

## ***Gentiana bolavenensis* (Gentianaceae), a new species from Dong Hua Sao National Protected Area in southern Laos**

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### ABSTRACT

A new species of *Gentiana*, *Gentiana bolavenensis* (Gentianaceae) is described from Dong Hua Sao National Protected Area in southern Laos, with photographs, a vernacular name and a preliminary conservation status.

KEYWORDS: Bolaven Plateau, flora, Gentianales, Indochina, taxonomy.

Accepted for publication: 10 June 2019. Published online: 19 July 2019

### INTRODUCTION

The genus *Gentiana* L. has about 400 species distributed mainly in temperate regions of Europe, Asia and America, as well as in most tropical mountain systems of the world, with the exception of Africa (Chen & Wang, 1999; Ho & Liu, 2001; Mabberley, 2005; Anilkumar *et al.* 2015). In Laos, three taxa were known (Hul, 1999, 2003): *G. langbianensis* subsp. *kerriana* Hul, *G. leroyana* Hul, and *G. loureiroi* (G. Don) Griseb., among which *G. leroyana* is endemic to Phou Khao Khouay National Protected Area, Vientiane Province. Later, Hul (2007) described an additional species, *G. khammouanensis* Hul from Nakai Nam Theun, Khammouan Province. More recently, a fifth *Gentiana* species, *G. laotica* Soulad., Tagane & Yahara, was described from Phou Khao Khouay National Protected Area (Souladeth *et al.* 2018). Following the discovery of *G. laotica*, our recent field surveys in Dong Hua Sao National Protected Area (Fig. 1), resulted in the discovery of another undescribed species of *Gentiana*.

We here describe it as a new species, *Gentiana bolavenensis* Nagah., Tagane & Soulad. as the sixth

*Gentiana* species from Laos among which five are endemic. The flower character measurements below were derived from rehydrated dried herbarium specimens.

### TAXONOMIC TREATMENT

***Gentiana bolavenensis* Nagah., Tagane & Soulad., sp. nov.** Fig. 2.

*Gentiana bolavenensis* is similar to *G. tingnung-hoae* Halda and *G. laotica*, but differs from the former in having a larger size (9.5–18.3 cm tall in *G. bolavenensis* vs. 1–7(–10) cm tall in *G. tingnung-hoae*), longer calyx tube and lobes (calyx tube 4 mm long, lobes 6–7 mm long, vs calyx tube 2.5 mm, lobes 2–3 mm long, respectively), longer stamens (ca 6 mm long vs 4–4.5 mm long) and shorter stigma (1 mm long vs 2–2.5 mm long), and from the latter in having light pale blue or pale purple corolla (vs whitish in *G. laotica*) and lanceolate, narrowly elliptic, oblanceolate leaves (vs obovate to obovate-oblong in *G. laotica*) (Table 1). Type: LAOS. Champasak Province: Dong Hua Sao National Protected Area, in open grassland, 15°04'36.40"N, 106°12'20.64"E,

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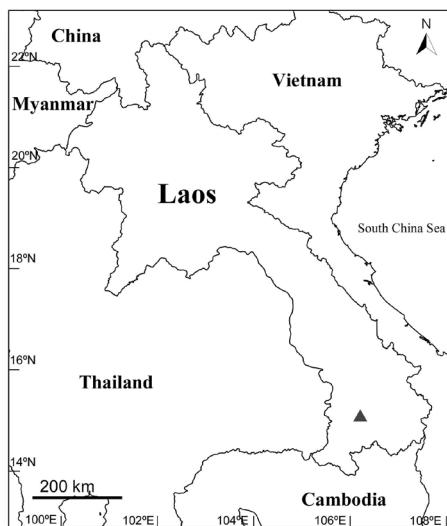


Figure 1. Locality of Dong Hua Sao National Protected Area (black triangle).

at alt. 1268 m, 19 Feb. 2019, *P. Souladeth, S. Tagane, A. Nagahama, A. Sengthong, Y. Suyama, N. Ishii* L2474 [fl.] (holotype FOF!, isotypes BKF, FU!, KAG!, P).

