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Research Article

Ceropegia andhrica (Apocynaceae), a new species from Andhra Pradesh, India

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A new hysteranthous species of *Ceropegia, C. andhrica* P.Chiranjeevi, K.Prasad & V.Nagaraju sp. nov. (Apocynaceae), is described from the Paderu forest division, Alluri Sitharamaraju District, Andhra Pradesh, India. It morphologically resembles *Ceropegia vemanae* and *C. ciliatior* in features such as the shape and size of tuber, pendulous flowers, reflexed corolla lobes and exposed gynostegium with corona, but differs in having branched or rarely unbranched stem, flowers 4–6 at a node, pedicels 4–10 mm long, sepals subulate or narrowly deltoid, corolla dark purple, densely hairy, lobes 3.4–6.0 mm long, ovate-triangular at base then gradually tapering above, interstaminal corona lobes shortly bilobed with triangular lobules, and staminal corona lobes narrowly oblong, 3-lobed at apex. A detailed description, photographs, and the conservation status of the new species are provided.

Keywords: Asclepiadoideae, Ceropegieae, Hysteranthous, Paderu forest division

Introduction

Ceropegia (Asclepiadoideae-Ceropegieae) is one of the largest genera in the family Apocynaceae and includes 461 species distributed from Africa to northeast Australia (POWO 2025). The genus displays enormous diversity both in vegetative and floral characters, and according to the synopsis by Bruyns et al. (2017), it comprises 717 species and 30 sections, including the highly succulent Stapeliads and species of *Brachystelma*. More recently, Endress et al. (2018) accepted the inclusion of *Brachystelma* in *Ceropegia*, but not the inclusion of the succulent stapeliads. The merging of *Brachystelma* into *Ceropegia* is also controversial and it is often retained as a separate entity from *Ceropegia*, as these genera exhibit distinctive floral morphologies. The genus *Brachystelma* (s.str.) can be differentiated by its rotate corolla, corolla base

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usually not inflated, and corolla lobes normally not connivent at tips, in contrast to *Ceropegia* species which have a long tubular corolla with inflated base and lobes connivent at tips (Pullaiah et al. 2019, Prasad and Venu 2020, Surveswaran et al. 2021). However, most online databases currently follow the view of Bruyns et al. (2017) and in the present we also adopted same view.

During a recent floristic and ethnobotanical survey of the Paderu forest division, Alluri Sitharamaraju District, Andhra Pradesh, the first author (PC) encountered a small population of plants characterized by short erect stems and nodding flowers, which were initially identified as *Brachystelma* (s.str.), now *Ceropegia* (s.l.). After examination of the specimens, it was revealed that the habit, tuber, stem characters and distribution information point to a position in the *Ceropegia* sect. *Tiloris* of (s.l.). This section is represented by 38 species, distributed in India and southeast Asia, Malesia (New Guinea, Philippines) to northern Australia (Bruyns et al. 2017); all Indian *Brachystelma* (s.str.) species belong to sect. *Tiloris*. However, perusal of relevant literature related to *Brachystelma* s.str. (Meve 2002, Bruyns et al. 2017, Kambale and Yadav 2019, Pullaiah et al. 2019, Prasad and Venu 2020) revealed that the specimens could not be referred to any known species. Therefore, it is here described as a new species which is similar to *Ceropegia vemanae* and, to a lesser extent, *C. ciliatior*, but differs in a number of features, which are tabulated below (Table 1).

Taxonomic treatment

Ceropegia andhrica P.Chiranjeevi, K.Prasad & V.Nagaraju sp. nov. (Fig. 1–2)

