

# *Calotes emma* Gray, 1845 (Squamata: Agamidae): range extension and new addition to the reptilian fauna of Tripura, northeast India

Joydeb Majumder\* and B. K. Agarwala

Tripura University, Department of Zoology, Ecology and Biodiversity Laboratories, Suryamaninagar – 799022, Tripura, India  
 \* Corresponding Author. E-mail: [jmtugemo@gmail.com](mailto:jmtugemo@gmail.com)

**Abstract:** Two new records of *Calotes emma* Gray, 1845, are reported from Srirampur and Homnpui in the state of Tripura, northeast India. These records are the first from Tripura. Present locality records extended the known distribution of *C. emma* in Southeast Asia.

**Key words:** *Calotes emma*, Agamidae, Lizard, range extension, Tripura, northeast India

Reptiles are one of the most diverse groups of animals on earth (Evans 2003), and they are adapted to a wide variety of habitats (Vitt *et al.* 2003). In India, 202 species of lizards have been reported till date. Of these, the family Agamidae is represented by 47 species under 17 genera (Venugopal 2008; Aengals *et al.* 2011). The northeastern parts of India are home to only 14 species of agamid lizards represented under 7 genera (Ahmed *et al.* 2009). Particularly from the state of Tripura 6 species of agamid lizards under 5 genera have been recorded so far including the most common lizard, *Calotes versicolor* (Daudin) (Sanyal *et al.* 2002; Majumder *et al.* 2012). However, none of these earlier studies have been reported the presence of spiny-headed forest lizard, *Calotes emma* Gray, from the state of Tripura.

During a faunistic survey in Dhalai and North districts of Tripura (Figure 1) in May 2012, we came across two live specimens of a lizard: one at Srirampur (24°07'25.63" N, 091°46'26.01" E, 191 m a.s.l. [above sea level], Dhalai Tripura) on 5 May 2012 and another at Homnpui (24°02'12.30" N, 092°14'59.35" E, 655 m a.s.l., North Tripura) 7 May 2012. Both of these specimens were collected using an insect sweeping net (30 cm diameter × 70 cm long) attached to a long wooden handle. Collected specimens were photographed and released soon after necessary morphological observations (*e.g.*, body colour, scale patterns, head, and eye and limb structures) and measurements (*e.g.*, snout–vent length, from snout tip to cloaca; tail length, from cloaca to tail tip; and number of midbody scale rows) (Table 1). For each specimen, selected morphometric measurements were made to the nearest 1 mm with the help of a measuring tape.

These specimens are identified as *Calotes emma* Gray, 1845

(Figure 2), based on morphological characters: *viz.*, snout a little longer than the orbit; cheeks swollen in the adult male; three small groups of spines, completely separate from each other, on each side of the head—one behind the superciliary margin and two above each tympanum. The dorsal crest is well developed on the neck and on the anterior part of the trunk and gradually disappears behind. The gular sac is little developed. The series of scales round the middle of the trunk ranges from 49–65 in number. Eyelids have short, radiating brown streaks, a brown band from behind the eye to above the tympanum. The fold before the shoulder is black, with an irregular white margin; body colour light olive-brownish above, with dark brown dorsal bars. Legs and tail have indistinct dark cross bands. The tail is compressed (Boulenger 1890; Smith 1935; Daniel 2002).

