is found on limestone cliff faces, and excretion from chalk glands results in heavy incrustation of stem and the underside of the leaves; *C. spelaea* is found in loose soil within the entrances of limestone caves; it appears to lack chalk glands and consequent incrustation. It may be noted, too, that *C. calciphila*, also without chalk glands, grows on the same limestone cliffs as the heavily encrusted *C. incrustata*. *Cyrtandra* has found more than one way of coping with the exigencies of the limestone habitat.

The other point worth mention concerns the new species *C. leucochlamys*. This species differs from its apparent ally *C. serrato-bracteata* Lauterb. in just the same way as *C. angularis* Elmer differs from *C. oblongifolia* (Bl.) C.B.Cl. In each case the first of the two species mentioned has a thin membranous calyx that covers the young corolla until it is ruptured when the flower is about half-grown; the second species has a calyx of 5 short teeth. The two pairs of species are not themselves closely related.

The emergence of these, and other, patterns of variation is helping to bring order into the genus: it is the large number of recognizable entities of which material is inadequate that holds up an attempt at a general revision.

It must be mentioned that, even now, by no means all the specimens that reach me are 'workable' in the herbarium, the usual trouble being lack of corollas and stamens. *Cyrtandra* flowers easily disappear between field and herbarium, and in any case the ratio of flowers to leafage is usually small. It is essential to collect flowers separately from more plants than one needs to take for herbarium sheets, and it is essential that care be taken to collect flowers that have the parts intact—corollas are often full of insects that will live long enough to consume the rest of the stamens etc. before they die. Of course the ideal solution is preservation of flowers in liquid, but this may not always be possible. Pressed flowers are adequate if the job is done carefully (a flat pack of toilet paper always travels with me).

I have not yet located authentic material of the following published names. I shall be very grateful for any information that will help me to find this:—

*C. anisopoda* Kr., Samarinda, *Schlechter* 13355.

*C. debilis* Kr., SE Borneo, *Winkler* 2678, 2831, 3313 (originally det.

*C. radiceiflora* by Lauterbach. I have seen a fragment of *W.* 2678 from herb. Lauterbach—Wrocław).

*C. microcalyx* Kr., Long Sele, *Schlechter* 13490.

*C. punctatissima* Kr., SE Borneo, *Winkler* 2845.

I am grateful to the Curators of the herbaria cited for access to materials, and to Dr M. H. Bokhari for observations on sclereids. I am also very grateful to those who have aided my own work in the field or have helped by collecting for me.

*Cyrtandra ammitophila* B. L. Burtt *species nova* a *C. mirabili* C.B.Cl. foliis multo minoribus, pedunculis brevioribus tenuioribus, pilis calycis eglandulosis, antheris dorso glanduloso-pilosis facile distinguitur. Etiam affinis *C. calciphilae* B. L. Burtt, sed foliis latioribus apice acuminatis basi abruptius attenuatis supra mamillatis longe pilosis, filamentis papilloso-verrucosis recedit.

Caulis lignosus c. 12 cm longus. *Folia* rosulata, leviter falcata, c. 15 × 3 cm, ad apicem acuminata, ad basin attenuata, supra mamillata pilis longis setosis et aliis brevioribus intermixtis praedita, subtus pilosa, marginibus crenatodentatis dentibus iterum denticulatis. *Pedunculi* axillares, 2–4 cm longi, pilosi; bractee foliaceae, c. 10 × 2.5 mm, pilosae; pedicelli anthesi c. 1.5 cm, pilosi. *Calyx* 1 cm longus, fere ad medium divisus, lobis triangulari-acuminatis, extra setis longis brunneis pilosis, intus glandulis pedicellatis parce praeditus. *Corolla* 2 cm, extra tenuiter pilosa; tubus 13 mm; lobi inferiores c. 5 × 5 mm, superiores 4 × 4 mm, omnes rotundati et marginibus parce et breviter glanduloso-pilosis. *Stamina* 8 mm supra corollae basin orientia; filamenta 3 mm, curvata, praecipue in parte superiore papilloso-verrucosa; antherae 1 × 1.25 mm, apicibus cohaerentes, dorso connectivo dense glanduloso-piloso. *Discus* 1.5 mm altus, cupularis, undulatus. *Ovarium* 4 mm, inferne glabrum, superne densissime pilosum, abrupte in stylum robustum 4.5 mm longum dense glanduloso-pilosum contractum; stigma lobis duobus brevibus obtusis.

Type. Sarawak. Fourth Div., Bintulu distr., NE slope of Bukit Kana, 600–850 m, on rather dry sandstone cliff, fl. white, 19 xi 1963, *Hirano & Hotta* 1287 (holo. KYO).

The epithet records the habitat of this species on sandstone, in contrast to that of its ally *C. calciphila* on limestone cliffs. For discussion see under that species.

**Cyrtandra argentata** B. L. Burt, *species nova* inter species corollis magnis extra longe pilosis habitu humili, foliis angustis supra pseudolepidotis, corollis extra argenteo-sericeis (nec ferrugineo-sericeis) intus dense rubromaculatis recognoscitur.

Caulis lignosus ad 7 cm altus, apicem versus foliatus, inferne decumbent-curvatus et illic radicibus rigidis suffulcentibus saepe praeditus. *Folia* anguste elliptica vel oblanceolato-elliptica, 15–28 cm longa (petiolo alato 1–1.5 cm longo incluso), apice acuta vel breviter acuminata, ad basin attenuata, marginibus distanter serrato-dentata, dentibus pilis comatis, supra primum appresse pilosa demum glabrescentia et basibus pilorum delapsorum punctata, subtus in nervis prominulis dense inter nervos parcius pilosa. *Inflorescentiae* axillares, subsessiles; bracteae c.  $1.7 \times 1$  cm, inferne coalitae, flores c. 3 circumcingentes, apice breviter acuminatae, extra basin versus dense verrucosae verrucis apice in pilos crassos transeuntibus; bracteolae submembranaceae  $10 \times 2.5$  mm, bracteis occultae. *Calyx* membranaceus 17 mm longus, lobis 5 triangularibus  $5 \times 4$  mm, extra pilosus. *Corolla* magna 6 cm longa, extra dense et longe pilosa; tubus 4 cm longus, per 2.5 cm cylindricus, superne amplius; lobi subaequales, c.  $10 \times 8$  mm, rotundati. *Filamenta* 2, in fauce 3 cm supra corollae basin orientia, paulo decurrentia, c. 12 mm longa, crassa, demum spiraliter torta et retracta; antherae 2 mm longae, thecis leviter divergentibus, apicibus cohaerentes. *Discus* cylindricus, 2.5 mm altus, leviter undulatus. *Gynoeceum* 4 cm longum; ovarium conicum c. 7 mm longum, glabrum, in stylum 3.3 cm longum sursum pilosum attenuatum; stigma peltatum, stomatomorphum, 5 mm diam. *Fructus* ellipsoideus, 1 cm longus.

Type. Sarawak, Third Division, Bukit Raya, near Pelagus Rapids on Rejang, 420 m; on slopes under fairly dense canopy, very open ground vegetation, some leaf litter; leaves with silvery area up midrib, corolla white and very silky outside, very densely red-purple-spotted inside, spots thinning towards tips of lobes; 20 vii 1962, *Burt & Woods* 2575 (holo. E; iso. SAR).

SARAWAK. Third Div.: Ulu Sebako, Belaga, c. 100 m, 10 iv 1963, *Ashton* S17745 (SAR); Sungei Bena, tributary of S. Sut, c.  $1^{\circ} 55' N$ ,  $115^{\circ} 5' E$ , 23 vii 1962, *Burt* 2611 (E, SAR); Melinau Community Forest near Nanga Tunoh, 3 viii 1967, *Burt & Martin* B4779 (E, SAR); Teneong, 2 ix 1954, *Brooke* 9153 (L); Long Bah, 15 viii 1954, *Brooke* 9020 (L, SING). Fourth Div., along S. Latai a small branch of Ulu S. Kakus, 7 xi 1963, *Hirano & Hotta* 822 (E, KYO).

This is a rather striking dwarf species, the inside of the white corolla being very conspicuously red-spotted; the leaves often have a line of silver patches parallel to the midrib. The upper leaf surface has an almost scaly appearance under a hand lens; this is due to the collapsed bases of the deciduous hairs.

The species is obviously variable, but I think all the cited material must be included: other more doubtful specimens are not quoted. Variability extends to leaf anatomy: osteosclereids in the hypodermis may be long or short and the hypodermis itself 1- or 2-layered.

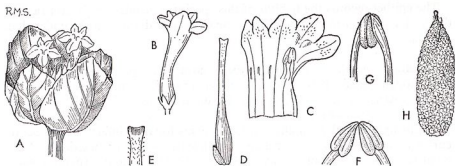


FIG. 1. *Cyrtandra atrichos* C.B.Cl. A, inflorescence ( $\times 1$ ); B, flower ( $\times 2$ ); C, corolla opened out ( $\times 2$ ); D, gynoecium and disc gland ( $\times 4$ ); E, top of style and stigma ( $\times 9$ ); F, anthers opened out ( $\times 6$ ); G, anthers in natural position ( $\times 6$ ); H, fruit ( $\times 3$ ). All from B. 1949 (spirit material).

*Cyrtandra atrichos* C.B.Cl. in DC. Mon. Phan. 5:237 (1883). Fig. 1.

Type. Sarawak, First Division, Penkalan Ampat [ $1^{\circ} 11' N$ ,  $110^{\circ} 15' E$ ], Nov. 1866, Beccari 2792 (FI, K).

SARAWAK. First Division, Mt Matang, July 1915, Ridley s.n. (K); *ibidem*, 29 v 1962, Burt & Woods B. 1949 (E, SAR); *ibidem*, 7 ix 1967, Burt & Martin B. 5148 (E, SAR).

