

A new variety of *Cryptocoryne* (Araceae) from the Philippines and first wild record of *C. coronata* after more than two decades of uncertain provenance

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Abstract

Cryptocoryne esquerionii var. *purpurea*, a new endemic variety discovered in Zamboanga del Norte, Western Mindanao, Philippines, is herein described and illustrated. A detailed morphological description, colour plates, distribution, ecology and provisional conservation status are provided. In addition, updated field records and conservation notes for *C. coronata*, a species previously known only from cultivated material of uncertain provenance, are presented. These findings further highlight Zamboanga Peninsula as an important region of *Cryptocoryne* diversity in the Philippines.

Key words: Aquatic plants, aroid, biodiversity, western Mindanao, Zamboanga Peninsula

Introduction

The genus *Cryptocoryne* Fisch. ex Wydler (1830: 428), belonging to the family Araceae, is currently represented by about 78 (POWO 2026) species distributed from India and Sri Lanka through mainland Asia, the Malay Peninsula, Sumatra, Borneo, the Philippines and New Guinea (Mayo *et al.* 1997). In the Philippines, the genus is represented by 11 species, 10 of which are endemic, underscoring the country as a hotspot of *Cryptocoryne* diversity (Pelsner *et al.* 2011 onwards; Naive *et al.* 2023c). The number of described taxa continues to increase, with most recent discoveries concentrated in Mindanao and its satellite islands (e.g. Naive & Villanueva 2018; Naive *et al.* 2022a, b; 2023a, b, c). These regions warrant continued botanical exploration given their strong potential for new discoveries in less-studied areas.

Intensified fieldwork and investigation of freshwater streams in Zamboanga Peninsula have recently revealed two previously undocumented *Cryptocoryne* populations. Careful examination of their vegetative and reproductive morphology, combined with comparisons against protologues, relevant literature, and digitized type specimens of the genus, allowed their identities to be assessed. One population matched *C. coronata* Bastm. & Wijng. (1999: 23), a species that has remained poorly known for more than two decades since its description from cultivated material of uncertain provenance and has never been documented in the wild. The second population was consistently distinct in its morphology, representing a novel infraspecific taxon within *C. esquerionii* Naive & Wongso (2023: 3). In this

study, we present a new variety of *C. esquerionii*, accompanied by a detailed description, coloured plates, phenology, distribution, and provisional conservation status. We also provide an extended morphological description, updated distribution and ecological information for *C. coronata*. These findings further highlight Zamboanga Peninsula as an important region of *Cryptocoryne* diversity, emphasizing the urgent need to conserve its freshwater ecosystems.

Materials and methods

The measurements and descriptions were based on freshly collected material. Relevant specimens and literature of *Cryptocoryne* species from the Philippines and neighbouring countries were examined in different herbaria through high-resolution images from Global Plants on JSTOR accessed at <https://plants.jstor.org/>, Global Biodiversity Information Facility (GBIF) accessed from <https://www.gbif.org> and Integrated Digitized Biocollections (iDigBio) accessed from <https://idigbio.gbif.us/>. Assessment of their conservation status was carried out following IUCN (2024), based on our current knowledge and using their terminology on categories, criteria and subcriteria.

Taxonomic treatment

Cryptocoryne esquerionii Naive & Wongso var. *purpurea* Naive & Fulgencio var. *nov.*

Type:—PHILIPPINES. Mindanao Island, Zamboanga Peninsula, Zamboanga del Norte, elev. 251 m, 24 February 2026, *BKR Fulgencio & MAK Naive 003* (holotype PNH accession 271927 with spirit collection; isotypes HNUL, HITBC). Full locality withheld owing to the risk of potential exploitation of wild populations for commercial purposes. Figs. 1–2.

