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Crassicaulis (Gesneriaceae), a newly recorded genus in India, based on a new species - *Crassicaulis middletonii* from Arunachal Pradesh, India

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ABSTRACT: *Crassicaulis middletonii* Chowlu & A.Shenoy, a new species of Gesneriaceae, is described and illustrated. The species was discovered in the Eastern Himalayas in 2025 during a botanical survey in Arunachal Pradesh, India. *Crassicaulis middletonii* differs from *C. guiliangii* with its lobed to cordate leaf base, green pedicel and calyx with white flowers, ellipsoid green ovary and linear glabrous capsule. A detailed description, coloured photo-plate, phenology and distribution as well as a comparison table with morphologically close species is presented as easy aid for its identification. The new species is assessed as 'Critically Endangered' according to the IUCN Red List criteria.

KEY WORDS: Didymocarpoideae, Eastern Himalayas, Indian Himalayan Region (IHR), IUCN, Leptoboeinae, West Siang

INTRODUCTION

Gesneriaceae Rich. & Juss. ex. DC. is a middle-sized family, including about 150 genera and almost 4000 species (GRC, 2025; Yang *et al.*, 2025). Based on molecular and morphological data, Weber *et al.* (2013) put forward a new classification system, consisting of three subfamilies: Sanangoideae Weber (monotypic, endemic to South America), Didymocarpoideae Arn. and Gesnerioideae Burnett. Didymocarpoideae part of Old World Gesneriaceae, consisting of 73 genera and more than 2700 species (Möller *et al.*, 2017; GRC, 2025).The subtribe Leptoboeinae C.B.Clarke (Tribe Trichosporeae Nees, Subfamily Didymocarpoideae Arn.) is a group with around 49 species in six genera (*Beccarinda* Kuntze, *Boeica* C.B.Clarke, *Crassicaulis* Lei Cai & Mich.Möller, *Leptoboea* Benth., *Platystemma* Wall. and *Rhynchotechum* Blume), distributed from the Himalayan region to South Asia, Southeast Asia and East Asia and has undergone numerous taxonomic revisions due to ambiguous generic boundaries, complicating conservation and utilization efforts. Phylogenetic analysis conducted by Yang *et al.* (2025) placed the newest genus, *Crassicaulis*, as sister group to the remaining genera within the subtribe. Based on morphological and molecular analyses they described the only species, *Crassicaulis guiliangii* Lei Cai & F.M.Yang from China. The newly described genus shares close morphological similarities with *Leptoboea* Benth. and *Boeica* C.B.Clarke. It can be distinguished from *Boeica* by its opposite leaves, and a corolla tube that is slightly longer than the limb, from *Leptoboea* by the habit of its species (subshrubs without woodiness), presence of a nectary, and the 15–35 flowers in each inflorescence, and from both genera by the pedicel, calyx and corolla all being glandular-pubescent, having two short ridges in the lower part of the corolla throat and a non-woody stem. *Crassicaulis* was hitherto known only from China (Yunnan).

During floristic explorations in Arunachal Pradesh, the authors (KC and AS) encountered a population (c. 50 individuals) of Gesneriaceae in the West Siang district. After critical examination of the specimens and thorough scrutiny of relevant literature (Clarke, 1884; Wang *et al.,* 1998; Burtt, 2001; Sinha and Datta, 2016; Möller *et al.,* 2017; Bhattacharyya *et al.*, 2023; Yang *et al.*, 2025) the population was determined to represent a hitherto undescribed species which belongs to a newly described genus *Crassicaulis*. It is therefore described here as a new species, *Crassicaulis middletonii* Chowlu & A.Shenoy accompanied by a comprehensive description and color photographs. The present finding extends the distribution of the genus to India, around 1200 km away from the type locality.

TAXONOMIC TREATMENT

Crassicaulis middletonii Chowlu & A.Shenoy ***sp. nov.***

Figs. 1 & 2

Type: INDIA. Arunachal Pradesh: West Siang district, Bagra circle near Pushi Doke village, 28°02'42"N 94°40'35"E, alt. 860 m, 08 Aug 2025, *A.Shenoy & K.Chowlu 57268* (holotype: ARUN; ARUN000039006, istotype: CAL).

