



# Systematic list of Genus *Megophrys* Kuhl and van Hasselt, 1822 (Amphibia : Anura : Megophryidae) in Meghalaya, North-East India with a discussion on the distribution of *M. wuliangshanensis* Ye and Fei, 1995 in India

Ilona Jacinta Kharkongor<sup>1\*</sup>, Bhaskar Saikia<sup>2</sup> and Rita Deb<sup>2</sup>

<sup>1</sup>North Eastern Regional Centre, Zoological Survey of India, Shillong – 793014, Meghalaya, India; [ilona.kharkongor@gmail.com](mailto:ilona.kharkongor@gmail.com)

<sup>2</sup>Southern Regional Centre, Zoological Survey of India, Chennai – 600028, Tamil Nadu, India

## Abstract

The recent descriptions and range extensions of many species of genus *Megophrys* have raised the number of species in Meghalaya from two to eight. While *M. boettgeri* was removed from the faunal list of India in 2013, a recent report on its occurrence in Meghalaya needs to be verified. Considerable doubts have been raised regarding the range extension of *M. wuliangshanensis* into India in recent years. Discussions on the distributional records of this species from India are provided and re-examination of a few specimens identified as *M. wuliangshanensis* by previous workers have also been done. A common name for *M. oropedion* is also proposed.

**Keywords:** Amphibia, Distributional, *Megophrys boettgeri*, Shyllong horned toad

## Introduction

North-East India, which comprises of Meghalaya and seven other hilly States, falls under the confluence of two biodiversity hotspots of the world, viz the Himalaya and the Indo-Burma (<http://www.bsienviis.nic.in/>). The north-eastern biodiversity, therefore, shows a marked difference from the mainland Indian biodiversity, as it has more affinity with South East Asia, geographically as well as biologically. One such instance can be found in the distribution range of the Genus *Megophrys*, which is predominantly a South East Asian frog genus, extending only into the north-eastern region of India (Frost, 2018).

In recent times, several research works on the amphibian fauna of Meghalaya relating to new discoveries (Mahony *et al.*, 2011 and 2013) or range extensions (Saikia and Sen, 2012; Sangma and Saikia, 2015) of *Megophrys*

have been published. With these published accounts the number of species under the genus *Megophrys* from Meghalaya have gone up from two (Mathew and Sen, 2010) to eight. Recently, the authors have come across a few specimens of this genus from Shillong, which includes a recently described species, *M. oropedion* Mahony *et al.*, (2013). The authors have perused the identified specimens present in the National Zoological Collection of Zoological Survey of India, Shillong, and the literature of recent works from the State, and the outcome of the study is this systematic list of genus *Megophrys* from Meghalaya.

A discussion on the distribution of *M. wuliangshanensis* in North East India is also included as considerable doubts regarding its range extension into India has been raised in recent times (Fei and Ye, 2016; Frost, 2018).

\* Author for correspondence

**Systematic List**

Class AMPHIBIA

Order ANURA

Family MEGOPHRYIDAE

**1. *Megophrys boettgeri* (Boulenger, 1899)****Boettger's Pelobatid Toad**

1899. *Leptobrachium boettgeri* Boulenger, *Proc. Zool. Soc. London*: 171 (Type locality: "Kuatun, a village about 2700 miles from Foochow, in the mountains at the North-west of the Province of Fokien (=Fujian), at an altitude of 3000 to 4000 feet or more", China.)

*Material examined*: Nil.

*Distribution*: INDIA: Meghalaya. *Elsewhere*: China.

*Remarks*: Mahony *et al.* (2013) has raised doubts about the existence of this species in India, and commented that the previous reports could be a result of wrong identifications. However, Sangma and Saikia (2015) have reported (along with two photographs and a brief description) this species from Tura Peak Reserve Forest, West Garo Hills district of Meghalaya as a new record from the State. We are of the opinion that further detailed study on the 'identified' specimens will help to resolve the ambiguity in the range extension of this species into India. However, for the time being, we are including this species in the amphibian checklist of Meghalaya.