Amphibious perennial herbs, up to 17.2 cm tall. **Rhizome** terete, 1.0–1.5 cm long, 0.2–0.8 cm in diameter, fleshy, glabrous, brownish to whitish externally, creamy white internally, producing numerous fibrous roots. **Cataphylls** narrowly triangular, 2.0–4.5 cm long, glabrous, pale reddish-brown to whitish-red, often suffused with purple, margin involute, cucullate, apex acuminate. **Leaves** fully spreading, 10.5–16.0 cm long, 7–8 per individual plant; **petiole** slightly flattened, sulcate, 4.5–8.5 cm long, pale red to purplish-brown; **lamina** ovate, 6.0–7.5 × 3.0–3.5 cm, chartaceous, dorsoventrally bullate to rugose on both surfaces, dorsoventrally colliculate, adaxially purplish-brownish green, abaxially reddish-brown, margin entire to weakly sinuate, base cordate, apex attenuate; midrib adaxially inconspicuous, shallowly canaliculate, abaxially conspicuous, keeled, with 3–5 primary veins. **Anthomorph** solitary, 12–14 cm long; **peduncle** cylindrical, inconspicuously sulcate, 6.8–7.0 cm long, 2 mm in diameter, glabrous, reddish-white. **Spathe** erect, 5–7 cm long, colliculate, lower part whitish pale purple red, upper part purplish-brown; **kettle** urceolate, 1.0–1.3 cm long, 6.5–9.0 mm in diameter, fleshy, white to reddish white, flap light yellow; **tube** 7–8 mm long, 5–8 mm in diameter, pale red to purplish-red; **limb** twisted, narrowly triangular, ascending to oblique, 3.8–4.0 cm long, purplish to reddish-brown externally, pale reddish-yellow internally, margin entire to slightly crenulate, apex long-acuminate; **collar** conspicuous, colliculate; **throat** deep purplish-red, smooth. **Spadix** 1.0–1.3 cm long; **female flowers** 4; **ovary** 2.0–2.5 mm long, creamy white, minutely and sparsely papillose; **stigmas** horizontally spreading to slightly descending, ellipsoid, 1.0–1.3 mm long; **olfactory bodies** yellow; **naked axis** 4–5 mm long, glabrous, translucent yellow; **male flowers** 20–30, pale yellow, congested; **sterile appendix** whitish yellow to pale yellow. **Syncarp** ovoid, 5.0–7.0 mm long, 4.0–4.8 mm in diameter, verrucose, dark reddish-brown, apex apiculate.

Distribution:—Endemic to Zamboanga Peninsula. This variety has so far only been found in the streams of Zamboanga del Norte province.

Habitat:—It was found in a small forest stream with clear, slow-running water at 200–300 m a.s.l. The plants grow fully submerged in a sandy-muddy substrate with a baseline water depth of 6–10 cm during normal weather conditions. The habitat is characterized by abundant decaying leaf litter, with populations growing adjacent to *C. esquerionii* var. *esquerionii* (Fig. 2).

Phenology:—Observed flowering in August, September and December.

Proposed conservation status:—The variety has been found in its type locality where fewer than 50 mature individuals have been observed. However, this population is currently under threat by anthropogenic activities as the area is near human settlement and agricultural land, endangering the existence of this narrowly endemic variety. Following the Red List criteria of the IUCN Standards and Petitions Committee (IUCN 2024), we herein propose this variety be treated as ‘Critically Endangered’ (CR D).

