



Euphorbia chalamensis (Euphorbiaceae), a new species from the Gundla Brahmeswaram Wildlife Sanctuary, Andhra Pradesh, India

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ABSTRACT: *Euphorbia chalamensis* is described as a new species from Gundla Brahmeswaram Wildlife Sanctuary, Nandyal district of Andhra Pradesh, India. It belongs to the subgenus *Chamaesyce* sect. *Anisophyllum*, subsect. *Hypericifoliae*. It is closely allied to *E. concanensis* but differs in many attributes which are discussed here. A key to the related species of *Euphorbia* in India is provided for easy identification.

KEY WORDS: Eastern Ghats, *Euphorbia concanensis*, section *Anisophyllum*, subgenus *Chamaesyce*, subsection *Hypericifoliae*.

INTRODUCTION

Euphorbia L. is the largest genus in the family Euphorbiaceae and is also among the largest genera of angiosperms with about 2000 species distributed throughout the world, with the highest diversity found in arid and semi-arid regions of the tropics and sub-tropics (Mabberley, 2017; Steinmann *et al.*, 2026). In India, the genus is represented by 92 species of which 39 are endemic (Binojkumar and Balakrishnan, 2010, 2012; Swamy and Prasad, 2022). The genus includes geophytes, herbs, shrubs, trees, and a host of succulent and xerophytic forms and is characterized by a distinctive morphological synapomorphy: the cyathium inflorescence (Horn *et al.*, 2012). During recent floristic explorations in the Gundla Brahmeswaram Wildlife Sanctuary (Nallamala hills) from the Eastern Ghats of Andhra Pradesh, authors have collected interesting population of *Euphorbia*. After critical examination of the specimens, it is revealed that characters like a non-succulent and leafy herbaceous habit, presence of interpetiolar stipules, opposite leaves with oblique base, presence of petaloid appendages and ecarunculate seeds confer its position in the subgenus *Chamaesyce* Raf., sect. *Anisophyllum* Roesler, subsect. *Hypericifoliae* Boiss. (Boissier, 1862; Binojkumar and Balakrishnan, 2010; Yang *et al.*, 2012). This subsection consists of around 365 species and have worldwide distribution (Yang *et al.*, 2012). In India, subgenus *Chamaesyce* is represented by 37 taxa, including recently described species, *Euphorbia kadapensis* Sarojin. & R.R.V.Raju, *E. telanganensis* Sadas., K.Prasad & A.Ramakrishna, *E. vasudevaraoi* Hanum., Sarojin. & Raja Kullayisw., *E. yadgirensis* Sarojin. & Raja Kullayisw. and *E. acolumella* Sarojin. & Raja Kullayisw. (Binojkumar and Balakrishnan, 2010, 2012; Sarojinidevi and Raju, 2014; Sadasivaiah *et al.*, 2022; Sarojinidevi and Swamy, 2023, 2024; Swamy *et al.*,

2023). After a critical examination, the collected specimens were found to be morphologically most similar to *E. concanensis* Janarth. & S.R.Yadav, but they differ in certain characters. Based on the morphological analysis we described here a new species of *Euphorbia* under subsection *Hypericifoliae* (subgen. *Chamaesyce*, sect. *Anisophyllum*).

MATERIALS AND METHODS

During floristic surveys conducted in the Gundla Brahmeswaram Wildlife Sanctuary (Nallamala hills) from the Eastern Ghats, Andhra Pradesh, a population of *Euphorbia* was observed in grassy patches of the Chalama forest range, Nandyal district. Specimens were collected from dry deciduous forest and treated with ethanol, and herbarium specimens were prepared following the standard methods. Cyathia and fruits were preserved in 70% ethanol and later used for microscopic observations and imaging. Online databases, protologues, and herbarium specimens both virtual and physical were consulted from various sources, including Kew, JSTOR Global plants, GBIF, POWO, and Botanical Survey of India herbaria (BSID, CAL, MH, SKU), and also comparison with recently published taxa. The conservation status proposed here follows the IUCN Red List Categories and Criteria (IUCN, 2024).

TAXONOMIC TREATMENT

Euphorbia chalamensis Nagendra, K. Prasad & A.M.Reddy, *sp. nov.* **Figs 1 & 2**

Type: INDIA, Andhra Pradesh, Nandyal district, Gundla Brahmeswaram Wildlife Sanctuary, Chalama forest, 315 m, 07 September 2024, C. Nagendra, Sake Akkulanna & K. Prasad 5363 (holotype: CAL; isotypes: BSID, YVU).

