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Lysionotus namchoomii (Gesneriaceae), a new species from Arunachal Pradesh, India

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Summary. The new species of the genus *Lysionotus* (Gesneriaceae), named *L. namchoomii*, discovered in Pakke-Kessang District of Arunachal Pradesh, India, is described and illustrated here. It differs from morphologically similar *L. ziroensis* mainly in glabrous vegetative organs, denticulate-crenulate leaf blade, deltoid inflorescence bracts, free spatulate glabrous calyx lobes, and corolla glabrous inside. This species is confined to two different locations, with a small population comprising a total of 60–100 individuals. The conservation status of this new species is provisionally assessed here as Critically Endangered, CR: B1a, b(iiii, v) + 2a, b(i-iii,v) following the IUCN Red List Categories and Criteria.

Lysionotus namchoomii (Gesneriaceae) – новый вид из штата Аруначал-Прадеш, Индия

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Ключевые слова: новый таксон, разнообразие растений, таксономия растений, флора Индии, эндемизм растений, Юго-Восточная Азия.

Аннотация. В статье приведено описание и иллюстрации нового вида рода *Lysionotus* (Gesneriaceae), обнаруженного в районе Пакке-Кессанг штата Аруначал-Прадеш (Индия) и названного *L. namchoomii*. От морфологически сходного вида – *L. ziroensis* – он отличается главным образом голыми вегетативными органами, зубчато-городчатым краем листовой пластинки, дельтовидными брактеями, свободными лопатчатыми голыми долями чашечки и голым внутри венчиком. Этот вид был обнаружен в двух местообитаниях, с общей численностью популяции всего 60–100 взрослых особей. Природоохранный статус этого нового вида предварительно оценивается как находящийся под угрозой исчезновения, CR: B1a, b(iiii,v) + 2a, b(i-iii,v) в соответствии с категориями и критериями Красного списка МСОП.

Introduction

The genus *Lysionotus* D. Don belongs to the subtribe *Didymocarpinae* D. Don, tribe *Trichosporeae* Nees ex Weber, subfamily *Didymocarpoideae* Arnott, and family Gesneriaceae Rich. et Juss., according to the recently established classification (Weber, 2004; Weber et al., 2011, 2013), supported by molecular data (Ogutcen et al., 2021). The genus includes 34 accepted species (Mabberley, 2017; Taram et al., 2019), thirteen of which are reported from India (Sinha, Datta, 2016; Joe et al., 2017), including the recently described *L. chatungii* M. Taram, A. P. Das et H. Tag, and *L. ziroensis* Nampy, Nikhil, Amrutha et Akhil (Taram et al., 2019; Akhil et al., 2021). About 50 % of Indian species are endemic. Species of the genus are mostly epiphytic, lithophytic, or terrestrial evergreen erect or climbing subshrubs. They are well distinguished by their opposite or whorled leaves, funnel-shaped corolla with an inflated upper half, two stamens with connivent anthers, and appendaged seeds. The genus has broad distribution in continental SE Asia, spreading from Bhutan, Nepal, and S Japan to N Thailand, Laos, and N Vietnam (Möller et al., 2011), with the highest diversity in NE India and S China (Wang, 1983). All Indian species belong to the type section, *L.* sect. *Lysionotus*, according to the taxonomic system of the genus proposed by Wang (1983) and Li and Wang (2004). Species of this group have erect or ascending herbaceous stems, usually whorled leaves, a deeply divided calyx, and seed appendages as long as, or longer than, the seeds themselves. During the floristic studies of the years 2020 and 2021 in Arunachal Pradesh (Pakke-Kessang District), the first author collected a few unusual specimens of *Lysionotus*. The collected plants fit well with the characters of the type section but are surely different from all the known species of the genus, which have pendulous branches, 2–3 irregular, tuber-like swellings at the basal nodes, and glabrous leaves. Critical analysis of morphological characters, scrutiny of relevant literature, and herbarium specimens housed in BM, CAL, ARUN, and ASSAM clearly indicate that the collected specimens represent a hitherto undescribed taxon, which is described here as *L. namchoomii*.