**2. *Megophrys glandulosa* (Fei, Ye and Huang, 1991)****Glandular Horned Toad** (Figure 8, Plate-IV)

1990. *Megophrys glandulosa* Fei, Ye & Huang. *Key to Chinese Amphibians. Chingching, China*, 99: 273 (Type locality: Wuliang Shan, Jingdong, Yunnan Province, China)

*Material examined*: 1 ex. (Regn. No. V/A/NERC/1216), Reserve Forest, Upper Risa Colony, Shillong, East Khasi Hills District, Meghalaya, 09.05.2006, Coll. I. J. Kharkongor and party.

*Distribution*: INDIA: Nagaland and Meghalaya. *Elsewhere*: Bhutan, China and Myanmar.

*Remarks*: Recently reported from Meghalaya (Sangma and Saikia, 2015). This species is not easily encountered in the field.

**3. *Megophrys major* (Boulenger, 1908)****Major's Horned Toad** (Figure 1 and 2, Plate-I)

1908. *Megalophrys major* Boulenger, *Proc. Zool. Soc. London*: 416 (Replacement name of *Xenophrys gigas* Jerdon, 1870).

*Material examined*: 1 ex. (Regn. No. V/A/ERS-912) Near Living Root bridge Mawshamok village, East Khasi Hills District, Meghalaya, 30.08.2009, Coll. A. Rana and party.

*Distribution*: INDIA: Arunachal Pradesh, Assam, Nagaland, Manipur and Meghalaya. *Elsewhere*: Bhutan, China, Thailand, Cambodia, Laos, Vietnam and Myanmar.

*Remarks*: Recently reported from Meghalaya (Sangma and Saikia, 2015).

**4. *Megophrys megacephala* Mahony, Sengupta, Kamei and Biju, 2011****Big-headed Horned Frog**

2011. *Megophrys megacephala* Mahony, Sengupta, Kamei and Biju, *Zootaxa*, 3059: 37 (Type locality: "Basistha Road, approx. 5 km south of Basistha temple, East Khasi Hills, northern Meghalaya, India")

*Material examined*: Nil.

*Distribution*: INDIA: Meghalaya and Assam. *Elsewhere*: Not reported

*Remarks*: Recently described from Meghalaya. The Type locality is apparently in Ri Bhoi District in the northern part of Meghalaya, along its border with Assam, and not East Khasi Hills.

**5. *Megophrys oropedion* Mahony, Teeling and Biju, 2013****Shyllong Horned Toad** (Figure 3 and 4, Plate-II)

2013. *Megophrys oropedion* Mahony, Teeling & Biju. *Zootaxa*, 3722: 151 (Type locality: "Um Risa stream", Malki forest, Shillong, East Khasi Hills, Meghalaya, India.)

*Material examined*: 1 ex. (Regn. No. V/A/NERC-1217) Umlyngka village, Upper Shillong, East Khasi Hills District, Meghalaya, 31.10.2015, Coll. S. Swell and T. Marweñ.

*Distribution*: INDIA: Meghalaya. *Elsewhere*: Not reported

*Remarks:* Recently described from Meghalaya. Proposed common name “Shyllong Horned Toad” is based on the location of the Type locality in the foothills of Lum Shyllong (=Shillong Peak).

#### 6. *Megophrys parva* (Boulenger, 1893)

##### Concave Crowned Horned Toad (Figure 5, Plate-III)

1893. *Leptobrachium parvum* Boulenger, Ann. Mus. Civ. Stor. Nat. Genova, (2) 13: 304-347. (Type locality: “District of Karin Bia-po”, Myanmar)