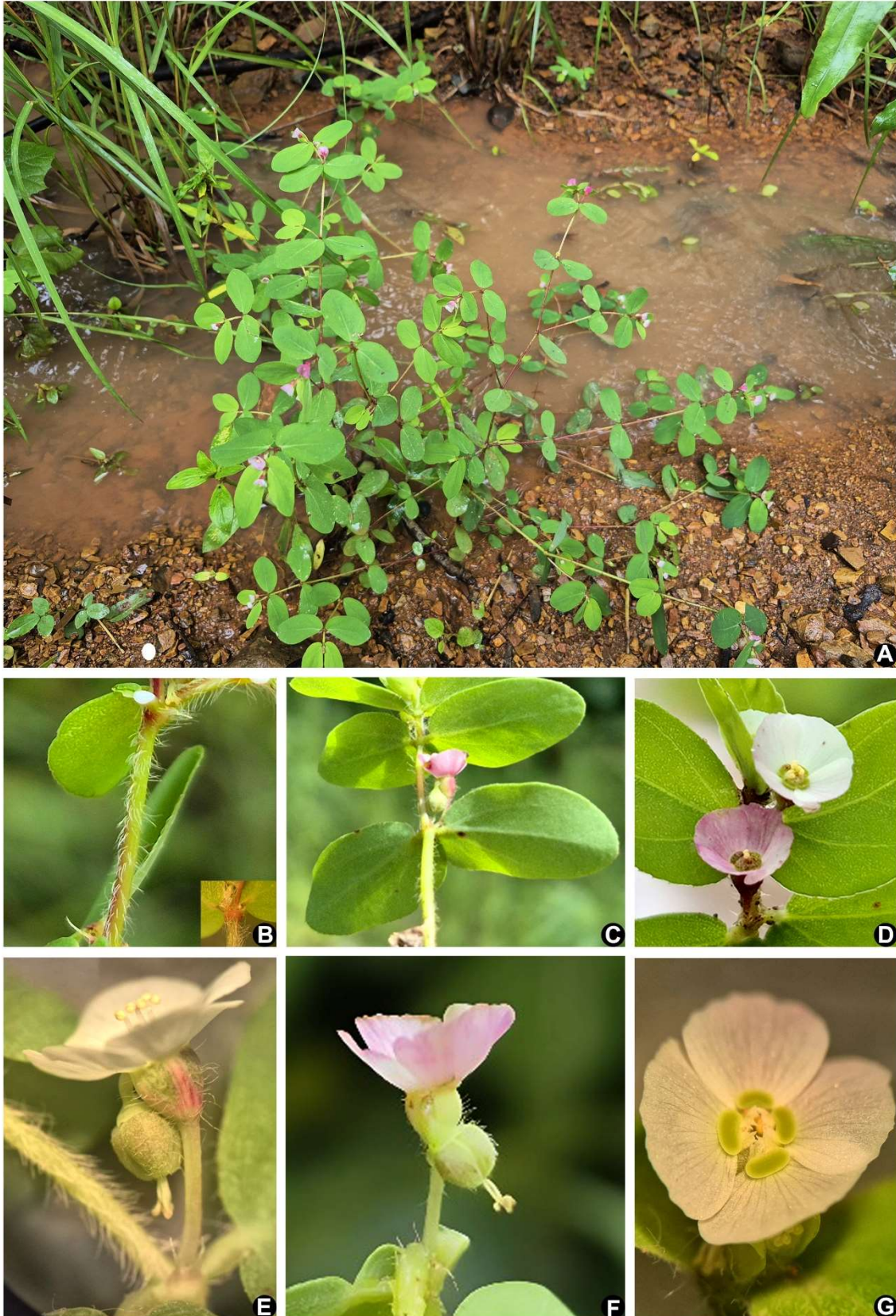


Fig. 1. *Euphorbia chalamensis* Nagendra, K. Prasad & A.M.Reddy *sp. nov.* **A.** Habit; **B.** Stem with hairs; **C.** Leaves and cyathia; **D.** Cyathia with white and pink colour petaloid involucre gland appendages; **E & F.** Cyathia; **G.** Involucre glands with petaloid appendages.

