



***Utricularia furcellata* (Lentibulariaceae): A new record to Bhutan**

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Abstract

Five *Utricularia* species are described in the Flora of Bhutan. During a recent floristic exploration, specimens of *Utricularia* L. were collected from the Cool Broadleaved forests of Dzongkhalum, Trongsa district at an elevation of 2600 m. The specimens identified as *Utricularia furcellata* Oliv. is a new record to Bhutan, which is described and illustrated in this paper. *U. furcellata* is similar to *U. striatula* Sm., but can be distinguished easily by the shape of the lower corolla.

Keywords: Bhutan, conservation status, description, ecology, *Utricularia furcellata*

Introduction

Lentibulariaceae is a cosmopolitan family of carnivorous plants with three currently recognized genera (Stevens, 2001). They are distributed worldwide, with the highest diversity in the tropical regions (Janarthanam and Henry, 1992; Fischer *et al.*, 2004; Shu, 2011) and can be semi-aquatic, terrestrial, lithophytic or epiphytic (Noltie, 2001; Chew and Haron, 2011; Bhowmik and Datta, 2012).

The members of the genus *Utricularia* L. are commonly known as bladderworts and is the largest genus in Lentibulariaceae with about 240 species distributed mostly in the tropical regions and a few in temperate zones (Janarthanam and Henry, 1992; Chew and Haron, 2011). Janarthanam and Henry (1992) reported about 60

species from the Indian subcontinent and 25 species are said to be occurring in China (Shu, 2011). In Bhutan, Noltie (2001) described nine *Utricularia* species of which five species are known to occur in the country. No further study was conducted on the genus until recent exploration. The addition of one species from the current study confirms the presence of six species of *Utricularia* from Bhutan and more are likely to be found and confirmed with further exploration. Detailed morphological description, distribution, phenology, and ecology along with colour photographs of the species are provided in this paper.

Materials and Methods

During a recent floristic exploration in Trongsa district in 2019, the first author collected some interesting specimens belonging to the genus *Utricularia* L. The specimens were keyed out using the Flora of Bhutan (Noltie, 2001) and by referring additional relevant literature (Oliver, 1859; Clarke, 1884; Janarthanam and Henry, 1992). Additionally, the specimens collected were compared with the protologue and images

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of type specimens available at JSTOR Global Plants (<http://plants.jstor.org>). The study confirmed the collected species to be *Utricularia furcellata* Oliv.

Utricularia furcellata is morphologically similar to *U. striatula* Sm., but it can be readily distinguished by the shape of the lower corolla (Figure 2). Noltie (2001) incorporated a brief description of this species in the Flora of Bhutan based on the specimens from Darjeeling (West Bengal) and Sikkim in India, but the occurrence of *U. furcellata* from Bhutan then was unknown. The present collection of the species from Trongsa district confirms the distribution of species in Bhutan.

Photographs of the habit and macro-morphological characters were taken in the field using Nikon D3400 camera. Morphological observations and measurements of different parts of the plants are based on the living plants

and fresh material observed in the field. A microscope was used to observe the minute morphological parts. The descriptions are based on living specimens (Figure 1). The voucher specimens are deposited at the National Herbarium (THIM), National Biodiversity Centre, Thimphu, Bhutan.

Results and Discussion

Taxonomy

Utricularia furcellata Oliv., J. Proc. Linn. Soc., Bot. 3: 189 (1859); *Utricularia furcellata* Oliv. var. *minor* C.B. Clarke in Hooker, f., Fl. Brit. India 4: 334, 1884.

Type: Boga Pani, Khasia Mts., India, 27.10.1850, Hooker, J.D. #2534; lectotype K; Isotypes G, M).

Description: Annual herb, litho-phytic, simple or sparsely branched, 1-4 cm tall. **Leaves:** petiole 2-5 mm long, terete, pale

green; lamina rosette, orbicular or reniform to obovate, 2–3.0 x 1-4.0 mm, fleshy, margin entire, apex rounded, base truncate to rounded, veins dichotomous, pale green to green. **Traps** white, few on rhizoids, ovoid, c.1.2 mm long, sub-sessile to minutely stalked, mouth lateral with dorsal bifid appendages, internal hairs 4-armed. **Inflorescences** with erect racemes up to 7 cm long, often glandular at base, 1-5-flowered; peduncle glabrous, 0.3-2 cm long, terete, green, greenish-yellow with age, scale absent; rachis 0.3-1 cm long; bracts c.0.5-0.7 mm long, lanceolate, constricted near base, both ends free, acute at apex; bracteoles c.1 mm long, similar to bracts but slightly curved. **Flowers** 4-5 x 3-4 mm; pedicels 1-3 mm long, terete, erect in flower, spreading in fruit. **Calyx-lobes** purplish red to white, unequal, upper one much larger; upper lobe reddish in the middle, light pinkish-white at periphery, orbic-