Clarke gave no locality for this species. The specimen in Beccari's herbarium is, however, clearly labelled Pankalan Ampat, which is a village visited by Beccari high up the Sarawak river, below Gunong Penrissen on the Indonesian border.

The name *C. atrichos* has had a fascination for those identifying Bornean *Cyrtandras* and has been applied to almost any species. Fortunately none of these wild determinations seem to have been published. Part of the trouble was no doubt due to the fact that Clarke's type material had no flowers. In their absence Clarke placed the species in his sect. *Decurrentes*; but the small corollas are nothing like the large shaggy ones of *C. decurrens* de Vriese and its allies.

The following details should be added to Clarke's description. *Inflorescence* c. 3.5 cm diam. *Calyx* barely 2 mm long, divided almost to the base into triangular teeth. *Corolla* (lower lip extended) 15 mm; tube 10 mm; upper lobes erect  $3 \times 3$  mm; lower lip with lobes  $3.5 \times 4$  mm, palate with two orange (rarely yellow) mounds, lobes and palate with stalked glandular hairs. *Stamens* arising 6 mm above base of corolla; filaments 1.5 mm, glabrous; anther 1 mm. *Disc* with a thick ventral gland, 1 mm. *Ovary* 2.5 mm, glabrous; style 5 mm very shortly pubescent; stigma shortly bilobed.

*C. atrichos* is, in fact, a very distinct species with long, smooth, deep green, gradually attenuate leaves and very dense, pedunculate, axillary heads of flowers invested by the large foliaceous bracts. The small white corolla is rendered conspicuous by the orange mark on the palate. The leaves lack sclereids. The affinity of the species is at present uncertain, but, despite obvious differences it probably belongs to the same general group as *C. smithiana*, described below.

*Cyrtandra calciphila* B. L. Burtt, *species nova* fortasse *C. mirabilis* C. B. Clarke affinis, sed planta minore, foliis multo angustioribus bullatis nec mamillatis, floribus minoribus et habitu calciphilo distinguenda.

Caulis lignosus, e scopulo calcareo pendulus, simplex vel pauciramosus, apice folia congesta flabellum formantia gerens. Folia lineari-oblonga vel lineari-oblongata, 15–25 × 2–3 cm, majora pendula minora sursum emissa, supra breviter pilosa interdum glabrescentia inter venas impressas leviter bullata et interdum quasi mamillata, subtus longius pilosa, apice acuta, ad basin sensim attenuata, sessilia. Pedunculi axillares, 1–3 cm longi, 1–5-flori, patenter pilosi; pedicelli ad 1 cm, etiam pilosi. Calyx campanulatus, tubo 4–5 mm longo, lobis triangularibus 2.5–3 × 1.5 mm interdum dentatis, dense pilosus. Corolla c. 22 mm longa (ad apicem lobi mediani), extra tenuiter pilosa; tubus c. 12 mm longus, dimidio superiore intus bicarinatus extra invaginatus; lobi superiores c. 7 × 7 mm, laterales c. 7 × 6 mm, medianus c. 9 × 6 mm, omnes rotundati. Stamina 7 mm supra corollae basi orientia; filamenta c. 3 mm longa, curvata, in parte superiore glandulosa; antherae 1 mm longae, dorso glanduloso-pilosae, apicibus cohaerentes. Discus cylindricus, 1.5 mm altus. Ovarium conicum, 3 mm longum, basi glabrum superne dense pilosum; stylus 4 mm, glanduloso-pilosus; stigma bifidum, lobis obtusis. Fructus 10 × 4 mm, breviter rostratus, pilis brevibus patentibus indutus.

Type. Sarawak, Fourth Division, Gunong Mulu National Park, Melinau gorge camp, c. 120 m, 11 vi 1975, Burtt 8239 (holo. E; iso. SAR).

SARAWAK. Fourth Division, Gunong Mulu National Park, Lobang Rusa, c. 30 m, 9 vi 1975, Burtt 8224 (E); along Sungei Payau from S Melinau Paku to Lobang Payau, 50–100 m, 22 iii 1964, Hotta 15282 (E, KYO); Gunong Api, 120 m, 1970, Lehmann 503 (E); Gunong Api, Gua Batu, 26 ix 1971, Anderson S. 30750 (E, SAR); Melinau gorge camp, 21 vi 1962, Burtt & Woods B 2211 (E, SAR). Fifth Div., SW face Benarat, 13 vi 1975, Burtt 8260 (E, SAR).

This species is very characteristic of limestone cliff-faces in the Gunong Mulu National Park. It is allied to *C. mirabilis* C.B.Cl. which is a granite-loving species from the Poi Range in southern Sarawak and the neighbouring Landak in Kalimantan (see *Notes R.B.G. Edinb.* 30:35. 1970).

There is another plant very closely allied to *C. calciphila* found in the Bintulu district of Sarawak. This I have described above as *C. ammitophila*. It differs in leaf shape and indumentum, and in the papillose-verrucose, not glandular-hairy filaments; it was found on dry sandstone cliff-faces.

The three species *C. mirabilis*, *C. calciphila* and *C. ammitophila* all have thinnish leaves with bullate or mamillate surfaces; as one learns to expect in such plants, they all lack sclereids in the leaves.

It is interesting that these three species are so neatly separated ecologically: *C. mirabilis* on granite, *C. calciphila* on limestone and *C. ammitophila* on sandstone.

Another plant of this affinity was also collected in the Bintulu district (Sungei Anap, a branch of S. Tatau, Hirano s.n., 22 x 1963, KYO). The specimen differs from both *C. calciphila* and *C. ammitophila* in having more branched inflorescences and more glabrous ovaries. Lack of flowers on the material makes a final decision on its status impossible. Unfortunately, the rock on which this plant was growing was not recorded.

*Cyrtandra chaiana* B. L. Burt, species nova distinctissima; fortasse *C. chryseae* C.B.Cl. affinis, sed ab hac foliis multo majoribus, inflorescentiis axillaribus subsessilibus, calyce aequaliter 5-dentato latiore et corolla majore ore ampliato longe recedit. Fig. 2.

Caulis basi effusus radicans lignosus, superne erectus, obtuse quadrangularis et inter angulos sulcatus, medulla magna, sericeo-lanatus. *Folia* opposita, utraque magna sed interdum paulo inaequalia; petiolus ad 12 cm longus, sericeo-lanatus, superne lamina decurrente leviter alatus; lamina oblique ovato-elliptica, usque ad  $30 \times 15$  cm, apice acuminata, basi inaequilateraliter angustata, supra primum sericeo-pilosa maturitate glabra, subtus dense sericeo-lanata, marginibus serratis, costa et nervis lateralibus curvatis utrinsecus 15 subtus prominulis. *Pedunculus* communis 5 mm longus, flores multos cymosus congestos gerens; pedicelli 3-7 mm longi, tenuiter pilosi. *Bractee* exteriores c.  $1.7 \times 1$  cm, apice cornu leviter recurvatum 5 mm longum formante, pilosae, interiores apice minore. *Calyx* pilosus, campanulatus, 6-7 mm longus, tubo 3-3.5 mm; lobi 2.5 mm inferne ovato-triangulares, subito in acumen 1 mm contracti. *Corolla* 3 cm longa, tubo 1 cm, labio inferiore 3 cm diam., lobo mediano  $8 \times 7$  mm, lateralibus  $6 \times 6$  mm, lobis superioribus  $7 \times 5$  mm fere ad medium conjunctis. *Stamina* 5 mm supra corollae basin orientia; filamenta 3 mm longa, dimidio superiore pilis glandulosis crassis parvis; antherae liberae, 1.75 mm longae, thecis leviter divergentibus, rimis apice confluentibus, dorso uti filamenta glandulosae. *Discus* cupularis, 1 mm altus. *Ovarium* 2.75 mm longum, glabrum, subito in stylum uti filamenta glandulosum 2.5 mm longum contractum; stigma lobis duobus horizontalibus, 1.5 mm diam. *Fructus* ellipsoideus, 1 cm longus, verrucosus.

Type. Sarawak: First Division, Padawan distr., near Kampong Bra'ang Wah, c. 285 m, in bamboo-scleria-zingiberaceae vegetation on steep clay hillside, 8 v 1975, Burt 8106 (holo. E; iso. SAR).

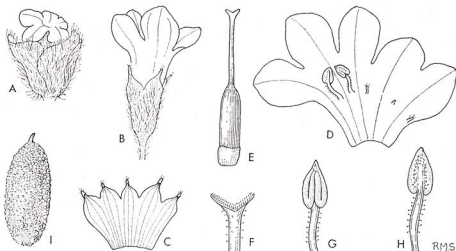


FIG. 2. *Cyrtandra chaiana* B. L. Burt. A, inflorescence ( $\times 1$ ); B, flower ( $\times 2$ ); C, calyx opened out ( $\times 2$ ); D, corolla opened out ( $\times 2$ ); E, gynoecium and disc ( $\times 4$ ); F, top of style and stigma ( $\times 9$ ); G & H, anthers front and back view ( $\times 6$ ); I, fruit ( $\times 3$ ). All from B. 8106 (spirit material).

SARAWAK. First Division, Serian distr., Gunong Penrissen, shrub 6 ft high on sandstone rock in primary forest on plateau summit of mountain, corolla white, 29 iv 1962, *Ilias Paie* S 16389 (E, SAR).

The flower of *C. chaiana* is white, marked yellow on three lines at the base of the midvein of the median lobe and with a short line on each lateral. Even on the living plant the anthers were free from one another: this is rather unusual in *Cyrtandra*, as is the confluence of the lines of dehiscence. The inflorescences were solitary in the axils of the upper leaves, but persisting on old stems below the leaves and then often increasing to 2-3 in an axil, sometimes with a leafy axillary shoot also present.