*Material examined:* 1 ex. (Regn. No. V/A/ERS-251) Kanchan Chiring, Songsak Reserve Forest, East Garo Hills District, Meghalaya, 07.11.1978, Coll. Inger; 1 ex. (Regn. No. V/A/ERS-409) St. Edmund’s School Campus, Shillong, East Khasi Hills District, Meghalaya, 07.05.2003, Coll. K. K. Deb; 2 ex. (Regn. No. V/A/ERS-514) Risa Colony, Shillong, East Khasi Hills District, Meghalaya, 10.07.2003, Coll. R. Mathew; 1 ex. (Regn. No. V/A/ERS-528) Motinagar, Shillong, East Khasi Hills District, Meghalaya, --.06.2003, Coll. R. Mathew; 4 ex. (Regn. No. V/A/ERS-749) Mawphlang and around, East Khasi Hills District, Meghalaya, 02.08.2006, Coll. R. Mathew & party; 1 ex. (Regn. No. V/A/ERS-780) Risa Colony, Shillong, East Khasi Hills District, Meghalaya, 26.09.2005, Coll. Roselind Mathew; 7 ex. (Regn. No. V/A/ERS-790) Motinagar, Shillong, East Khasi Hills District, Meghalaya, 19.08.2004, Coll. T. B. Rai; 3 ex. (Regn. No. V/A/ERS-832) Nokrek National Park, Daribokgre, East Garo Hills District, Meghalaya, 29.09.2008, Coll. R. Mathew & party; 2 ex. (Regn. No. V/A/NERC-1218) Umjasai (downstream), Upper Shillong, East Khasi Hills District, Meghalaya, 10.09.2015, Coll. S. Swell and T. Marweñ; 1 ex. (Regn. No. V/A/NERC-1219) Umjasai (Upstream), Upper Shillong, East Khasi Hills District, Meghalaya, 16.09.2015, Coll. S. Swell and T. Marweñ.

*Distribution:* INDIA: Arunachal Pradesh, Assam, Nagaland, Manipur and Meghalaya. *Elsewhere:* Bangladesh, Nepal, China, Myanmar, Thailand, Vietnam, Laos and Myanmar.

*Remarks:* Apparently the most common Horned Toad in Meghalaya, and the most widely distributed *Megophrys* in India.

#### 7. *Megophrys robusta* (Boulenger, 1908)

##### White-lipped Horned Toad (Figure 6, Plate-III)

1908. *Megalophrys robusta* Boulenger, Proc. Zool. Soc. London: 418 (Type locality: “Darjeeling”, West Bengal, India).

*Material examined:* 1 ex. (Regd. no. V/A/NERC/1051), War Umsning, East Khasi Hills, Meghalaya, 19.8.2006, Coll. S. Swell.

*Distribution:* INDIA: Assam, Nagaland, Meghalaya, Arunachal Pradesh and West Bengal. *Elsewhere:* China; Myanmar; Vietnam; Hong Kong; Bangladesh; Nepal.

*Remarks:* Rarely found. It is, by far, the largest Horned Toad in size.

#### 8. *Megophrys zunhebotoensis* (Mathew and Sen, 2007)

##### Zunheboto Horned Toad (Figure 7, Plate-IV)

2007. *Xenophrys zunhebotoensis* Mathew and Sen. Cobra, 1(2): 20 (Type locality: “Nguti (Sukhalu), Zunheboto district, Nagaland, India”)

*Material examined:* 1 ex. (Regd. no. V/A/NERC/1009), Mawbah area, near Cherrapunjee, East Khasi Hills, Meghalaya, 25.10.2010, Coll. A. Rana and party.

*Distribution:* INDIA: Nagaland and Meghalaya. *Elsewhere:* Not known.

*Remarks:* Reported from Meghalaya (Saikia and Sen, 2012).

## Abbreviation

V/A/ERS: Vertebrate/Amphibian/Eastern Regional Station  
V/A/NERC: Vertebrate/Amphibia/North Eastern Regional Centre

## Discussion

There has been several recent works on the genus *Megophrys* by various researchers in India. This has resulted in many new records and discoveries, as well as debates regarding the availability of *M. boettgeri* (Boulenger, 1899) in India, and hence, questioning the correctness of the identification

of earlier specimens of *Megophrys* as *M. boettgeri* by previous workers. In the light of these developments, the authors have undertaken the present study in an attempt to throw some light on the systematic list of this genus in Meghalaya, in particular, and in India, in general. During the course of the study, we have collected a few *Megophrys* from Shillong, re-examined the already identified collections of *Megophrys* from Meghalaya deposited in the National Zoological Collections of NERC, ZSI, Shillong and studied the literature of earlier workers. This study has resulted in the listing of six more species to the earlier two recorded species (Mathew and Sen, 2010) raising the total number to eight species in the list of genus *Megophrys* from Meghalaya. From our recent collection, we have found one specimen of recently described species of *M. oropedion* Mahony, Teeling and Biju, 2013. This specimen was collected from Umlyngka, Upper Shillong- in between Mawphlang and Malki (the type locality of the species).

