

# Recollection of *Lysionotus kingii* (C.B. Clarke) Hilliard (Gesneriaceae) after 138 years, and its expanded description

Sherpa N., Mangar S., Chettri B., Chhetri G., Franklin Benjamin J.H. & R. Gogoi\*

Botanical Survey of India, Sikkim Himalaya Regional Centre, Gangtok - 737103, Sikkim, India

\*E-mail: rajibdzuko@gmail.com

**Abstract:** *Lysionotus kingii* (C.B. Clarke) Hilliard (Gesneriaceae) is recollected after a gap of 138 years. A detailed description of *L. kingii* and information on its identity is provided here.

**Keywords:** *Aeschynanthus*, Darjeeling, Himalaya, Sikkim

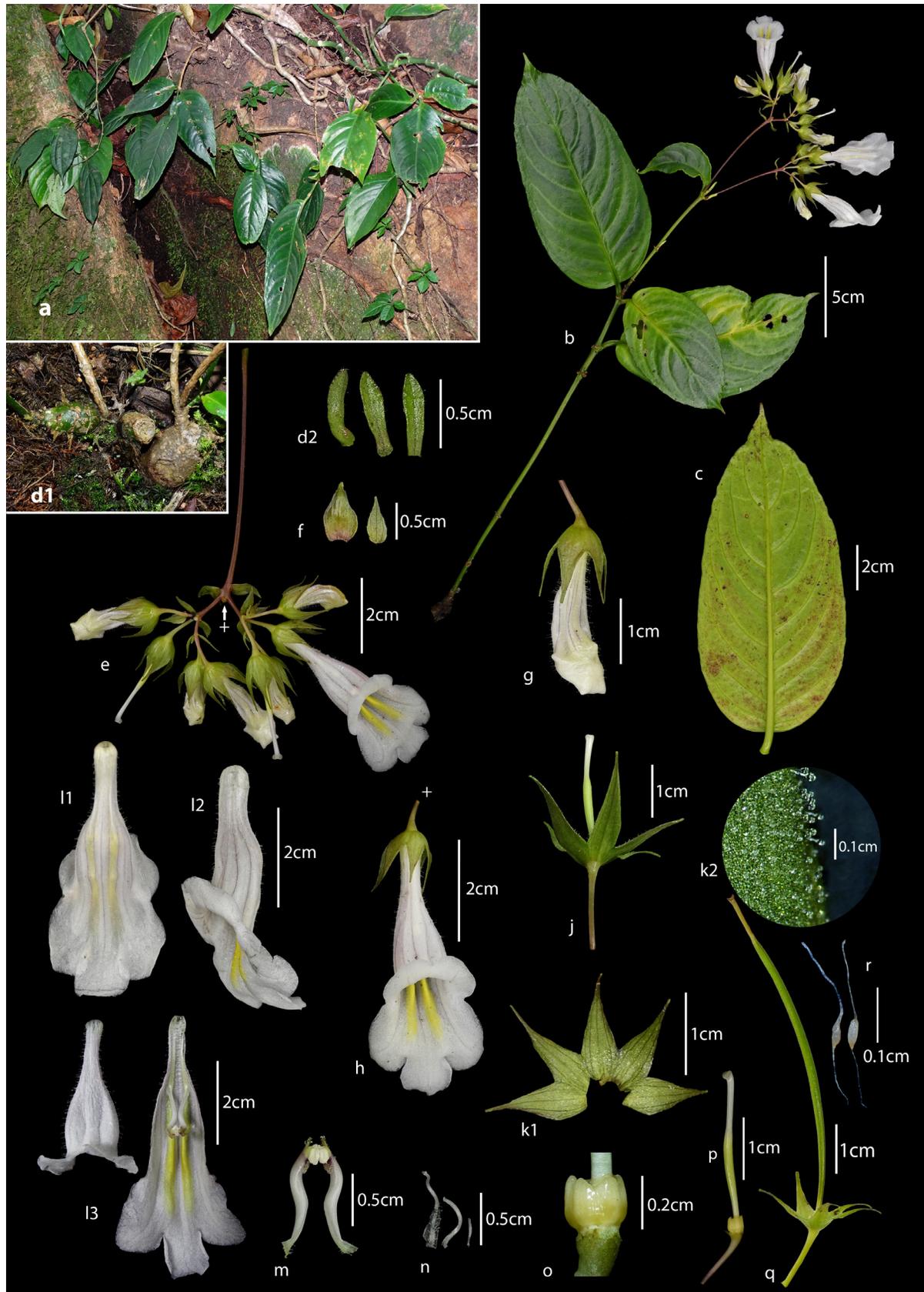
## Introduction

The genus *Lysionotus* D. Don comprises currently 35 accepted species (POWO, 2024) distributed from Nepal, northern India, spreading eastwards through Bhutan, northeastern India, south China, northern Thailand, Laos, Vietnam to southern Japan (Möller *et al.*, 2017), with the centre of diversity in China (Xu *et al.*, 2017). In India, the centre of diversity of the genus is in Arunachal Pradesh, which has 10 out of 13 taxa extant in India (Bhattacharyya *et al.*, 2020; Chowlu *et al.*, 2023). The majority of the species are lithophytic or epiphytic, evergreen herbs or small shrubs with opposite (sometimes whorled, rarely ternate) leaves, infundibuliform corolla with inflated upper half of the tube, two fertile stamens with face-to-face cohering anthers and appendaged seeds (Möller *et al.*, 2017). All Indian species belong to the section (sect. *Lysionotus*), characterized by erect or ascending herbaceous stems, whorled leaves, deeply divided calyx and filiform appendages exceeding the length of seed (Wang, 1983).

During a floristic exploration of East Sikkim (Barapathing Reserve Forest) in 2022, the authors (NS, SM & BC) observed a specimen of *Lysionotus*