Diagnosis: *Crassicaulis middletonii* Chowlu & A.Shenoy is morphologically close to *Crassicaulis guiliangii* Lei Cai & F.M.Yang by its habit (herbs to subshrubs without woodiness), opposite ovate pubescent leaves, presence of two short ridges in the lower part of the corolla throat and ovary with a disc. It can be differentiated

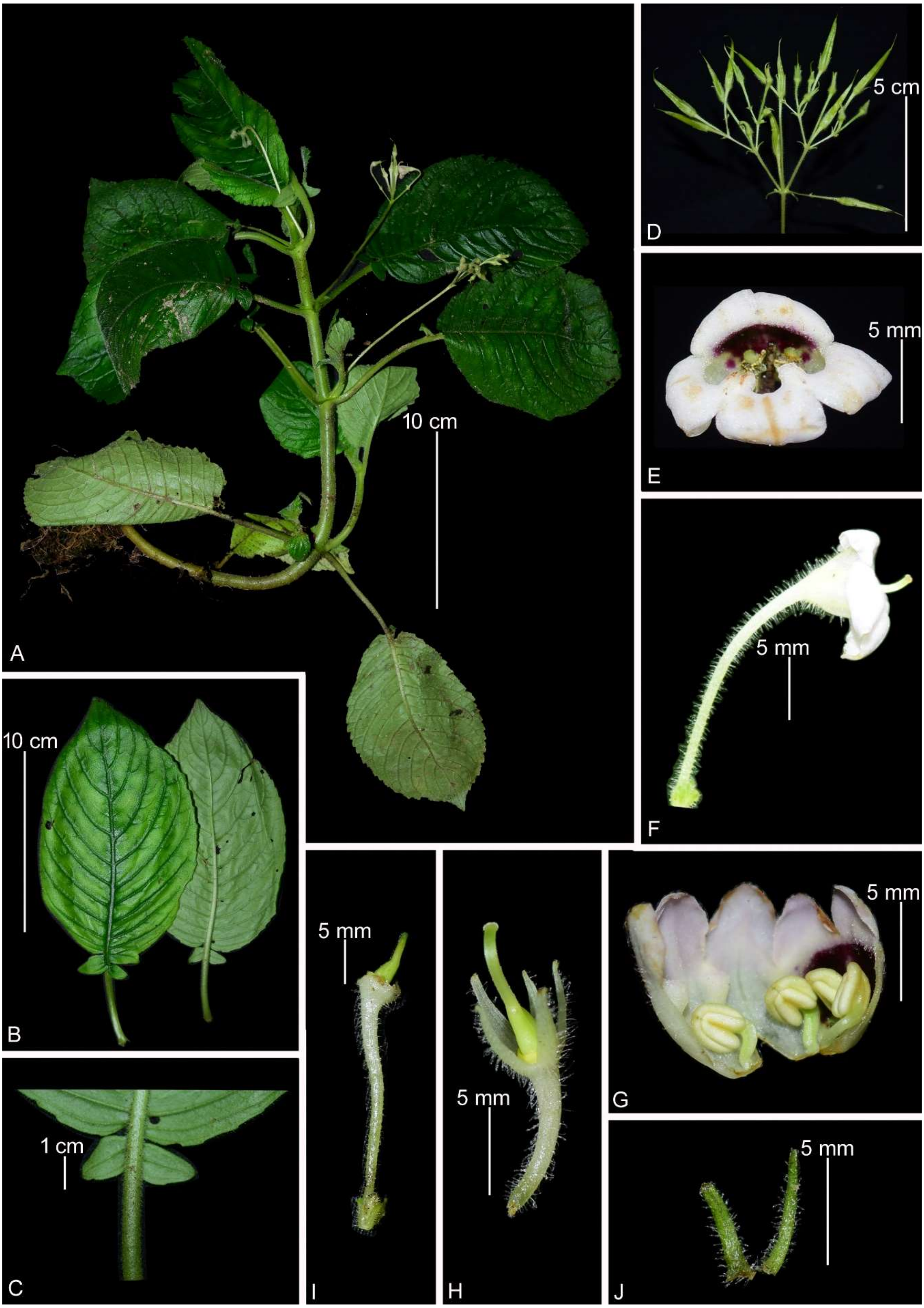

Fig. 1. ***Crassicaulis middletonii*** Chowlu & A.Shenoy: **A.** Habit. **B.** Leaves. **C.** Leaf base. **D.** Infrutescence. **E.** Flower, front view. **F.** Flower with pedicel, side view. **G.** Corolla split open. **H-I.** Pistil. **J.** Bracts.

Table 1. Comparison of qualitative and quantitative morphological characters of ***Crassicaulis middletonii*** with ***C. guiliangii*** (Yang *et al.,* 2025)

Characters	*Crassicaulis middletonii*	*Crassicaulis guiliangii*
Leaf base	cordate to rarely lobed	cuneate
Leaf margins	sinuate to finely crenate	serrate
Flowers per inflorescence	15–20	20–35
Peduncle	9–12 cm long	2.5–8.0 cm long
Bracts	3–6 mm	2–3 mm
Pedicel	1.5–2.5 cm long, green	0.4–1.0 cm long, purple
Calyx	green	purple
Corolla	white, rarely with a pinkish tinge at lobes	purplish or purple,
Ovary	ellipsoid, green	ovoid, yellow to purplish
Style	green	purple
Capsule	linear, 1.5–2.5 cm long, glabrous	narrowly ellipsoidal, 0.8–1.2 cm long, glandular-pubescent
Distribution	India (Arunachal Pradesh)	China (Yunnan)

Fig. 2. Field photographs of ***Crassicaulis middletonii*** Chowlu & A.Shenoy: **A-B**. Habitat.

from the type species by its cordate to rarely lobed (vs. cuneate) leaf base, sinuate to finely crenate (vs. serrate) leaf margins, green (vs. purple) pedicel and calyx, ellipsoid green (vs. ovoid, yellow to purplish) ovary, green (vs. purple) style and 1.5–2.5 cm long linear glabrous capsule (vs. 0.8–1.2 cm long narrowly ellipsoidal glandular-pubescent).

