

# New Distributional Records of *Utricularia striatula* Smith (Lentibulariaceae) in Mindanao, Philippines

Mark Arcebal K. Naive<sup>1</sup>, Dave P. Buenavista<sup>2,3</sup> and Noe P. Mendez<sup>2\*</sup>

## KEY WORDS : ABSTRACT

Bladderwort  
Bukidnon  
Carnivorous plant  
Lithophytic

*Utricularia striatula* (Lentibulariaceae) is reported for the first time in the Southern Philippines and represents a new record for Mindanao Island. Full descriptions of the species, its habitat ecology, along with photographs are provided.

## INTRODUCTION

Bladderworts are small carnivorous plants belonging to the Lentibulariaceae. This group is represented by three genera with 280 species distributed throughout the world with the greatest species richness in the tropical regions (Taylor, 1989; Fischer et al., 2004). These plants are commonly found as epiphytic plants inhabiting a wide range of habitats including wet grounds, ponds, lakes, and other marshy areas and seasonal deserts (Bhowmik & Datta, 2012). In the Philippines, the bladderwort family is represented by a single genus, *Utricularia* L. with nine species (Pelser et al., 2011).

*Utricularia* is a cosmopolitan genus of small carnivorous herbs of wet habitats with minute submerged or subterranean suction traps (Ridley, 1923). They are distributed mostly in the tropics and subtropics; only a few are temperate (Cook, 1996). This plant group was first described by Linnaeus (1753) in "Species Plantarum" with seven species and has remained poorly known until the first monograph of this genus was published (Taylor, 1989). This was then followed by several discoveries of new taxa (Janarthanam & Henry, 1992; Yadav et al., 2000; Parnell, 2005; Rahman, 2005; Yadav et al., 2005; Hu et al., 2007; Lowrie et al., 2008; Zamudio & Olvera, 2009).

In December 2016, a small population of what was suspected to be a new *Utricularia* species was discovered in two localities, namely Barangay Kibalabag in Malaybalay City and Barangay San Jose in Quezon municipality, both in the province of Bukidnon. Field collection of voucher specimens and taxonomic identification were carried out using plant samples and spirit collection of the flowers. Morphological examination showed that the specimens conformed to the description of *Utricularia striatula* Smith, commonly known as the striped bladderwort (Verma et al., 2014). *U. striatula* is a widely distributed species but was previously known and recorded only in some provinces on Luzon island and in Negros Occidental on Negros Island in the Philippines (Pelser et al., 2011 onwards). Thus, this present paper reports on the extended Philippine distribution with additional notes on the habitat ecology of *U. striatula* specifically from the province of Bukidnon on Mindanao island. Herbarium specimens and spirit collection were deposited at the Central Mindanao University Herbarium (CMUH), Musuan, Bukidnon, Philippines.

*Utricularia striatula* Smith. Rees, Cyclop. 37 (1819) no. 17 (Fig. 1)

Small, perennial lithophytic herbs, reaching up to 8 cm tall, variously and microscopically papillose; **Rhizoids** up to 2.5 cm long, simple, few; stolons up to 9 cm long, simple, rarely branched, glandular. **Foliar** organs with pseudopetiole, up to 15 mm long, orbicular to obovate, rosulate at scape base, scattered on stolons, expanded portion up to 5 mm across, veins dichotomously branched. **Traps** up to 1.5 mm across, globose to obliquely ovoid; mouth lateral; appendages glandular, hairy, on expanded, divergent upper lip. **Racemes** up to 10 cm long, erect, often zigzag, glabrous to sparsely glandular, up to 10-flowered;

<sup>1</sup>Department of Biological Sciences, College of Science and Mathematics, Mindanao State University-Iligan Institute of Technology, Iligan City, 9200 Lanao del Norte, Philippines

<sup>2</sup>Department of Biology, College of Arts and Sciences, Central Mindanao University, University Town, Musuan, 8710 Bukidnon, Philippines

<sup>3</sup>Department of Environment, Natural Resources and Geography, Bangor University, Bangor, Gwynedd, LL57 2UW, Wales, U.K.

\*Corresponding author: npolomendez@gmail.com

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**Table 1.** *Utricularia* species present in the Philippines (Based on Taylor, 1977; Taylor, 1989; Lal et al., 2003; Pelsner et al., 2011 onwards; Landsdown et al., 2013).

