

CYRTANDRA SAMARENSIS (GESNERIACEAE), A NEW SPECIES FROM THE LIMESTONE FORESTS OF SAMAR ISLAND, PHILIPPINES

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A species new to science of the megadiverse genus *Cyrtandra* (Gesneriaceae) and endemic to the limestone forest of Samar Island Natural Park, Philippines, is described. It is distinct in its hairy bracts at the base of the adaxial surface and its long pendulous umbelliform inflorescences that comprise either solitary flowers or branches carrying two clusters of 7–9 diminutive flowers. A conservation assessment following the Red List criteria of the IUCN Standards and Petitions Subcommittee is proposed, and a line drawing and photographs of the species are provided.

Keywords. Karst landscape, megadiverse genus, taxonomy.

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Introduction

Having more than 800 species, *Cyrtandra* J.R.Forst. & G.Forst. is the most species-rich genus of Gesneriaceae (Atkins *et al.*, 2013, 2020; Olivar *et al.*, 2022). The genus is recognised by its possession of two fertile stamens, in addition to ellipsoidal indehiscent fruits that can be either tough-walled capsules or fleshy berries (Cronk *et al.*, 2005). The distribution of this genus extends from the Nicobar Islands in the west, across the islands of Malesia to New Guinea, and across the Pacific to Hawaii, and its centres of diversity are in Borneo, New Guinea, and the Philippines (Cronk *et al.*, 2005; Atkins *et al.*, 2013; Nishii *et al.*, 2019). To date, 98 species of *Cyrtandra* have been reported to occur in the Philippines, of which only three species are not endemic (Pelser *et al.*, 2011–; Olivar *et al.*, 2022). The majority of these species are known only from the type material, and information regarding their ecology, biology and conservation status is still lacking.

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Reflecting the archipelagic nature of the Philippines, many plant species, including those in *Cyrtandra*, have ranges confined to one or a few remote islands or small regions of the larger islands such as Luzon and Mindanao (Pelser *et al.*, 2011–; Olivar *et al.*, 2022). The genus has a high tendency to form island endemics, as its species tend to grow exclusively in dense rain forests and populations are often scattered, with only one or two individuals present at any one time (Burt, 2001). The remoteness of many localities is a challenge to documenting the Philippine species, and as a result, new records and new species are still waiting to be discovered. Following Merrill's (1923) monumental work on the Philippine flora, Atkins & Cronk (2001), Nishii *et al.* (2019) and Olivar *et al.* (2019, 2020, 2022) have described new species and records in the Philippines. These limited efforts stand in contrast to the recognition of the Philippine islands as a centre of diversity of the genus (Atkins *et al.*, 2020). There is a need for not only taxonomic revisions but also continuous botanical explorations across the Philippines to augment new species discovery and obtain reliable distribution records for conservation programmes that address the biodiversity crisis.

Samar is the third largest of the many islands of the Philippines, having a total land area of 330,300 ha (Mallari *et al.*, 2001; UNDP, 2007; Taylor *et al.*, 2015, Villanueva *et al.*, 2021). The island is home to various forest types, including extensive limestone forests, which are widely considered to be important biodiversity arks and are predicted to host a unique species diversity, with a high proportion of endemic taxa (Restificar *et al.*, 2006; Meneses *et al.*, 2019; Day & Urich, 2000). The forests of Samar are incompletely recorded, as illustrated by the continuing discovery of species new to science (e.g. see Rubite *et al.*, 2021; Ordas *et al.*, 2022; Tandang *et al.*, 2022).

During a field survey of the Samar Island Natural Park in October 2021, a putative new species of *Cyrtandra* was collected. Morphological analysis confirmed that it was distinct from all species previously described from the Philippines (Pelser *et al.*, 2011–; Olivar *et al.*, 2022). Based on the results of our investigation, we describe in this paper a new species of *Cyrtandra* from the limestone forests of Samar, the Philippines.

