

## CYRTANDREAE HAWAIIENSES, SECT. MICROCALYCES HILLEBR.

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The present paper concludes the monograph of the Hawaiian representatives of *Cyrtandra*,<sup>1</sup> which number ninety-five species, varieties, and forms. The Hawaiian species were divided by Hillebrand into five more or less well-defined sections as follows: *Cylindrocalyces*, *Crotonocalyces*, *Schizocalyces*, *Chaetocalyces*, and *Microcalyces*. Hillebrand's system has been here adhered to rather than that of C. B. Clarke, who includes foreign species with Hawaiian species in some of his sections. The latter arrangement does not seem to be a satisfactory one, for what must be recognized as a variety of a species is to be found in a different section from that to which the species is referred. Krauflein in his paper on the Philippine *Cyrtandreae* says that C. B. Clarke's arrangement is for the present still quite satisfactory, which of course may be true for the Philippine and Malayan species, but certainly not for the Hawaiian species. The writer has described sixteen new species, twenty-one new varieties, and six new forms, all of which save one (*C. cyaneoides*) are described in the present series of papers.

Through the courtesies extended the writer by the directors of the various herbaria in Europe where he worked shortly before the outbreak of the recent war, and through the loan of material from the Gray Herbarium and the Cornell Herbarium, the writer was in a position to unravel the existing confusion in this difficult group of plants. The writer is especially indebted to Prof. B. L. Robinson of Harvard and to Dr. Rowlee and Prof. Hosnier of Cornell for the loan of material at a time when transportation facilities are more or less upset and when the shipping of types is exceedingly hazardous.

That there remain additional new species of *Cyrtandreae* to be discovered in Hawaii there is no doubt; especially will Kauai yield a goodly number from the little explored gorges on the windward side. *Cyrtandreae*, like the Hawaiian *Lobelioideae*, are very local, and it is therefore to be expected that the numerous deep ravines on the windward side of Oahu and the other islands will furnish new species; the Punaluu region on Oahu is a veritable paradise for the botanist and as splendid a collecting ground as is to be found anywhere in this group of islands. *Cyrtandreae* are especially abundant there in the deep shade along the numerous watercourses.

<sup>1</sup> For the previous papers of the series, see *Amer. Journ. Bot.* 4: 604-623. 1917. *Ibid.* 5: 259-277. 1918. *Ibid.* 6: 47-68. 1919.



Unfortunately the writer was compelled to write an addendum in which there are described species and varieties belonging to the section *Cylindrocalyces*.

He would also call attention to *C. Pickeringii*, the synonymy of which is thoroughly discussed under *Cyrtandra Oliveri* in the preceding paper. The task of arranging these difficult plants was not an easy one, and the writer would refer the reader to the introductory remarks in the first paper of the series, so that he may appreciate the difficulties encountered.

#### SECTION FIVE: MICROCALYCES CINEREAЕ Hillebr. Fl. Haw. Isl. 326. 1888

Calyx small, five-fid to the middle into narrow lobes. Corolla erect with small lobes. Flowers many in open cymes. Leaves broad, obovate or elliptical. Tomentum, when present, short-cinereous or pale ochraceous.

The species of this section are characterized by the small calyx and small calycine lobes; they certainly form a distinct group, though some are related to species of the section *Crotonocalyces*, as for example *Cyrtandra Garnotiana* to *C. honolulensis*. *Cyrtandra triflora* is placed in this section but with some doubt, as the writer has been unable to examine the type. The other species of this section are *C. laciflora* and *C. polyantha*. A single new species belonging to this section has been found on Hawaii; it is a small tree fifteen feet or more in height, and grows in the vicinity of the Volcano of Kilauea in the fern forests, but especially in Mr. W. M. Giffard's forest residence, Kalauilehua. It has been named after Mr. Giffard (*Cyrtandra Giffardii*), who recently collected splendid specimens of *Cyrtandreae* on Hawaii.

#### CYRTANDRA TRIFLORA Gaud. Bot. Voy. Uranie 447, t. 52. 1826

"Foliis oblongis aut ellipticis, breviter acuminatis, basi cuneatis, leviter serratis, supra glabris, subtus secus nervos adpresso-pubescentibus; pedunculis trifloris; calyce glabriusculo, dentibus ovato acuminatis tubo brevioribus vel cum hoc vix aequilongis. G. Don Gen. Syst. 4, p. 661. neque Hooker et Arn., neque Asa Gray.

"Folia opposita subaequalia, longa 10-6 cm., lata 4 cm., nervi primarii laterales utrinque 8-9; petioli 5 cm.; pedunculi 1-2 cm.; fusco pubescentes; bracteae 8 mm., oblongae. Calyx 11 mm. longus, minute furfurascens; tubo 6 mm., cylindrico-campanulaceus. Corolla longa 22-25 mm., fere recta, extus superne rufescenti-villosula."

INS. SANDWICH: Gaudichaud in herb. De Caudolle, Paris.

Unfortunately the writer has been unable to examine the type of this species. It seems that a number of botanists were unable to place this species, and it seems too that no one has re-collected it since Gaudichaud's first visit. C. B. Clarke saw the type and states that neither Hooker and Arnott's nor Asa Gray's specimens designated as *C. triflora* are referable to that species. Hillebrand's specimens referred to that species were described by C. B. Clarke as *Cyrtandra polyantha*. As can be judged from the de-



scription, which is here copied from C. B. Clarke, the species belongs undoubtedly to this section. Asa Gray's specimen referred by him to *Cyrtandra triflora* is a variety of *C. platyphylla* and must be referred to the writer's *C. platyphylla parviflora*. The drawing in the Atlas (Bot. Voy. Uranie) is too schematic to permit identification.