D. Don in vegetative state and thereby its identity could not be confirmed in the field. A few live specimens were collected and introduced to the Experimental Botanic Garden of Botanical Survey of India, Sikkim Himalayan Regional Centre (BSI-SHRC). Two of the plants flowered in the months of June 2023 and June 2024. After a critical study of the flowering plant material along with the scrutiny of the relevant literature (Clarke, 1883, 1884; Hilliard, 2001; Möller *et al.*, 2017; Bhattacharyya *et al.*, 2020), and comparison with herbarium specimens of other taxa housed in various herbaria, this taxon was identified as *Lysionotus kingii* (C.B. Clarke) Hilliard.

*Lysionotus kingii* was first described in the genus *Aeschynanthus* Jack as *A. kingii* C.B. Clarke (Clarke, 1883; Hilliard & Burtt, 1995) based on materials in fruiting collected in 1875 (*G. King 2166*). Apart from the type materials, it was also known from other gatherings made in 1873 (*J.S. Gamble 3570A*), 1874 (*J.S. Gamble 3571A*) and 1884 (*Collecteurs natifs s.n.* and *C.B. Clarke 36467B*) (Hilliard & Burtt, 1995), and had remained uncollected since then for the next 138 years. It is closely related to *Lysionotus serratus* D. Don, and *L. gamosepalus* W.T. Wang due to its oblong to elliptic leaves, terminal or subterminal inflorescence, funnellform, hairy (glandular) corolla and appendaged connective. *L. serratus* is a widely distributed species found throughout the Himalayas, China, and Southeast Asia (including Laos, Myanmar, Thailand, and Vietnam), typically inhabiting subtropical and temperate mountainous regions. In contrast, *L.*



**Fig. 1.** *Lysionotus kingii* (C.B. Clarke) Hilliard: **a.** Plants in natural habitat; **b.** Flowering twig; **c.** Leaf showing abaxial surface; **d1.** Rootstocks; **d2.** Prophylls; **e.** Inflorescence; **f.** Bract and bracteole; **g.** Flower bud; **h.** Flower; **j.** Calyx with pistil; **k1.** Calyx split open; **k2.** Glandular hairs on inner surface of calyx lobes; **i1 & i2.** Corolla; **i3.** Corolla split open; **m.** Stamens; **n.** Staminodes; **o.** Nectary disk; **p.** Pistil; **q.** Fruit; **r.** Seeds (Photos by N. Sherpa)..