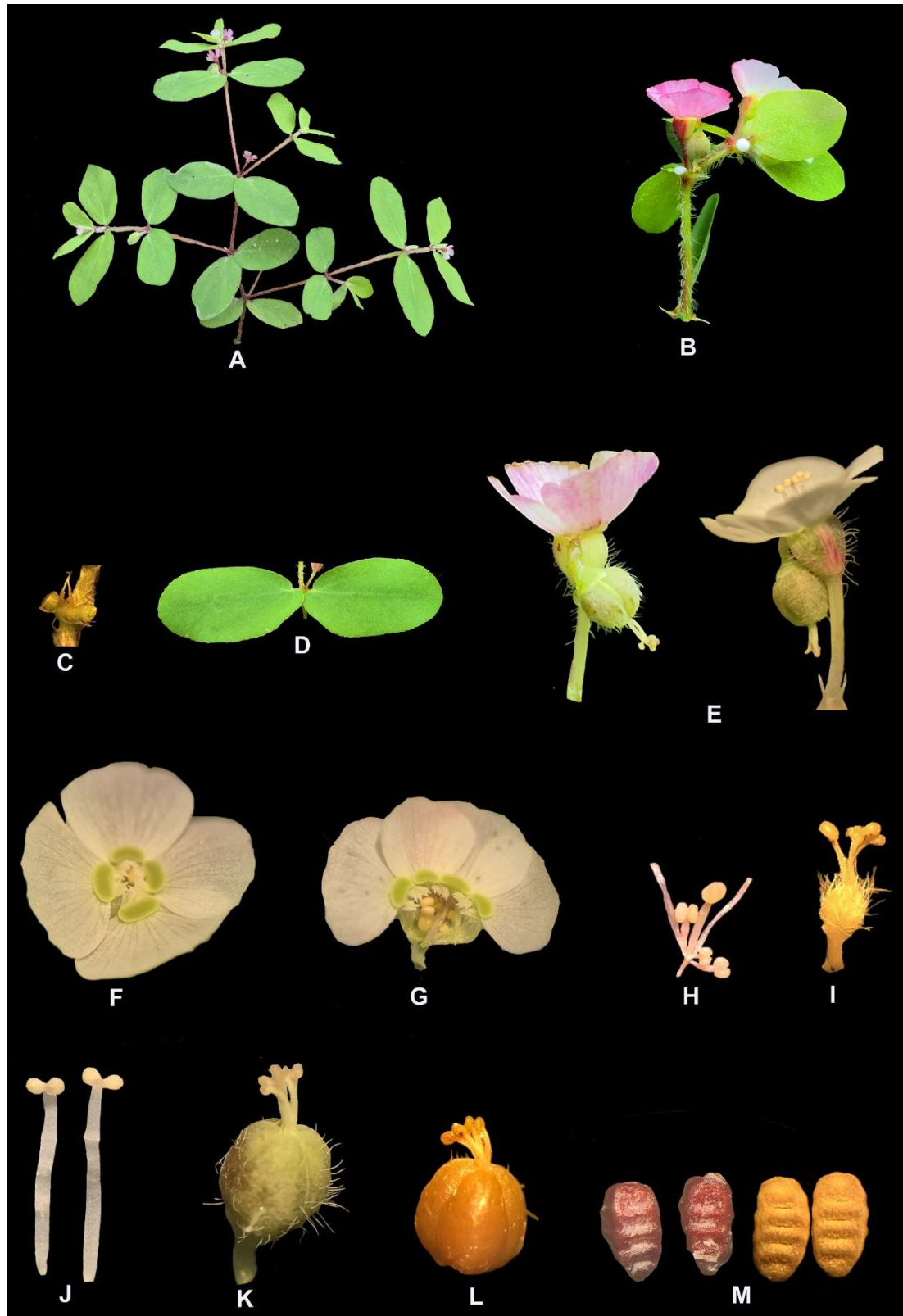


Fig. 2. *Euphorbia chalamensis* Nagendra, K. Prasad & A.M.Reddy *sp. nov.* **A & B.** Twigs; **C.** Stipules; **D.** Leaves; **E.** Solitary cyathia; **F.** Involucral glands with petaloid appendages; **G.** Involucral lobes with Involucral glands and petaloid appendages; **H.** Staminate flowers in fascicle; **I.** Pistillate flower; **J.** Staminate flowers; **K.** Mature pistillate flower; **L.** Capsule; **M.** Seeds (from type collection, 5363).

**Table 1.** Comparative morphology between *Euphorbia chalamensis*, *E. concanensis*, *E. hispida*, *E. deccanensis* and *E. notoptera*.