***Cyrtandra Giffardii* Rock n. sp.**

A small, soft-wooded tree 5 m. in height, with numerous tortuose thin branches, the latter quadrangular and pubescent near their apices with dark blackish-brown hairs; leaves elliptical or obovate, chartaceous, dark green, acute at the apex, cuneate at the base, with denticulate margin, subglabrate above or with single scattered hairs, the midrib and veins prominent underneath, and covered with dark brown hair, 6–8 cm. long, 2.5–3.5 cm. wide, on dark brown pubescent petioles of 2–2.5 cm.; inflorescence a three-to four- or five-flowered cyme, covered with a dark brown tomentum throughout; peduncle 2–3.5 cm. long, slender; pedicels 2–3 cm. long, slender, the bracts linear-lanceolate, 6–7 mm. long; calyx tube short, 2–3 mm., the linear acuminate lobes 4–5 mm., hairy outside, glabrate inside; corolla small, 12 mm. long, constricted at the throat, straight, hirtulose; berry small, globose to ovate.

HAWAII: Forests near the Volcano House, especially Kalauilehua, fruiting July, 1911, Rock no. 10337 in herb. College of Hawaii; same locality, flowering January, 1918, W. M. Giffard (type) no. 13096 in herb. College of Hawaii.

A very distinct species probably distantly related to *Cyrtandra polyantha*; it is a small tree fifteen feet or so in height and is much branched with numerous small tortuose branchlets. It is named for Mr. W. M. Giffard who collected flowering material of this plant.

CYRTANDRA GARNOTIANA Gaud. Bot. Voy. Uranie 447, t. 53. 1826

*Cyrtandra Carnotiana* G. Don. Gen. Syst. 4: 661. 1838.

*Cyrtandra Vaniotii* Lév. Repert. Sp. Nov. Fedde 10: 155. 1912.

Branches obscurely triangular, the young shoots canescent-tomentose; leaves opposite, subequal, up to 18 cm. long, 10 cm. broad, acute, attenuate or rounded at the base, chartaceous, puberulous above, gray-tomentose and pale underneath, the margin denticulate or serrulate; cyme 5–10 cm. long, densely but shortly canescent-tomentose, 5–20-flowered; common peduncle 2.5–5 cm., stout, bracteate at the apex, the bracts ovate-acute, clasping at the base, 1 cm.; pedicels 1.5 cm.; calyx gray-tomentose, 8 mm. long, divided to the middle into five triangular-oblong lobes; corolla small, 8–16 mm., straight, tubular, widening below, with nearly equal lobes; ovary and style pubescent; berry ovoid, 14–16 mm. long, acute.

OAHU: Gaudichaud in Gray Herbarium; U. S. Explor. Exped. in Gray Herbarium; Mann and Brigham no. 126 in Gray Herbarium, no. 77 in Cornell Herbarium; Hillebrand, western part of the island, in herb. Berlin; Hillebrand, Wahiawa, in herb. College of Hawaii; R. S. Hosmer,



Mt. Kaala, no. 13088 in herb. College of Hawaii; U. Faurie, Kaala Mts., November 1909, no. 1144 (labeled *C. Wainotii*) in herb. College of Hawaii.

Specimens examined in the herbaria of Europe: In Museum Botanicum Berolinense:—

Cum determinat. C. B. Clarke	{	Ex herbario Gaudichaud, a small branchlet with fruit marked "Gaudichaud ded. 1829, Sandwich." It bears C. B. Clarke's determination as <i>C. Garnotiana</i> .
		A second sheet, no. 551, coll. Gaud., visit 1841. det. C. B. Clarke.
		Ex herbario Hillebrand; Oahu, western part of the island.
Sine determinat. C. B. Clarke	{	Ex herbario Wawra, Erdumseglung Donau 1868-1871. Specimen with flower bud and fruit.
		Ex herbario Hillebrand, from Wahiawa, Oahu, with young flowers.
		Another sheet with large leaves from Mt. Kaala, Oahu, July, 1869, Hillebrand.

In herbario Caesareo Palat. Vindobon. (Wien) Vienna.

Ex collect. Wawra, Oahu, no. 1981, with C. B. Clarke's determination.

Another sheet, same number (1981), with large leaves, without C. B. Clarke's determination.

C. B. Clarke's citation of species: Gaudichaud in herb. De Candolle, Berlin, Delessert; Seemann no. 1277 in herb. De Candolle; Hinds, in herb. Kew; Hillebrand no. 321 in herb. Kew et Berlin; Wawra no. 1981 in herb. (Wien) Vienna; Beechey in herb. Kew, Delessert; Seemann no. 1722 in herb. De Candolle et Kew.

*Cyrtandra Garnotiana* is evidently confined to the western end of Oahu, especially Mount Kaala. U. Faurie collected a small-leaved form of it which was described by L  veill   as *C. Vaniotii*. The specimens are however labeled *C. Wainotii*; the number cited by L  veill   (no. 1144) is the same as on Faurie's specimen with the latter spelling. His specimen labeled *C. Garnotiana* no. 637 Faurie, is not referable to that species, as can be seen from the shape of the leaves, but as it is without flower or fruit must remain unidentified. It belongs however to the group with *C. Pickeringii*.

C. B. Clarke describes a variety  $\beta$  (*fulva foliis subtus magis fulvis; calyce altius diviso*). Ins. Sandwich; Oahu, Barclay, in herb. British Museum. The writer has not seen this plant, but it evidently is only a form of *C. Garnotiana* Gaud.