Perennial herbs, 9.5–18.3 cm tall, all part glabrous except a few ciliolate hairs on margin of leaf base. Root fibrous, light yellowish brown. Flowering stem simple, sometimes 2–4 branched above the middle, erect, terete, purplish *in vivo*, dark purple *in siccō*. Leaves opposite, 7–13 pairs, sessile, blade lanceolate, narrowly elliptic, oblanceolate, (0.4–)1.1–2.3 × 0.3–0.5 cm, chartaceous, apex acute,

base attenuate, margin entire, sometimes with a few ciliolate hairs along the base of lamina, 1-nerved, midrib prominent abaxially. Inflorescences terminal clusters, flowering branches crowded into a capitulum, sometimes also in axillary clusters on peduncle-like branches. Flowers (1–)3–9 per plant, 5-merous. Calyx tube narrowly conical, ca 4 mm long, yellowish white *in siccō*, lobes 5(–6), subequal, 2(–3) small and 3 large, linear, smaller ones ca 6 mm long, larger ones 7 mm long, light green, apex attenuate-acuminate, apiculate, margin entire. Corolla light pale blue or pale purple, outside light green, purplish at middle  $\frac{1}{3}$ , inside yellowish at basal  $\frac{1}{3}$ , pale gray toward to apex, with light yellowish brown spots at around  $\frac{1}{3}$  from the base, corolla tube campanulate, 1–1.6 cm long, lobes 5, triangular, ca 2 mm long, apex acute; plaeae ovate-triangular, ca 1 mm long, apex acute, obtuse, margin erose with 1–4 teeth. Stamens 5, equal, filaments ca 5 mm long, yellow, attached slightly above the base of the corolla tube, anthers narrowly ellipsoid, ca 2 mm long, light yellow. Ovary obovoid-oblong, slightly flattened, ca 6.5 mm long, ca 1 mm wide, ca 0.9 mm thick, conspicuously winged near the apex, shortly stipitate, stipe to 0.5 mm long; style ca 1 mm long, stigma bilobed, ca 1 mm long, recurved at anthesis. Capsule and seed not seen.

Additional specimens examined.— Laos. Champasak Province: Dong Hua Sao National Protected Area, in open grassland, 15°03'39.25"N 106°12'35.73"E, at alt. 1,260 m, 11 Dec. 2018, S. Tagane, A. Nagahama, P. Souladeth, P. Pisuttimarn L2116 [fl.] (FOF, FU-flowers in spirit, KAG).

Table 1. Comparison of characters among *Gentiana bolavenensis*, *G. ting-nung-hoae*, and *G. laotica*.

Characters	<i>G. bolavenensis</i>	<i>G. ting-nung-hoae</i> <sup>1</sup>	<i>G. laotica</i> <sup>2</sup>
Plant height (cm)	9.5–18.3	1–7(–10)	5–8.5
Leaves	lanceolate, narrowly elliptic, oblanceolate (0.4–)1.1–2.3 × 0.3–0.5 cm	narrowly ovate to linear (0.9–)2.2–2.5(–2.8) × 0.2–0.6 cm	obovate to obovate-oblong, 0.6–2.5 × 0.1–1.0 cm
Length of calyx tube (mm)	4	2.5	4–5
Length of calyx lobe (mm)	6–7	2–3	4–5
Corolla tube	campanulate, 1–1.6 cm	Campanulate-tubular, 1 cm long	urceolate-tubular, ca 1.4 cm long
Color of corolla	light pale blue or pale purple	purplish violet or blue	whitish
Length of stamens (mm)	6	4–4.5	ca 8.2
Length of stigma (mm)	1	2–2.5	ca 1.85

<sup>1</sup> Hul 2003, Toyama *et al.* 2506 (FU), Toyama *et al.* 2859 (FU); <sup>2</sup> Souladeth *et al.*, 2018