Character	<i>E. chalamensis</i>	<i>E. concanensis</i>	<i>E. hispida</i>	<i>E. deccanensis</i>	<i>E. notoptera</i>
Stems	Densely hairy; internodes ribbed	Glabrous; internodes not ribbed	Hispid; internodes ribbed	Glabrous; internodes not ribbed	Glabrous; internodes not ribbed
Leaves	Ovate-elliptic, ovate-oblong, obovate or elliptic-obovate, apex subacute to obtuse or rounded, glabrous	Oblong or elliptic-oblong, apex acute to obtuse, glabrous	Oblong, apex obtuse or subacute, hairy	Linear-oblong, to oblong-lanceolate, apex acute or subacute or acute-mucronate, glabrous	Oblong to oblong-elliptic, apex mucronate, glabrous
Stipules	Linear or linear-lanceolate, acute	Triangular, toothed	Linear-lanceolate, laciniate	Ovate, multifid or fimbriate	Broad, bifid
Cyathia	Solitary	Solitary	Solitary or in clusters of 2-3	Solitary or paired	Solitary or in clusters of 2-3
Peduncle	2.6–5.5 mm	ca. 7 mm	ca. 2 mm	1–2 mm	ca. 2 mm
Involucre	Greenish-pink, hairy	Red, glabrous	Green, glabrous	Greenish-pink, glabrous	Pinkish or greenish-pink, glabrous
Involucral lobes	Not exceeding the involucral glands	Not exceeding the involucral glands	Exceeding the involucral glands	Not exceeding the involucral glands	Not exceeding the involucral glands
Involucral glands	Ellipsoid or transversely oblong	Transversely oblong	Rounded	Transversely oblong or cupular	Transversely oblong
Involucral gland appendages	Broadly obovate or fan shaped, white or pink	Obovate, rosy-pink	Rounded, white	Obovate to orbicular, white or red or pink with a red spot	Orbicular, white or yellow
Ovaries	Sparsely hairy	Glabrous	Sparsely hairy	Glabrous	Glabrous
Capsules	Sparsely hairy; cocci without wings	Glabrous; cocci without wings	Sparsely hairy; cocci without wings	Glabrous; cocci without wings	Glabrous; cocci with prominent wings
Seeds	Not wrinkled	Not wrinkled	Wrinkled	Not wrinkled	Not wrinkled
Habitat	Deciduous forests	Laterite rocks	Grassy areas or slopes and waste places	Deciduous forests and moist deciduous forest	Deciduous forests
Distribution	Endemic to India (Andhra Pradesh).	Endemic to India (Goa & Maharashtra)	Afghanistan, China, India (Himachal Pradesh, Jammu & Kashmir, Odisha, Rajasthan, Uttarakhand, Uttar Pradesh & Tamil Nadu), Iran & Pakistan.	Endemic to India (Andhra Pradesh, Karnataka, Kerala & Tamil Nadu)	Endemic to India (Goa, Karnataka & Maharashtra)

Diagnosis: *Euphorbia chalamensis* is morphologically similar to *E. concanensis* in having dichotomously branched stems, oblique at base and serrulate at margins leaves, solitary cyathia, large limbs but differs in having densely hairy stem (vs. glabrous), ovate-elliptic or ovate-oblong or obovate or elliptic-obovate leaves (vs. oblong or elliptic-oblong), linear or linear-lanceolate stipules (vs. triangular), greenish-pink and hairy involucre (vs. red, glabrous), white or pink involucral gland appendages (vs. rosy-pink), sparsely hairy ovary and capsules (vs. glabrous).

Description: Decumbent or erect annual herb, 15–25 cm tall; latex milky. Stems dichotomously branched; branches terete, distally filiform, densely hairy, basal part of the stem dark pink, upper pale green; internodes 3–5 cm long, thickened at nodes. Stipules present, interpetiolar, linear or linear-lanceolate, 1.2–1.8 mm long. Leaves simple, opposite, petioled; lamina 1.6–3.4 × 0.8–1.4 cm, ovate-elliptic or ovate-oblong or obovate or elliptic-obovate, subacute to obtuse or rounded at apex, serrulate at margins, oblique at base, midrib prominent, veins slightly distinct on adaxial surface, glabrous but rarely basal margins hairy, dark green on adaxial surface,