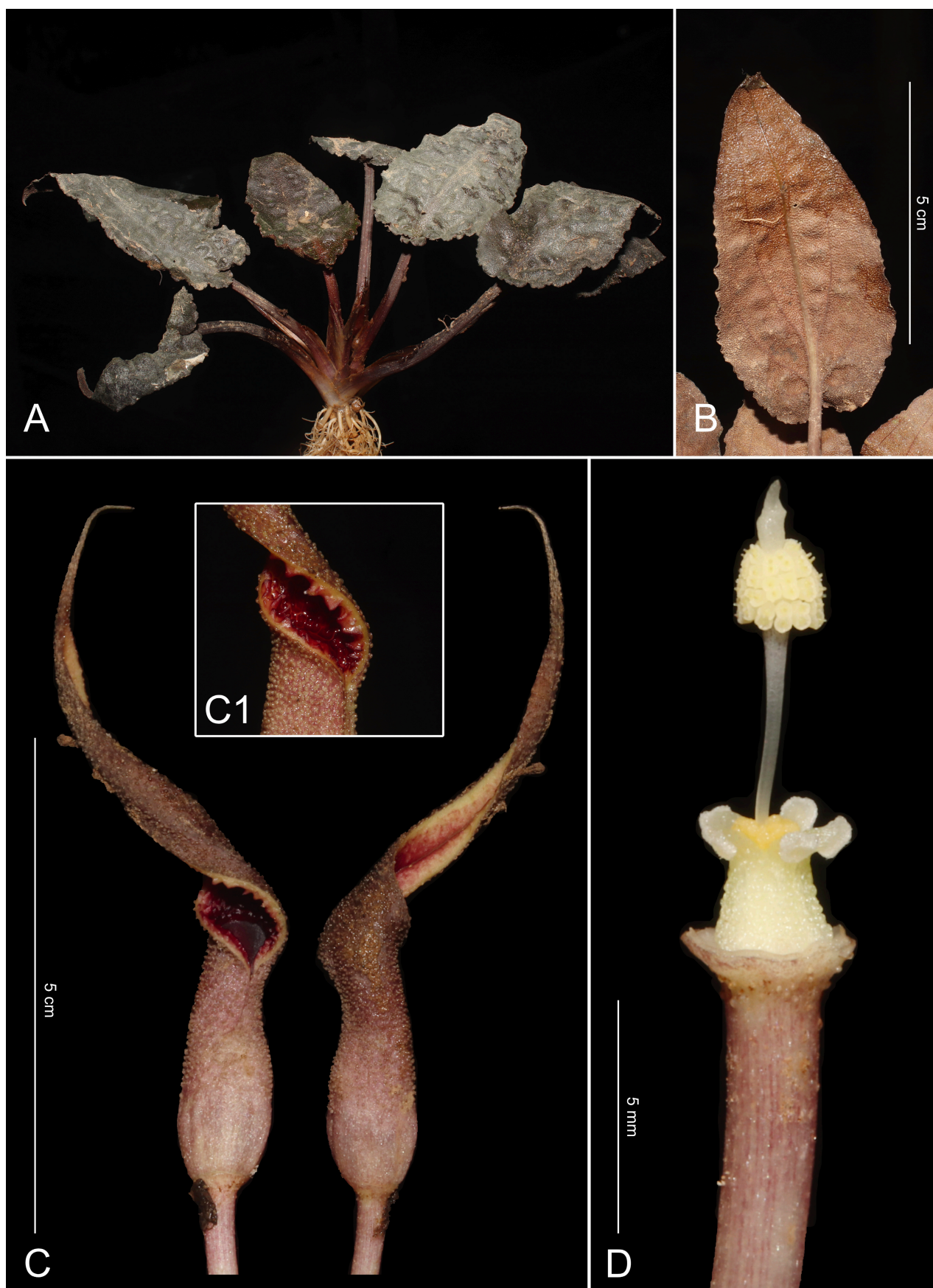


FIGURE 1. *Cryptocoryne esquerionii* var. *purpurea*. (A) habit (B) Leaves (C) Spathe, C1 detail of limb (D) Spadix. Photos by: M.A.K. Naive.

Etymology:—The specific epithet ‘*purpurea*’ is derived from the Latin *purpureus*, meaning “purple” or “reddish-purple”, in reference to the distinct coloration of the leaves and spathe that distinguishes this variety.

Cultivation:—Cultivation experiments have found that it thrives best shaded. The planting substrate was a mixture of sand and gravel. Growth was lusher in the presence of organic debris in the substrate. The leaves are very sensitive to drying and prefer to be constantly submerged in water.

Other specimens examined:—*C. esquerionii* Naive & Wongso var. *esquerionii*: PHILIPPINES. Mindanao Island, Zamboanga Peninsula, Zamboanga del Norte, elev. 251 m, 24 February 2026, *BKR Fulgencio & MAK Naive 002* (PNH accession 271932, HNUL). Full locality withheld owing to the risk of potential exploitation of wild populations for commercial purposes.