Materials and methods

Botanical surveys were conducted at Samar Island Natural Park, Samar Island, the Philippines from 22 to 28 October 2021. These efforts enabled the discovery of the taxonomic novelty described in this paper. Initial taxonomic descriptions and photographic documentation of the living specimens were carried out *in situ*. Flowers and fruits were preserved in 70% denatured alcohol, and all parts of the plants were preserved as herbarium specimens. Herbarium specimens, including types, deposited at AAH, BM, BO, E, GH, K, L, NY, P, PNH and US were examined and compared (herbarium codes follow Thiers, [continuously updated](#)). The morphological and microscopic features of the dried flowers and fruits, as well as alcohol-preserved flowers and fruits, were further examined under a

stereo microscope (Nikon Fabre NS 161673; Nikon, Tokyo, Japan). Measurements of all significant parts of the plant were made using a ruler, a digital caliper (Tactix: 150 mm; Xinqiao, Shanghai, China) and the ImageJ program (Rueden *et al.*, 2017). The figures and scientific illustrations presented herein were based on photographs (Nikon D3400) taken in the field, herbarium specimens, and spirit collections.

Taxonomic treatment

Species description

Cyrtandra samarensis Tandang & M.D.Angeles, *sp. nov.*

Cyrtandra samarensis is distinct from other known *Cyrtandra* species from the Philippines by a combination of its hairy bracts, long pendulous inflorescence, clustered and diminutive umbelliform inflorescence, and small, white, globose, fleshy berry. Morphologically, it is similar to *Cyrtandra umbellifera* Merr. but differs in its glabrous stem except for a brownish setose tip (vs glabrous), glabrous calyx (vs pubescent), densely hairy bracts with prominent tuft of hairs on the basal part of the adaxial surface (vs puberulous), 13 cm long pendulous inflorescence (vs 0.8–3 cm long) and globose fruit (vs narrowly ovoid and long-acuminate towards tip). The new species is also morphologically similar to *Cyrtandra bacanii* Olivar & Muellner-Riehl but can be distinguished by its acuminate leaf apex (vs obtuse or short-cut), short peduncle 9.9–1.3 cm long (vs 9–10 cm long), and an umbelliform (vs corymbose) inflorescence. – Type: Philippines Samar Island, Paranas, Samar Island Natural Park, 200–230 m a.s.l., 26 x 2021, MD delos Angeles 376 (holotype PNH!, isotype CAHUP!). **Figures 1, 2.**

Shrub reaching 1.5 m tall. *Stems* striate, terete, light brown, glabrous except at tips. *Leaves* opposite, crowded mostly on the upper part of the branchlets, anisophyllous; blades of larger leaf 19.5–20 × 3.9–4.7 cm, lanceolate, apex acuminate, base acute to cuneate, margin undulate to irregularly toothed, petiole 16.6–31.1 mm long, pubescent, base of leaves decurrent, dark green and glabrous on the upper surface, pale green below, with minute appressed hairs on the midrib and lateral nerves, lateral nerves 6–9 pairs, diverging at 40–70° from midrib, strongly curved towards the margin; blades of the smaller leaf 9–11.5 × 2.16–2.8 cm, similar to the larger leaf in other aspects; however, petiole is shorter, 11.6–13.8 mm long. *Inflorescence* axillary, occasionally borne along the leafless stem of old branches, pendulous, up to 13 cm long, umbelliform either solitary or branching into two clusters, with 7–9 flowers; peduncle 9.9–1.3 cm long, with appressed minute hairs; bracts 5, pale green, 3.6–4.6 × 1.5–2.4 mm, elliptic or oblong to ovate, apex acute, margin ciliate, densely hairy with prominent tuft of hairs on the basal part of the adaxial surface, persistent. *Calyx* cream to greenish white, 4.5–5.9 mm long, cupular, lobes uniformly triangular 1.2–2.1 × 1.1–1.7 mm, acute at apex, glabrous to sparsely minutely puberulent