The Spiny-headed Forest Lizard, *Calotes emma*, belongs to the family Agamidae in the order Squamata. This species is widely distributed in Southeast Asia and is known to occur in Myanmar (10.362° N, 098.6253° E) (Vindum *et al.* 2003), southern China (25.2813° N, 098.8371° E) (Schmidt 1925), Vietnam (14.3413° N, 108.4794° E) (Bobrov and Semenov 2008), Malaysia (5.4196° N, 100.2687° E) (Grismer *et al.* 2010), Cambodia (14.2234° N, 106.9936° E) (Grismer *et al.* 2008) Thailand (8.9148° N, 098.5278° E) and Laos (16.9622° N, 105.9902° E) (Boulenger 1890), and Bangladesh (Satchari National Park [Satachhari NP]: 24°07'34.87" N, 091°26'12.70" E, 58 m a.s.l.) (Reza and Mukul 2009). In north-east India, the species is recorded from Assam (Barail Wildlife Sanctuary: 24°58.692' N, 092°47.491' E, 85 m a.s.l.) (Das *et al.* 2009), Mizoram (Dampa Tiger Reserve [Dampa TR]: 23°36.03' N, 092°25.16' E, 85m a.s.l.; Ngengpui Wildlife Sanctuary: 22°05' N, 092°47' E; Herhse: 23°58' N, 092°41' E, 310 m a.s.l.) (Pawar *et al.* 2004) and Meghalaya (Khasi Hills) states (Smith 1935).

**Table 1.** Morphometric measurements of *Calotes emma* recorded from Tripura.

Sl. No.	Specimen observed	SVL length (cm)	TL Length (cm)	No. of MSR
1.	One adult male	11.10	22.50	59
2.	One sub-adult male	8.70	17.30	52

\* SVL – Snout-vent length; TL – Tail length; MSR – Midbody scale rows.

Present locality records extends the known distribution of *C. emma* in northeast India, extending its distribution *ca.* 31 km to the east (Satachari National Park to Srirampur) and 84 km to the southeast (Satachari National Park to Homnpui) of the nearest known occurrence in neighboring Bangladesh, and 91 km to the southwest (Dampa Tiger Reserve to Srirampur) and 51 km to the southwest (Dampa Tiger Reserve to Homnpui) of the nearest Indian occurrence in the state Mizoram.

The species is diurnal, and occurs in forest-floor as well as arboreal in habits and found along stream margins of secondary mixed moist deciduous forests of Srirampur, Dhalai Tripura and in semi-evergreen forests of Homnpui,

North Tripura. The two new occurrences are 53.7 km apart from each other. The dominant vegetation of at these sites consists of *Albizia procera* (Roxb.) Benth., *Dendrocalamus longispathus* Kurz., *Glochidion multiloculare* (Roxb. ex Willd.) Mull. Arg., *Melocanna baccifera* Roxb., *Mangifera indica* L., *Tectona grandis* L., *Saraca asoca* (Roxb.) Wilde, *Duabanga grandiflora* (Roxb. ex DC.) Walpers, *Garcinia cowa* Roxb. and *Bambusa tulda* Roxb. at Srirampur, and *Saraca asoca* (Roxb.) Wilde, *Duabanga grandiflora* (Roxb. ex DC.) Walpers, *Albizia procera* (Roxb.) Benth., *Mangifera sylvatica* Roxb., and *Mitragyna rotundifolia* (Roxb.) O. Kuntze trees with patchily distributed *Bambusa tulda* Roxb. at Homnpui. *Calotes emma*