CYRTANDRA LAXIFLORA Mann, Proc. Amer. Acad. 1: 190. 1868

Branches scarcely quadrangular, glabrous; leaves 15-20 cm. long, 6-13 cm. wide, acute at the apex, unequally obtuse at the base, rarely rhomboidal, oblong to ovate, serrulate, with scattered multicellular hairs above,



softly yellowish-pubescent below; petioles 3–8 cm.; cymes lax, twice dichotomously branching; peduncle 5 cm.; bracts 1–2 cm., oblong to linear spathulate; pedicels 1–2 cm., villous; calyx minutely villous, with five oblong-linear lobes, 6–11 mm. long; corolla 2 cm., narrow, cylindrical, hirsute to villous outside; ovary almost glabrous; stigma after anthesis bilobed; fruit slightly villous at the apex as is also the short style, the latter slightly exceeding the calyx.

OAHU: Waialua mountains, Mann and Brigham no. 615 in herb. Kew, herb. Cornell University, and Gray Herbarium; Waianae range, Hillebrand in herb. Berlin and part (fragment) in herb. College of Hawaii.

*Cyrtandra laxiflora* Mann is certainly a distinct species and, as Mann states, comes close to *C. Macraei* but in flowers only.

To *C. laxiflora* Mann must be referred as a special variety Hillebrand's var. *grandifolia* of *C. triflora* Hillebr. not Gaud. This latter plant is certainly much more closely related to *C. laxiflora* than to *C. polyantha* C. B. Clarke (*C. triflora* Hillebr.). Here belongs also a new variety from Kaliuwaa Valley, *C. laxiflora rhyzantha*, which see.

CYRTANDRA LAXIFLORA **rhizantha** Rock n. var.

A shrub with few ascending branches; leaves 15–20 cm. long, 6.5–8 cm. wide on petioles of 4–10 cm., sharply dentate, otherwise as in *Cyrtandra laxiflora* var. *grandifolia*; inflorescence on the stem near the ground and on exposed roots, a twice to thrice dichotomous cyme, the peduncle of varying length, 1.5–3 cm. long; bracts 8 mm.; ultimate pedicels of varying length, villous; calyx and corolla as in var. *grandifolia*.

OAHU: Koolau Mts., Punaluu, flowering October 31, 1914, Rock no. 13086 in herb. College of Hawaii.

This plant differs little from *C. laxiflora* var. *grandifolia*, but mainly in the smaller leaves, and open and lax thrice-dichotomously branching cyme. The inflorescence is borne on the lower portions of the stem and on exposed roots, hence the name.

CYRTANDRA LAXIFLORA **grandifolia** Rock n. comb.

*Cyrtandra triflora* Hillebr. var. *grandifolia* Hillebr. Fl. Haw. Isl. 332. 1888.

Branches glabrous, apices hirtellous to villous; leaves large, ovate to suborbiculate, 15–24 cm. long, 6.5–14 cm. wide, acuminate at the apex, rounded at the base or uneven-sided, hispidulous above, pubescent below, especially on the stout midrib and nerves; petioles 3–5.5 cm.; cymes large, open, branching; bracts 7 mm., acute; pedicels filiform, villous; calyx as in *C. laxiflora*, more deeply divided, the lobes linear-acute, 8 mm.; corolla 12–14 mm., the tube narrow-cylindrical, ampliate at the throat, hirsute especially in the upper third; ovary elliptical, sessile and rounded at the base, long acuminate at the apex, puberulous; fruit twice as long as the calyx, elliptical-acuminate, puberulous.

OAHU: Waialua and Waipio, Hillebrand in herb. Berlin and part of type in herb. College of Hawaii; mountains of Waialua, flowering February 10, 1907, Otto. H. Swezey no. 12773 in herb. College of Hawaii.



According to the right interpretation of *Cyrtandra triflora* Gaud. and *C. polyantha* C. B. Clarke, Hillebrand's variety *grandifolia* of his *C. triflora* cannot be retained, but must be referred as a variety to *Cyrtandra laxiflora*. Even should Hillebrand's determination or interpretation of Gaudichaud's *C. triflora* have been correct, it could not possibly have been retained as a variety of *C. triflora* Gaud., but would have had to be referred to *C. laxiflora* to which it comes so close as to make even its varietal rank questionable. It differs from *C. laxiflora* mainly in the smaller flowers and perhaps larger leaves.

CYRTANDRA POLYANTHA C. B. Clarke in DC. Monogr. Phan. 5: 220.  
1883-1887.

*Cyrtandra triflora* Hillebr. Fl. Haw. Isl. 332. 1888, in part, not Gaud.

*Cyrtandra gracilis* Drake Cast. Illustr. Fl. Ins. Mar. Pacif. 7: 253. 1892,  
not Hillebr.

A small shrub, 1 m. high; branches subterete, glabrous, young portions yellowish-villous to woolly; leaves opposite, of equal size, 12 cm. long, 2.5-3.5 cm. wide according to type (5-7 cm. broad *teste* C. B. Clarke), closely denticulate, elliptical, acuminate at both ends, coriaceous, slightly scabrous above, shortly yellowish-silky beneath; cyme dichotomously branching, densely many-flowered; peduncle 5-8 mm., almost glabrous, bracts 6 mm., lanceolate; pedicels up to 8 mm., glabrate; calyx divided to the middle, the lobes 2 to 3 mm.; corolla 12 mm., cylindrical, hirsute or villous; ovary glabrous, the style partly glandular-pilose.

OAHU: Mountains of Ewa, Hillebrand in herb. Kew, Berlin, and Gray Herbarium, clastotype in herb. College of Hawaii; main ridge of Niu Valley, elevation 1700 feet, flowering August 22, 1909, Rock no. 4815 in herb. College of Hawaii.