SPECIES	ELEVATION	DISTRIBUTION	HABITAT
<i>U. aurea</i> Lour.	near sea level to 2700 masl	India to China, Taiwan, and Japan through Malesia to tropical Australia. Philippines (Northern Luzon (Cagayan, Palawan and Mindanao)	A long shallow lake margins, sluggish streams, swamps, inundated rice paddies at low and medium elevation, pools, river backwaters, rice fields
<i>U. australis</i> R. Brown	1300-2500 masl	W Europe to China and Japan, tropical and S Africa, India, Sri Lanka, Sumatra, Java, Philippines, New Guinea, Australia	Lakes, pools, river backwaters, ditches rice fields
<i>U. baouleensis</i> A. Chevalier	near sea level	Tropical Africa from Mali to Mozambique, Madagascar, India, Hainan, Thailand, E Java, Philippines (Luzon)	Wet grasslands, rice fields
<i>U. bifida</i> Linnaeus	near sea level to 1400 masl	India to China and Japan, Indochina, Malesia (not recorded in Sunda Islands, but present in Kangean Islands or Moluccas, but common elsewhere) to N Australia.	Swamps or marshes, wet soils, rocks, rice fields
<i>U. caerulea</i> Linnaeus	near sea level to 2000 masl	India to China and Japan, across Malesia (not recorded in Sunda Islands and Sulawesi) to Australia	Damp or wet open sites, Wet rocks, swamps, stream sides, rice fields, wet grassland, damp places
<i>U. exoleta</i> R. Brown	N/A	Tropical Africa, Portugal, India to China and Japan, across Malesia (but unrecorded from the Lesser Sunda Islands)	Shallow still water in lakes, swamps and marshes, usually at low altitudes
<i>U. heterosepala</i> Benj.	N/A	Philippines (Luzon, Palawan, Sibuyan)	Lowlands to medium altitudes, lithophytic in damp forests and along streams and creeks
<i>U. minutissima</i> Vahl	near sea level	India to China and Japan, Indochina, Sumatra, Peninsular Malaysia, Borneo, Philippines, New Guinea	Sandy soil in open areas, grassy places, wet rocks; near sea level.
<i>U. striatula</i> Smith	400-3600 masl	Indonesia, Malaysia, Myanmar, Nepal, Papua New Guinea, Philippines, Sri Lanka, Thailand, Vietnam; tropical Africa, Indian Ocean islands (N Andaman Islands), northeast India (Meghalaya, Nagaland, Sikkim)	Damp rocks, tree trunks



**Figure 1.** *Utricularia striatula* Smith. A) Habit; B) Close-up (anterior) view of the flower; C) Close-up (lateral) of the flower. Photos provided by MAKN and NPM.

**Scales** if present 1-1.5 mm long, medifixed; **Bracts** 0.6-2 mm long, medifixed, constricted at the middle, limbs unequal; bracteoles 0.7-1.5 mm long, medifixed, limbs unequal; **Flowers** up to 10 mm long; **Pedicels** 1.5-7 mm long, filiform, spreading in anthesis, spreading or recurved in fruit, papillose in least in fruiting. **Calyx** lobes highly unequal, papillose; upper lobe 1.2-4 x 2-4 mm, obovate to obcordate, emarginate, truncate or obtuse at apex; lower lobe 0.6-2 x 0.4-2 mm, oblong to ovate, truncate, notched or rounded at apex. **Corolla** pink, lilac, violet, white to variously tinged, often yellow blotched near base; upper lip 0.6-2 mm across, semi-orbicular to deltoid, bidentate, truncate or irregular at apex; lower lip 3-7 x 3-10 mm, 3- or 5-lobed, throat hairy, base raised or flat, rounded or truncate at apices of lobes; spur 1-6 mm long, cylindrical or conical, rarely reduced to a mound, obtuse, acute or retuse at apex. **Stamens** up to 1.2 mm long; filaments strap-shaped, curved; anther thecae subdistinct. **Pistil** up to 1.2 mm long; ovary obliquely ovoid, attached to base of upper calyx-lobe; style distinct; stigma 2-lipped, lower lip oblong to semi-orbicular, upper lip obsolete. **Seeds** 0.3-0.4 mm long, clavate, cylindrical or oblong, attached radially to placentum, glochidiate.

**Habitat/Ecology:** In Barangay Kibalabag (8°13'38"N, 125°9'49"E), Malaybalay City, Bukidnon, the populations of *U. striatula* species were observed to be growing in an open damp area near the waterfalls and attached to the rocks (lithophytic) at an elevation 500-600 masl. On the other hand, the populations examined from Barangay San Jose (7°42'22" N, 125°01'50"E), Quezon, Bukidnon were growing on karst rocks often associated with bryophytes along the Pulangui

river at an elevation 326 masl. Other reports of *U. striatula* populations were observed associated with mosses and blue green algae along the road sides in Maredumilli Forest in India (Prakasa Rao et al., 2014), steep stony road side slope with seepage water, growing with liverworts and cyanophytes in a locality south of Bomdila in India (Liden & Bharali, 2014), growing on wet rock or even on tree trunks in northeast India (Verma et al., 2014) and can be found from sea level to the highest peak of Gunung Tahan, usually in acidic conditions in Peninsular Malaysia (Chew, 2009, 2010).

The body plan of *Utricularia* species is peculiar, plastic and unique among flowering plants. It is capable of changing its resources investment to match varying water chemistry, irradiance level and prey availability (Jobson & Morris, 2001; Adamec, 2007). Thus, the preferential occurrence of *U. striatula* near bodies of water may be due to the availability of the plant's common prey such as rotifers, tardigrades, and copepods among others which are sources of macronutrients (nitrogen and phosphorus) (Poppinga et al., 2016).

**Global Distribution:** Tropical Africa (but apparently absent from Madagascar), India to China, Indochina and throughout Malesia (Taylor, 1977, 1989). Other *Utricularia* species present in the Philippines are summarized in Table 1.

**Distribution within the Philippines:** LUZON: Banawe, Mountain Province, Albay Province, Quezon Province, Romblon Province, Aurora Province; VISAYAS: Negros Occidental Province (Pelser et al., 2011 onwards); and

MINDANAO: Bukidnon Province (present study).

**Specimens examined:** Southern Bukidnon: Quezon, Barangay San Jose, Blue Water & Northern Bukidnon: Malaybalay City, Barangay Kibalabag, Kibalabag Falls, MAKN15-2017, 30 December 2016 (CMUH: 00010863).

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