



## A new species of *Lysionotus* (Gesneriaceae) from northern Vietnam

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**ABSTRACT:** *Lysionotus hagiangensis*, a new species from northern Vietnam, is described and illustrated. It morphologically resembles *L. chatungii* and *L. petelotii*, but differs markedly by the character of leaf, inflorescence, corolla color, the shape of stamens, and the number of well developed staminodes. We provide detailed information, including morphological descriptions, illustrations, pictures, and information about the habitat of the new species. *Lysionotus hagiangensis* is confined to a small area of Cao Ma Po Commune, and further explorations are necessary for identification of its real conservation status, which is provisionally assessed now as “Data Deficient” in accordance with IUCN criteria.

**KEY WORDS:** Ha Giang Province, limestone endemism, *Lysionotus chatungii*, *L. hagiangensis*, *L. petelotii*.

### INTRODUCTION

The genus *Lysionotus* D. Don (Gesneriaceae) containing about twenty-three species and ten varieties (Wen *et al.*, 2021) is distributed mainly in Nepal, northern India, Bhutan, southern & southwestern to eastern China, northern Myanmar, northern Thailand, Laos, northern Vietnam, and southern Japan (Möller *et al.*, 2017). Before our study the genus in Vietnam included five species, namely *Lysionotus aeschynanthoides* W.T. Wang, *L. chingii* Chun ex W.T. Wang, *L. pauciflorus* Maxim. (type variety), *L. petelotii* Pellegr., and *L. serratus* D. Don (Luu *et al.*, 2018). During the botanical fieldwork in October 2018 in limestone areas of Ha Giang Province in northern Vietnam, we collected several unusual specimens sharing all generic characteristics of *Lysionotus* (Wang *et al.*, 1998; Li and Wang, 2005), but morphologically different from all species known earlier in a series of features indicated in diagnosis. After consulting relevant literature (Wang *et al.*, 1998; Pham, 2000; Li and Wang, 2005; Mukherjee *et al.*, 2008; Nong *et al.*, 2010; Do *et al.*, 2013; Sinha and Datta, 2016; Joe *et al.*, 2017; Borah and Joe, 2018; Luu *et al.*, 2018; Akhil *et al.*, 2019, 2021; Taram *et al.*, 2019; Tian *et al.*, 2020), as well as examining available herbarium specimens stored at CPNP, HN, HNU, LE, VNF, VNMN Herbaria, as well as digital collections accessible at E, K, P, PE, and TI, we identified our plants as a new species on the base of morphological features indicated in diagnosis, description, and table 1. It is described and illustrated here with a plate of color analytical photographs. With our new discovery, the number of *Lysionotus* species in Vietnam reaches six.