The specimen in the Hillebrand Herbarium in the Berlin Botanical Museum bears in C. B. Clarke's handwriting the name *C. polyantha* C. B. Clarke, and in Hillebrand's handwriting the name *C. triflora*, Oahu, Mts. of Ewa.

Drake Del Castillo is absolutely wrong in citing *C. polyantha* as a synonym of *C. gracilis*; the plant has nothing in common with it. In *Cyrtandra gracilis* the calycine lobes are very long and subulate, and the whole aspect of the plant is different; besides the leaves in *C. polyantha* are densely silky-villous below.

The writer's specimens came from an exposed ridge or spur in Niu Valley and agree quite well with the specimen marked as *C. polyantha* by C. B. Clarke in the Berlin Herbarium, with the exception of the peduncles which are up to 2 cm. in length. There is, however, no doubt that it is *C. polyantha*.



CYRTANDRA POLYANTHA **ambigua** Rock n. comb.

*Cyrtandra triflora* Hillebr., var.  $\gamma$  *ambigua* Hillebr. Fl. Haw. Isl. 332. 1888.

Leaves 8 cm. long, 2.5 cm. wide, acuminate at both ends, closely denticulate, coriaceous, on petioles of 2 cm.; peduncle 8 mm., pedicels several of variable length, glabrous as is the calyx; calyx one-half or two-thirds the length of the corolla, cylindrical, shortly and unevenly divided to less than the middle into lanceolate-acute lobes or teeth, beaked in the bud and splitting laterally; corolla cylindrical, hirsute, the lobes small.

OAHU: Hillebrand in herb. Berlin and herb. College of Hawaii.

Hillebrand's var. *ambigua* of his *C. triflora* is exceedingly close to *C. polyantha* and almost identical with it, but still worthy of varietal rank. As it does not belong to *C. triflora* Gaud. but to *C. polyantha* C. B. Clarke, it is here referred to it as a variety. Hillebrand gives no other locality than Oahu. The writer has not collected this variety.

## ADDENDA SECTION CYLINDROCALYCES

***Cyrtandra limosiflora*** Rock n. sp.

Single-stemmed, bearing a crown of leaves at the apex, 1–1.5 m. high; stem stout, 5 cm. in diameter near the base, distinctly nodose, the nodes at intervals of 2.5–3 cm., greenish-gray; leaves large, quaternate, sessile, forming a large rosette-like crown, chartaceous, broadly lanceolate-oblong, acuminate at the apex, gradually tapering from the middle of the leaf to a broad sessile base, 45–50 cm. long, 10–12 cm. wide (2–2.5 cm. wide at the sessile base), the margin denticulate, sparingly so towards the base, dark green above, pale grayish-brown beneath, glabrous above, puberulous to glabrous below but somewhat pubescent along the midrib and veins; inflorescences densely crowded around the stem for a length of 14–20 cm., surrounding the stem at each node and in the axils of the leaves; peduncle 3–5 mm., bearing about ten flowers; pedicels about 4 mm.; calyx pale green, cylindrical, puberulous outside, densely hirsute with long hairs inside, about 2.5 cm. long, bilabiate, unequally deeply slit into four lobes with long filiform apices; corolla the length of the calyx, slightly curved, glabrous throughout, the lobes unequal, oblong, rounded; style glabrous, the stigmatic lobes large, ovate-oblong; fruit ovoid-oblong, glabrous.

MOLOKAI: Mapulehu Valley, Pukoo, among rocks in stream bed, flowering December 24, 1915, Rock no. 12522, type in College of Hawaii Herbarium.

A remarkable species, resembling in habit a *Cyanea*. The name *limosiflora* refers to the slimy inflorescence which is usually full of insect life, slugs, and decayed vegetable matter and gelatinous substances. It is related to *Cyrtandra longifolia* var. *degenerans* C. B. Clarke, but differs from it in the very large, broadly sessile leaves and numerous inflorescences which extend down the stem for sometimes 20 cm. It belongs to the section *Cylindrocalyces*, from which it was omitted by an oversight.

In Halawa Valley on the same island (Molokai) there occurs a *Cyrtandra* with very large leaves which resemble those of *C. limosiflora* but are dis-



tinctly oblong and do not taper towards the base from the middle of the leaf but from the lower third; they are 60–70 cm. long and about 15 cm. wide, and puberulous on both faces, the petiole none. Unfortunately the plant was neither in flower nor in fruit. The leaf specimens were collected in April, 1909, in Halawa Valley; they are deposited in the College of Hawaii Herbarium and bear the number 13101. There is no doubt that these specimens represent an undescribed species of the section *Cylindrocalyces* as can be judged by the habit of the plant.

*CYRTANDRA PALUDOSA BREVICALYX* Hillebr. forma **linearis** Rock, n. f.

*Cyrtandra paludosa* var. *filipes* Hillebr. ms. in Gray Herbarium.

A shrub; branches terete, glabrous; leaves linear-lanceolate, elliptical, 7–11 cm. long, 1.5–2.5 cm. wide, acuminate at both ends, the margin wavy-crenate, chartaceous, pale green and glabrous on both sides; petioles 2–3.5 cm.; peduncle short, 2–5 mm., bearing single flowers on pedicels of 2.5–3 cm.; fruit elliptical-fusiform.

OAHU: Kaala Mts., Hillebrand, in Gray Herbarium; eastern range (Kaala) Schofield Barracks, flowering July 11, 1916, A. S. Hitchcock no. 14027 in U. S. National Herbarium and clastotype in College of Hawaii Herbarium.

This form differs from the variety *brevicalyx* mainly in the linear-lanceolate leaves. The specimen in the Gray Herbarium *ex coll.* Hillebrand is labeled *C. paludosa* var. *filipes*.