I am happy to link the name of Paul Chai (Forest Botanist, Kuching) with this very distinct species of *Cyrtandra*. The success of my 1975 collecting trip in Sarawak owed much to his unstinting help and I also greatly enjoyed his company in the field. It is particularly appropriate, therefore, that this species was collected when we were together.

*Cyrtandra chrysea* C.B. Cl. in DC. Mon. Phan. 5:212 (1883).

Type: Sabah, Kulawat [presumably = Kalawat, 6° 19' N, 116° 22' E], *Lobb* (K).

SABAH. Mt Kinabalu: Dallas, 900 m, 31 viii 1931, *Clemens* 26089 (BM, K, L, SING); Panataran R., 2700 m, 21 vi 1933, *Clemens* 33661 (BM, K, L); Gurulau spur, 2100 m, 5 xii 1933, *Clemens* 50719 (BM, K); Kabayan-Koung, 180-390 m, 3 xi 1931, *Holtum* SFN 25118 (SING); Kadamaian R., c. 1950 m, 21 vi 1933, *Carr* SFN 27721 (SING).

SARAWAK. First Div.: Mt Matang, 1890, *Hullett* s.n. (K); *ibidem*, near top, 600 m, 28 x 1929, *Clemens* 22328 (K); Bau distr., below Bungoh Range, 6 xii 1969, *Paie & Mamit* S 29328 (E, SAR); Padawan distr., Kampong Sadir, 50 miles from Kuching, 3 xii 1973, *Mamit* S 33386 (K, L, SAR).

KALIMANTAN. W Koetai, near Mt Kemoel, 1600 m, 17 x 1925, *Endert* 4234 (L).

The disjunct distribution of this species is a striking one. However, it must be remembered that our knowledge of distributions in Borneo is still very incomplete. It is only recently that *C. eximia* C.B. Cl. was collected anywhere except on Mt Matang: it is now known from the Pelagus Rapids on the Rejang and from the SE Hose Mts (see *Notes R.B.G. Edinb.* 30:30. 1970). *C. chrysea* has not been seen recently on Mt Matang, despite deliberate search: *C. eximia*, which is not dissimilar in flowers, but differs sharply in habit, is undoubtedly the common species on that mountain.

*C. eximia* is a slender unbranched pole plant, up to 4 m high, whereas *C. chrysea* is described as a shrub or herb. The two species may also be distinguished thus:—

1. Flowers borne in pedunculate inflorescences in the leaf axils; calyx c. 10-15 mm long, deeply divided but the three upper lobes rather less deeply separated from one another than the lower two . . . . . *chrysea*
- + Flowers fasciculate, axillary to fallen leaves; calyx c. 5-7 mm long, deeply but almost equally divided . . . . . *eximia*

*Cyrtandra cuprea* B. L. Burt species nova, foliis junioribus pilis rubro-cupreis densissime vestitis, petiolis basi haud auriculatis, ovario et stylo (pilis perpaucis eglandulosus prope apicem exceptis) glabris ab affini *C. erectipila* B. L. Burt et *C. subgrandis* B. L. Burt distinguenda.

Herba robusta, ad 1.5 m alta, haud ramosa, cauli primum dense et patenter velutino-pubescente ima basi nonnumquam decumbenti et radices fulcientes emittente. *Folia* opposita utraque evoluta sed saepe paulo inaequalia, petiolo c. 4 cm incluso usque 30 cm longa et 8 cm lata, late oblanceolata vel obovato-elliptica, apice acuta vel breviter acuminata, ad petiolum attenuata, marginibus serrato-dentatis, primum utrinque dense et appresse pilis rubro-cupreis induta, demum supra basibus pilorum delapsorum asperula, subtus breviter et appresse pubescentia. *Inflorescentiae* axillares pedunculo 3 mm longo vel subsessiles; bractae conjunctae involucrum  $2 \times 1-1.5$  cm formantes, uti folia breviter rubro-pubescentes, aliquantum verrucosae, margine libera serrata; flores in involucro ad 15. *Calyx* c. 13 mm longus, extra pilosus, membranaceus, corollam primum obtegens, demum ut videtur irregulariter ruptus. *Corolla* 5 cm longa, extra sericeo-pilosa; tubus 3.75 cm, inferne cylindricus sursum leniter ampliatus; limbus intus glandulosus, lobo mediano 10 mm, lateralibus 8 mm, superioribus 6 mm longis alte connatis infra sinu marsupiatu. *Stamina* 3 cm supra corollae basin orientia; filamenta 7 mm longa, paulo supra basin geniculata, glabra; antherae 2 mm longae, coram dispositae apicibus tantum cohaerentes, thecis parallelis, rimis haud confluentibus. *Discus* cylindricus, 3 mm altus. *Ovarium* glabrum, 7 mm longum sensim attenuatum in stylum 30 mm longum pilis perpaucis eglandulosus prope apicem exceptis glabrum; stigma transverse ovale, 2.5 mm diam. *Fructus* conico-ellipsoideus, c. 2 cm longus.

Type. Sarawak: First Division, Gunong Matang, 7 ix 1967, *Burt & Martin* 5149 (holo. E; iso. SAR).

SARAWAK. First Division, Gunong Matang, *Hullett* s.n. (K), *Brooke* 8713 (E, L, G), *Brooke* 9533 (L), *Clemens* 22302 (K), *Burt & Woods* 1942 (E, SAR), *Chai* S 18531 (E, SAR); Sungei China, north end Gunong Matang, *Woods & Burt* 2509 (E, SAR); Batu Empan, Santubong, *Ashton* S 21552 (E, SAR). Third Division, Pelagus Rapids on Rejang, 21 vi 1962, *Burt & Woods* 2583 (E, SAR); Sungei Benar, tributary of S. Sut, 23 vii 1962, *Burt* 2605 (E, SAR); Teneong, 2 ix 1964, *Brooke* 9156 (L). Fourth Division, NE slope Bukit Kana, Bintulu, 600-850 m, *Hirano & Hotta* 1370 (E, KYO).

KALIMANTAN. Sinkawang, *Teyssman* 7987 (Fl).

*C. cuprea* has the same pattern of sclereids in the leaves as *C. erectipila* and *C. subgrandis*: osteosclereids in the hypodermis, astrosclereids in the mesophyll.

*Cyrtandra dilatata* C.B.Cl. in DC., Mon. Phan. 5:238 (1883).

Type: Sarawak, rapide del Rejang, Sept. 1867, *Beccari* 3835 (Fl).

SARAWAK. Third division, Pelagus Rapids on Rejang, c.  $2^{\circ} 10' N$ ,  $113^{\circ} E$ , *Burt & Woods* B 2556 (E, SAR), *Brooke* 8985 (BM), *Anderson & Ding Hou* 511 (L); Sungei Benar, tributary of S. Sut, c.  $1^{\circ} 55' N$ ,  $113^{\circ} 5' E$ , 23 vii 1962, *Burt* 2626 (E, SAR). Fourth Division, along Ulu S. Kakus from S. Biyah to S. Mubong, 11 xi 1963, *Hirano & Hotta* 1007 (KYO); *ibid.* from S. Mubong to S. Latai, 12 xi 1963, *Hirano & Hotta* 1133 (KYO).



*C. dilatata* has no sclereids in the leaf hypodermis, but astrosclereids in the mesophyll. Both the localities so far known to me personally are steeply sloping shady river banks. For discussion of the affinity of this species see under *C. incrustata* (p. 168).

*Cyrtandra disparoides* B. L. Burtt, species nova *C. dispari* DC (speciei malayensi) affinis, cortice striato nec squamoso, foliorum marginibus crebrius serratis, calyce fere ad basin diviso recedit.

Frutex parva; caules cortice striato griseo, partibus juvenilibus breviter ferrugineo-pilosis. Folia valde inaequalia; alterum late oblanceolatum 20-30 × 5-8 cm, apice acuminatum, basi sensim attenuatum et sessile, marginibus serraturis piloso-apiculatis praeditis, supra glabratum, subtus ferrugineo-pubescentis, nervis lateralibus c. 12 subtus prominulis; alterum haud oppositum sed prope latus majoris oriens, lanceolatum, c. 15 × 3 mm. Inflorescentiae in axillis utriusque folii orientes, parvae, c. 5-florae; bractae variabiles c. 5-10 × 1-1.5 mm dorso pilosae; pedicelli 2-4 mm, pilosi. Calyx 2.5 mm, lobis triangulari-linearibus tubo aequalibus, extra tenuiter pilosus. Corolla 12 mm, extra patenter brevipilosa; tubus 8 mm; labium inferius 5 × 6 mm lobis c. 2 × 3 mm, superius lobis 2 × 2 mm. Stamina 5 mm supra corollae basin orientia; filamenta 3 mm, glabra; antherae 1 mm, apicibus cohaerentibus. Discus 1 mm, unilateralis. Ovarium 3 mm, obtuse papillosum; stylus 5 mm, pilis parvis glandulosis praeditus; stigma horizontaliter bilobum, fere 1 mm diam. Fructus ellipsoideus, 7 × 3.5 mm, basi styli persistente 2 mm excluso, verrucosus.

Type. Sarawak, Third Division, SE end Hose Mts, c. 2° 6' N, 113° 42' E, below Bukit Mabong, flowers (few seen) with 2 yellow lines in throat, 5 viii 1967, Burtt & Martin B 4804 (holo. E; iso. SAR).