Taxonomic notes:—Morphologically, *Cryptocoryne esquerionii* var. *purpurea* is distinguished by having a purplish-brownish green to reddish-brown leaves (vs. green to blackish-brown leaves in *C. esquerionii* var. *esquerionii*), a whitish pale purple red to purplish-brown spathe (vs. pale yellow to greenish-yellow spathe in *C. esquerionii* var. *esquerionii*), deep purplish-red throat (vs. a whitish yellow to greenish-yellow throat in *C. esquerionii* var. *esquerionii*) and four female flowers per spadix (vs. 5–6 female flowers per spadix in *C. esquerionii* var. *esquerionii*). As this taxon differs from var. *esquerionii* primarily in coloration of vegetative and reproductive structures, we recognize this taxon at the varietal rank as *Cryptocoryne esquerionii* var. *purpurea*. Field observations show that both varieties occur in close proximity within the same stream system but are not intermixed. *C. esquerionii* var. *esquerionii* is restricted to the river margins, whereas var. *purpurea* grows with leaves fully submerged in the water. This sympatric but ecologically segregated occurrence suggests that the observed differences may reflect either heritable differentiation associated with contrasting hydrological niches or phenotypic plasticity in response to submergence; however, this hypothesis requires further population-level and molecular investigation.

The examined population of *C. esquerionii* var. *esquerionii* differs slightly from the type population described by Naive & Wongso (2023a). Although separated from the type locality by approximately 27 km, the examined population differs primarily in having generally longer leaves and spathes. No appreciable variation was observed in the morphology of vegetative and floral structures or in coloration, suggesting that the observed differences are attributable primarily to size variation within the variety.

Cryptocoryne coronata Bastm. & Wijng. (1999: 23)

Type:—PHILIPPINES. Mindanao, near Zamboanga, 18 November 1998, *van Wijngaarden s.n.* (holotype: L barcode L.0063295-image seen!; isotypes: L barcode L.0063296-image seen!, K barcode K000291566-image seen!, M barcode M0242127-image seen!). Figs. 2–3.

Amphibious perennial herbs, ca. 20 cm tall. **Rhizome** terete, 2–5 cm long, 6–10 mm in diameter, fleshy, glabrous, brownish to whitish externally, creamy white internally, producing numerous fibrous roots. **Cataphylls** narrowly triangular, 2–4 cm long, glabrous, translucent white, often suffused with reddish-brown, margin entire, cucullate, apex acuminate. **Leaves** fully spreading, 9–22 cm long, 9–15 per individual plant; **petiole** terete, corrugated, 3.5–9.3 cm long, semi-glossy whitish-red to dark red; **lamina** narrowly lanceolate to elliptic, 5.5–12.5 × 3.5–4.5 cm, chartaceous, dorsoventrally glabrous, adaxially glossy green, abaxially reddish-brown, margin entire, base subcordate to cordate, apex acute; midrib adaxially distinct by its red coloration, abaxially conspicuous, rounded, with 4–5 primary veins. **Anthomorph** solitary, 10–21 cm long; **peduncle** cylindrical, terete to slightly corrugated, 1–4 cm long, 2 mm in diameter, glabrous, fleshy, white to pale reddish. **Spathe** erect, 9–17 cm long, glabrous, purplish-red; **kettle** urceolate, 1.0–1.4 cm long, 7–9 mm in diameter, fleshy, purple to reddish-purple externally, purplish-white internally, flap white; **tube** erect, occasionally strongly twisted, 5–12 cm long, 5–9 mm in diameter, pale purplish-red; **limb** twisted, ascending to oblique, narrowly triangular-lanceolate, 2.3–5.0 cm long, verrucose, purplish externally, deep purplish-red internally, margin recurved after opening, apex emarginate; **collar zone** conspicuous, margin bearing irregular, white, partly branched appendages; **throat** whitish to purplish-red. **Spadix** 1.0–1.2 cm long; **female flowers** 5–6; **ovary** ca. 2.0 mm long, minutely and sparsely papillose, cream-colored, suffused with purplish-red; **stigmas** horizontally spreading to slightly descending, ellipsoid to reniform, ca. 1 mm long, papillose, whitish to purplish-red, centrally shallowly depressed, upper margin slightly notched; **olfactory bodies** regularly to irregularly shaped, pale purplish; **naked axis** 4–5 mm long, glabrous, translucent white. **Male flowers** 30–60, pale yellow, congested; **sterile appendix** translucent white. **Syncarp** oblate spheroid, ca. 9 mm long, ca. 12 mm in diameter, verrucose, reddish-brown, apex depressed.