silver-green on abaxial surface; petiole 1.4–2.2 mm long, hairy. Cyathia terminal and axillary, solitary, 4.5–6 mm long; peduncle longer than the petiole, 2.6–5.5 mm long, glabrous or sparsely hairy towards tip; involucre 2–2.5 × 1.6–2.4 mm, turbinate, hairy, greenish-pink; involucral lobes 5, laciniate, upper margins irregularly lobed, whitish, hairy; involucral glands 4, ellipsoid or transversely oblong, greenish-yellow; involucral gland appendages 4, petaloid, imbricate, distinctly larger than glands, equal, broadly obovate or fan shaped, 3.2–4 × 4–5 mm, margins sub-entire or undulate, white or pink. Staminate flowers 16–20, exserted, 0.8–2 mm long, bracteate; bracts simple, longer than the staminate flower, 1.6–2.2 mm long; anther lobes sub-globose, dehiscing transversely, yellow. Pistillate flower single, laterally pendulous, 4–5.5 × 1.4–2.1 mm, sparsely hairy; pedicel 2.6–3.2 mm long; ovary tricarpetate, trilocular, 1.8–2 × 2–2.2 mm; styles 3, free from base, 0.8–1 mm long, each deeply bifid at apex; stigma simple, capitate, pale. Capsules ca. 2 mm long, ovoid, trigonous, schizocarpic, keeled, sparsely hairy; fruiting pedicels recurved. Seeds 3 per capsule, ecarunculate, brown, oblong or oblong-ovoid, ca. 1.6 × 0.8 mm, tetragonal, transversely and obscurely



furrowed, 4 per seed, truncate at base.

Flowering & fruiting: August–October.

Habitat: It is found growing in blackish-red gravelly soil of dry deciduous forest at an elevation range of 300–500 m. The common associate herbs are *Spermacoce pusilla* Wall., *Cymbopogon coloratus* Stapf., and *Heteropogon contortus* (L.) P.Beauv.

Distribution: *Euphorbia chalamensis* is hitherto known from the Chalama Forest in Gundla Brahmeswaram Wildlife Sanctuary, Nandyal district, Eastern Ghats, Andhra Pradesh, India.

Etymology: The species is named after the type locality of the Chalama Forest in Gundla Brahmeswaram Wildlife Sanctuary (Nallamala hills) from the Eastern Ghats of Andhra Pradesh state.

Preliminary conservation status: The new species, *Euphorbia chalamensis* has a restricted distribution with more than 100 individuals and spreading about 2 km² in one population. Presently, the area is well protected as it falls under the Gundla Brahmeswaram Wildlife Sanctuary, Andhra Pradesh. Therefore, there is no immediate threat to this species but the habitat is prone to anthropogenic forest fires. Initially, based on ‘extent of occurrence’ (Criterion B1: EOO < 100 km²) and ‘area of occupancy’ (Criterion B2: AOO < 10 km²), 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).

Additional specimens (Paratypes): INDIA, Andhra Pradesh, Nandyal district, Gundla Brahmeswaram Wildlife Sanctuary, Chalama Forest, 324 m, 07 September 2025, C. Nagendra, Sake Akkulanna & A.M. Reddy 5364 (YVU).

Note: The new species, *Euphorbia chalamensis*, is closely similar to *E. concanensis* in having dichotomously branched stems, leaves oblique at base and serrulate at margins, solitary cyathia, conspicuous, petaloid involucre gland appendages, and ecarunculate seeds. However, it differs in having densely hairy stems, ovate-elliptic, ovate-oblong, obovate or elliptic-obovate leaves, linear or linear-lanceolate stipules, greenish-pink and hairy involucre, white or pink involucre gland appendages, and sparsely hairy ovaries/capsules. Three more species, namely, *E. hispida* Boiss., *E. notoptera* Boiss., *E. deccanensis* V.S. Raju also show strong similarity with *E. chalamensis*, but they have their own diagnostic features (Table 1). *Euphorbia hispida* has oblong leaves with hairy, cyathia solitary or in clusters of 2-3, peduncle ca. 2 mm long, involucre glabrous, lobes exceeding the involucre glands, glands rounded, and involucre gland appendages rounded, slightly larger than glands; *E. notoptera* is entirely glabrous, leaves oblong to oblong-elliptic and mucronate, stipules broad and bifid, peduncles ca. 2 mm long, involucre glabrous, involucre gland appendages orbicular, ca. 5 mm long, white or yellow, ovary and capsules glabrous, and cocci with

prominent wings; *E. deccanensis* is also entirely glabrous, leaves linear-oblong, to oblong-lanceolate, apex acute or subacute, stipules ovate, multifid or fimbriate at apex, cyathia solitary or paired, peduncles 1–2 mm long, involucre glands appendages white or red or pink with a red spot, involucre, ovary, and capsules glabrous.