Diagnosis

A species showing similarities with *Ceropegia vemanae*, and to a lesser extent with *C. ciliatior*, but differs from these two species in having branched or rarely unbranched stem (versus unbranched in *C. vemanae* and unbranched or sparsely branched in *C. ciliatior*), lanceolate or elliptic-lanceolate or linear-lanceolate leaves (versus linear-lanceolate to oblong in *C. vemanae* and acicular to subulate or linear or linear-lanceolate in *C. ciliatior*), 4–6 flowers at each node (versus solitary in *C. vemanae* and 2–4 in *C. ciliatior*), 4–10 mm long pedicels (versus 9–12 mm long in *C. vemanae* and 15–38 mm long in *C. ciliatior*), subulate or narrowly deltoid sepals (versus narrowly triangular, ovate-lanceolate or linear-lanceolate in *C. vemanae* and ovate or ovate-lanceolate in *C. ciliatior*), dark purple, 3.4–6.0 mm long, densely hairy corolla lobes that are ovate-triangular at base then gradually tapering above, (versus basal portion light brown or creamish with dark rose ornamentation, later becoming uniformly brownish-pink, 7–10 mm long and corolla lobes lanceolate or lanceolate-oblong, completely pilose in *C. vemanae* and greenish-yellow or pale yellow and violet at apex and with violet streak at middle and 1.5–5.0 mm long corolla lobes narrowly ovate-lanceolate or oblong-ovate, ciliate at apex in *C. ciliatior*), interstaminal corona lobes shortly bilobed with triangular lobules (versus lobes deeply divided, lobules triangular at base then narrower towards apex in *C. vemanae* and lobes bifid, lobules orbicular in *C. ciliatior*) and staminal corona lobes glabrous, narrowly oblong, 3-lobed at apex (versus sparsely pilose, linear or linear-oblong, obtuse at apex in *C. vemanae* and glabrous, ovate, obtuse at apex in *C. ciliatior*).

Type: India, Andhra Pradesh: Alluri Sitharamaraju District, Paderu forest division, Cheedikudda, 18°01′38.1″N, 82°41′24.0″E, 1010 m a.s.l., 8 July 2019, P. Chiranjeevi 028 (holotype: CAL; isotype: BSID, KFRI).

Etymology

The new species is named after the Andhra Pradesh state of India.

Table 1. Comparison of morphological characters between *Ceropegia andhrica, C. vemanae* and *C. ciliatior*.

Character	*C. andhrica* sp. nov.	*C. vemanae*	*C. ciliatior*
Stem	generally branched or rarely unbranched	unbranched	unbranched or sparsely branched
Leaves	lanceolate or elliptic-lanceolate or linear-lanceolate	linear-lanceolate to oblong	acicular to subulate or linear or linear-lanceolate
Flowers	4–6 at each node	solitary	2–4 at each node
Pedicel length (mm)	4–10	9–12	15–38
Sepals	subulate or narrow deltoid	narrowly triangular, ovate-lanceolate or linear-lanceolate	ovate or ovate-lanceolate
Corolla lobes	dark purple, broader and ovate-triangular at base, gradually tapering above, 3.4–6 mm long, densely covered with hairs	basal portion light brown or creamish with dark rose ornamentation, later becoming uniformly brownish-pink, lanceolate or lanceolate-oblong, 7–10 mm long, completely pilose	greenish-yellow or pale yellow and violet at apex and with violet streak at middle, narrowly ovate-lanceolate or oblong-ovate, 1.5–5 mm long, glabrous but apex ciliate
Interstaminal corona	outer surface glabrous but inner surface with hairy patches; lobes bilobed, lobules triangular	sparsely pilose; lobes deeply divided, lobules triangular at base then narrower towards apex	glabrous; lobes bifid, lobules orbicular
Staminal corona lobes	not reaching to gynostegium, narrowly oblong, apex 3-lobed, glabrous	incurved and connivent at apex over gynostegium, linear or linear-oblong, apex obtuse, sparsely pilose	not reaching to gynostegium, ovate, apex obtuse, glabrous



Figure 1. *Ceropegia andhrica* sp. nov. (A) Habit with leaves, (B) habit with leaves and follicles, (C) tuber, (D) buds, (E) flowers, (F) follicles, (F) open follicle with seeds.

Description

Dwarf, perennial erect and hysteranthous tuberous herb, 4–16 cm tall, appearing after first rains. Tubers globose to subglobose or discoid, 3–5 cm in diameter, similar to small potatoes; roots few, fibrous. Stem erect, solitary, slender, cylindrical, generally branched or rarely unbranched, 1–2 mm diameter, sparsely pubescent or glabrous, pale greenish or purplish-green. Leaves appearing after the flowers, opposite, sessile to subsessile, fleshy, lanceolate or elliptic-lanceolate to linear-lanceolate, 2–6 × 0.2–0.5 cm, acute at apex, pubescent; margins entire and ciliate. Inflorescence on a leafless scape, subsessile or shortly peduncled; peduncle ca 1 mm long, pubescent; young buds facing upwards and mature buds pendent. Flowers 4–6 at each node and 2–3 in axil of each bract, drooping; pedicels 4–10 mm long, hairy, purplish-green or pale green; bract and bracteoles subulate, 0.5–1.0 mm long, acute, glabrous, green, caducous. Calyx only very basally fused; sepals 5, subulate or narrowly deltoid, 1.2–1.6 mm long, 0.6–0.7 mm broad at base, acute, hairy, pale green. Corolla completely reflexed with more