Mahony *et al.* (2013) has raised doubts about the “correctness of the identification” of *M. boettgeri* by previous workers and has removed it from the checklist of Indian amphibians. However, recently, Sangma and Saikia (2015) has reported this species from Tura Peak Reserve Forest, in West Garo Hills, Meghalaya, giving two photographs and a brief description. A perusal of the photographs provided may look like a misidentified *M. vegrandis*, however, in their description of the species they have reported a SVL of 8 cm (80 mm), while *M. vegrandis* has a SVL range of 27.5–30.6 mm. We are of the opinion that further detailed study on the specimens collected by Sangma and Saikia (2015) from Tura Peak will help to clarify the position and the distribution of *M. boettgeri* in India.

Interestingly, from the identified collection of ZSI, Shillong, the authors have also come across four *Megophrys* specimens, collected from Meghalaya and Mizoram which were identified by previous workers as *M. wuliangshanensis* Ye and Fei, 1995. Since the species has not yet been reported from Meghalaya and Mizoram, the four specimens in our hand would have formed the first record of the species from these two North-East India States [i.e. Meghalaya and Mizoram]. Earlier, Ao *et al.*, (2003) had reported *M. wuliangshanensis* from Nagaland, which is also the first report of the species from India. Since then the species has been reported from Manipur (Ningombam and Bordoloi, 2007) and Assam (Sengupta *et al.*, 2010), in North-East India.

The ‘*M. wuliangshanensis*’ specimens in our hands warranted a thorough study and the outcome is that these four specimens were not agreeing with the diagnostic characters of *M. wuliangshanensis* provided by Ao *et al.*, (2003), nor with the specimen [V/A/ERS/564] of ‘*M. wuliangshanensis*’ deposited by Dr. Meren Ao [one of the authors of Ao *et al.*, (2003)] in the ZSI, Shillong; and neither with the diagnostic characters and the photographs provided by Fei and Ye (2016). In fact, they show more affinity towards *M. serchhipii* (Mathew and Sen, 2007). Compounding the problem is the fact that earlier reports of *M. wuliangshanensis* from India do not contain diagnosis or photographs of the specimens on which their report is based! While Ao *et al.*, (2003) provided brief morphological characters; Ningombam and Bordoloi (2007) provided only a few morphometric measurements, whereas Sengupta *et al.*, (2010) merely reported the range extension of this species into Assam. To add to the confusion, the photographs and diagnostic characters of *M. wuliangshanensis* as given in Mathew and Sen (2010), contradicts the morphological characters as per Ao *et al.*, (2003) and Fei and Ye (2016). Considering the fact that there has been no report of this species from the intervening regions between the type locality in Yunnan (China) and North-East India (Frost, 2018) coupled with the scant but vague and/or contradicting information provided by the authors reporting *M. wuliangshanensis* from India, a re-examination of the specimens on which the reports are based is required. Even, Fei and Ye (2016) have raised their doubt regarding the range extension of this species into India.

Mahony *et al.* (2013) when describing *M. oropedion* from Shillong, separated it from its closest relative *M. parva* by the larger size of the female as in the latter species the females are smaller in size. In a very recent paper describing two small sized *Megophrys* (*M. sanu* and *M. katabhako*) from Darjeeling and Sikkim, Deuti *et al.*, (2017) restricted the small sized *M. parva* to Meghalaya based on the presumption made by Sengupta *et al.* (2009), that the River Brahmaputra may be a ‘geographical barrier’ in the distribution of amphibia (*Kaloula* spp.) in the region. However, to extrapolate this presumption and apply it to the distribution and/or in restricting the distribution of other amphibian species needs more studies, as recent publications have reported the occurrence in the northern bank of River Brahmaputra, of a few species like *Leptobranchium smithi* and *Rhacophorus*

*suffry*, hitherto known only from the southern bank of River Brahmaputra (Dutta *et al.*, 2013; Bordoloi *et al.*, 2008; Saikia *et al.*, 2017).