Distribution:—Endemic to Zamboanga Peninsula. The species has been found in the province of Zamboanga del Norte and Zamboanga Sibugay, Western Mindanao, Philippines.

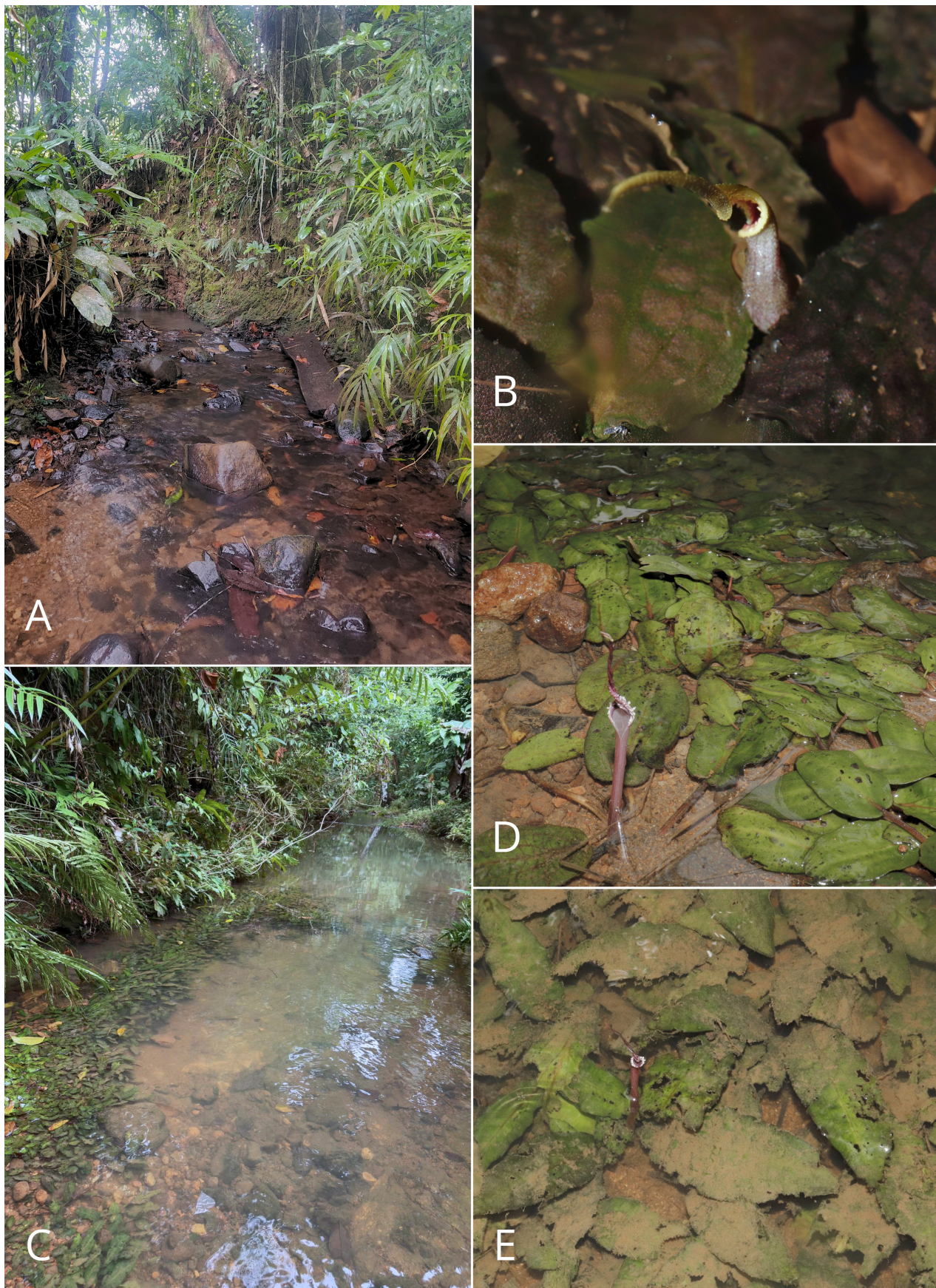


FIGURE 2. *Cryptocoryne esqueronii* var. *purpurea*. (A) Detail of habitat (B) Plant growing fully submerged among leaf litter with the spathe emerging above the water. *Cryptocoryne coronata*. (C) Detail of habitat (D) Semi-submerged with elliptic leaves (E) Fully submerged with narrowly lanceolate leaves. Photos by: B.K.R. Fulgencio.