### MATERIALS AND METHODS

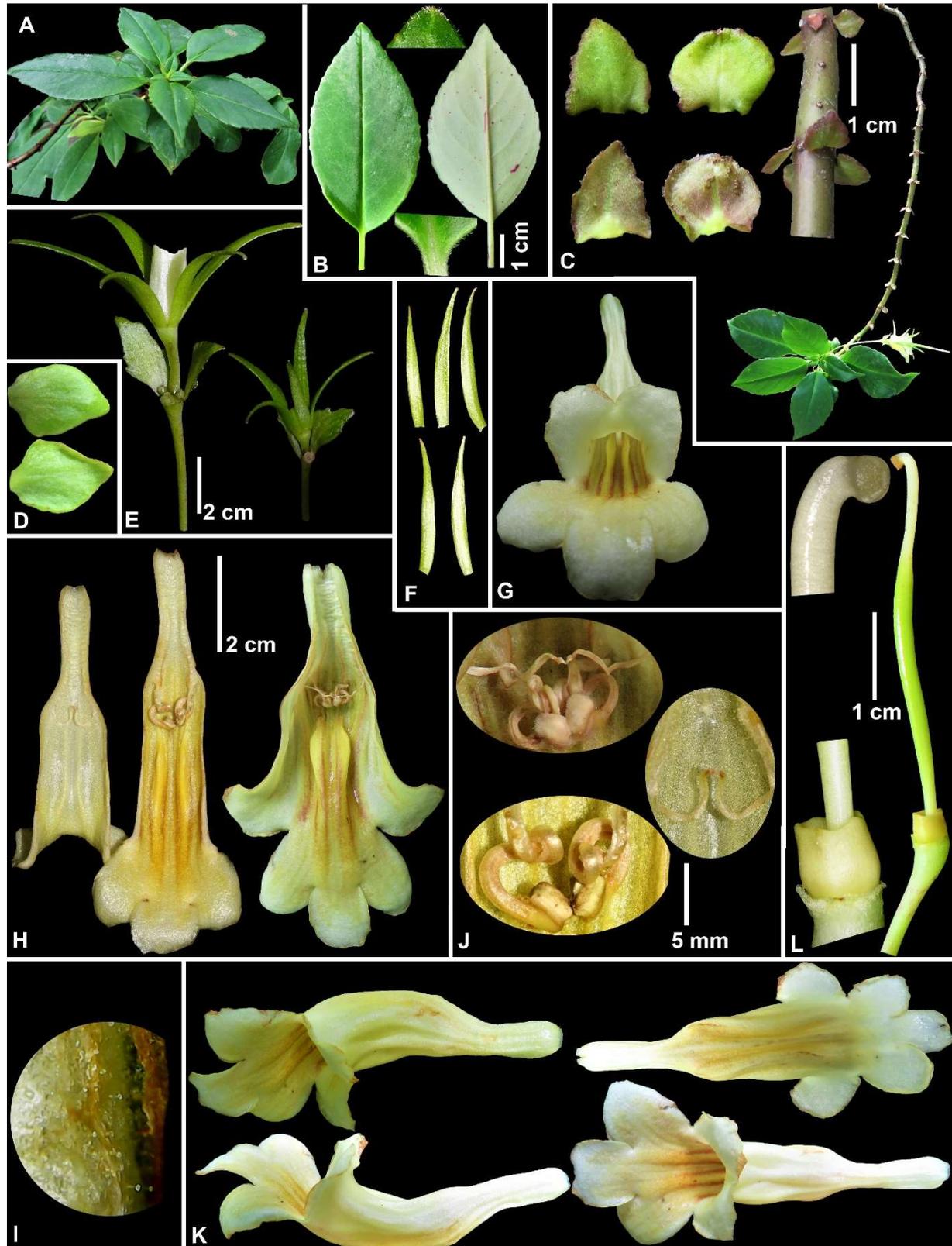
Morphological observations and measurements were made on living plants cultivated at the Botanical Garden of the Komarov Botanical Institute of the Russian Academy of Sciences. Studied voucher herbarium specimens were prepared from cultivated flowering plants and stored at the Herbarium of the Komarov Botanical Institute, Russia (LE). Specimens of related species were studied in the main herbaria of Vietnam (CPNP, HN, HNU, VNF, VNMN), as well as were analyzed images of digitalized specimens from other herbaria owing largest collections on the genus (E, K, LE, P, PE, TI). Morphological characters are described using the terminology proposed by Wang *et al.* (1998).

### TAXONOMIC TREATMENT

*Lysionotus hagiangensis* C.H. Nguyen & Aver., *sp. nov.*

**Fig. 1**

Described from northern Vietnam. **Type:** type herbarium specimens were prepared from cultivated plants on 20 July 2021 by L. Averyanov and T. Maisak, VR 1050.4 (holotype – LE01077137, isotype – LE01077145, analytical photos – LE01122889), originated from northern Vietnam, Ha Giang Province, Quan Ba District, Cao Ma Po Commune, Chin Chu Lin Village, around point 23°05'13.5"N 104°48'30.2"E, rocky outcrops on steep rocky slopes composed with eroded karstic limestone at elevation of 1750–1950 m a.s.l., highly degraded remnants of primary evergreen broad-leaved very humid forest, epiphyte on mossy tree, not common, 20 October 2018, L. Averyanov, Nguyen Sinh Khang, T. Maisak, Truong Duc Thieu.