Moreover, though we have included *M. boettgeri* in this paper on the basis of the report by Sangma and Saikia (2015), a re-examination of the specimens collected by them is necessary as this species has been removed from the faunal list of India by Mahony *et al.*, (2013). Also, in the light of doubt raised by Fei and Ye (2016) and Frost (2018) regarding the range extension of *M. wuliangshanensis* into India, and taking into consideration our findings during the course of this work, re-examination of all the previous reports of this species from India is needed.

## References

- Ao, J.M., Bordoloi, S. and Ohler, A. 2003. Amphibian fauna of Nagaland with nineteen new records from the state including five new records for India. *Zoos' Print Journal, Coimbatore, India*, **18**: 1117–1125.
- Bordoloi, S., Sengupta, S., Ohler, A. and Agarwal, I. 2008. *Rhacophorus suffry*. The IUCN red list of threatened species 2008: e.T136092A4231921. Available from: <http://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T136092A4231921.en>
- Deuti, K., Grosjean, S., Nicolas, V., Vasudevan, K. and Ohler, A. 2017. Nomenclatural puzzle in early *Xenophrys nomina* (Anura, Megophryidae) solved with description of two new species from India (Darjeeling hills and Sikkim). *Alytes, Paris*, **34**: 20–48.
- Dutta, D., Roy, J.K., Nath, A. Das, A., Sengupta, S. and Dutta, A. 2013. Locality record of *Leptobrachium smithi* Matsui, Nabhitabhata and Panha, 1999 (Anura: Megophryidae) on the north bank of Brahmaputra river in India. *Asian Journal of Conservation Biology*, **2**(2): 168–171.
- Fei, L. and Ye, C.Y. 2016. Amphibians of China, Volume 1. Beijing, China: Chengdu Institute of Biology, Chinese Academy of Sciences. Science Press.
- Frost, D.R. 2018. Amphibian species of the World: an Online Reference. Version 6.0. *American Museum of Natural History*, New York, USA. Available from: <http://research.amnh.org/herpetology/amphibia/index.html> [http://www.bsienvi.nic.in/Database/Biodiversity-Hotspots-in-India\\_20500.aspx](http://www.bsienvi.nic.in/Database/Biodiversity-Hotspots-in-India_20500.aspx)
- Mahony, S., Sengupta, S., Kamei, R.G. and Biju, S.D. 2011. A new low altitude species of *Megophrys* Kuhl and van Hasselt (Amphibia: Megophryidae), from Assam, Northeast India, *Zootaxa*, **3059**: 36–46.
- Mahony, S., Teeling, E.C. and Biju, S.D. 2013. Three new species of horned frogs, *Megophrys* (Amphibia: Megophryidae) from Northeast India, with a resolution to the identity of *Megophrys boettgeri* populations reported from the region. *Zootaxa*, **3722**(2): 143–169.
- Mathew, R., and Sen, N. 2007. Description of two new species of *Xenophrys* (Amphibia: Anura: Megophryidae) from north-east India. *Cobra. Chennai* **1**(2): 18–28.
- Mathew, R. and Sen, N. 2010. *Pictorial Guide to the Amphibians of North East India*: 1-144 pp. (Published by the Director, Zool. Surv. India, Kolkata).
- Ningombam, B., and Bordoloi, S. 2007. Amphibian fauna of Loktak Lake, Manipur, India with ten new records for the state. *Zoos' Print Journal, Coimbatore, India*, **22**: 2688–2690.
- Saikia, B. and Sen, N. 2012. Additional information on *Xenophrys zunhebotensis* Mathew & Sen, 2007 (Amphibia: Anura: Megophryidae) and range extension in Meghalaya, India. *Rec. Zool. Surv. India*, **112**(3): 123–124.
- Saikia, B., Nanda, P. and Sinha, B. 2017. Atlas of Endemic *Rhacophorus* (Amphibia: Anura) of North East India. *Bulletin of Arunachal Forest Research*, **32**(1&2): 91–95.
- Sangma, M.A. and Saikia, P.K. 2015. New records of amphibian fauna from Tura Peak Reserve Forest, West Garo Hills District, Meghalaya, Northeast India. *Journal on New Biological Reports*, **4**(1): 115–126.
- Sengupta, S. Das, A., Das, S. Hussain, B. Choudhury, N.K. and Dutta, S.K. 2009. Taxonomy and Biogeography of *Kaloula* Species of Eastern India. *The Natural History Journal of Chulalongkorn University*, **9**(2): 209–222.
- Sengupta, S., Hussain, B., Gogoi, J., Choudhury, P.K., Kalita, J. and Baruah, B.K. 2010. Amphibians of some protected landscape of Assam, north-eastern India. *Hamadryad, Madras*, **35**: 28–36.