*gamosepalus* is more restricted in distribution, occurring in China (Tibet Autonomous Region) and in Arunachal Pradesh, India (Hilliard & Burtt, 1995; Wang, 1983; Sinha & Datta, 2016; Joe *et al.*, 2017; Akhil *et al.*, 2019). Based on our recent collections, this paper addresses an important lacuna in the description of this species – none of the literature dealing with this species have a description of the flowers (corolla, androecium and gynoecium) in it (Clarke, 1883, 1884; Hilliard & Burtt, 1995; Hilliard, 2001; Bhattacharyya & Goel, 2015; Sinha & Datta, 2016; Bhattacharyya

*et al.*, 2020). This paper presents, for the first time, a detailed description and a complete illustration of floral parts of *Lysionotus kingii* (Fig. 1) and its comparison with *L. serratus* (Fig. 2) and comparative analysis with the allied species, *L. serratus* and *L. gamosepalus* (Table 1) in order to facilitate their identification and differentiation.

## Materials and Methods

The current study was based on field work conducted in Sikkim and West Bengal. The description was prepared after examining all available specimens.



**Fig. 2.** Comparison of floral parts between *Lysionotus kingii* (a1–f1) and *L. serratus* (a2–f2): **a.** Flowering twigs; **b.** Bracts and bracteoles; **c.** Flower buds; **d.** Flowers; **e.** Calyx with pistil; **f.** Calyx spread-open showing calyx lobes (Photos by N. Sherpa [a1–f1] and S. Mangar [a2–f2]).

Materials used for measurements of vegetative and floral parts of *Lysionotus kingii* were taken from two live plants in the Experimental Botanic Garden of BSI-SHRC, their specimens (*R. Gogoi & N. Sherpa* 45471 and *N. Sherpa, B. Chettri & S. Mangar* 43719) and specimen images obtained online from CAL, E, G and K (Thiers, updated continuously); for *L. serratus*, from a live plant in the Experimental Botanic Garden of BSI-SHRC, herbarium specimens at BSHC and specimen images from CAL, E and KATH (Thiers, updated continuously); and for *L. gamosepalus*, from specimen images obtained from CAL, CALI and PE (Thiers, updated continuously), with additional references to Wang (1983), Joe *et al.* (2017) and Akhil *et al.* (2019). Collected specimens of *L. kingii* were processed into mounted herbarium sheets following the standard herbarium methodology and stored in the herbarium of the Botanical Survey of India, SHRC (BSHC).

### Taxonomic Treatment

***Lysionotus kingii*** (C.B. Clarke) Hilliard, Edinburgh J. Bot. 52: 219. 1995; Hilliard, Fl. Bhutan 2(3): 1304. 2001; Sinha & Datta, Nelumbo 58: 32. 2016; Bhattacharyya *et al.*, Fl. Ind. 20: 113. 2020. *Aeschynanthus kingii* C.B. Clarke in A. DC. & C. DC., Monogr. Phan. 5(1): 31. 1883; C.B. Clarke in Hook. f., Fl. Brit. India 4: 342. 1884; Bhattacharyya & Goel, Phytotaxonomy 14: 18. 2015. *Trichosporum kingii* (C.B. Clarke) Kuntze, Revis. Gen. Pl. 2: 478. 1891. *Type*: INDIA, **Sikkim**, 1800 m, 08.08.1875, *G. King* 2166 (CAL [CAL0000019153, CAL0000019138 digital images!]).