Description: Perennial herbs, erect, up to 30 cm tall. Stems few branched, terete, green, densely white pilose; nodes 4–9 cm apart. Leaves, opposite, equal to subequal in a pair, petiolate; petiole 3–8.5 cm long, green, densely pubescent; lamina ovate, 12–17 × 6–8 cm, base cordate to rarely lobed, apex acute, margins sinuate to finely crenate, green, densely pubescent on both sides, abaxially densely pilose along veins; lateral veins 8–12 on each side of midrib, subparallel. Inflorescence in axillary cymes, 15–20-flowered, fascicled; peduncles 9–12 cm long, non-filiform, densely pilose; pedicels 1.5–2.5 cm long, green, filiform, pubescent, bracteate; bracts 2, linear, 3–6 × 1 mm, pilose, persistent. Calyx 5-lobed, persistent; lobes linear to narrowly triangular, 4–6.5 × 2 mm, green, free to base, equal. Corolla shallowly campanulate, 1.2–1.5 cm long, uniformly white rarely with a pale pinkish tinge at lobes, inside two short ridges at the corolla throat, pink blotches near throat of upper lip which appears green from outside, 2-lipped, 5-lobed; lobes c. 1.0 × 1.2 cm, outside glandular-pubescent, glabrous inside, sub-equal, orbicular to oblong; tube short, 5–7 mm long. Stamens 4, inserted at corolla base, included; filaments 2.5–3 mm long, green, adnate to the base of corolla; anthers free, c. 2 × 1.5 mm, pale yellow, dorsifixed, thecae subparallel, confluentat apex, dehiscing longitudinally; staminodes not seen. Disc ring-like, 0.7 mm, yellow, glabrous. Ovary ellipsoid, c. 3 × 1 mm, green, glabrous; style 4 mm long, green, glabrous; stigma capitate. Capsule straight, linear with persistent calyx and style, 1.5–2.5 cm long, glabrous. Seeds numerous, 0.25 × 0.15 mm long, elliptic to oblong, some times irregular, reticulate, brown.

