SHORT COMMUNICATION

NEW RECORD OF BLUE-EYED EASTERN SPADEFoot TOAD
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26 February 2019 | Vol. 11 | No. 3 | Pages: 13385–13389
DOI: 10.11609/jott.4134.11.3.13385-13389
NEW RECORD OF BLUE-EYED EASTERN SPADEFOOT TOAD
*LEPTOBRACHIUM BOMPU* (AMPHIBIA: MEGOPHYRIIDAE) FROM SARPANG DISTRICT IN BHUTAN

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Abstract: This study provides the first report of *Leptobrachium bompu* Sondhi & Ohler, 2011 from Bhutan. The species was recorded from Simkhar watershed in Jigmecholing under Sarpang District, at an elevation of 1,610m. Simkhar Stream is small and perennial, shaded and swampy, with a few moss-laden flat stones along the course, and is pollution-free and slow-flowing. The current report extends the distribution record of *L. bompu* towards the east and will help in understanding the range and conservation status of the species.

Keywords: Habitat, Jigmecholing, litter frogs, Megophryids, morphometric measurements, Simkhar watershed.

Megophryids are known as litter frogs and are native to warm southeastern Asian countries from the Himalayan foothills to Indonesia and Greater Sunda Islands in maritime southeastern Asia up to the Philippines (Zweifel 1998). There are currently 230 species in five genera assigned to Megophryidae Bonaparte, 1850 (Frost 2019) in the world, out of which seven species are reported from Bhutan (Wangyal 2014). The Eastern Spadefoot Toad genus *Leptobrachium* was described by Tschudi (1838) and is known to consist of 36 species (Frost 2019).

*Leptobrachium bompu* was described by Sondhi & Ohler (2011) from Eagle-nest Wildlife Sanctuary in Arunachal Pradesh, India. The distribution of the species was further extended to Talle Village Wildlife Sanctuary in Arunachal Pradesh (Saikia et al. 2017) and Upper Medog in Tibet, China (Liang et al. 2017). This paper presents the first report of the species in Bhutan along with information on its morphometry and habitat.

Materials and Methods
Study area
Simkhar watershed in Jigmecholing under Sarpang District is located within 27.031–27.054°N & 90.495–90.497°E at an elevation ranging from 1,160–2,646 m (Fig. 1). Geographically, Simkhar watershed falls within biological corridor no. 3, which covers the corridor of Jigme Singye Wangchuck National Park (JSWNP) in the north and Royal Manas National Park (RMNP) towards the east, and runs down to Pibsoo Wildlife Sanctuary in southern Bhutan (Tenzin & Dhendup 2017; Tenzin et al. 2018). Floristically, the study area comprises subtropical broad-leaved forests at the...
lower altitudes (1,000–2,000 m) to warm temperate forests at the upper altitudes (2,000–2,500 m), which support diverse biologic fauna (Oshawa 1987). Besides its rich biodiversity, Simkhar River has seven major tributaries with more than 10 secondary tributaries that drain to the Mouchu River basin and finally reach the Brahmaputra in Assam.

Morphometric measurements of specimens

All morphometric measurements were taken with a digital calliper under a microscope. All the morphometric measurements used by Sondhi & Ohler (2011) based on one male specimen, Liang et al. (2017) collected from seven specimens, and one male specimen of Saikia et al. (2017) were taken for comparison. Habitat description was recorded. Abbreviations for morphometric measurements taken are provided in Table 1.

Specimen was collected following standard protocol where specimen was euthanized using 0.001% clove oil and treated in 10% formalin for short-time preservation after taking photographs when alive (Gurung et al. 2012; Tenzin & Dhendup 2017). The specimens were deposited in the museum collection of the Laboratory of the College of Natural Resources (CNR), Lobesa, in Punakha District, Bhutan.