*CYRTANDRA CONFERTIFLORA* C. B. Clarke in DC. Monogr. Phan. 5: 235. 1887

*Cyrtandra paludosa* Gaud. var.  $\gamma$  *confertiflora* Wawra, Flora 30: 560. 1872.

Branches thick, subquadrangular, the apex fulvo-sericeous; leaves large, opposite, elliptical, serrate, 28 cm. long, 12 cm. broad, acute at both ends, silky-villose along the nerves below; petioles 5–8 cm., narrowly winged cymes subsessile, almost capitate, yellowish-silky when young; bracts 2 cm., glabrate, deciduous; calyx 12 mm., subovate, rostrate and closed before flowering, reddish yellow-silky, finally glabrate and deciduous; corolla 25 mm. long, the upper lip erect, the lower divaricately opened, almost glabrous; fruit 1 cm. long, 7 mm. broad, ovoid, subconical.

KAUAI: Dense forest of Kealia, Wawra no. 2057 in herb. Vienna; U. Faurie, December, 1909, no. 618, in herb. College of Hawaii, no. 13098.

*Cyrtandra confertiflora* C. B. Clarke is a decidedly distinct species and differs from *C. paludosa* mainly in the larger leaves and the densely glomerate cyme practically without peduncle and with short pedicels. The writer has examined the type in the Vienna Herbarium, but through some error he omitted it from the section *Cylindrocalyces* where it belongs. U. Faurie's specimens of this species were identified by Hector L  veill   as *Cyrtandra latebrosa* Hillebr. and distributed as such.



CYRTANDRA LONGIFOLIA Hillebr.; C. B. Clarke in DC. Monogr. Phan. 5:  
276. 1883-87

*Cyrtandra paludosa* Gaud. var. *longifolia* Wawra, Flora 55: 558. 1872.

*Cyrtandra paludosa* Lév. (not Gaud.) ms.

U. Faurie, who collected the typical *Cyrtandra longifolia*, distributed it (no. 610) as *Cyrtandra paludosa* Gaud.; the plants were identified by H. Lévillé.

A. A. Heller collected specimens of a *Cyrtandra*, no. 2624, which he distributed to various herbaria as *Cyrtandra longifolia* and *Cyrtandra Wahiawae* n.sp. The former is in the herbarium of Cornell University and the latter in the Gray Herbarium; both bear the number 2624 and are identical. The plant is not referable to *Cyrtandra longifolia*, nor can it very well be retained as a new species as it is not sufficiently distinct from the former, but may best be disposed of as *Cyrtandra longifolia Wahiawae* (Heller) Rock. The plant is entirely glabrous throughout save the juvenile leaves; the leaves are smaller than in the species and are more distinctly petiolate.

CYRTANDRA LONGIFOLIA  $\gamma$  PARALLELA C. B. Clarke in DC. Monogr. Phan.  
5: 277. 1883-1887

"Foliis oblongis, lateribus subparallelis; petiolis usque ad 5 cm., longis, minus alatis. *C. longifolia typica* Hillebrand ms."

INS. SANDWICH. Hillebrand no. 327 in herb. Kew.

This variety is too briefly described to enable any one to identify it. No locality is given other than Sandwich Islands. Hillebrand's specimens collected later do not bear the same names as those which he previously sent to Kew and Berlin; besides, none of the Berlin material *ex herb.* Hillebrand bears numbers. The var.  $\gamma$  *parallela* is not known to the writer. A. S. Hitchcock collected a *Cyrtandra*, no. 15446 on Kauai, Waialeale, which may be referable to this variety of *C. longifolia*. That it belongs to one of the many varieties of *C. longifolia* there is no doubt. The inflorescence is cymose and the peduncle about 1 cm. long, otherwise it could be referred to *C. longifolia* var. *arborescens* (Wawra) C. B. Clarke. It may also be a form of *C. paludosa* var. *Gayana* (Heller) Rock. The specimen is too fragmentary to allow a definite diagnosis (no. 15446 in U. S. National Herbarium).

CYRTANDRA HAWAIIENSIS C. B. Clarke in DC. Monogr. Phan. 5: 235.  
1883-1887

*Cyrtandra paludosa* var. *integrifolia* Hillebr. (in part) Fl. Haw. Isl. 337.  
1888.

*Cyrtandra longifolia* Drake Cast. Fl. Ins. Mar. Pacif. 7: 256. 1892, not C. B. Clarke.



"Foliis magnis sessilibus, spathulato-oblongis, subintegris, maturis fere glabratiss; calycibus 2-3 cm., semi-5-fidis, lobis lanceolato-linearibus. Ramuli teretes, crassi; novellae partes fulvo-villosae. Folia longa 3 dm., lata 7 cm., supra glabrata, subtus secus nervos fulvide pubescentia, nervi primarii laterales utrinque 12. Cymae axillares, pluriflorae, subcapitatim condensatae. Calyx viridis, angustus, extus glabriusculus, intus fulvo-hirsutus. Corolla extus glabra. Stamina 2, glabra; antherarum loculi oblongi, paralleli, rimis apice curvatis, mox in unam confluentibus. Ovarium cum stylo glabrum; discus brevis annularis. Bacca non visa. Exemplum mancum; folia non certe opposita."

INS. SANDWICH; HAWAII: Kohala, Hillebrand no. 333 in herb. Kew.