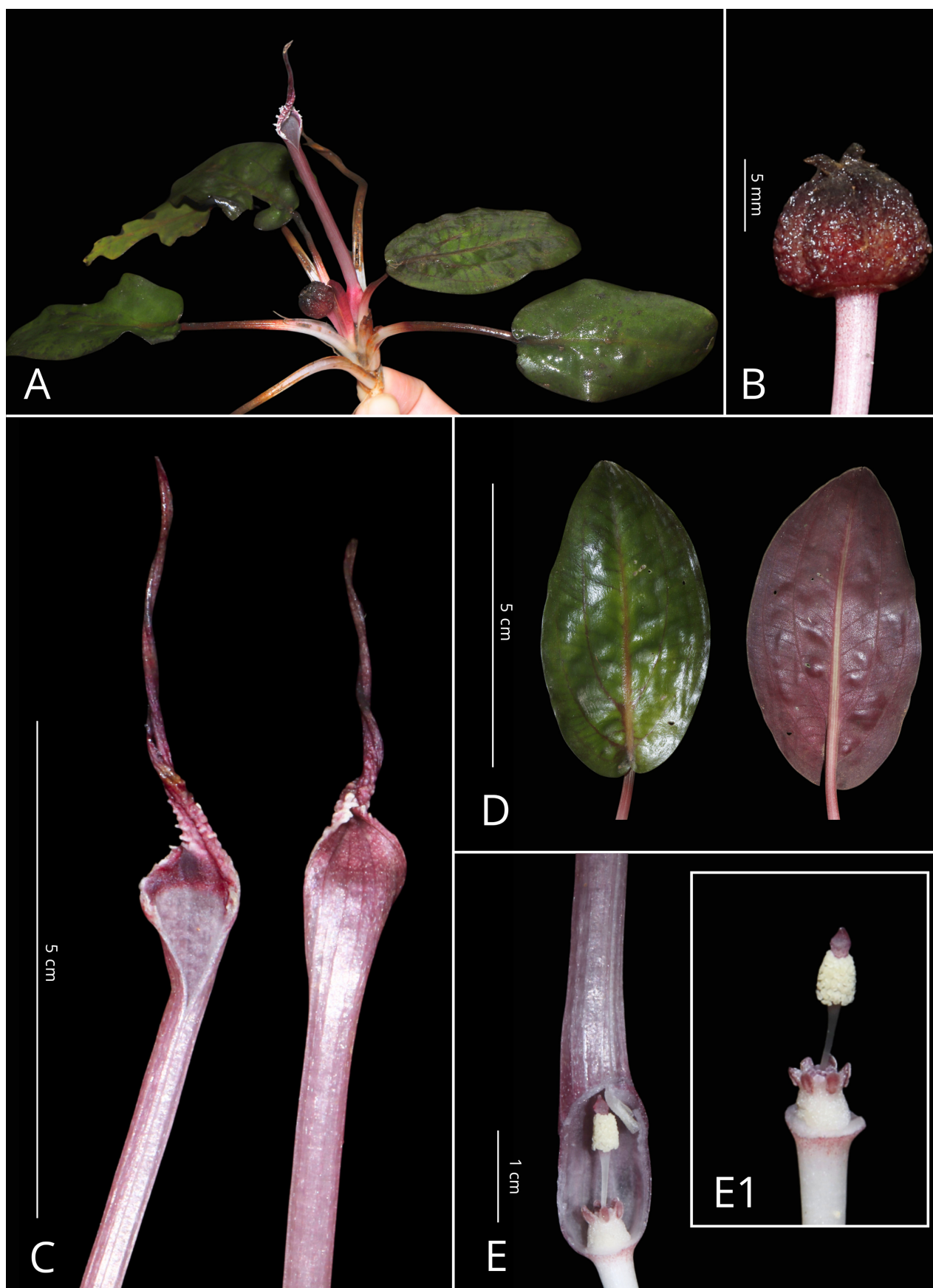


FIGURE 3. *Cryptocoryne coronata*. (A) habit (B) infructescence (C) Spathe (D) detail of leaves (left: adaxial leaf, right: abaxial leaf) (E) Close-up of the cut open kettle, E1 spadix. Photos by: B.K.R. Fulgencio.

Habitat:—It was found along the margins of a shallow, clear, slow-flowing forest stream at 350 m a.s.l. It forms dense colonies, fully submerged at a baseline water depth of 5–10 cm during normal weather conditions, to occasionally emergent. It grows in sandy to coarse gravel substrates with small stones and scattered leaf litter (Fig. 2).

Phenology:—Observed flowering in January and November.

Etymology:—The specific epithet ‘*coronata*’ is derived from the Latin *coronatus*, meaning “crowned” or “crested”. It refers to the spathe collar zone, which is characterized by conspicuous, white, crown-like appendages around its margin.

Proposed conservation status:—Following the IUCN Standards and Petitions Committee (2024), we propose *Cryptocoryne coronata* to be treated as “Endangered” (EN D). At present, the species is fragmented into two distant populations located in provinces of Zamboanga del Norte and Zamboanga Sibugay. Each population is found with more than 100 mature individuals and faces immediate localized threats. Forest-area mining expansion pressures the Zamboanga del Norte population, while agricultural encroachment affects the Zamboanga Sibugay population, indicating threats that contribute to the decline of its overall habitat quality.

Specimen examined:—PHILIPPINES. Western Mindanao, Zamboanga Peninsula, Zamboanga del Norte, elev. 350 m, 10 Mar 2026, *BKR Fulgencio & MAK Naive 008* (PNH accession 271928, HNUL, HITBC). Full locality data withheld owing to the risk of potential exploitation of wild populations for commercial purposes.