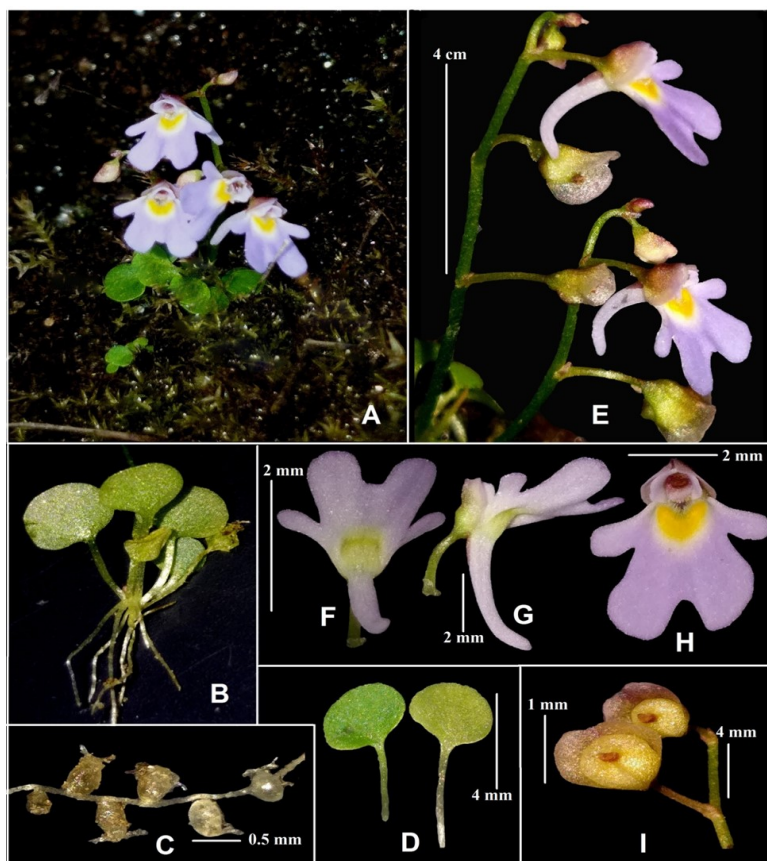


Figure 1: *Utricularia furcellata* Oliver: A. Habit; B. Roots with Rosette Leaves; C. Traps on rhizoid; D. Adaxial and abaxial views of the leaves; E. Inflorescences; F. Abaxial view of flower; G. Side view of flower; H. Adaxial view of flower; I. Fruit with upper calyx attached to the pedicel. Photographs and Plate designed by Phub Gyeltshen.

ular to broadly obcordate, 1.5-2 x 2.2-4 mm, cucullate, emarginate at apex; lower lobe narrowly-ovate to oblong-lanceolate, c.1 x 0.3-0.5 mm, reddish when young, pale white with age; apex rounded or obtuse, nerves absent. **Corolla** white or pale purple, horse shoe-shaped band and a yellow patch at the base of the lower lip; lateral lobes distinctly smaller than the apical pairs; upper lip transversely widely oblong, c.1.3 x 2 mm; apex shortly 2-lobed, slightly shorter than the upper calyx lobe; lower lip oblong to oblong-ovate in outline, 2.5-3.5 x 3-4 mm, 4-lobed, palate fringed with hairs, apex rounded to broadly obtuse. **Spur** short, subulate, 3.5-4.5 x c.1 mm, channelled, straight to slightly curved, apex broadly acute. **Filaments** curved to slightly straight c.0.5 mm. **Pistil** 1.2 mm long; **Capsules** globose 1.5-2.5 mm across, obliquely ovoid, attached to upper calyx-lobe at the base, keeled on ventral surface; **Seeds** ovoid to ellipsoid c.0.5 mm long; glochidiate hairs present.

Specimens examined: BHUTAN: Trongsa, Dzongkhalum, 27°27'41.39"N, 90°29'48.33"E, 2000 m elevation, *P. Gyeltshen* 012-14, 10 October 2019 (THIM).

Global distribution: India, China, Malaysia, Thailand and Bhutan (Dzongkhalum)

Phenology: Flowering and fruiting in August–

November.