This is the plant the writer mentioned under the *Specimina excludenda* of *Cyrtandra paludosa*, stating on page 611 of this publication (Amer. Journ. Bot. December, 1917): "Hillebrand's specimen from the Kohala Mts. Hawaii and referred by him to the above variety [*C. paludosa* var. *integrifolia*], with Knudsen's no. 137, is an entirely different plant and has absolutely nothing in common with *C. paludosa* or with *C. longifolia*; the leaves remind one very much of a species of *Shorea*. It represents an undescribed species."

The specimen in the Berlin Herbarium (without number) is without flowers and possesses only a couple of old broken-up fruits from which the calyx has disappeared. Through cross references and the description the writer finally traced this specimen to C. B. Clarke's *C. hawaiiensis* from the Kohala Mountains. It certainly represents a different species, and in his notes on *Cyrtandra* made in Berlin, the writer suggested the name *shoreae-folia*; if Hillebrand had given numbers to his own specimens, as he did to those of his he sent to Kew, matters might have been less confusing.

CYRTANDRA MACRANTHA C. B. Clarke in DC. Monogr. Phan. 5 265.  
1883-1887

"Foliis magnis petiolatis, oblongo-ellipticis subintegris, maturis fere glabratiss; calyce 4 cm., lobis ovato-lanceolatis; corolla 6-7 cm.; frutex 10-petalis; ramus crassus; novellae partes minute tomentellae, pilis ferrugineis parce additis. Folia longa 3-4 dm., lata 12 cm., basi cuneata; nervus medius supra prope basin fulvide hirsutus; nervi primarii laterales utrinque 14; petioli 3 cm. Flores axillares condensati. Calyx tubulosus sub anthesis usque ad tertiam partem divisus, extus subglaber, intus fulvide tomentellus, lobis caudatis. Corolla tubulosa, leviter caudata, extus glabra; lobi 2 cm., rotundati. Bacca non visa."

INS. SANDWICH: in vallibus a mare remotis (herb. Hooker) sine nomine lectoris in herb. Kew.

If this is really a Hawaiian species, it certainly possess the largest flowers of any of our *Cyrtandreae*. The description of the calyx places this species at once in the section *Cylindrocalyces*. It is evidently closely related to the writer's *Cyrtandra waianuensis*, from which it differs in the exceedingly large flowers and the 3-cm.-long petiole.



CYRTANDRA GLAUCA Drake Cast. Fl. Ins. Mar. Pacif. 7: 253. 1892

"Glaberrima, foliis membranaceis, elliptico-lanceolatis (15-18 cm. longis, 3-4 cm. latis, petiolo 2-3 cm. longo) grosse serratis. Flores solitarii, pedunculo gracili petiolum aequante, calyce oblongo (1 cent.) fere usque ad dimidiam partem fisso, corollae tubo brevi, fauce leviter ampliata, bacca oblonga."

KAUAI: Remy no. 440 bis, herb Paris (?)

The writer has not seen this species and he can only quote here the description. It probably belongs to the section *Cylindrocalyces* as can be judged from the description of the calyx.

CYRTANDRA SCABRELLA C. B. Clarke in DC. Monogr. Phan. 5: 277.

1883-1887

"Scabrella; foliis ellipticis utrinque acutis, calloso serratis, cymis 3-floris; calyce juniore usque ad mediam partem diviso, lobis ovato-oblongis. Rami vix quadrangulares. Folis opposita subaequalia, longa 1 dm., lata 4 cm., in utraque superficie (supra parcius) a pilis fulvis minutis scabra; nervi primarii laterales utrinque 6, subtus elevati; petiolus 2 cm. Pedunculus 12 mm., bracteae 12 mm.; ellipticae, subacutae; pedicelli 12 mm. Calyx sub anthesi longus 2 cm., lobi 11 mm., minute scabrelli. Corolla 25 mm.; tubus paullo curvatus, extus villosus."

INS. SANDWICH: Hillebrand no. 324 in herb. Kew.

The writer has not seen this species, and even from the description is unable to give an opinion as to the validity of the species. It may be related to *C. longifolia*, but the "callous serrate leaves" would bring it closer to *C. paludosa* than to the former, which has entire leaves. C. B. Clarke's description is here quoted.

CYRTANDRA OENOBARBA Mann.

Horace Mann included in his *C. oenobarba* from the Wahiawa Falls, Kauai, no. 616, specimens also numbered 616, but which are not identical with the type of *C. oenobarba*. Wawra collected the same plant which Wawra evidently erroneously placed with *C. oenobarba* and described it as *Cyrtandra paludosa* var. *herbacea*. Heller, who also collected the latter plant, recognized correctly that the plant is not so much related to *C. paludosa* as to *C. oenobarba* and correctly changed it to *Cyrtandra oenobarba* Mann var. *herbacea* (Wawra) Heller. Mann's specimens no. 616 are only *pro parte* referable to *C. oenobarba*. The species is distinguished by the shaggy hairs with which the leaves and petioles are covered, while the variety *herbacea* is glabrous.

The writer had all specimens herein mentioned at his disposal for comparison.

***Cyrtandra montis* Loa Rock n. sp.**

A shrub 3-5 m. high with few ascending branches, the latter terete; bark thin, grayish-brown, glossy, glabrous, excepting the apex which is



covered with dirty brown hair; leaves ternate, thick-coriaceous, elliptical-oblong, acute at the base, acuminate at the apex, dark green and glossy above, the veins impressed, pale dull green beneath with the hispidulous midrib and veins very prominently projecting, the margins irregularly and coarsely serrate, excepting the entire base, 20–25 cm. long, 6–9 cm. wide, on petioles of 6–9 cm.; cymes axillary in the five upper leaf-whorls, 3–7-flowered; peduncle thick, fleshy, 1–2 cm. long, bearing at the apex two large foliaceous bracts, sessile and subcordate at the base, up to 4 cm. long, 2 cm. wide, 3–5-nerved, peduncle and pedicels hirsute with dark brown hair, the pedicels of varying length up to 3.5 cm. when with fruit; calyx large, divided to near the base into five large foliaceous lobes, which are distinctly 3-nerved; the lobes ovate, acute at the apex, 2.5 cm. long, 1.5 cm. broad near the base; corolla hidden in the calyx, the tube straight or slightly curved, constricted at the throat and hairy in the upper portion, the lobes small, not spreading, and subequal; style short, curved, the broadly bilamellate stigma downward-spreading; ovary glabrous; fruit large, obovate, 2 cm. long, 18 mm. thick, obtuse but crowned with the remnant of the style.