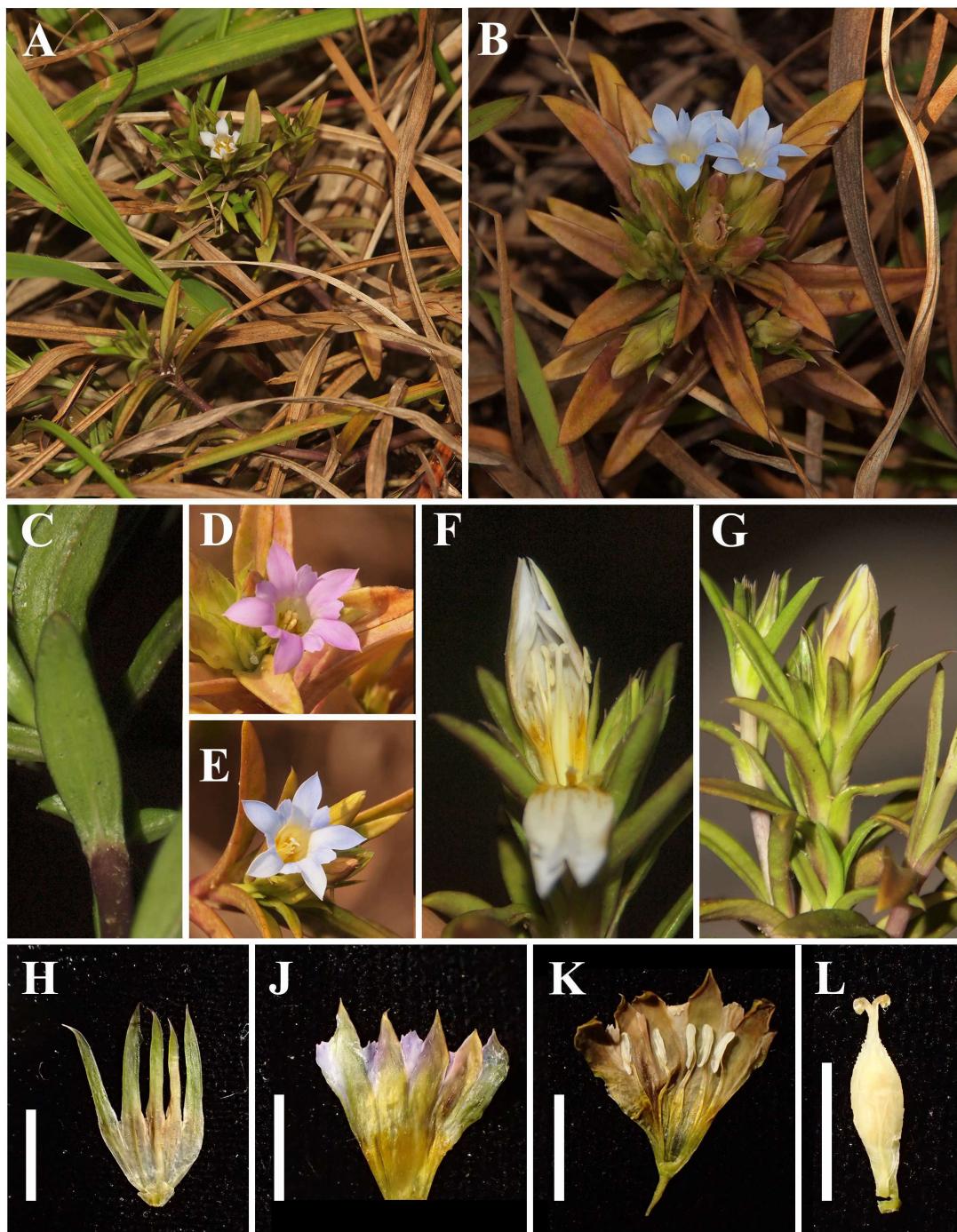


Figure 2. *Gentiana bolavenensis* Nagah., Tagane & Soulad.: A & B. habit; C. abaxial leaf surface; D. pale purple flower, top view; E. light pale blue flower, top view; F. flower opened; G. side view of flower bud; H. calyx opened out; J. outside of corolla opened; K. corolla opened out showing stamens; L. pistil. Scale bars: H–L = 5 mm. H–L from Tagane et al. L2116 (FOF).

**Etymology.**—The specific epithet refers to the Bolaven Plateau where we collected the plant.

**Distribution.**—Laos (so far known only from Dong Hua Sao National Protected Area; Fig. 1).

**Ecology.**—Three small populations each consisting of ca 20–30 individuals were found in the open grasslands on the top of Bolaven Plateau, at altitudes of 1,239 m (15°04'16.2"N, 106°12'35.6"E), 1,260 m and 1,268 m (Fig. 2). From the latter two, we collected the above specimens.

**Phenology.**—In December, most individuals had flower buds. In February, many individuals were in full bloom.

**Vernacular name.**—Wheed Bolaven (ຫວີ່ບໍລິບໍລະຄວນ)(suggested here).

**Preliminary conservation assessments.**—Endangered (EN). The total number of mature individuals we observed is less than 250 individuals, the grassland habitat is under a risk of human disturbance, and this species is qualified as EN based on IUCN Red List criterion D (IUCN, 2018).

## ACKNOWLEDGEMENT

The authors would like to thank the manager and staff of Dong Hua Sao National Protected Area for permitting our botanical inventories in the protected area. We also thank curators of the herbaria BKF, FOF, FU, NHL, KAG for their specimens accessible. This study was supported by Nagao Natural Environment Foundation, from Japan, the Environment Research and Technology Development Fund (4-1601) of the Ministry of the Environment, Japan, and MEXT/JSPS KAKENHI (Grant Number JP15H02640).

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