Figure 2. *Ceropegia andhrica* sp. nov. (A–A2) Habit with flowers, follicles, leaves, (B) buds, (C) flowers, (D) pedicel, (E) corona side view, (F) corona top view, (G) gynostegium with pollinia, (H) pollinia, (I) solitary follicle, (J) paired follicles, (K) seed.

or less flat tube; tube much shorter than the lobes, ca 1 mm long, hairy, white with purple patches; lobes becoming broader and ovate-triangular at base, gradually tapering above, 3.4–6.0 mm long, 1.0–1.5 mm broad at base, acute to subobtuse at apex, with margins slightly revolute in basal regions and fully revolute towards upper region to gain near tubular appearance, densely ciliate, adaxially dark purple and densely covered with hairs throughout, abaxially glabrous; hairs white, ca 1 mm long. Corona 2.2–2.6 mm across, bi-seriate, staminal and interstaminal parts fused to a cup-shaped structure, higher than gynostegium; interstaminal corona cupular, 5-angled, 1.2–1.6 mm high, pale at basal region and deep purple at above, glabrous at outer surface but inner surface with hairy patches, its lobes shortly

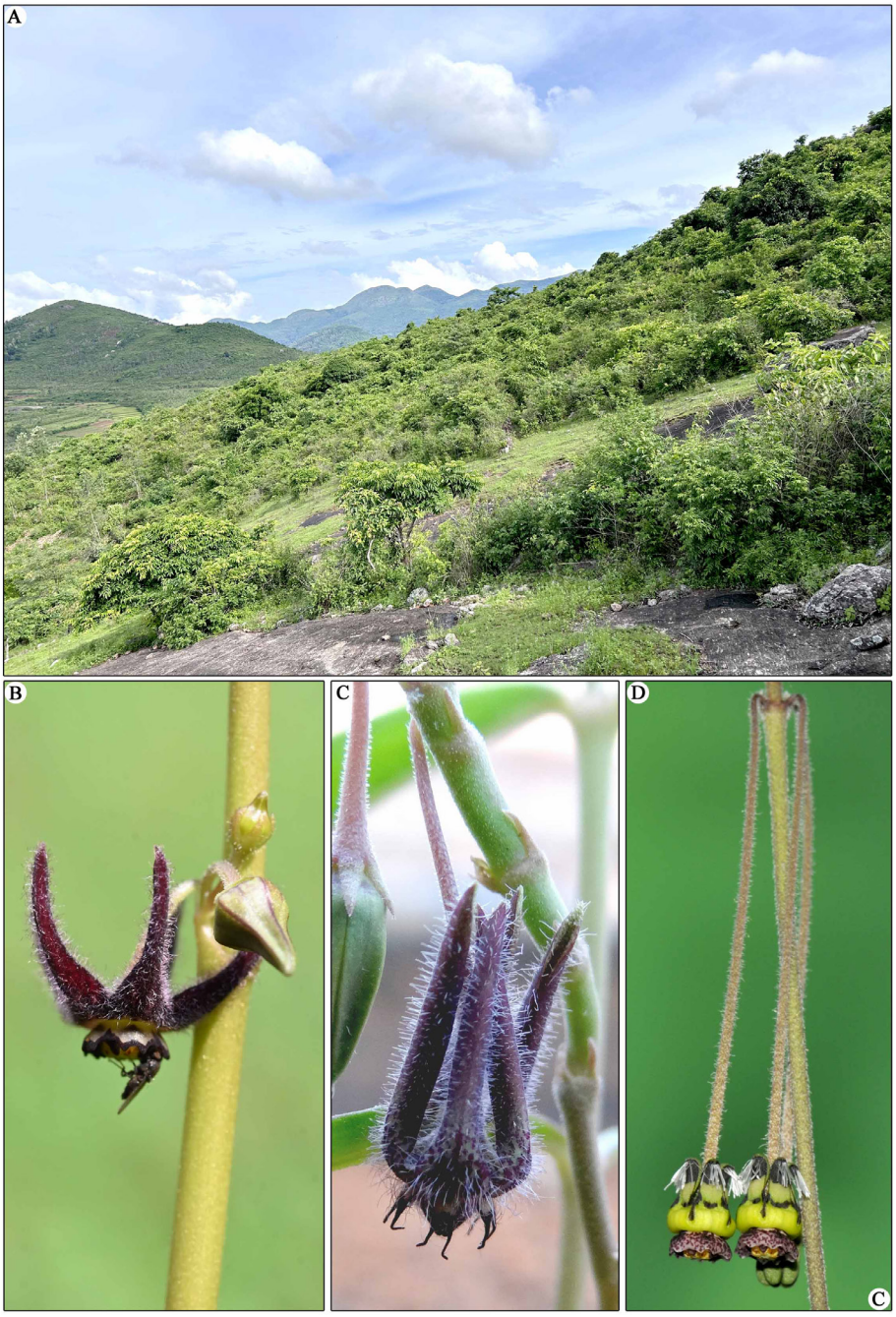


Figure 3. Habitat and flower comparison. (A) Habitat of *Ceropegia andhrica,* (B) flower of *C. andhrica,* (C) flower of *Ceropegia vemanae,* (D) flower of *Ceropegia ciliatior*.