This species is certainly allied to *C. dispar* DC. known from the Malay Peninsula, Sumatra and Thailand: the specific epithet has been chosen as a reminder of this affinity. It is the first record of this group of species from Borneo. C. B. Clarke based a section, *Dispares*, on *C. dispar* but at least one of the four species he placed in it (the Bornean *C. schizostyla*) belongs far away. Insistence on unequal leaves as a sectional character is unlikely to prove satisfactory, for another species which is almost certainly of this affinity is *C. patula* Ridl.; this has both leaves of a pair well-developed.

*Cyrtandra gillettiana* B. L. Burtt, species nova *C. gibbsiae* S. Moore affinis, sed foliis angustioribus et multo longioribus, acumine longiore, corollae tubo haud aurantiaco-notato facile distinguitur.

Herba effusa, caulibus basi decumbentibus radicanibus primum pilis brevibus patentibus brunneis dense indutis. Folia valde inaequalia; alterum late oblanceolatum petiolo 5-7 mm longo uti caule brevipiloso instructum, ad 25 × 4 cm, apice in acumine c. 3 cm longo angustatum, basi inaequilateraliter rotundatum, supra glabrum (in siccitate sclereidibus horizontalibus sub epidermide conspicuis), subtus in costa et venis et ad marginem breviter pilosum; alterum lamina tantum c. 4 × 3 mm petiolo 3 mm, ad majus laterale. Flores 2-3 in axillis foliorum delapsorum basin caulis versus orientes; pedicelli pilosi 1 cm longi. Calyx 15-17 mm longus, parce brunneo-pilosus, in lobos acuminatos tubo plus minusve aequilongos divisus. Corolla 4.5 cm

longa, extra breviter et patenter pubescens; tubus 3.5 cm longus, in parte inferiore 2 cm longa cylindricus, superne subito ampliatus; lobi superiores  $12 \times 8$  mm, per 5 mm basi conjuncti, laterales  $12 \times 9$  mm, medianus  $11 \times 8$  mm, omnes rotundati. *Stamina* fertilia filamentis 18 mm supra corollae basin orientibus per 5 mm decurrentibus 13 mm longis glabris; antherae thecis 5 mm longis basi leviter divergentibus, dorso connectivo crasso ultra thecam in rostrum 1 mm longum producto, rostris apicibus cohaerentibus-staminodia 3, 3 mm longa. *Discus* 3.5 mm altus, dentatus. *Ovarium* cylindricum; cum 9 mm longum, patenter puberulum, in stylum 16 mm longum conspicue patenter pubescens transiens; stigma alte bilobum. *Fructus* cylindricus, c. 2 cm longus.

Type. Sarawak, Third Division, SE end Hose Mts, c.  $2^{\circ} 6' N$ ,  $113^{\circ} 42' E$ , near Bukit Semako, c. 660 m; wet shaded cliff face and overhang, large white flowers with two faint pinkish purple bars in throat; prostrate stems rooting; 16 viii 1967, *Burt & Martin B 4945* (holo. E; iso. SAR).

The discovery of *C. gillettiana* brings to four the number of species known to have horizontal vermiform sclereids in the leaf hypodermis. The others are *C. gibbsiae* S. Moore, *C. elatostemoides* Elmer and *C. quinquetata* Kraenzl.

*C. gillettiana* differs from *C. gibbsiae* not only by its leaves, but by the more sprawling habit. Also *C. gibbsiae* has white flowers with a strongly marked orange floor to the throat of the corolla, whereas in *C. gillettiana* the pure white corolla is marked only by the faint pinkish-purple lines in the throat.

The species is named in memory of Professor G. W. Gillett who worked devotedly on the *Cyrtandras* of the southern Pacific, the Solomon Islands and the Bismarck Archipelago and who had just undertaken a revision of the genus on the New Guinea mainland. His death in January 1976 was a sad loss to botany and a great setback to the study of this huge genus in which he had already accomplished so much.

*Cyrtandra gracilentata* Kraenzl. in Journ. Linn. Soc. Bot. 37:278 (1906); Merrill, Bibl. Enum. Born. Pl. (in Journ. Str. Br. Roy. As. Soc., special no.) 535 (1921).

Type: Sumatra, near Dator [? Dalor] *Curtis 455*, comm. Veitch 1897 (K).

*C. gracilentata* was described by Kränzlin as a Bornean species, but, as pointed out previously (in *Notes R.B.G. Edinb.* 30:32. 1970) the word 'Borneo' on the type sheet was added by Kränzlin himself. Ridley (in *Kew Bull.* 1925: 86) quotes a specimen of *Didymocarpus* collected by Curtis at Dalor as from Sumatra and he is not likely to have been wrong about this. Dalor and Dator, both used for specimens collected by Curtis, are surely the same. *C. gracilentata* should therefore be excluded from the Bornean list.

*Cyrtandra hololeuca* B. L. Burt, species nova ob folia tenuia, et pedicellos et calyces et corollas alba, et calycem tubulosum nulli arcte affinis.

Herba 0.3-1 m alta, caule dense piloso. *Folia* opposita, inaequalia, alterum  $25-35 \times 10-12$  cm, alterum duobus partibus minus, late et suboblique oblongo-elliptica, apice acuminata, basi inaequilateraliter angustata, utrinque pilosa, marginibus crebre crenato-serrulatis, nervis lateralibus in folio majore

utrinsecus c. 12 ascendentibus, petiolis 5-9 cm in folio majore in minore c. 3 cm suffulta. *Pedunculi* axillares, c. 3-6 cm longi, pilosi, apice bracteis duabus plus minusve ovatis c.  $10 \times 7$  mm praediti; flores c. 10, cymosi sed subumbellatim congesti, pedicellis patenter pilosis 0.5-1.5 cm longis. *Calyx* albus, tenuis, tubularis, 2 cm longus, extra pilis patentibus hirsutus, intus etiam hirsutus pilis ad basin calycis versus brevioribus glandulosis; lobi 2 mm longi, late triangulares. *Corolla* alba, 4.75 cm longa; tubus parte inferiore calyce aequante angusta, deinde subabrupte ampliatus per 1.5 cm, in fauce lineis duabus elevatis (extra invaginis) brunneis glandulosis, bilabiatus; labium inferius 1.25 cm longum, trilobum, lobo mediano  $6 \times 10$  mm, lateralibus  $5 \times 8$  mm; labium superius 1 cm longum bilobatum, lobis  $5 \times 7$  mm. *Stamina* duo in corolla 3 cm supra basin orientia; filamenta ascendentia, glabra, supra basin incrassata sursum iterum angustata leviter torta; antherae reniformes, 1.5 mm latae, coram cohaerentes, in marsupio breviter glanduloso-piloso post corollae lobos dorsales positae. *Discus* breviter cupularis 1 mm altus. *Ovarium* anguste cylindricum, glabrum, 1 cm longum, in stylum pilosum vix angustiore 1.3 cm longum transiens; stigma capitatum, stylo vix latius, haud lobatum. *Fructus* fere 3 cm longus, pallide viridis, calyce persistente diu circumcinctus.

Type. Sarawak, Fourth Division, Lambir Hills, c.  $4^{\circ} 7' N$ ,  $113^{\circ} 55' E$ , fairly widespread on suitable streamside banks, light green peduncles and bracts, white pedicels, calyx and corolla, 6 viii 1962, *Burt & Woods* B 2420 (holo. E; iso. SAR).

SARAWAK. Fourth Division: Miri, 22 iv 1895, *Hose* 686 (E, K); Lambir Hills National Park, 29 iv 1966, *Sibat* S. 24149 (E, SAR); Bukit Lambir, 22 v 1966, *Banyeng & Sibat* S. 24477 (E, SAR); Miri,  $6\frac{1}{2}$  miles on Bakam road, 3 iv 1966, *Sibat & Ilias* S. 24730 (E, SAR); Gunong Mulu National Park, Melinau gorge, c.  $4^{\circ} 5' N$ ,  $114^{\circ} 59' E$ , 22 vi 1962, *Burt & Woods* B 2228 (E, SAR).

BRUNEI. Seria distr., Teraja forest reserve, en route from Kampong Mendaram to Bukit Teraja, west route, 100-300 m, on wet sandstone cliff, 20 xii 1963, *Hotta* 12786 (KYO); Bukit Teraja, 300-400 m, 21 xii 1963, *Hotta* 12832 (E, KYO).

This very distinct species has been known in herbaria for over 80 years, often unidentified even as to genus. The soft leaves and tubular calyx are distinctive, the latter recalling the genus *Cyrtandromoea* now placed in Scrophulariaceae. *C. hololeuca* has the sausage-shaped indehiscent fruit of *Cyrtandra* and there is no doubt about the generic position. It is a plant of streamside rocks and banks. At one place in the Lambir Hills broken leaves had been flattened on to the clay bank by heavy rain and numerous adventitious plantlets were arising at the edges of broken tissues. There are no sclereids in the leaf of this species.

*Cyrtandra incrustata* B. L. Burt, species nova *C. dilatatae* C.B.Cl. affinis, sed foliis longe petiolatis, lamina, et tota planta, calce incrustata facile distinguitur; etiam a *C. spelaea* B. L. Burt incrustatione et bracteis conjunctis recognoscitur.