Phenology: Flowering July – September; fruiting August to October.

Habitat and Distribution: The new species is only known from the type locality, at an elevation of 800 m. It is found on the sides of small streams which are mainly associated with small waterfalls in an evergreen forest.

Etymology: The species epithet honors David J. Middleton, a plant taxonomist, retired Head of Research at Singapore Botanic Gardens, Singapore, and current editor of the Flora of Singapore project for his valuable and ongoing contributions to the family Gesneriaceae in Asia.

Conservation Status and Preliminary IUCN Assessment: *Crassicaulis middletonii* is currently known only from its type locality. Fewer than 50 mature individuals were observed there. The type locality is near to a village called Pushi Doke, were the residents are mainly depends on forest resources, rice cultivation and cattle farming. The stream near to the population is getting polluted due to anthropogenic pressure. This newly described species faces threats due to several such anthropogenic activities and grazing. The habitat and individuals of this newly described species are also under great threat from occasional landslides and flooding and face a high risk of extinction. Field surveys were conducted to find similar microclimatic zones in the nearby area and only a single such microclimatic zone was found. But the new species was not observed. Based on the results of field surveys and available data, *Crassicaulis middletonii* is provisionally assessed as 'Critically Endangered' (CR) B1a,b(i,ii,iv) according to the IUCN Red List categories and criteria (IUCN, 2024).

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LITERATURE CITED

Bhattacharyya, U.C., Lakhminarasimhan, P., Krishna, G. 2023 Gesneriaceae. In Lakhminarasimhan, P., Arisdason, W., Karthigeyan. K., Krishna, G., Mao, A.A. (Eds.) Flora of India Volume 20. Gesneriaceae - Acanthaceae. Botanical Survey of India, Kolkata. pp. 1–145.

Burtt, B.L. 2001 Flora of Thailand: Annotated checklist of Gesneriaceae. Thai For. Bull. (Bot.) **29**: 81–109.

Clarke, C.B. 1884 Gesneriaceae. In: Hooker J.D. (Eds.) The Flora of British India. Volume 4. L. Reeve & Co. Ltd., London. pp. 336–375.

GRC 2025 (continuously updated). Gesneriaceae Resource Centre. Royal Botanic Garden, Edinburgh. http://padmr.rbge.org.uk/GRC (Accessed: 24 October 2025).

IUCN Standards and Petitions Committee. 2024 Guidelines for Using the IUCN Red List Categories and Criteria, version 16. Prepared by the Standards and Petitions Committee. https://www.iucnredlist.org/documents/RedListGuidelines.pdf.

Möller, M., Nampy, S., Janeesha, A.P., Weber, **A.** 2017 The Gesneriaceae of India: Consequences of updated generic concepts and new family classification. Rheedea **27(1)**: 23–41.

Sinha, B.K., Datta, **S.** 2016 Taxonomic account on the family Gesneriaceae in Northeast India. Nelumbo **58**: 1–43.

Wang, W.T., Pan, K.Y., Li, Z.Y., Weitzman, A.L., Skog, **L.E.** 1998 Gesneriaceae. In: WU Z.Y. & P.H. RAVEN (eds.), Flora of China. Volume 18. Science Press, Beijing and Missouri Botanical Garden, St. Louis. pp. 244–401.

Weber, A., Clark, J.L., Möller, M. 2013 A new formal classification of Gesneriaceae. Selbyana **31**:68–94.

Yang, F., Ling, S., Yang, R., Wen, F., Gu, W., Hu, X., Lin, L., Wang, Y., Cai, J., Ren, M., Möller, M., Cai, L. 2025 Phylogenomic reconstruction reveals deep reticulate evolutionary history and polyphyletic genus (*Boeica*) in the subtribe *Leptoboeinae* (Gesneriaceae), with description of a novel genus. Cladistics. https://doi.org/10.1111/cla.70010