**Figs. 1 & 2**

Epiphytic herbs, up to 30 cm tall, stem pendulous, glabrous; rootstock dilated, elongate or globose, fleshy, green, brown at maturity, glabrous. Prophylls on rhizome and young stems oblong-lanceolate, 1.5–1.6 × 5–6 mm, 2–3 in a whorl, sparsely pilose along margins, caducous. Leaves

opposite, unequal, crowded at apical portion, lamina oblong-elliptic, 2–7 × 4–20 cm, base rounded to cuneate or shortly attenuate, apex abruptly acuminate, margins entire or repand towards apex, coriaceous, papery when dry, glabrous, dark green above, lighter beneath; lateral nerves 7–8 pairs. Inflorescences terminal or sub-terminal, 3–9-flowered cymes; peduncle 5–7 cm long. Bracts and bracteoles ovate, 2–3 × 3–7 mm, 3-nerved, glabrescent, deciduous. Pedicel 5–15 mm long, glabrescent. Calyx green, divided to above base; tube 2–5 mm long, lobes 5, ovate-lanceolate, 2–4 × 5–15 mm, apex acuminate, 3-nerved, glabrous outside, densely glandular hairy inside, persistent and spreading wide open after anthesis. Corolla infundibuliform, bilabiate, white or purplish-white with purplish longitudinal veins, 4–5 cm long; tube ventricose at and above middle, 2.5–3 cm long, two yellow longitudinal keels on floor of throat, sparsely glandular pilose outside, glabrous within except glandular pilose towards base; upper 2 lobes ascending, c. 10 × c. 5 mm, lower mid lobe orbicular, up to 10–12 × 8–10 mm, lateral lobes 8–10 mm broad. Stamens 2; filaments sigmoidal, 5–7 mm long, white, apically purple with a patch of green glandular masses, glandular hairy at base; anthers white, up to 2 mm long; connective green, appendaged, 1–1.5 mm long; staminodes 3, 2–7 mm long, white, unequal in length, glandular hairy at base. Nectary disc annular, shallowly 5-lobed, up to 2 mm long, greenish-white. Pistil 2–2.5 cm long, glabrous; ovary stipitate, up to 1.5 cm long, green; style white, 5–8 mm long; stigma slightly clefted. Capsules stipitate, linear, 6–10 cm long, green, glabrous; seeds minute, fusiform, c. 0.5 mm long, numerous, finely appendaged at both ends, appendage 1–2 mm long.

*Flowering & fruiting*: Flowering from June to August, and fruiting from July to October.

*Habitat*: On tree trunks and in humus pockets, in moist sub-tropical forests at 1500–1900 m altitude; associated with *Hymenophyllum* sp. (Hymenophyllaceae), *Otochilus fuscus* Lindl.

**Table 1.** Morphological differences between *Lysionotus kingii* (C.B. Clarke) Hilliard, *L. serratus* D. Don and *L. gamosepalus* W. T. Wang (s.l.).

Characters	<i>L. kingii</i>	<i>L. serratus</i>	<i>L. gamosepalus</i> (s.l.) (Wang, 1983; Joe <i>et al.</i> , 2017; Akhil <i>et al.</i> , 2019)
Habit	Epiphyte	Epiphyte or lithophyte	Epiphyte or terrestrial
Leaves	Lamina oblong-elliptic; margins entire or repand towards apex; base rounded to cuneate or shortly attenuate	Lamina oblong lanceolate to elliptic lanceolate; margins dentate or serrate; base cuneate	Lamina ovate or ovate-elliptic; margins sub-serrate or dentate to spinose; base rounded to cuneate, slightly oblique
Inflorescence	3–9-flowered	3–15-flowered	2–11-flowered
Bracts	Ovate, glabrescent	Broadly ovate to orbicular, glabrous	Broadly ovate, orbicular or cordate, minutely pubescent or glabrous
Calyx	Divided to above base, with distinct tube, 2–5 mm deep; lobes ovate-lanceolate, apex acuminate, densely glandular hairy inside, widely spreading after anthesis	Divided almost to base; lobes oblong-lanceolate, apex acute or acuminate, glabrous, sub-flexuous	Divided to middle with distinct tube, 6–8 mm deep; lobes ovate, glabrous or sparsely puberulent
Corolla	White or purplish-white, 4–5 cm long, sparsely glandular pilose outside, glabrous inside	Pale purple to purple, 3–5 cm long, sparsely puberulent outside, glabrous inside	Lilac white or purplish, 3.6–5 cm long, glabrous to densely glandular hairy outside, sparsely villous or glandular inside
Filaments	Sigmoid; connective appendaged	Sigmoid; connective appendaged	Coiled; connective appendaged

(Orchidaceae), *Piper* sp. (Piperaceae), *Polypodium* sp. (Polypodiaceae), *Rhaphidophora decursiva* (Roxb.) Schott (Araceae), *Sloanea dasycarpa* (Benth.) Hemsl. (Elaeocarpaceae), *Tetrastigma* sp. (Vitaceae), and mosses.