Herba e praerupto calcareo horizontalis, foliis pendulis, caule ad 12 cm longo, omnino calce incrustata. *Folia* petiolis 5-8 cm longis; lamina  $15-17 \times 4-5$  cm in plantis majoribus sed interdum tantum  $7 \times 3$  cm, supra glabra

subtus praecipue in costa pilis brevibus appressis calcificatis praedita, marginibus obscure serratis paulo revolutis primum brunneo-ciliatis. *Inflorescentiae* axillares, pedunculis 1-2 cm longis, c. 5-florae; bractae conjunctae, involucrem 1 cm longum formantes. *Calyx* 8 mm, extra pilis paucis breviter setosis, lobis 3 mm triangularibus dorso leviter carinatis carinis in tubum decurrentibus. *Corolla* c. 22 mm; tubus 13 mm, parte inferiore 7 × 1.5 mm cylindrica glaber, superne subito ampliatus ore 6.5 mm diametro extra brunneo-setoso-pilosus; limbus bilabiatus intus glandulis stipitatis parce indutus, extra setis brunneis appressis pilosus; labium inferius 12 mm diam., lobis 6 × 5 mm, palato c. 3 mm; lobi superiores c. 6 × 4-5 mm, paulo reflexi. *Stamina* 8 mm supra corollae basin orientia; filamenta 4 mm, glabra; antherae 1 mm, coram dispositae, apicibus tantum cohaerentes. *Discus* 1.5 mm altus. *Ovarium* 3 mm, glabrum, in stylum 8 mm glabrum transiens; stigma 2 mm diam. *Fructus* oblongus, 12 mm.

Type. Sarawak, Fourth Div., Gunong Mulu National Park, c. 4° 5' N, 114° 50' E, Melinau gorge pathway and camp; on rough more or less vertical limestone, fls. white with two yellow bands running from the sinus of the lower lip into the throat and there dotted brown, anthers brown; 24 vi 1962, *Burt & Woods* 2283 (holo. E; iso. SAR).

SARAWAK. Fourth Div., Gunong Mulu National Park; Gunong Api, 1970, *Lehmann* 504; *ibidem*, 26 ix 1971, *Anderson* S. 30739; S Melinau at Batu Bungan, 29 vi 1962, *Burt & Woods* 2339 (E, SAR); Bukit Sungei Pala, 12 vi 1962, *Burt & Woods* B. 2049 (E, SAR); Lobang Rusa, 9 vi 1975, *Burt* 8220 (E, SAR). Fifth Div., N end Gunong Benarat, 180-360, 22 vi 1975, *Burt* 8352 (E, SAR); below Gunong Buda, N of Sungei Medalam, 20 vi 1975, *Burt* 8332 (E, SAR).

*C. incrustata* is common on limestone cliffs in the Gunong Mulu National Park and nearby. At the moment I think there is only one species in the material quoted above, but I did have doubts in the field and there is certainly a fair amount of variation. For instance *B.* 8352 is densely brown-hairy on peduncles, involucre and petioles and has small leaves whereas *B.* 8332 has similar small leaves but is heavily lime-encrusted: both these forms, although small plants, have longer peduncles than the type.

Higher on the limestone of Gunong Api, 750 m and above, there is an erect plant growing up to 60 cm: this I have at present excluded from the species, but it is certainly very closely allied.

There is no doubt that *C. dilatata*, *C. incrustata* and *C. spelaea* compose a closely related group of species. Inflorescence and floral form are almost identical in all three. The contrasts between them are therefore particularly interesting. *C. dilatata* is a plant of shaded river banks: *C. incrustata* and *C. spelaea* are both limestone plants, but of very different types. *C. incrustata* grows on vertical cliffs and is well provided with chalk glands so that the adult plant is heavily encrusted with their excretion. *C. spelaea*, on the other hand, grows in the shelter of caves: it is erect and apparently has few if any chalk glands and has much thinner unencrusted leaves. It is also ecologically interesting to see the heavily encrusted *C. incrustata* and *C. calciphila*, a rather distantly related and quite unencrusted species, growing side by side on limestone cliffs. Clearly different species meet the demands of the limestone habitat in different ways.

*Cyrtandra leucochlamys* B. L. Burtt, species nova corolla magna glabra et bracteis albis distincta; *C. serrato-bracteatae* Lauterb. fortasse affinis sed inflorescentiis paucifloris, calyce membranaceo irregulariter rumpente, fructibus (et fortasse floribus) multo majoribus, foliis basi minus attenuatis distinguenda. Fig. 3.

Herba erecta ad 2 m. *Folia* opposita, aequalia, subsessilia, usque ad 30 × 7 cm, anguste elongato-elliptica, apice acuminata, basi attenuata et juniora quasi auriculata, marginibus serratis, supra pilis paucis dispersis, subtus pilis brevibus appressis in nervis praedita ceterum glabra, nervis lateralibus c. 10 irregularibus aliis minoribus patentibus interjectis. *Inflorescentiae* axillares, involucretae, pedunculo appresse pubescente 5 mm longo: bracteae late ovatae, 3 cm longae, albae, flores c. 5 circumcingentes, nervis appresse pubescentibus. *Calyx* membranaceus, lobis cohaerentibus, c. 1.5 cm longus, corolla irregulariter ruptus. *Corolla* 4 cm longa, alba, glabra; tubus parte inferiore 1 cm cylindricus, superne subabrupte ampliatus; lobi c. 4 × 7 mm, rotundati, subaequales. *Stamina* 15 mm supra corollae basin orientia; filamenta c. 8 mm longa, glabra, post antherarum dehiscencia torta; antherae 2 mm longae, thecis parallelis basi acutis, dorso connectivo crasso glanduloso apice in rostra cohaerentia producto. *Discus* cupularis, 3 mm altus. *Gynoecium* 2.5 cm longum, ovario c. 12 mm cylindrico in stylo sensim attenuato, breviter pubescens; stigma alte bilobum, lobis obtusis, 5 mm diam. *Fructus* cylindricus, (immaturus?) c. 30 × 2 mm.

R.M.S.

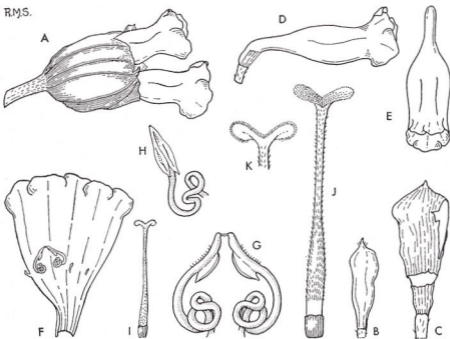


FIG. 3. *Cyrtandra leucochlamys* B. L. Burtt. A, inflorescence (× 1); B, young bud enclosed by calyx (× 2); C, older bud, showing rupture of calyx (× 2); D, flower lateral view with calyx remains (× 1); E, flower (× 1); F, corolla opened out (× 1); G & H, stamens after dehiscence (× 4); I, gynoecium and disc (× 1); J, gynoecium (× 3); K, reverse of stigma (× 3). All from B. 4713, cult. R.B.G. Edinb. as C8234.

Type. Sarawak, First Division, Semengoh Forest Reserve, 12 miles S of Kuching, in damp ground near stream by forest opening, 24 vii 1967, *Burt & Martin* B 4713 (holo. E; iso. SAR), cult. R.B.G.E. as *C.* 8234.

SARAWAK. First Division, Bau, viii 1912, *J. W. Anderson* 51 (SING); Semengoh Forest Reserve, north of arboretum, primary mixed dipterocarp forest, near stream, 27 iv 1966, *J. A. R. Anderson* S. 25134 (SAR).

It is unfortunate that the flowers of *C. serrato-bracteata* are unknown except in very young bud. Lauterbach's surmise that the corolla is no more than 2-3 mm long is, however, very improbable. A *Cyrtandra* flower 1 cm long is very small and it will be surprising if *C. serrato-bracteata* does not prove to have flowers of that size or even larger. However, even the young bud shows a short, deeply toothed calyx scarcely covering the very young corolla, whereas in *C. leucochlamys* the calyx is membranous and covers the corolla until quite a late stage (fig. 3C). So marked a difference might be thought to deny a close affinity, but in this respect *C. leucochlamys* parallels *C. angularis* Elmer, while *C. serrato-bracteata* parallels *C. oblongifolia* (Bl.) C.B.Cl., another pair of species strikingly similar in all respects except the calyx (cf. *Notes R.B.G. Edinb.* 30:26. 1970).

Another member of this affinity is the Peninsular *C. cupulata* Ridl. It also has conspicuous white bracts, large corolla more or less glabrous on the outside and cylindrical pods. The calyx of *C. cupulata* is of the membranous type, covering the corolla until it is well-developed, as in *C. leucochlamys*.

*Cyrtandra martinii* B. L. Burt, species nova *C. chainae* B. L. Burt (vide supra) caule quadrangulati et characteribus floralibus maxime accessit, sed foliis multo longioribus et angustioribus, petiolis basi conspicue auriculatis, indumento citius delapso, filamentis glabris distinguitur. *Fig. 4.*

Caules ad 2 m longi, effusi, quadrangulares, primum sericeo-lanati mox glabrati. *Folia* opposita, utraque bene evoluta sed inaequalia, alterum 28 × 6 cm, alterum triente minus; petiolus 5 cm longus auricula foliacea 2 × 1 cm inclusa, primum dense sericeo-lanatus, demum glabratus; lamina anguste oblonga, apice acuminata, basin versus angustata, integra, primum tenuiter sericea demum glabra, subtus primum dense sericea demum glabra pilis brevibus in nervis persistentibus exceptis. *Inflorescentiae* axillares, congestae; bractae c. 15 × 6 mm, oblongo-ellipticae, leviter naviculares et carinatae, parum verrucosae, apice cucullato-acuminatae; pedicelli c. 3 mm. *Calyx* 11 mm longus extra breviter pilosus, tubo 7 mm, lobis 4 mm longis basi 2.5 mm latis apice in acumen cucullatum 1.5 mm longum angustatis. *Corolla* tubo 9 mm longo parte inferiore cylindrico superne subito ampliato; limbus intus glandulis breviter pedicellatis rigidis praeditus, lobis duobus superioribus 5 × 4 mm ad medium conjunctis, lateralibus 5 × 5 mm, mediano 6 × 6 mm. *Stamina* fere ad orem tubi orientia; filamenta 2 mm longa, arcuata, glabra; antherae 2 mm longae dorso connectivo crasso glanduloso, thecis parallelis, lateraliter compressae, coram positae sed apicibus tantum cohaerentes; staminodia lateralia curvata 1.25 mm, dorsale vix 1 mm rectum. *Discus* 1.5 mm altus. *Ovarium* 4 mm longum, conicum, glabrum; stylus 5 mm longus, pilis glandulosis dispersis indutus; stigma peltatum, transverse ellipticum, fere 1.5 mm diametro. *Fructus* ellipsoideus, 7 mm longus, verrucosus.