HAWAII: Not uncommon in the forests on the northeastern slope of Mauna Loa, especially in the dense tree-fern forests between 29 miles and Kulani (neighborhood of the Volcano of Kilauea), elevation 3000–5000 feet, in company with *Cyrtandra platyphylla typica*, *Cibotium Menziesii*, *C. Chamissoi*, *Pritchardia Beccariana*, *Cyanea pilosa*, etc., flowering and fruiting August 15, 1918, Rock and Hashimoto no. 13115 (type) in herb. College of Hawaii.

*Cyrtandra montis Loa*, confined to the fern forests of the northeast slope of Mauna Loa, is a very distinct species and easily recognized by its terete stems, and large, leathery, deep green leaves with impressed veins. The tallest specimens the writer observed were near the summit of the ancient cone crater Kulani, 5500 feet elevation. It is the predominating species in the region of Kilauea.

The species belongs to the section *Schizocalyces* Hillebr., but on comparison with the other species of that section we find no close relationship with any of them. Like *C. umbraculiflora* it is a very distinct species with no apparent relationship to the rest of the species of that section, but with leanings towards species in the section *Crotonocalyces*.

### ***Cyrtandra ramosissima* Rock n. sp.**

A tree 5 m. high or more with a trunk about 15 cm. in diameter; bark smooth, usually covered with mosses and ferns; branches many, tortuose, the branchlets twisted, terete, and nodose, the nodes at close proximity to each other towards the apex; leaves opposite, pale green above, paler to whitish below, the veins impressed above, and prominently projecting below, hirsute with pale brownish hair above, shortly pubescent to puberulous below, thin, submembranous, with pellucid veins and nerves, elliptical, acute at the base, acuminate at the apex, coarsely and irregularly serrate with the exception of the lower fourth which is entire, 10–12 cm. long, 5.5 cm. wide, on hirsute petioles of 2.5–4 cm.; flowers solitary in the axils of the upper leaves on a hirsute peduncle of 12–15 mm. in length, bracteate



at the apex, the bracts lanceolate-foliaceous, hirsute, distinctly 3-nerved, 2 cm. long, 6 mm. wide; pedicel of the same length as the peduncle; calyx deeply divided to the lower third into five lanceolate, hirsute, 1-nerved, acute lobes, 8–10 mm. long, 2.5–3 mm. wide; corolla white, slightly exceeding the calyx, semi-erect or slightly curved, widening at the throat, hirtellous in the upper portion, the lobes of equal size, small and rounded; ovary elliptical, 4 mm. high, white, glabrous as is the short style; stigma broadly two-lobed, the lobes elliptical; anthers slightly protruding from the throat; fruit obovate to elliptical, glabrous, crowned by the short style.

HAWAII: In dense rain forest near Glenwood, elevation 2400 feet, rarely ascending higher, flowering and fruiting August 19, 1918, Rock and Hashimoto no. 13116 (type) in herb. College of Hawaii.

This species and *Cyrtandra Giffardii* are then apparently the only arboreous Cyrtandreae in the Hawaiian Islands. It is a many-branched small tree 15–20 feet in height with a single woody trunk over five inches in diameter. It belongs to the section Schizocalyces Hillebr. and is related to *Cyrtandra lysiosepala* (Gray) Clarke, from which it differs in the single-flowered inflorescence, the small corolla lobes, the hirsute leaves and green calyx and bracts, which are white in *C. lysiosepala*.

#### ***Cyrtandra Hashimotoi* Rock n. sp.**

A much-branched, tortuose shrub 1–1.5 m. high, the branches rough and twisted, ultimate branchlets terete, nodose, and glabrous, with the exception of the apex, this coarsely hirsute with short, stiff, brownish-black hairs; leaves opposite, small, elliptical to obovoid, acuminate at the apex, acute at the base, 5.5–6.5 cm. long, 1.75–2.5 cm. wide, thick-coriaceous, dark green above, brownish beneath, with scattered stiff, reddish-brown hairs on the upper surface, glabrous on the lower, with the exception of the very prominently projecting midrib and veins which are hirsute; petioles hirsute, 1–2 cm. long; flowers single in the axils of the upper leaves; peduncle 10–12 mm. long, hirsute with brownish hairs; bracts or bractlets none; calyx divided to the base into linear-subulate lobes, these hirsute outside and subglabrous inside, 1 cm. long, less than 1 mm. wide, acute, and broader at the base; corolla nearly twice as long as the calyx, the tube narrow-cylindrical, curved, 2 mm. wide, strongly hirsute outside with the exception of the lobes which are subglabrous, rounded, small, equal in size and not spreading; ovary turbinate, puberulous or glabrous, the acute apex crowned by the short style; fruit unknown.

MAUI: Northern slopes of Mt. Haleakala in dense rain forest along the Waikanioi stream at an elevation of 4000 feet, in company with *C. caulescens*, *C. Lydgatei*, *Hillebrandia sanduicensis*, *Gunnera petaloidea*, etc., flowering September 3, 1918, Rock and Hashimoto no. 13117 (type) in herb. College of Hawaii.