A common English name is proposed for *M. oropedion*: 'Shyllong Horned Toad' since when describing the species having its type locality in Shillong, Mahony *et al.*, (2013) did not propose one. Shillong is the anglicized name for 'Shyllong', so named after a local deity, *U'Lei Shyllong*; hence the common name proposed.

## Acknowledgements

The authors are grateful to the Director, Zoological Survey of India, Kolkata for providing facilities. We would also like to thank Mr Silbaster Swell and Mr Teibor Marweñ for the assistance rendered in the field; to our colleague Dr. Uttam Saikia for his assistance during the preparation of the manuscript.

PLATE 1



**Figure 1.** Dorsal view of *Megophrys major*



**Figure 2.** Femoral glands of *Megophrys major*

**PLATE 2**



**Figure 3.** Dorsal view of *Megophrys oropedion*



**Figure 4.** Ventral view of *Megophrys oropedion*

PLATE 3



Figure 5. Dorsal view of *Megophrys parva*



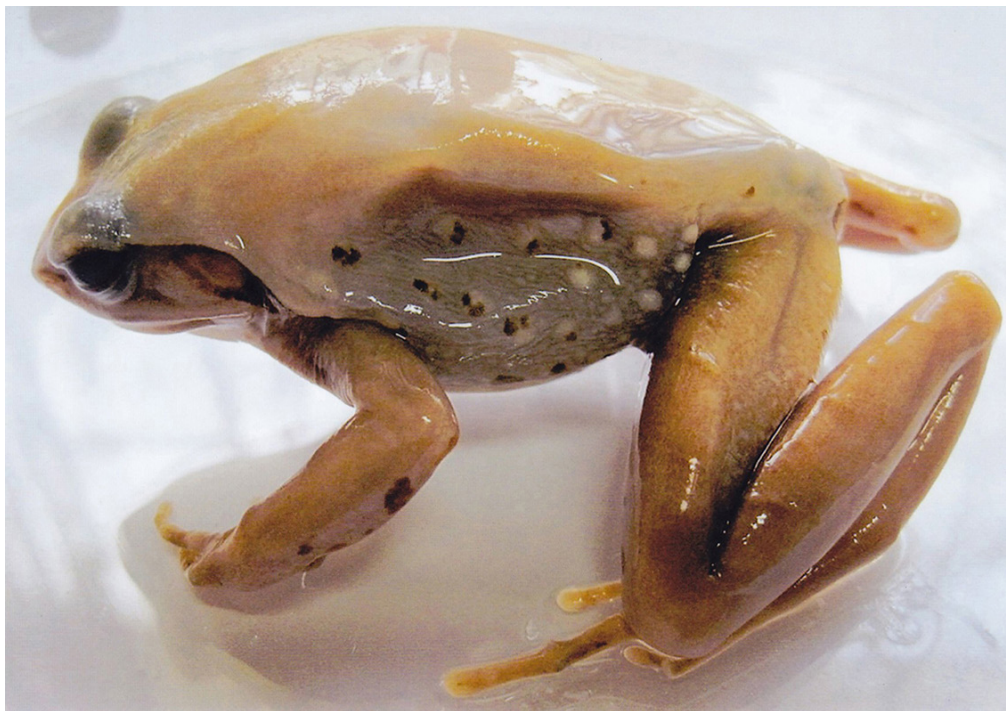
Figure 6. Dorsal view of *Megophrys robusta*



**PLATE 4**



**Figure 7.** Dorsal view of *Megophrys zunhebotensis*



**Figure 8.** Dorsal view of *Megophrys glandulosa*