bi-lobed; lobules small, triangular, 0.6 mm long; staminal corona lobes incumbent and adpressed on the anther lobes, glabrous, narrowly oblong, 0.8–1.2 mm long, 3-lobed at apex. Pollinium yellow, subglobose or subglobose-oblong, ca 325 × 300 µm, pellucid-margined inside, basally attached to corpusculum by short, hyaline, tubular caudicles. Follicles paired or solitary, erect, cylindrical, tapering towards apex, 4.5–7.0 cm long, yellowish-green or purplish. Seeds narrowly elliptic, 7–9 × 1.5–2.0 mm, brown at centre, with winged light brown margin, comose; coma ca 2.5 cm long, white.

Phenology

Ceropegia andhrica has been found with flowers from May to June and fruits from end of May–August.

Distribution and habitat

Ceropegia andhrica grows mostly in open, relatively dry habitats along forest edges,which have sandy-gravelly to loamy soils, above 1000 m a.s.l. (Fig. 3). Presently, it is known only from the type locality at Cheedikudda in Paderu forest division, Alluri Sitharamaraju District, Andhra Pradesh, and is endemic to type locality (Fig. 4).

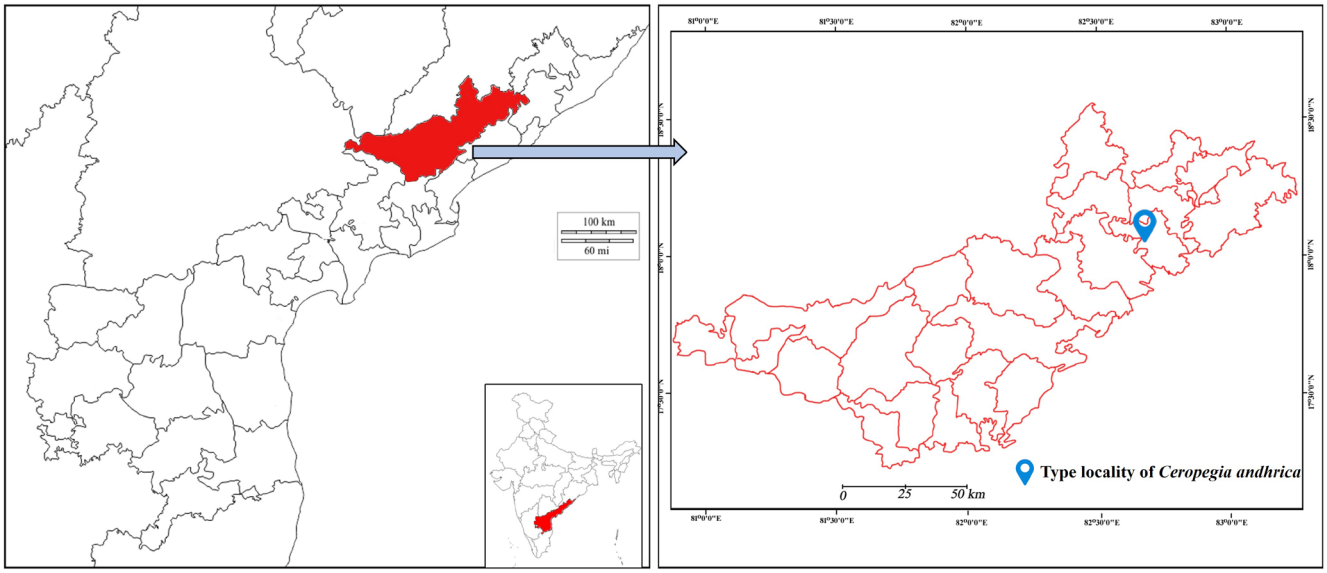


Figure 4. Distribution of *Ceropegia andhrica* sp. nov. in Andhra Pradesh, India.