**Fig. 1.** *Lysionotus hagiangensis* C.H. Nguyen & Aver. **A.** Plant. **B.** Leaf. **C.** Prophylls and internodes. **D.** Bracts. **E.** Inflorescence. **F.** Calyx lobes. **G.** Flower, frontal view. **H.** Section of corolla showing inner surface with stamens and staminodes. **I.** Glandular hairs on the adaxial surface of the corolla. **J.** Stamens and staminodes. **K.** Flowers, side and half side views. **L.** Pistil, base of pistil and its apex with stigma. Photos of L. Averyanov and Cuong Huu Nguyen, correction and design by Cuong Huu Nguyen.

**Table.** Comparative morphological characters of *Lysionotus hagiangensis*, *L. chatungii*, and *L. petelotii*

Characters	<i>L. hagiangensis</i>	<i>L. chatungii</i>	<i>L. petelotii</i>
Stem length	up to 1.5 m	up to 3 m	up to 0.5 m
Characters of petiole	up to 3.5 cm, pubescent	up to 1 cm, glabrous	up to 1.7 cm, glabrous
Shape of prophylls	deltoid or reniform	lanceolate to ovate	absent
Leaf blade shape	elliptic to oblong	ovate, elliptic to rounded	lanceolate or lanceolate oblong
Shape and character of leaf blade base	cuneate, pubescent	rounded or obliquely shallowly cordate, glabrous	cuneate or rounded, glabrous
Shape and character of leaf blade apex	acute or acuminate, pubescent	acuminate or shortly caudate, glabrous	acuminate, glabrous
Character of inflorescence	solitary cyme at node with 2–4 flowers	2–4 1-flowered cymes in each node	1–3 1-flowered cymes in each node
Shape of inflorescence bracts	rhomboid	ebracteate	lanceolate
Peduncle length and color	green with purple irregular spots	green with purple irregular spots	purple
Pedicele length and color	green to green with purple tint	green with purple irregular spots	purple
Character of calyx lobes and their color	lobes subequal, green	3 anterior lobes longer than 2 posterior lobes, purple	lobes subequal, purple
Tube length and its color	4–4.4 cm, uniform light yellow to creamy white	1.6–2.3 cm, white with light purple tint and deep-purple venation	3.6–4 cm, light purple to yellow
Filament shape and color	spirally twisted, pale yellow	curved, pale yellow and black at apex	curved, purplish to yellow
Number of well-developed staminodes	3	2	2
Disc characters	ring-like, entire, margin repand	4-lobed, lobes oblong with conical tips	ring-like, margin entire

**Diagnosis.** From closest *Lysionotus chatungii* Taram, A.P. Das & Tag, the new species differs in pubescent leaf petiole up to 3.5 cm long, solitary inflorescence at node, deltoid inflorescence bracts, subequal, green calyx lobes, spirally twisted filaments, and flower with three well-developed staminodes.

**Description.** Epiphytic herb or undershrub. **Stems** suberect, pendulous or occasionally creeping and rooting at nodes, terete, with no swellings, up to 150 cm long, terete, few to many branched, young stem and branches pubescent, green with purple irregular spots, mature stem brownish; internodes 2.5–3.5 cm long. **Leaves** petiolate, mostly ternate or occasionally in whorl of 4; sometimes two leaves of normal shape and size are alternating on stem with prophylls; whorls of 4 prophylls occur at each node in lower non-leafy part of shoots; petioles 1.5–2.5 cm long, terete or slightly flattened adaxially, pale green, pubescent; lamina elliptic to oblong, 6–12 cm long, 3–6 cm wide, adaxially dark green, somewhat velvety, abaxially pale green with purple scattered spots, base cuneate, sometimes slightly oblique, apex acute or acuminate, pubescent, obscurely serrate along margin, main and lateral veins inconspicuous adaxially and protuberant abaxially, secondary veins in 6–8 pairs on each side of main vein. **Inflorescence** axillary cyme, 1 or several on the branch, 1 in each node, 2–4-flowered each; peduncle slender, terete, 3.5–6 cm long, 2.5–4 mm in diameter, green with purple irregular spots; bracts obscurely rhomboid, 2–3 cm long, 8–10 mm wide, entirely glabrous, entire or obscurely dentate at the base; pedicel terete, somewhat fleshy, 1.5–2.0 cm long, 3–4 mm in diameter, green to green with purple tint, glabrous. **Calyx** divided from the base; calyx segments 5, subequal,