*Distribution:* India (Sikkim and West Bengal).

*Specimens examined:* INDIA, **Sikkim**, October 1873, *J.S. Gamble* 3570A (K [K001257775]); Gangtok, BSI-Experimental Botanic Garden (in cultivation, plant introduced from Barapathing

Reserve Forest, East Sikkim, 27°15'36.01"N, 88°41'12.92"E, 1800 m), 1600 m, 17.06.2024, *R. Gogoi* & *N. Sherpa* 45471 (BSHC); Gangtok, BSI-Experimental Botanic Garden (in cultivation, plant introduced from Barapathing Reserve Forest, East Sikkim, 27°15'36.01"N, 88°41'12.92"E, 1800 m), 1600 m, 21.06.2023, *N. Sherpa*, *B. Chettri* & *S. Mangar* 43719 (BSHC); West Sikkim, Pemyangtse, 5800 ft, 03.06.1990, *G. Kirkpatrick* 73 (E [E00628369]). **West Bengal**, Mongpo (=Mungpoo), 5500ft, 10.10.1884, *C.B. Clarke* 36467B (G [G00414331]);

Rungbee, 5500ft, 04.07.1884, *Collecteurs natifs s.n.* (G [G00414332]); Rungyun (=Rungiroong, Darjeeling), 6000 ft, 25.07.1874, *J.S. Gamble* 3571A (K [K001257774]).

*Notes:* *Lysionotus kingii* was variously marked as — doubtful (Bhattacharyya & Goel, 2015, listed as *Aeschynanthus kingii* C.B. Clarke); imperfectly known (Hilliard, 2001; Sinha & Datta, 2016) as the species was not collected since 1884. Hilliard and Burt (1995) while transferring this species from *Aeschynanthus* to *Lysionotus*, studied few other specimens (K001257774 from Rungiroong, Darjeeling, erstwhile Sikkim) and (G00414331 and G00414332 from Mungpoo, erstwhile Sikkim) while also not adding much of a description. Hilliard (2001) also lacks a complete description of the species. Certain erroneous character description in Clarke's protologue was carried forward by later authors (Bhattacharyya & Goel, 2015) due to lack of fresh specimens. For example, Clarke (1883) describes the leaf as membranous and entire, however, we observed that the leaves are membranous only after drying but remains coriaceous to fleshy in its natural state and that the margins are entire in only the lower half of the leaf, while being repand from the middle to upper half. The recollection of this species after 138 years is noteworthy as multiple extensive scouting efforts for this species in its other historical localities (Mungpoo, Rungbee, Rungiroong) provided futile. Consultation of online herbaria revealed several specimens — E00628379 (from Arunachal Pradesh, India) at E; IBK00243196 (from Yunnan, China) at IBK; 0550638, 0550640 and 0550642 (from Yunnan, China) at IBSC; KATH014780 and KATH014795 (from eastern and central Nepal respectively) at KATH, and 00154033, 0015442, 01506226, 02383738 and 02383739 (from TAR China) at PE currently identified as *L. serratus* that exhibit leaf margin characteristics consistent with *L. kingii*. However, the identity of these specimens as *L. kingii* could not be ascertained because the studied specimens are either fragments of vegetative parts or are immature inflorescence

or in fruiting conditions. A single specimen at E (E00628369) collected from West Sikkim in 1990 and originally identified as *L. serratus* is correctly referable to *L. kingii* based on the presence of inflorescences with calyx bearing distinct tube and ovate-lanceolate lobes with acuminate apex. Given the morphological overlap between these two species in the absence of flowers, a thorough examination of herbarium specimens, particularly from neighbouring regions and under the name *L. serratus*, could indeed reveal underrepresented collections. It is quite plausible that *L. kingii* has a wider distribution than currently documented.

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