Additional specimens examined (paratypes)
India, Andhra Pradesh: Alluri Sitharamaraju District, Paderu forest division, Cheedikudda, 23 June 2024, V. Nagaraju and P. Chiranjeevi 3834 (BSID, KFRI).

Conservation status
Ceropegia andhrica is so far known only from the type locality and has a restricted distribution with about 200 individuals in the Paderu forest division, Alluri Sitharamaraju District, Andhra Pradesh. Further explorations in the adjacent hills are needed to ascertain its status. Presently, its known habitat is under great pressure due to grazing, forest fires and habitat degradation. Based on 'extent of occurrence' (Criterion B1: EOO < 100 km^2) and 'area of occupancy (Criterion B2: AOO < 10 km^2), together with the number of locations – 1 (subcriterion 'a') and the predicted decline in area, extent and/or quality of habitat (subcriterion 'b(iii)'), it is here tentatively assessed as 'Critically Endangered [CR B1 B2 a, b(iii)]' (IUCN 2024).

Similar species
Indian *Ceropegia* species typically have corolla tubular, or spreading or connate at the tips to forma a cage-like structure, except for those of the *C. ciliatior* complex which have corolla lobes reflexed backwards in mature flowers exposing the corona completely. This complex includes, *C. ciliatior* Bruyns (Endemic to South India), *Ceropegia swarupa* (Kishore & Goyder) Bruyns (endemic to Kerala) and *Ceropegia vemanae* (A.M.Reddy, M.V.S.Babu & K.Prasad) Kottaim. (endemic to Andhra Pradesh). *Ceropegia andhrica* sp. Nov. is comparable with the above-mentioned species in having a similar flower structure with corolla lobes reflexed backwards in mature flowers. However, all these species were found to have their own diagnostic features and are clearly distinct from *Ceropegia andhrica*: *C. swarupa* has 10- or more-flowered cymes, corolla lobes 2.5 mm long, glabrous, and tube ciliate near the rim only. *Ceropegia andhrica* is morphologically more similar to *C. ciliatior* and *C. vemanae*, but differs from them by several characters (Table 1, Fig. 3).

Key to Indian *Ceropegia* species with completely backwards-reflexed corolla lobes

1. Cymes with ≥10 flowers; corolla lobes glabrous……..……*C. swarupa*
– Cymes with 1–6 flowers; corolla lobes pilose or hairy, or at least ciliated at apex……2
2. Corolla lobes only ciliated at apex, greenish-yellow or pale yellow and violet at apex; pedicels more than 1.5 cm long, filiform……*C. ciliatior*
– Corolla lobes pilose or hairy, not as above; pedicels less than 1.5 cm long……3
3. Flower solitary; corolla brown or creamish with dark pink ornamentation at base, then uniformly brownish-pink, densely pilose; interstaminal coronal lobes deeply divided and pilose; staminal corona lobes not lobed at apex……*C. vemanae*
– Flowers 4–6 at each node; corolla dark purple, densely hairy; interstaminal coronal lobes shallowly bilobed and glabrous; staminal corona lobes 3-lobed at apex……*C. andhrica* sp. nov.

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Author contributions

Pabbathi Chiranjeevi: Formal analysis (supporting); Investigation (supporting); Resources (equal). **Prasad Kothareddy**: Formal analysis (lead); Investigation (supporting); Resources (lead); Supervision (lead); Writing – original draft (lead); Writing – review and editing (lead). **Vallepu Nagaraju**: Formal analysis (supporting); Investigation (supporting); Resources (supporting); Writing – review and editing (supporting). **Puthiapurayal Sujanapal**: Formal analysis (supporting); Investigation (supporting). **Marapareddy Sowghandika**: Formal analysis (supporting); Investigation (supporting). **Madiga Bheemalingappa**: Investigation (supporting); Resources (supporting); Writing – original draft (supporting).

Data availability statement

This article has no additional data.

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