Materials and Methods

The measurements and plant description are mainly based on living specimens. Studied herbarium specimens are stored at the Botanical Survey of India, Central National Herbarium, Calcutta (CAL), and Arunachal Pradesh Regional Centre, Itanagar (ARUN). All photos were taken in nature. Morphological characters were described using the terminology proposed by Harris J., Harris M. (2006), Hickey, King (2013), and Beentje (2016).

Taxonomic treatment

Lysionotus namchoomii Chowlu, C. H. Nguyen, K. Gogoi et Aver., **sp. nov.** (Figs. 1, 2).

Diagnosis. From the morphologically most similar *Lysionotus ziroensis* the new species differs mainly in glabrous stem, leaves, and peduncle; denticulate-crenulate leaf blade pale green below;

glabrous deltoid bracts; straight, spatulate, glabrous calyx lobes; and corolla glabrous inside.

Holotype: "India, Arunachal Pradesh, Pakke-Kessang District, Sukiyo, 27°09'01.45"N, 93°15'02.63"E, 1299 m, 8 August 2020, K. Chowlu 41539" (CAL!, iso – ARUN!).

Etymology. The species epithet honors the late Chau Phunkyoo Namchoom, a very popular figure as a social reformer representing the Khampti community in Arunachal Pradesh. He was a great nature lover and played a significant role in the upliftment of the Khampti community in Arunachal Pradesh, especially in facilitating good education and medical facilities for the people.

Description. Evergreen epiphytic, perennial, rhizomatous, terrestrial, glabrous subshrub to 50 cm tall. **Rhizome** hypogeous, plagiotropic to ascending, light pink, pale grey, or almost white, terete, 12–16 cm long, with 1–2(3) irregular tuber-like swellings and constrictions between them; individual swellings fusiform, villose; constrictions nearly glabrous, sometimes bearing adventitious roots. **Leaves** petiolate, normally three per node, unequal; petioles 0.5–1 cm long, glabrous; leaf lamina 4–10 × 3–5.5 cm, ovate to ovate-elliptic, oblique, green above, pale green beneath, glabrous, acute to shortly acuminate at apex, cuneate and slightly oblique at the base, margin dentate-crenulate; lateral veins 8–10 on each side. **Cymes** subterminal or axillary, 6–12-flowered. **Peduncle** 8–14 cm long, terete, greenish, glabrous. **Bracts** two, 0.9–1.1 × 1.2–1.4 cm, deltoid, cordate to truncate at the base; acute to obtuse at apex; entire along the margin, slightly recurved, green to yellowish green, glabrous. **Pedicels** about 5 mm long, terete, green, glabrous. **Calyx** dissected from the base; lobes 5, about 1 cm long, spatulate, straight, purplish red at apex, 3(4)-nerved, acute, entire along the margin, glabrous. **Corolla** infundibular, outside white, gradually becoming lilac purple to the apex, inside white with lilac purple to dark purple veins and yellow area on median lobe of abaxial lip; corolla 3.2–3.6 cm long, glabrous, limb distinctly two-lipped; tube 2.2–2.6 cm long, 0.4–0.6 cm in diameter, thin, slightly wider at base; the distal part widening towards the throat; upper (abaxial) lip 2-lobed, 4.5–5.5 mm long, lobes 4.5–5.5 × 6–7 mm, sinus 4–5 mm deep; lower (adaxial) lip 3-lobed, 14–16.5 mm long, lateral lobes 7–9 ×8–10 mm wide, median lobe 7–9.5 × 5.2–6.5 mm wide. **Stamens** two, coherent; filaments 0.8–1 cm long, inserted above the middle of the corolla tube, slightly curved, white, dark purple at apex; anthers dithecous, about 3 mm diam., oblate, pale yellowish. **Staminodes** two, 6–8 mm long, straight. **Disc** ringlike, 5-lobed. **Ovary** about 1.9 × 0.25 cm, cylindrical, slightly curved, light greenish, glabrous; style about 8 mm long, cylindrical, white, glabrous; stigma about 8 mm in diameter, obscurely discoid. **Capsules** 6–8 cm long. Seeds not seen.