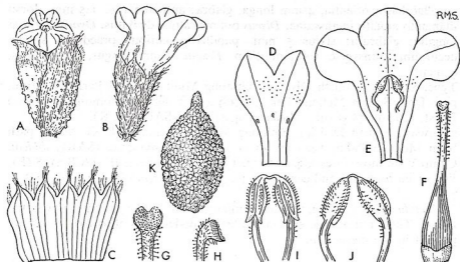


FIG. 4. *Cyrtandra martinii* B. L. Burtt. A, inflorescence ( $\times 1$ ); B, flower, side view ( $\times 2$ ); C, calyx opened out ( $\times 2$ ); D, upper half of corolla ( $\times 2$ ); E, lower half of corolla ( $\times 2$ ); F, gynoecium and disc ( $\times 4$ ); G, H, stigma front and side view ( $\times 9$ ); I, J, anthers front and back view ( $\times 6$ ); K, fruit ( $\times 3$ ). All from B. 4918 (spirit material).

Type. Sarawak, Third Division, SE Hose Mts, c. 420 m, gorge of Sungei Simpurai, c.  $2^{\circ} 6' N$ ,  $114^{\circ} 42' E$ , straggling from wet rock face, stems to 6 ft, 14 viii 1967, *Burt & Martin* B. 4918 (holo. E; iso. SAR).

The auricled leaves are a conspicuous feature of this species. At the shoot apex the auricle and lamina of the young leaf are almost joined: it is when the leaf expands that the petiole is intercalated.

The species was first spotted in the field by Adam Martin, my companion on the 1967 visit to Sarawak during which he successfully looked after the horticultural side of our work and was able to introduce many plants to cultivation at the R.B.G Edinburgh.

*Cyrtandra muluensis* B. L. Burtt, *species nova* ab affini *C. erectipila* B. L. Burtt involucreo pedunculato floribus et fructibus minoribus et foliis subtus brunneo-tomentello-nervosis recedit.

Suffrutex 0.5–1 m altus, caule simplici ad apicem tantum foliato primo dense et breviter brunneo-piloso demum glabrato *Folia opposita*, subaequalia; petioli 4–8 cm longi, superne canaliculati, subtus rotundati, primo breviter pilosi, mox glabrescentes; lamina coriacea, elliptica,  $9\text{--}17 \times 4.5\text{--}6.5$  cm, ad apicem acutum subito angustata, basi cuneata, marginibus serrato-dentatis, supra glabra, subtus etiam inter nervos glabra sed nervis ipsis conspicue brunneo-tomentellis. *Inflorescentiae* axillares, pedunculis c. 1 cm longis breviter pilosis suffulta. *Bractee* primariae c.  $1.5 \times 1.5$  cm ad medium coalitae marginibus liberis undulatis ciliatis. *Calyx* 1.5 cm longus, extra breviter brunneo-pubescent, lobis 4 mm longis acutis dorso leviter carinatis carina in tubum decurrente. *Corolla* 2.5 cm longa, extra longe sericeo-pilosa, tubo 1.5 cm longo, lobis omnibus c.  $5 \times 5$  mm. *Filamenta* 8 mm supra

corollae basin orientia, 4 mm longa, glabra; antherae  $1 \times 1.5$  mm, dorso filamento adnato incrassatae. *Discus* 0.5 mm altus, dentatus. *Ovarium* 2 mm longum, glabrum; stylus 5 mm, papillis patentibus praeditus; stigma decurvum, transverse 1.5 mm diam. *Fructus* 1 cm longus, ellipsoideus, conicus.

Type. Sarawak, Fourth Division, Gunong Mulu National Park, G. Mulu, path from Sungei Melinau Paku, shrub 2-3 ft high in submontane (moss) forest, 1260 m, 28 vi 1961, *Anderson* 4244 (holo. SAR; iso. K).

SARAWAK. Fourth Division, Gunong Mulu National Park, G. Mulu, path from Melinau Paku, 1290 m, 30 vi 1961, *Anderson* 4522 (SAR); *ibidem*, Camp V (in moss forest), c. 1350 m, 15 vi 1962, *Burt & Woods* B 2128 (E); *ibidem*, en route 1st-2nd camp, 960 m, 16 iii 1964, *Hotta* 14459 (E, KYO).

*C. muluensis* has white, slightly zygomorphic flowers, spotted yellow in the throat. There are no sclereids in the leaf hypodermis, but astrosclereids are present in the mesophyll.

*Cyrtandra ochroleuca* B. L. Burt, *species nova*, nulli arcte affinis; ob flores magnos laete flavos haud maculatos distincta et ab specie una flore simili (*C. aff. poikilophylla* Kraenzl.) fructu brevi ellipsoideo valde differt.

Caules 60 cm usque alti, solitarii vel e basi plures, inferne saepe decumbentes. *Folia* opposita, approximata, erecta, usque ad  $20 \times 6.5$  cm, late oblanceolata, apice breviter et obtuse acuminata, ad basin sensim attenuata (parte subpetiolarum anguste alata 3 cm longa), marginibus obtuse-serratis, nervis lateralibus ascendentibus utrinsecus 8-10, supra pustulosa, subtus glabra. *Inflorescentiae* axillares c. 3-florae, subsessiles, bracteis  $20 \times 8$  mm flores amplectentibus. *Calyx* cylindricus 13 mm, lobis 3-4 mm longis basi 1.5 mm latis, papillosus. *Corolla* 5 cm longa, basin versus glabra, superne breviter pilosa; tubus 4 cm, inferne cylindricus sursum sensim amplius; lobi superiores  $10 \times 10$  mm, per 3 mm basalia conjuncti, laterales et medianus  $8 \times 10$  mm, omnes rotundati. *Stamina* 3 cm supra corollae basin orientia; filamenta 1 cm longa, glabra; antherae 3 mm longae, coram dispositae, apicibus tantum cohaerentibus; staminodia lateralia 3-4 mm, dorsale vix 1 mm. *Discus* cylindricus, 2 mm, undulatus. *Ovarium* 5 mm, glabrum, in stylum 3.5 mm superne glanduloso-papillosum transiens; stigma 3.5 mm diam. *Fructus* ellipsoideus,  $15 \times 6$  mm.

Type. Sarawak, First Division, Lundu distr., Gunong Gading, on granite rocks and banks along stream,  $\frac{1}{2}$ -2 ft, flowers clear pale yellow with two slight brown lines in throat, 5 viii 1962, *Burt & Woods* B 2691 (holo. E; iso. SAR). SARAWAK. First Div., Lundu distr.; Gunong Lundu, viii 1912, *J. R. Anderson* 101 (SING); foot of Gunong Berumput, Poi Range, 9 viii 1962, *Burt & Woods* B 2745 (E, SAR); *ibidem*, 16 viii 1962, *Burt & Woods* B 2870 (E).

Although *C. ochroleuca* seems at first sight to lack any outstanding features, it is curiously difficult to find an affinity for it. The clear pale yellow corolla, with thin shortish hairs on the outside, is distinctive. In corolla it comes closest to a plant collected in the Gunong Mulu National Park (*Burt* 8279), but this is a species with a long cylindrical fruit, and deeply divided calyx, and seems close to *C. poikilophylla* Kraenzl. (described without flowers). There are several of these long-fruited species in Borneo and they seem to be related



to one another; *C. ochroleuca* is not of this affinity. For the time being it must be left to stand alone. There are many species in the herbarium known only from fruiting material and some of these may prove to have similar corollas.

*Cyrtandra scutifolia* B. L. Burt, species nova ab aliis foliis peltatis (*C. peltata* Jack et *C. scutata* S. Moore) corolla extra breviter pubescente (nec sericeo-villosa) facile distinguitur et eis haud arcte affinis. Fortasse *C. radiciflorae* C.B.Cl. magis approximata, a qua caule quadrangulari, foliis late ellipticis fere glabris peltatis recedit.

Herba effusa, caule quadrangulari basi decumbente et radicante et hic florente et fructificante. *Folia* opposita, inaequalia glabra; alterum ad 30 × 12 cm, late ellipticum, apice acuminatum, basi rotundatum et petatum, marginibus leviter serratis serraturis pilis brevibus apiculatis, petiolo c. 8 cm longo basin versus supra ferrugineo-pubescente praeditum; alterum simile sed minus, 10 × 6 cm, petiolo 3.5 cm. *Inflorescentiae* in parte caulis decumbente in axillis foliorum delapsorum orientes; flores c. 6, subumbellati, pedicellis pilosis 2 cm longis. *Calyx* tubo 15 mm longo, lobis 10 mm basi triangulari 3 mm in caudam 7 mm producto. *Corolla* c. 4 cm longa, extra breviter pubescens; tubus 3 cm; lobi? *Stamina* 2, 12–15 mm supra corollae basin orientia; filamenta 10 mm, glabra, sub medio membrana angusta unilaterali alata ad basin corollae conjuncta, demum torta; antherae 3 mm, thecis parallelis, apicibus rostris minutis conjunctae. *Discus* (e basi fructus juvenilis) 1 mm altus. *Ovarium* haud visum; fructus juvenilis 2 cm, inferne cylindricus et glaber, ad apicem subito in stylum contractus et hic dense villosus; stylus 17–20 mm patenter scabro-pubescentis; stigma in lobos duos obtusos 3 mm longos divisum. *Fructus* (vix maturus) 25 × 3 mm, pedicello 3 cm suffultus.