Abbreviations: SVL - snout vent length; EL - eye length; EN - anterior eye corner to nostril distance; HL - head length; HW - head width; IBE - distance between posterior eye corners; IFE - distance between anterior eye corners; IN - internarial distance; IUE - maximum distance between upper eyelids; MBE - posterior mandible corner to posterior eye corner distance; MFE - distance from posterior mandible corner to anterior eye corner; MN - distance from posterior corner of mandible to nostril; NS - snout tip-nostril distance; SL - snout length; UEW - maximum width of the upper eyelid; FLL - forelimb length between elbow to base of outer palmer tubercle; HAL - hand length from base of outer palmer tubercle to the tip of the third finger; FFTF - distance from maximum incurvation of web between proximal phalanges and metacarpal bone of the third finger; Fw3 - width of third finger at mid length; FFTF - distance from maximum incurvation of web between fourth and fifth toe to tip of fourth toe; FL - femur length
Record of *Leptobrachium bompu* from Bhutan  

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Results and Discussion

*Leptobrachium bompu* was known only from Bompu (27.116°N & 92.684°E; altitude 1,940m), the northernmost distribution limit of the genus *Leptobrachium* (Frost 2016) (Image 1). The new discovery of *L. bompu* in Upper Medog moved the northern limit to northern latitude 29.254°N, 338km (crow-fly distance) from Bompu. A solitary *L. bompu* was spotted coincidentally during the field survey of *Nanorana leibigii* (Gunther, 1864) at Pakhola (27.034°N & 90.494°E) in Jigmecholing under Sarpang District on 26 April 2015, at an altitude of 1,610m. With this new record, Bhutan now has 57 amphibian species (Wangyal 2014). This record extends the record of the species eastward from it known range.

Pakhola is one of the primary tributaries of Simkhar River where herpetofauna are mostly prevalent due to the presence of natural lakes and swampy areas around the lake at the stream head. Many species congregate in this area, especially when there is water scarcity in winter. The area was unexplored and the richness of its biodiversity unknown until 2014 when the first presence...
Table 1. Morphometric comparison among four specimens

| Variables (in mm) | Specimen in current study | Specimen of Liang et al. 2017 | Specimen of Saikia et al. 2017 | Holotype of Sondhi & Ohler 2011 |
|------------------|---------------------------|-------------------------------|-------------------------------|---------------------------------|
| EL               | 6.5                       | 6.4                           | 6.5                           | 6.5                             |
| EN               | 3.5                       | 3.9                           | 3.0                           | 4.8                             |
| FFTF             | 9.7                       | 8.7                           | 9.6                           | 9.6                             |
| FL               | 27.0                      | 21.8                          | 18.6                          | 24.4                            |
| FLL              | 12.3                      | 12.3                          | 12.2                          | 12.2                            |
| FOL              | 19.9                      | 17.5                          | 19.8                          | 19.8                            |
| FTL              | 9.0                       | 8.2                           | 8.7                           | 8.7                             |
| Fw3              | 1.3                       | 2.3                           | 0.9                           | 1.2                             |
| HAL              | 12.9                      | 15.6                          | 10.8                          | 12.8                            |
| HL               | 18.6                      | 21.9                          | 15.6                          | 16.9                            |
| HW               | 20.0                      | 23.6                          | 18.2                          | 18.8                            |
| IBE              | 15.4                      | 17.0                          | 15.4                          | 14.0                            |
| IFE              | 7.9                       | 8.9                           | 8.1                           | 6.3                             |
| IMT              | 3.2                       | 3.4                           | 2.3                           | 3.0                             |
| IN               | 5.6                       | 5.2                           | 4.4                           | 4.7                             |
| ITL              | 3.4                       | 3.7                           | 2.3                           | 3.4                             |
| IUE              | 5.7                       | 5.9                           | 5.8                           | 5.4                             |
| MBE              | 5.1                       | 7.6                           | 4.2                           | 5.0                             |
| MFE              | 11.1                      | 14.2                          | 10.0                          | 11.0                            |
| MN               | 13.9                      | 17.9                          | 13.1                          | 13.5                            |
| MTFF             | 7.2                       | 7.1                           | 6.8                           | 4.3                             |
| MTTF             | 7.1                       | 1.8                           | 11.0                          | 4.7                             |
| NS               | 4.8                       | 4.6                           | 3.8                           | 5.5                             |
| SL               | 7.7                       | 8.7                           | 7.5                           | 7.6                             |
| SVL              | 44.8                      | 51.8                          | 42.6                          | 47.0                            |
| TFL              | 7.8                       | 7.6                           | 6.4                           | 6.4                             |
| TFOL             | 27.0                      | 31.1                          | 24.9                          | 27.3                            |
| TFFT             | 10.5                      | 9.1                           | 10.4                          |                                  |
| TL               | 18.3                      | 20.8                          | 17.9                          | 20.9                            |
| TW               | 5.8                       | 6.7                           | 4.4                           | 5.7                             |
| Tw4              | 1.2                       | 2.1                           | 0.9                           | 1.3                             |
| UEW              | 3.9                       | 5.5                           | 3.9                           | 3.9                             |