Habitat: Lithophytes exposed damp rocks associated with mosses up to 2000 m elevation in

Conservation status

Field investigations show that this species prefers rocky habitats along roadsides. The original habitat could have been disturbed or changed due to developmental activities such as road expansion and maintenance. Currently, as only one population consisting of c.300 individuals is observed, this species is categorized as data deficient. Additional inventory is required for better understanding of the distribution and population trend of the species

Taxonomic notes

Utricularia furcellata (Lamiales: Lentibulariaceae) was first described by D. Oliver in 1859 from the mountains of Khasia, Boga Panee, India, where the type specimens were collected. It is native to East Himalaya, South-Central China, and Thailand. *U. furcellata* Oliv. is similar to *U. striatula* Sm., but the former prominently differs by its lower corolla with four lobes and narrowly-ovate to oblong-lanceolate lower calyx lobes. The key morphological differences between *U. furcellata* and its closely related taxon *U. striatula* is presented in Table 1.

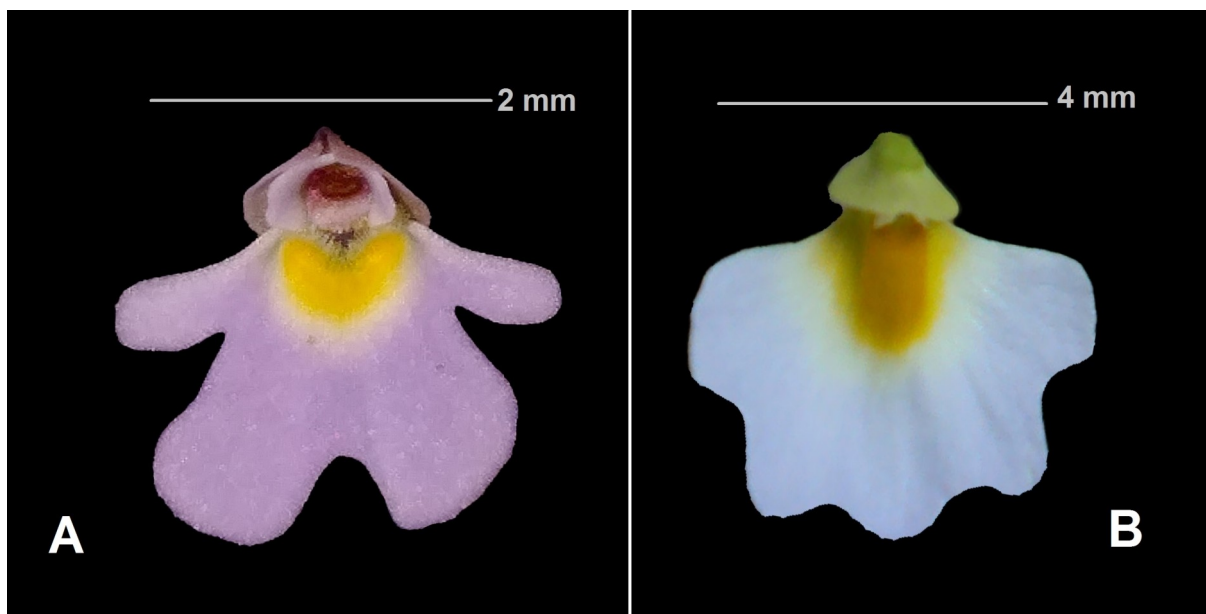


Figure 2: Adaxial view of *Utricularia striatula* (A) and *Utricularia furcellata* (B) flowers.

Table 1: Comparison of the key characters of *Utricularia furcellata* and *U. striatula*

Characters	<i>Utricularia furcellata</i>	<i>U. striatula</i>
Leaf	2–3.0 x 1-4.0 mm, base truncate to rounded	c.2 x 1.8-2.4 mm long,
Lower Calyx lobe	Narrowly-ovate to oblong- lanceolate	Oblong to ovate
Upper Calyx lobe	Transversely widely oblong, apex shortly 2-lobed	Semi-orbicular to deltoid
Lower Corolla lobe	4-lobed, 3-4 mm wide	5 lobed, 4-8 mm wide
Capsules	Globose to obliquely ovoid, 1.5-2.5 mm across	Subglobose, c.1.7 mm across
Seeds	Ovoid to ellipsoid c.0.5 mm	Pear-shaped, c.0.3 mm

Conclusion

Utricularia furcellata is reported here as a new record to Bhutan. With the addition of *U. furcellata* from the present study, the current number of *Utricularia* species in Bhutan stands at six. Currently, it is known from only one location but with additional exploration, we expect to find this species in other locations of the country on similar habitats.

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