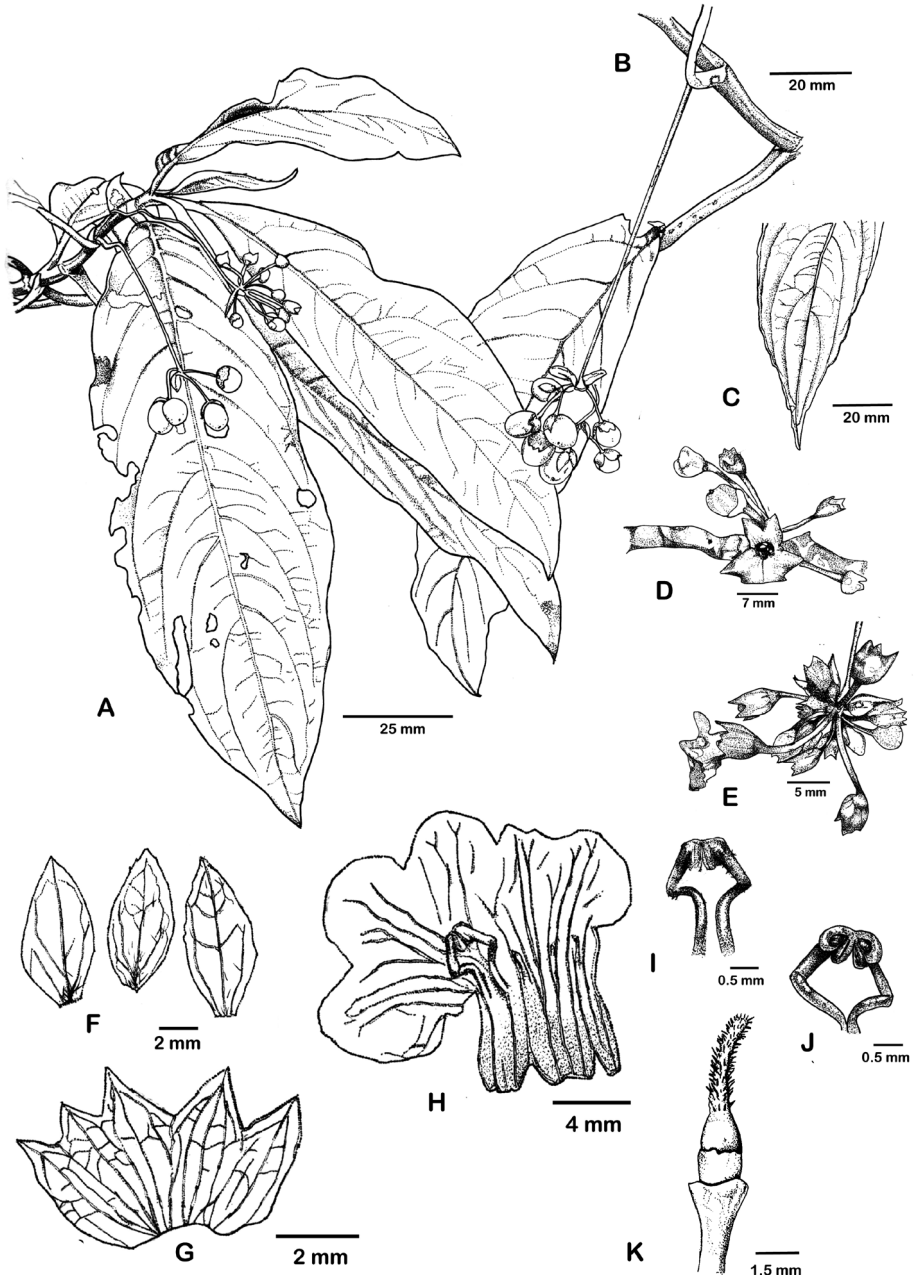


Figure 1. *Cyrtandra samarensis* Tandang & M.D.Angeles, sp. nov. A, Habit; B, infructescence; C, leaf apex; D, inflorescence (anterior view); E, inflorescence (lateral view); F, bracts (variable shapes); G, calyx (expanded); H, corolla (dissected anterior view); I, anthers (lateral view); J, anthers (front view); K, gynoecium with disc. Drawn from MD delos Angeles 376, and selected field photographs, by Danilo N. Tandang.