*C. Hashimotoi*, named for my friend and companion T. Hashimoto, who discovered the species, is related to *C. Lydgatei*, from which it differs in the single flowers, the thick, leathery, small leaves, ebracteate peduncle, and the corolla, which is nearly twice as long as the calyx. It is intermediate between the sections Schizocalyces and Chaetocalyces, but must be referred



to the former on account of the calycine lobes, which are not green and thin, the single flowers, and the thick, leathery leaves.

### CORRIGENDA

In Rock: Revision of the Hawaiian species of the genus *Cyrtandra*. Section *Cylindrocalyces* Hillebr. Amer. Journ. Bot. 4: 604-623. 1917, on page 613, sixth line, read: "*herb. (Wien) Vienna*" instead of "*herb. Berlin.*"

COLLEGE OF HAWAII, HONOLULU





ROCK: CYRTANDRA LAXIFLORA MANN, EX COLL. MANN AND BRIGHAM IN CORNELL HERBARIUM.







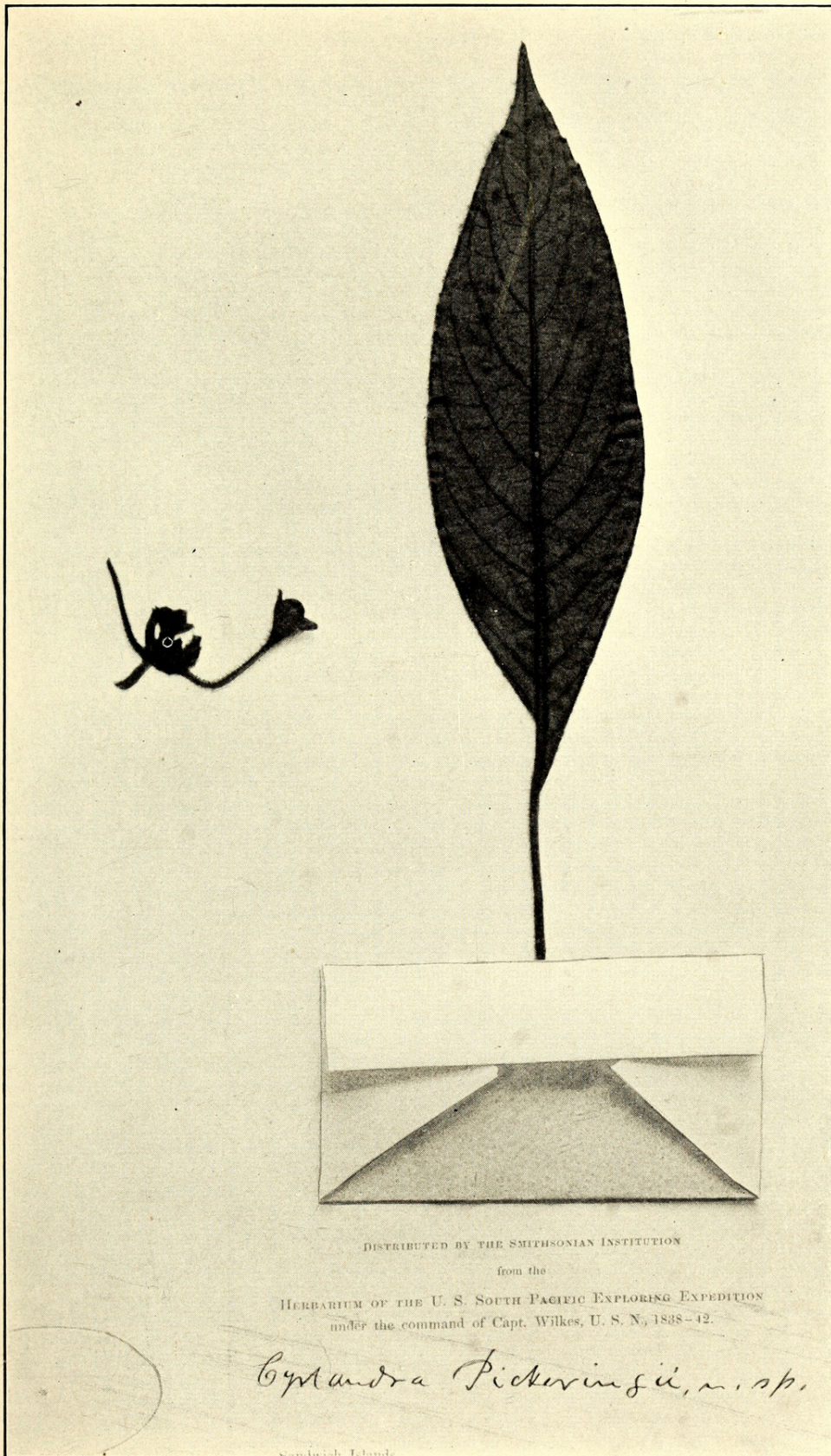


ROCK: *CYRTANDRA LIMOSIFOLIA* ROCK, GROWING IN THE STREAM  
BED OF MAPULEHU VALLEY, MOLOKAI.









Rock: TYPE OF CYRTANDRA PICKERINGII A. GRAY IN THE GRAY HERBARIUM









ROCK: TYPE OF *CYRTANDRA MONTIS* LOA ROCK, GROWING IN THE FORESTS OF KULANI, SLOPES OF MAUNA LOA, ELEVATION 5,000 FEET, HAWAII.





Rock, Joseph F. 1919. "Cyrtandreae hawaiienses, sect. Microcalyces Hillebr." *American journal of botany* 6(5), 203–216.

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