of *Nanorana leibigii* (Gunther, 1860) was recorded from Simkhar River (Tenzin & Dhendup 2017). Our current record of *L. bompu* from the same stream suggests that Simkhar watershed is likely to have rich amphibian diversity.

**Habitat characteristics**

*Leptobrachium bompu* was found under a moss-laden flat stone near a shaded and swampy, pollution-free and slow-flowing perennial stream in Pakhola (Image 2).

The habitat is on the leeward side in a wet subtropical broad-leaved forest (1,000–2,000 m) (forest types as Oshawa 1987) dominated by *Castanopsis hystrix*, *Beilschmiedia gammieana*, *Quercus lamellosa*, *Q. glauca*, *Lithocarpus elegans*, and *Syzygium formusa*. Additionally, as undergrowth, *Elatostema platyphyllum*, *Chimonobambusa callosa*, *Cephalostachyum latifolium*, and *Plectocomia himalayana* were abundant along the banks of the perennial streams. Meanwhile, the riparian area was mostly covered by bamboo thickets *Chimonobambusa callosa* and *Cephalostachyum*
latifolium, Ligustrum confusum, Elatostema platyphyllum, and Acconogonon molle. The streams have a total length of 1.42km, of which L. bompu was recorded from only one location (Image 1), which indicates the rarity of its population as per Saikia et al. (2017), WWF (2015), and Sondhi & Ohler (2011).

Sondhi & Ohler (2011) found L. bompu under leaf litter in small, slow-flowing perennial streams near campsites of Bompu in Eaglenest Wildlife Sanctuary, Arunachal Pradesh (27.116°N & 92.684°E at an altitude of 2,000m), while Saikia et al. (2017) recorded the species from damp and moist areas near hill streams at Pange Forest (27.546°N & 93.895°E, 1,926m) in Talle Valley Wildlife Sanctuary, Arunachal Pradesh, India. Liang et al. (2017) found seven male adults of the species from Gelin Village (29.224°N & 95.185°E, 1,600m) and Buqiong Lake (29.254°N & 95.224°E, 1,455m) in China within upper reaches of small streams (less than 1m) and tadpoles from lower reaches of two streams in broad-leaved forests. This suggests that L. bompu probably prefers moss-laden rocks for hiding, damp and swampy areas for sustenance, and slow-flowing hill streams for breeding and reproduction purposes, and that it can be located only during monsoons owing to its increased activity (Saikia et al. 2017).

In the current study, L. bompu was recorded at 1,610m, which is lower than the findings of Sondhi & Ohler (2011) and Saikia et al. (2017), but higher than Liang et al. (2017). This indicates that L. bompu may have an elevation range from 1,455–2,000 m, but it still requires extensive study within these geographic ranges in the future. In Bhutan, L. bompu was spotted from wet sub tropical forests (forest type as per Oshawa 1987), while holotypes and the second specimen were spotted from the same transition forest between eastern Himalayan subtropical wet hill forest in lower altitudes and eastern Himalayan wet temperate forest at higher altitudes of Arunachal Pradesh, India (forest type as per Champion & Seth 1968). Likewise, Liang et al. (2017) also recorded the species from the broad-leaved hill streams of Medog in Tibet, China. This suggests that L. bompu prefers hill streams of the wet sub-tropical broad-leaved forest as its niche habitat. The rarity of this population mandates a separate study on abundance, distribution patterns, and conservation threats for adopting long-term conservation of this species.

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