Cultivation:—Cultivation experiments have found that it thrives best shaded. The planting substrate was a mixture of sand and gravel. Growth was lusher in the presence of organic debris in the substrate. The leaves are very sensitive to drying and prefer a highly humid atmosphere or to be constantly submerged in water.

Taxonomic notes:—*Cryptocoryne coronata* was originally described by Bastmeijer & van Wijngaarden (1999) from cultivated plants exported from the Philippines, with the provenance noted only as “near Zamboanga” on Mindanao Island. Because no precise locality or ecological information accompanied the type material, the species remained poorly known and unverified from natural populations for more than two decades. Through recent fieldwork in Zamboanga Peninsula, we obtained confirmed records of this species in the wild, prompting us to provide an amended morphological description together with ecological data for the first time. In these natural populations, variation in leaf morphology was observed. Semi-submerged plants in shallow water produce elliptic leaves, whereas fully submerged plants bear narrowly lanceolate leaves with both forms occurring side by side.

Cryptocoryne coronata is distinguished from all other Philippine species of the genus by the presence of a conspicuous crown of irregular white appendages surrounding the purplish-white throat of the spathe (vs. the absence of appendages and a purplish-red throat in *C. zamboangaensis*, and a purplish throat with a broad yellowish rim in *C. aponogetifolia*), together with a deep purplish-red, verrucose, narrowly triangular-lanceolate limb (vs. the purplish-red to greyish-brown, densely verrucose, narrowly ovate limb of *C. zamboangaensis*, and the brownish purple, glabrous, lanceolate limb of *C. aponogetifolia*), and by its green leaves on the upper surface and red beneath (vs. green leaves on both surfaces in *C. aponogetifolia* and *C. zamboangaensis*).

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