Phenology. Flowers in July–September; fruits in October–December.

Distribution and habitat. Presently, this species is confined only to Pakke-Kessang District, Arunachal Pradesh. However, exploration in adjoining districts may shed light on its exact range of distribution in the state. This species is found in evergreen forests and grows as an epiphyte or lithophyte.

Conservation Status. *Lysionotus namchoomii* is so far only known from two close locations in Pakke-Kessang District, where 60–100 mature individuals were observed. Formally, the species may be estimated as globally Critically Endangered, CR: B1a,b(iiii, v)+ 2a,b(i-iii,v). Available observations indicate that the species meets the following IUCN Red List categories and criteria (IUCN, 2023): only two populations were discovered, with the extent of occurrence (EOO) much less than 100 km^2 (B1a) and the area of occupancy (AOO) surely less than 10 km^2 in two known locations (B2a); observed and expected continuing decline (b) of the extent of occurrence (i), the area of occupancy (ii), area, extent, and quality of habitat (iii), and the number of mature individuals (v), when the populations are very small and highly fragmented, with the estimated number of mature individuals less than 100.

Note. *Lysionotus namchoomii* is most similar to *L. ziroensis* in the shape of leaf blade, the length of peduncle, and the flower color, but can be easily distinguished in having glabrous (vs. sparsely pubescent) stem, glabrous (vs. pubescent) petiole, leaf blade pale green below, glabrous (vs. vinaceous below, sparsely pubescent), leaf margin denticulate-crenulate (vs. serrulate-spinose), peduncle glabrous (vs. pubescent), cyme 6–12-flowered (vs. usually with 10 flowers), inflorescence with deltoid, glabrous (vs. ovate-lanceolate to ovate, sparsely pubescent) bracts, calyx lobes straight, spatulate, glabrous, purplish red at apex (vs. reflexed, linear to narrowly oblong, sparsely puberulent, entirely pale green), corolla glabrous (vs. glandular pubescent) inside, anther oblate (vs. globular). The comparison of the key morphological characters of *L. namchoomii* and *L. ziroensis* is presented in Table.

Fig. 1. *Lysionotus namchoomii*: A – Flowering plant in natural habitat; B – Intact inflorescence; C – Flattened plant used for preparation of the type specimen; D – Rhizome; E – Inflorescence bracts; F – Calyx lobes, adaxial side; G – Intact flower, front view; H – Intact flower, side view; I – Opened corolla tube showing stamens; J – Pistil showing disc at the base. Photographed from the type materials by K. Chowlu, photo correction and plate design by K. Chowlu and L. Averyanov.