Type. Sarawak, Third Division, SE end Hose Mts, c. 2° 6' N, 113° 42' E, below Bukit Mabong, 5 viii 1967, *Burt & Martin* B 4805 (holo. E; iso. SAR).

Unfortunately this species was past flowering when found and the floral details have had to be taken from withered corollas. However the essential structure could be made out and the species is so distinctive that its description is justified. Despite the similarity in leaf-form I do not think *C. scutifolia* is closely allied to the two other species with peltate leaves, the Sumatran *C. peltata* Jack and *C. scutata* S. Moore. Both these have the heavily sericeous corolla and large bracts characteristic of the *C. pilosa-decurrans* group, to which the Sarawak species *C. erectipila*, *C. cuprea*, *C. bracheia* and many others belong. *C. scutifolia* has a thinly pubescent corolla, and flowers at the base of the stem without large bracts: this is the pattern of *C. radiciflora* and *C. splendens*.

*C. scutifolia* was growing in rock rubble on a steep slope under light canopy. The straggling stems were rooting when near the ground and the lowest fruits were below the uppermost roots.

*Cyrtandra smithiana* B. L. Burt, species nova insignis foliis magnis ovatis petiolatis, petiolis basi membranis stipulaceis circum caulem conjunctis praeditis, floribus rubris involucreis recognoscenda. *Fig. 5.*

Herba frutescens (vel si mavis frutex subherbaceus) c. 1.75 m alta; caulis robustus, basi (in siccitate) 3 cm diam., medulla 1.5 cm diam., ramis lateralibus paucis. *Folia* opposita, parum inaequalia; petioli c. 15–20 cm longi, glabri, basi per c. 6 cm alis stipulaceis cum eis folii oppositi connatis praediti; lamina c. 15–30 × 15–20 cm, late ovata, apice breviter acuminata, basi rotundata interdum inaequilateralis, marginibus serratis, utrinque glabra. *Inflorescentiae* axillares, subsessiles, c. 15-florae; bractae c. 3 cm longae, ad medium connatae, involucrem c. 4 cm diametro formantes, glabrae, saepe rubrae; pedicelli 3 mm, pilosi. *Calyx* c. 16 mm longus (lobis 2 mm longis inclusis), tubularis et sursum paulo amplius, parcissime pubescens, tenuis. *Corolla* rubra; tubus 2 cm longus, parte superiore 6 mm leviter ampliata et curvata, extra inferne glaber superne breviter pubescens, intus ad apicem glandulosus; lobi patentes, subaequales, c. 4 × 3 mm, extra pubescentes intus parce glandulosi. *Stamina* paulo sub ore tubi orientia; filamenta 3.5 mm, glabra; antherae 2.5 mm, apicibus cohaerentibus; staminodia 3, 0.5 mm. *Discus* 1 mm altus, unilateraliter fissus. *Ovarium* conicum, 5 mm, glabrum, in stylum parcissime breviter pilosum 15 mm longum sensim attenuatum; stigma alte divisum, lobis fere 2 mm longis subacutis. *Fructus* ellipsoideus, 10 × 4 mm, pedicello ad 5 mm suffultus. Type. Sarawak, Third Division, SE end Hose Mts, Ulu Melinau Falls, c. 2° 6' N, 113° 42' E, c. 1020 m, corolla red with 3 darker lines on each lobe, involucre dark red, 22 viii 1967, *Burt & Martin* B 5066 (holo. E; iso. SAR).

The most remarkable feature of this species is the stipule-like sheath formed by the connate wings on the lower part of the petiole. The wings of the two opposite leaves are joined and at the top of the stem they completely enclose the terminal bud. This tendency for an elaboration of the leaf base is met with in other species of *Cyrtandra* not closely related to this: for instance *C. erectipila* B. L. Burt and *C. martinii* B. L. Burt. *C. smithiana*, however, exhibits its strongest development.

For the rest, the size of the plant with its great ovate leaves and thick, though soft and pithy, stem, the many-flowered tightly involucrete inflorescences and the red corollas make this an outstanding species in the genus. It was growing in wet rainforest near waterfalls. In habit it is clearly related to a species, as yet undescribed, collected on Mt Kinabalu (*Carr* 26388, *Chew, Corner & Stainton* 1369) but this has pubescent involucre and leaf under-surface and seems to lack the stipular leaf base. Another distinctive feature of *C. smithiana* is the high insertion of the stamens and the short filaments.

The species is named in memory of the late Stanley Smith, whose kindness and generosity made our 1967 visit to Sarawak possible.

*Cyrtandra spelaea* B. L. Burt, species nova ex affinitate *C. dilatatae* C.B.Cl. sed foliis multo longius petiolatis minus serratis subtus uti petiolis dense pubescentibus differt; *C. incrustatae* B. L. Burt etiam affinis sed foliis tenuioribus haud calce incrustatis et bracteis liberis facile distinguitur. *Fig. 6.*

Herba vel fruticulus 5–60 cm altus, simplex, caule breviter et patenter brunneo-pubescente. *Folia* opposita; petiolus 5–10 cm longus, uti caulis pubescens; lamina oblonga (15 × 4.5 cm) vel late elliptica (15 × 7 cm), in plantis minoribus, utrinque (sed subtus densius) breviter et patenter pubescens, apice acuta vel obtusa, basi cuneata. *Inflorescentiae* axillares 1–3, pedunculis

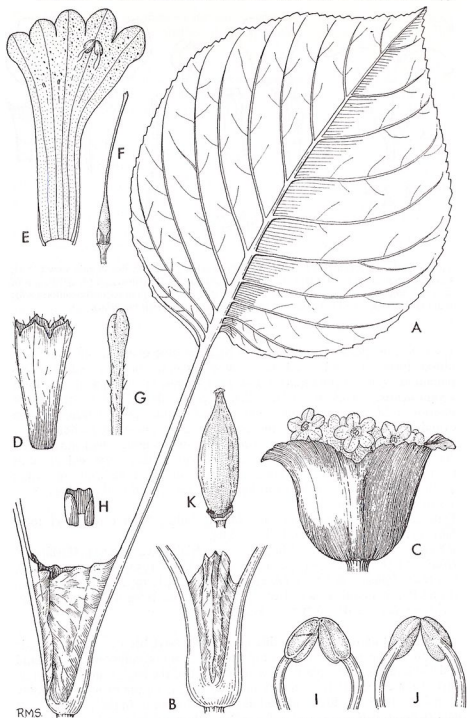


FIG. 5. *Cyrtandra smithiana* B. L. Burt. A, leaf, underside, showing stipuloid membrane attached to that from opposite leaf ( $\times \frac{1}{2}$ ); B, uppermost pair of leaf bases with stipuloid membrane enclosing terminal bud ( $\times 1$ ); C, inflorescence ( $\times 1$ ); D, calyx ( $\times 2$ ); E, corolla opened out ( $\times 2$ ); F, gynoecium and disc gland ( $\times 2$ ); G, stigma ( $\times 6$ ); H, disc gland ( $\times 4$ ); I, J, anthers, front and back view ( $\times 4$ ); K, fruit ( $\times 2$ ). All from B. 5066 (spirit material).

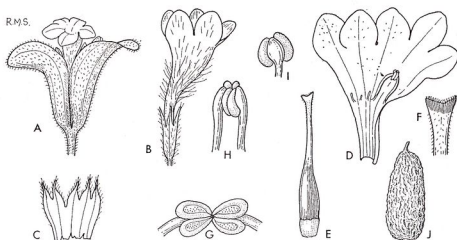


FIG. 6. *Cyrtandra spelaea* B. L. Burt. A, inflorescence ( $\times 1$ ); B, flower side view ( $\times 2$ ); C, calyx opened out ( $\times 2$ ); D, corolla opened out ( $\times 2$ ); E, gynoecium ( $\times 4$ ); F, top of style and stigma ( $\times 9$ ); G, anthers opened out ( $\times 6$ ); H, anthers in natural position ( $\times 6$ ); I, anther back view ( $\times 6$ ); J, fruit ( $\times 3$ ). All from B. 2018 (spirit material).

1-1.5 cm; bracteae in parte inferiore rigide erectae quasi involucrum 2 cm altum formantes sed haud inter se conjunctae, partibus superioribus patentibus, breviter pubescens. *Calyx* 7 cm longus, breviter pubescens, lobis 2 mm acutis. *Corolla* c. 17 cm, alba, in palato flavo lineata, extra, parte inferiore tubi excepta, brunneo-pilosa; tubus 9 mm, parte inferiore 5 mm cylindrica superne ampliata; limbus bilabiatus, lobis subaequalibus,  $6 \times 4.5$  mm. *Stamina* 6 mm supra corollae basin orientia; filamenta 4 mm, glabra; antherae 1 mm paulo excedentes, coram dispositae sed apicibus tantum conjunctae. *Discus* 1 mm altus. *Ovarium* 3 mm, glabrum, in stylum 4 mm (? haud maturum) puberulum transiens. *Fructus* ellipsoideus,  $8 \times 3.5$  mm, pariete tenui.

Type. Sarawak, Fourth Division, Gunong Subis, Niah Cave, 4 vi 1962, Burt & Woods B 2018 (holo. E; iso. SAR).

SARAWAK. Fourth Division, Gunong Subis, Niah Cave: vi 1894, Haviland & Hose 3531 (K, SAR), xi 1932, Syngé 615 (K), 7 x 1954, Ahmad 11 (SAR), 9 vi 1962, Alphonso & Samsuri A 239 (E, SING), 27 iv 1972, Anderson S 31918 (E, SAR); at mouth of small cave (some distance from main Niah Cave), 6 vi 1962, Burt & Woods B 2030 (E, SAR).