lanceolate to linear, recurved, entire, green. **Corolla** 6.4–6.8 cm long from the base to apices of lobes, infundibuliform, uniformly light yellow to creamy white, outside glabrous, bilabiate; upper lip 2-lobulated, 5–8 mm long; lower lip 3-lobulated, 0.7–1.4 cm long; all lobules broadly ovate, with rounded apex and 4–6 brown longitudinal strips in throat, glabrous; corolla tube 4–4.4 cm long, light yellow, sparsely glandular pubescent inside, glabrous outside. **Stamens** 2; filaments 0.9–1.1 cm long, terete, pale yellow, glabrous; anthers ovoid-oblate, cohering and touching each-other, white to pale yellow, without appendages or indumentum. **Staminodes** 3, filiform, terete, pale yellow, glabrous, with somewhat inflated apex, adnate to 1.5–1.8 cm above the corolla base; the median one 1–1.5 mm long, lateral ones 5.5–6.5 mm long. **Disc** ring-like, lemon-yellow, 1.6–2 mm high, margin repand, glabrous. **Pistil** 3.8–4 cm long; ovary narrowly cylindrical, glabrous, 2.6–2.8 cm long, about 2 mm in diameter; style 12–14 mm long, terete, glabrous, about 1 mm in diameter, apex curved; stigma slightly swollen, truncate. Capsule 8–12 cm long, linear, glabrous. Ripe seeds not seen.

**Etymology.** The species is named after the area of its origin.

**Local name:** Nở Lung Hà Giang (Vietnamese)

**Habitat.** Primary broad-leaved or mixed very humid montane forests on steep rocky slopes composed with eroded karstic limestone at elevations 1700–2000 m a.s.l. where rainy season lasting from May till September with mean temperatures 24–29°C and annual precipitation about 2500 mm (CLIMATE-DATA.ORG).

**Distribution.** Northern Vietnam (Ha Giang Province, Quan Ba District, Cao Ma Po Commune, Chin Chu Lin



Village, around point 23°05'13.5"N 104°48'30.2"E). Endemic.

**Phenology.** Flowers under cultivation in June–August, expected fruiting in August–September.

**Proposed conservation status.** The species up to now is known only from single location with several mature individuals on total square less than 1 km<sup>2</sup>. The currently available observations suggest that the new species is rare. More field studies are needed for assessment of its true conservation status. According to the IUCN criteria (IUCN, 2019) it may be tentatively assessed at present as “Data Deficient” (DD).

**Note:** *Lysionotus hagiangensis* is similar to *L. chatungii* and *L. petelotii* in its morphology and ecology. New species morphologically is most similar to *L. chatungii* in the shape of leaf blade, character of leaf margin, the length and color of peduncle, but can be easily distinguished in having pubescent petiole up to 3.5 cm long (vs. petiole glabrous, less than 1 cm long), leaf pubescent at apex and base (vs. leaf blade glabrous), solitary inflorescence at node (vs. 2–4 inflorescences at node), inflorescence with deltoid bracts (vs. inflorescence ebracteate), calyx lobes subequal, green (vs. three anterior lobes distinctly longer, than two posterior lobes, all lobes purple), filaments distinctly spirally twisted (vs. filaments curved, but not distinctly twisted), flower with three well developed staminodes (vs. flowers with two well developed staminodes). The new species differs from also close *L. petelotii* in having stem up to 150 cm long (vs. stem less than 50 cm long), stem nodes with four prophylls (vs. prophylls absent), leaf blade elliptic to oblong (vs. leaf blade lanceolate to lanceolate oblong), corolla outside uniform light yellow to almost white (vs. corolla outside light purple to pale yellow), disc with repand margin (vs. disc entire). The comparison of the key morphological characters of *Lysionotus hagiangensis*, *L. chatungii* and *L. petelotii* is presented in table 1. The most important distinguished characters of the new species are indicated in the diagnosis.

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