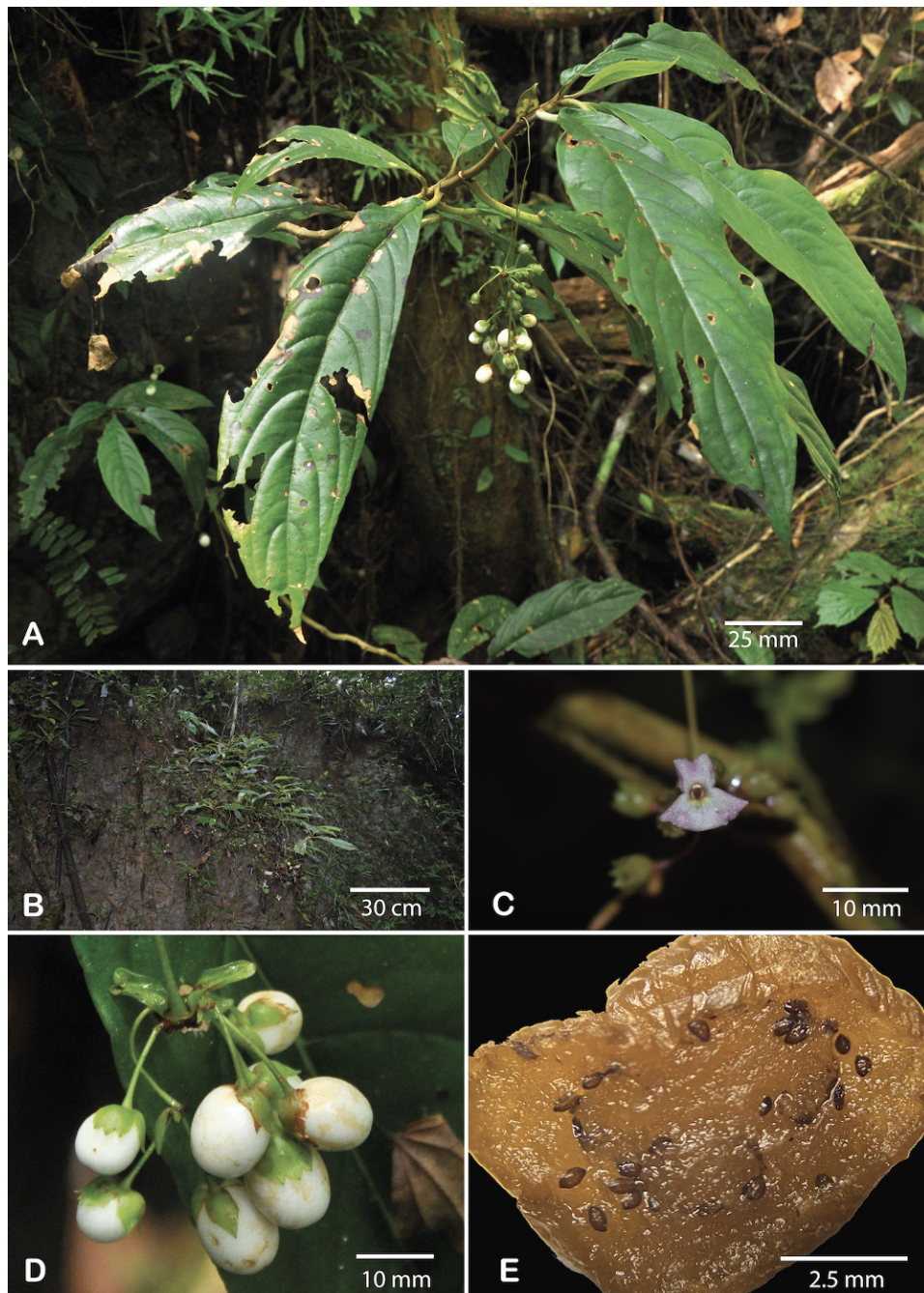


Figure 2. *Cyrtandra samarensis* Tandang & M.D. Angeles, sp. nov. A, Habit; B, habitat; C, single flower (front view); D, mature fruits; E, cross-section of fruit, showing seeds. Photographs: Danilo Tandang (A and D) and Marjorie delos Angeles (B, C and E).