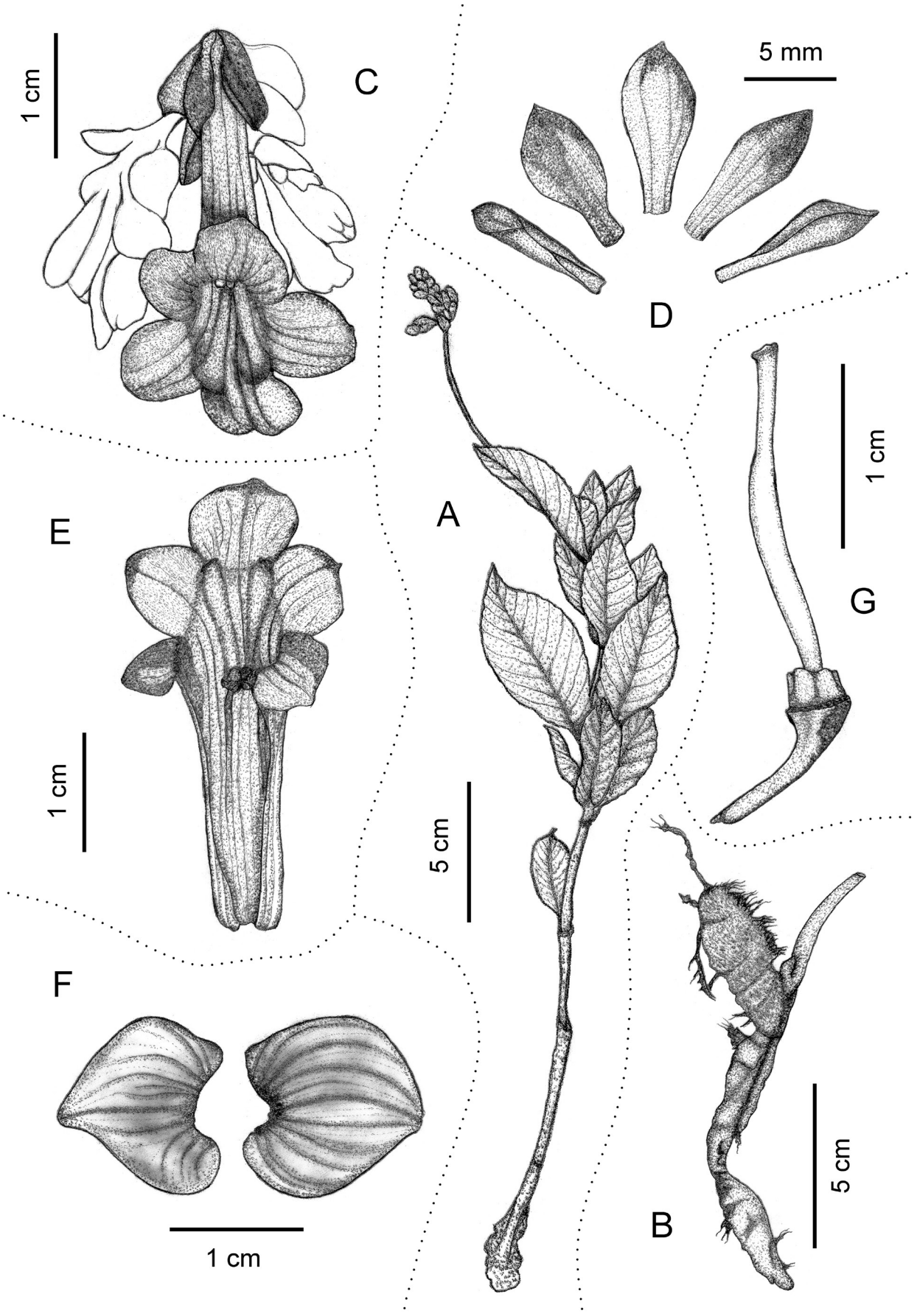

Fig. 2. *Lysionotus namchoomii*: A – Flattened flowering plant; B – Rhizomes; C – Flower, front view; D – Calyx lobes, adaxial side; E – Opened corolla tube showing stamens; F – Inflorescence bracts; G – Pistil showing disc at the base. Drawn from the type materials by Khyanjeet Gogoi.

Table

Diagnostic morphological characters of *Lysionotus namchoomii* and *L. ziroensis*

Character	*Lysionotus namchoomi*i	*Lysionotus ziroensi*s
Stem	glabrous	sparsely pubescent
Petioles	0.4–1 cm long, glabrous	0.2–0.5 cm long, pubescent
Leaf blade	below pale green, glabrous	below vinaceous, sparsely pubescent
Leaf margin	denticulate-crenulate	serrulate-spinose
Peduncle	5–8 cm long, glabrous	4–11 cm long, sparsely puberulent
Bracts	1.2–1.4 cm wide; deltoid; glabrous	0.5–0.6 cm wide; ovate to broadly lanceolate; sparsely pubescent
Cyme	6–12-flowered	ca. 10-flowered
Calyx	dissected from the base; lobes ca. 1 cm long, spatulate; straight; glabrous; purplish red at apex	calyx lobes joined near the base; lobes 0.8–1 cm long, linear-oblong; reflexed, sparsely puberulent, entirely pale green
Corolla	glabrous inside	glandular pubescent inside
Filaments	0.8–1 cm long	0.6–0.8 mm long
Anthers	oblate	globular

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