The largest known colony of this species must have been seen by hundreds of visitors to the great Niah Cave; specimens were first collected by Haviland and Hose in 1894. The plants grow at the foot of the back wall of a shallow part of the cave; but even so they must be 30 ft from the opening and only get a few minutes of direct sunlight as the sun drops low in the west. The soil here is loose, with some guano from the millions of bats and swiftlets that live in the caves; moisture must be derived from seepage and perhaps some condensation. Some other caves in the neighbourhood lack this species, but a colony of about 6 plants was found in a small cave about a mile away.

*C. spelaea* has no sclereids in the leaf hypodermis, but astrosclereids occur in the mesophyll. (For further discussion on this species see under *C. incrustata* p. 168).

*Cyrtandra thamnodes* B. L. Burtt, *species nova* habitu fruticoso distincta; *C. rubro-pictae* Kraenzl. fortasse affinis, sed cortice striato (haud squamoso) foliis integris (haud superne grosse-dentatis) facile distinguitur.

Fruticulus 1.5-2 m altus, ramosus. *Folia* opposita, valde inaequalia, supra glabra, subtus praecipue in nervis breviter brunneo-pubescentia, marginibus integra; alterum majus petiolo dense pubescente ad 3 cm longo, lamina ad 22 × 6 cm, late elliptica, apice longe acuminata, basi paulo inaequalitaterali; alterum minus petiolo 0.5 cm longo, lamina 3 × 1.7 cm. *Inflorescentiae* axillares, 3-5-florae, pedunculo pilis brevibus patentibus induto c. 4 mm; bractee ovatae, breviter et late acuminatae, 14 × 14 mm, patenter pubescentes, liberae; pedicelli 2 mm. *Calyx* 2 mm, paulo ultra medium in dentibus 5 acutis divisus, extra patenter pubescens. *Corolla* 17 mm longa, extra parce papilloso-pubescent glandulis breviter pedicellatis intermixtis; tubus 11 mm, leviter curvatus, intus sub lobis superioribus pilosus; lobi superiores 2 × 2 mm, laterales 2 × 4 mm, medianus 3 × 3 mm. *Stamina* 6 mm supra corollae basin orientia; filamenta 4 mm longa, supra medio incrassata, glabra; antherae 2 mm longae, coram dispositae, dorso connectivo crasso apice gongylode paulo glanduloso. *Discus* 2 mm altus, unilateralis. *Gynoeceum* 6.5 mm; ovarium 3 mm, glabrum; stylus 3.5 mm, patenter glanduloso-pubescent; stigma umbilicatum, stylo vix latius. *Fructus* (immaturus) 20 × 2 mm, cylindricus.

Type. Sarawak, First Division, Bau district, Bukit Kapur, 22 v 1962, *Burt & Woods* B 1885 (holo. E; iso. SAR).

SARAWAK. First Division, Bau distr.: Bau, 60 m, 15 ix 1962, *Purseglove* P 4472 (E, K, L, SING); near Tai Ton, 14 vi 1964, *Anderson* S 13818 (SAR); Bukit Jebong, 90 m, 22 iv 1967, *Anderson* S 25613 (E, SAR).

A shrubby habit is rare in Bornean *Cyrtandra*s; *C. oblongifolia* (Bl.) C.B.Cl. is the only other species I have seen in which it is well developed, but *C. thamnodes* has a much smaller flower and is not closely allied. The affinity of *C. thamnodes* is more likely to be found amongst the Philippine species where the branched shrubby habit predominates, as indeed it does also in New Guinea. Although distinctly shrubby, the branches are somewhat fleshy and have a rather large pith. The flowers are white with red spots inside. The leaves have no sclereids.

*Cyrtandra urceolata* C.B.Cl. in DC. Mon. Phan. 5:236 (1883).

Type. Kalimantan, Landak, *Teyssmann* 11216 (Fl).

SARAWAK. First Division, Bau district: Bau, vii 1893, *Ridley* s.n. (K); *ibidem*, 1 v 1955, *Brooke* 9923 (L); Seburan, 60 m, 29 v 1960, *Anderson* S 12920 (K, L, SAR); Jambusan caves, ix 1905, *Ridley* 12371 (K); near base Seburan, 8 iii 1947, *Sinclair* 5672 (E); Gunong Tabai, 24 v 1962, *Burt & Woods* 1915 (E, SAR); *ibidem*, 18 v 1975, *Burt* 8162 (E, SAR).

The above records show that *C. urceolata* is widespread on the limestone of the Bau district. Though found by many collectors, it is not a common or plentiful plant. There are no sclereids in the leaves.

*Cyrtandra verrucosissima* Kraenzl. in Phil. Journ. Sci. 8:174 (1913).  
Type. Sarawak, native collector 887 (n.v.)

I have not located type or isotype of this species. Over the years I have pondered the description and have gradually come to the conclusion that the plant described by Kränzlin is simply the Sarawak form of *Didymocarpus crinitus* Jack. The narrow leaves, solitary flowers on 4 cm peduncle, and 3.5 cm long glabrous flowers all fit well with this common *Didymocarpus*, but I know of no *Cyrtandra* with these characters. Kränzlin did not describe fruits, and as the flower was partly eaten by insects he was unable to give details of anthers. Under the circumstances I have no hesitation in excluding this from *Cyrtandra*.

*Cyrtandra vulpina* (Kraenzl.) B. L. Burtt, comb. nov.

Syn.: *Didymocarpus vulpinus* Kraenzl. in Mitt. Inst. Bot. Hamburg. 7:87 (1927).

[*Cyrtandra pilosa* auctt. non Bl.; Kraenzl. in Mitt. Inst. Bot. Hamburg 7:99 (1927) p.p.]

Type. Kalimantan, W Borneo, am mittleren Serawai, c. 130 m, 8 i 1925, Winkler 1238 (holo. HBG; photo. E).

KALIMANTAN. W Borneo, auf dem Bidang Menabai, c. 700 m, 26 xii 1924, Winkler 1067 (HBG).

SARAWAK. Third Division: Carapa Pila, Ulu Mujong, Balleh, 900 m, 7 iv 1964, Ilias Paie S 19965 (E, SAR); Pelagus Rapids on R. Rejang, 19 vii 1962, Burtt & Woods B 2566 (E, SAR); S. Benar, tributary of S. Sut, c. 1° 55' N, 113° 5' E, 23 vii 1962, Burtt 2616 (E, SAR); SE end Hose Mts, Bukit Nibong, 720 m, 7 viii 1967, Burtt & Martin B 4829 (E, SAR); Teneong, 300 m, 2 ix 1954, Brooke 9177 (BM); base of Bukit Temedu, Hose Mts, c. 300 m, 21 iii 1964, Ashton S 19003 (E, SAR); *ibidem*, 31 iii 1964, Ashton S 19039 (E, SAR); Ulu Temalad, Mujong, Hose Mts, 270 m, 22 iii 1964, Ashton S 17604 (E, SAR).

This species has occasioned some difficulty, and the possibility of a need for revision will remain until better material has been collected from the type locality. I had originally marked the Sarawak material as a distinct species, but later concluded that the often broader and more acuminate leaves were insufficient to justify this course while true *C. vulpina* was so little known.

As I have seen it in Sarawak the species is well marked. The stems are 30–45 cm high and rise from a branched woody prostrate base: they thus form a loose patch. This type of growth, also characteristic of *C. radiflora*, is believed to be due to the lower part of the stem becoming more prostrate and rooting as the apex continues to grow. Thus a more or less uniform height is maintained (cf. Burtt in *Gard. Bull. Singapore* 29:73–80. 1977). The red hairs on the young leaves, giving a red colour to the whole leaf, are also a characteristic feature: the hairs on the outside of the corolla, however, are similar to those found throughout the group of species, centred on *C. decurrens* de Vriese, to which *C. vulpina* belongs.

The leaves of *C. vulpina* have osteosclereids in the hypodermis, and astrosclereids in the mesophyll.

*Cyrtandra wallichii* (C.B. Cl.) B. L. Burtt, *stat. nov.*

Type. Penang, *Wallich*, List No. 807 (holo. K).

Syn.: *C. decurrens* de Vriese var. *wallichii* C.B.Cl. in DC., *Mon. Phan.* 5:232 (1883).

*C. grandiflora* Ridl. in *Journ. Fed. Mal. St. Mus.* 4:52 (1909)—non Gaud.

[*C. pilosa* auctt., non Bl.; C.B.Cl. in DC., *Mon. Phan.* 5:231 (1883), *pro parte*; Ridl., *Fl. Mal. Penins.* 2:546 (1923)].

This is the '*Cyrtandra pilosa*' of the Malay Peninsula, but not the true Javan *C. pilosa* Bl., which is quite a rare plant to judge from the few herbarium specimens (see *Notes R.B.G. Edinb.* 30:37. 1970). Clarke placed material from the Peninsula under two names, *C. pilosa* and *C. decurrens* var. *wallichii*, but Ridley suggested long ago that it all belonged to one species (see *Journ. Linn. Soc. Bot.* 32:526. 1896). The Malayan plants are certainly closer to *C. decurrens* from the Moluccas, but that species is smaller in stature and differs in having the style very densely long-pilose: in *C. wallichii* it is glabrous except for a few scattered short hairs towards the top.

*C. wallichii* is not the same as any member of this very complex group of species yet encountered in Sarawak. *C. erectipila* B. L. Burtt is probably its closest ally; that differs, however, not only in its glandular-pubescent style but in having the auriculate leaf-bases connate across the stem. The Peninsular *C. grandiflora* Ridl. does seem to be the same as *C. wallichii*, but as the name is a later homonym of *C. grandiflora* Gaud. it cannot be adopted.