These species are mainly distributed in the Indian subcontinent (Afghanistan and Pakistan), China, and Iran. Only one species, *Euphorbia hispida* is commonly widespread, occurring in Afghanistan, China, Iran, Pakistan, and several Indian states including Himachal Pradesh, Jammu & Kashmir, Odisha, Rajasthan, Uttarakhand, Uttar Pradesh, and Tamil Nadu. The remaining three species (including present new species) are endemic to India: *E. concanensis* and *E. notoptera* are restricted to the Western Ghats of Goa, Karnataka and Maharashtra, while *E. deccanensis* is endemic to South India. The present new species, *E. chalamensis*, is endemic to dry deciduous forest Chalama Forest of the Eastern Ghats, Nandyal district, Andhra Pradesh.

Key to allied *Euphorbia* species from India

(The identification key provided below updates that of Swamy *et al.* (2023) for this group of Indian *Euphorbia* by including the newly described species)

- 1a. Plant hispid; internodes ribbed; seeds wrinkled *E. hispida*
- 1b. Plants glabrous or minutely velutinous or hairy; internodes terete; seeds transversely obscurely or distinctly furrowed or smooth 2
- 2a. Branch apices filiform; style more than 1.5 mm long 3
- 2b. Branch apices not filiform; style less than 1.5 mm long 7
- 3a. Cyathial gland appendage entire and minutely sinuate *E. senguptae*
- 3b. Cyathial gland appendage dissected into 2 to multi-fid 4
- 4a. Stipules ciliate; cyathia terminal; capsules prominently ridged *E. kadapensis*
- 4b. Stipules lacinate or linear-lanceolate; cyathia terminal and axillary; capsules ridges absent 5
- 5b. Stipules linear-lanceolate; cyathial gland appendages 7–9-fid from the base *E. longistyla*
- 5b. Stipules lacinate; cyathial gland appendages 2–4-fid from middle or above the middle 6
- 6a. Plants decumbent to ascending; axillary gland present; cyathial gland appendages 2–4-fid from the middle; capsules obscurely keeled *E. vasudevvaraoi*
- 6b. Plants decumbent; axillary gland absent; cyathial gland appendages 2–3-fid from the one-fourth its length; capsules distinctly keeled *E. yadgirensis*
- 7a. Stems stramineous or pale green; leaves on main stem distinctly larger than the leaves on branches; cyathial gland appendages ca. 1.2 mm across 8
- 7b. Stems pink or pale pink; all leaves approximately same size; cyathial gland appendages ca. 2 mm across 9
- 8a. Leaves oblong to obliquely oblong or oblong to linear-oblong, glabrous; cyathial gland appendages equal, orbicular; capsules shallowly keeled *E. jodhpurensis*
- 8b. Leaves obovate or elliptic-obovate or ovate-elliptic, abaxially pubescent; cyathial gland appendages unequal, ellipsoid; capsules deeply keeled *E. telanganensis*
- 9a. Plants unbranched or rarely once or twice dichotomously branched; leaves 3 cm or more long; cyathia pubescent *E. katrajensis*
- 9b. Plants branched; leaves less than 3 cm long; cyathia glabrous or hairy 10
- 10a. Plants 30–60 cm high; leaves silvery-white beneath; cyathial gland appendages irregularly and shallowly wavy *E. erythroclada*
- 10b. Plants below 30 cm high; leaves pale green below; cyathial gland



- appendages entire or slightly wavy 11
- 11a. Cyathial gland appendages white or yellowish; capsules with 2 or 3 prominent wings on cocci *E. notoptera*
- 11b. Cyathial gland appendages pink, rosy or pinkish-white or white, never tinged with yellow; capsules ridged or keeled but without wings on cocci 12
- 12a. Leaves oblong-lanceolate; capsules faintly narrowly and acutely keeled *E. deccanensis*
- 12b. Leaves oblong to ovate-oblong, ovate-elliptic or ovate-oblong or obovate or elliptic-obovate; capsules prominently broadly and obtusely keeled 13
- 13a. Stems, involucre, ovary and capsules glabrous; leaves oblong to ovate-oblong; stipules triangular *E. concanensis*
- 13b. Stems, involucre, ovary and capsules hairy; leaves ovate-elliptic or ovate-oblong or obovate or elliptic-obovate; stipules linear or linear-lanceolate *E. chalamensis* sp. nov.

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