at margin. *Corolla* white with shade of pink at the marginal lobes and flushed with yellow at the base of the throat 4.3–4.7 mm long, corolla tube white, 4.6–5.7 mm wide, c.10-veined at base, veins gradually branching and diverging towards the corolla lobes, unevenly 5-lobed (2 small upper lobes, 2 broader laterals, and 1 lower lobe), rounded, the apical part purple, strongly recurved, margin entire, upper corolla lobes 2.6–4.8 × 3–3.3 mm, lateral corolla lobes 3.9–7.3 × 4.4–4.9 mm, lower corolla lobes 4.2–8.2 × 4.7–5.2 mm. *Stamens* 2, 0.6–0.7 mm long, attached 3.3–3.8 mm from base of corolla, puberulent, cohering at apices, staminodes 3, all less than 1 mm in length, central staminode slightly shorter; anthers 0.6–0.7 mm, glabrous. *Gynoecium* 4.8–6.2 mm long; *disc* cupular with undulate margin, glabrous, 0.6–0.8 × 1.3–1.5 mm; *ovary* ovoid, 1.6–2.3 × 1.2–1.6 mm long, glabrous; *style* 2.5 mm long, with glandular hairs throughout; *stigma* bilobed, erect. *Fruits* berry, globose 9.2–10.3 × 6.5–8 mm, white, pedicel terete, 13.3 mm long, green, glabrous, calyx persistent, green, seeds minute, ovate to oblong.

Distribution. Known from only a single location at Samar Island Natural Park, Samar Island (Figure 3). Thus, this species is considered a local endemic.



Figure 3. Samar Island Natural Park, Samar Island, Philippines, the type locality of *Cyrtandra samarensis* Tandang & M.D.Angeles, sp. nov. Map generated by Ren Divien Obeña, using QGIS.

Habitat and ecology. The type collection was found growing along rocks along the trail in deep-shaded limestone forest. It co-occurs with fern species such as *Cyclopeltis crenata* (Feé) C.Chr. Not observed to bear flowers in the months June and November; however, young and mature fruits were observed during the months of March and October.

Etymology. The specific epithet, *samarensis*, is derived from the province of Samar, where the new species was first recorded.

Proposed IUCN conservation category. Although currently recorded only from the type locality, there are no imminent dangers or threats to the population. *Cyrtandra samarensis* is therefore considered Least Concern (LC) in accordance with the Red List criteria of the IUCN Standards and Petitions Subcommittee (IUCN, 2012).

Notes. *Cyrtandra samarensis* belongs to an informal group of Philippine *Cyrtandra* species with umbellate or subumbellate inflorescences, namely *C. aeruginosa* Quisumb., *C. bacanii* Olivar & Muellner, *C. glabrilimba* Quisumb., *C. pachyphylla* Kraenzl., *C. peninsula* Elmer ex Olivar & H.J. Atkins, *C. tenuipes* Merr. and *C. umbellifera* Merr.

Key to the umbellate and subumbellate Philippine Cyrtandra

- 1a. Leaves with 8 or fewer lateral veins on each side of the midrib _____ 2
 1b. Leaves with 9 or more lateral veins on each side of the midrib _____ 4
- 2a. Leaves up to 10 cm long, 3 cm wide, lanceolate to oblong-oblongate, apex long-acuminate, acute or cuneate at base _____ *C. tenuipes*
 2b. Leaves more than 10 cm long, more than 3 cm wide _____ 3
- 3a. Leaves broadly oblong elliptic, apex obtuse or short-acuminate _____ *C. bacanii*
 3b. Leaves oblongate to oblong-oblongate, apex acutely acuminate _____ *C. glabrilimba*
- 4a. Leaves up to 7.5 cm long _____ *C. peninsula*
 4b. Leaves more than 7.5 cm long _____ 5
- 5a. Larger leaf petiole up to 13 mm long _____ *C. aeruginosa*
 5b. Larger leaf petiole more than 13 mm long _____ 6
- 6a. Corolla up to 1.3 cm long _____ 7
 6b. Corolla more than 1.3 cm long _____ *C. samarensis*
- 7a. Leaf oblong-elliptic to somewhat falcate, apex strongly acuminate _____ *C. umbellifera*
 7b. Leaf lanceolate-oblong or oblong, apex acute to acuminate _____ *C. pachyphylla*

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