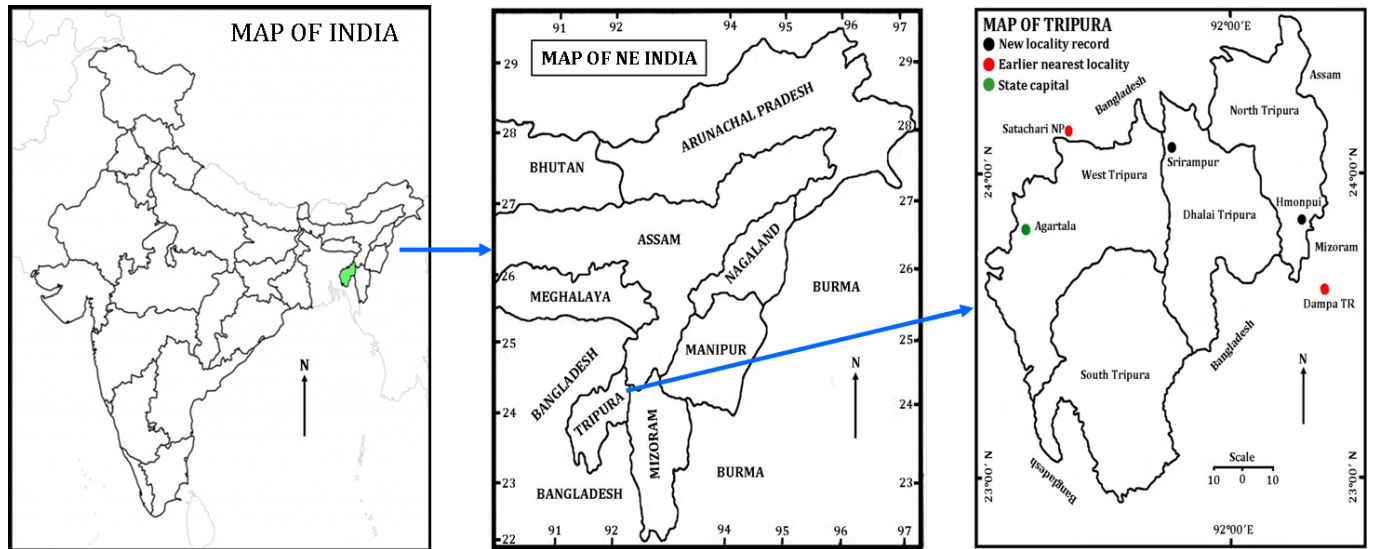


Figure 1. Location map of Tripura showing new locality and earlier nearest locality records of *Calotes emma*.



Figure 2. *Calotes emma* (inset shows the spiny structure on head) recorded from Homnpui, North Tripura.



foraged on the top surface of understory vegetation as well as on the forest floor along side a narrow slow flowing seasonal streams at both the locations and is found to feed on grasshoppers, ants, termites, cockroaches, beetles, diverse species of moths and low flying butterflies, and soil-living insects and their larvae. These lizards also blend in perfectly with their surroundings.

In last two decades, a large part of natural forests and other non-cultivated land of Tripura has been brought under rubber (*Hevea brasiliensis* Mull. Arg.) plantations (ca. 513.06 km<sup>2</sup>) (Economic Review of Tripura 2010–2011), and age-old method of slash and burn cultivation by the ethnic tribes is also prevalent in hilly parts of the state (Majumder *et al.* 2012). These activities have fragmented forest habitat and may affect the foraging and breeding habitats of *Calotes emma*. However, further studies are required to establish the threats to this species in Tripura.

#### ACKNOWLEDGEMENTS

The authors express their earnest thanks to Dr. Koushik Majumdar, Department of Botany for help with plant identifications.

#### LITERATURE CITED

- Aengals, R., V.M.S. Kumar and M.J. Palot. 2011. Updated checklist of Indian reptiles. Accessed at [http://www.lacertilia.de/AS/Bibliografie/BIB\\_6715.pdf](http://www.lacertilia.de/AS/Bibliografie/BIB_6715.pdf), 20 December 2014.
- Ahmed, M.F., A. Das and S.K. Dutta. 2009. Amphibians and reptiles of northeast India: a photographic guide. Guahati: Aranyak. 167 pp.
- Bobrov, V.V. and D.V. Semenov. 2008. Lizards of Vietnam. Moscow: KMK Publisher House. 236 pp. [in Russian].
- Boulenger, G.A. 1890. The fauna of British India including Ceylon and Burma: Reptilia and Batrachia. London: Taylor and Francis. 541 pp. <http://biodiversitylibrary.org/page/4388100>
- Daniel, J.C. 2002. The book of Indian reptiles. Bombay: Bombay Natural History Society. 141 pp.
- Das, A., U. Saikia, B.H.C.K. Murthy, S. Dey and S.K. Dutta. 2009. A herpetofaunal inventory of Barail Wildlife Sanctuary and adjacent regions, Assam, north-eastern India. Hamadryad 34(1): 117–134.
- Economic Review of Tripura. 2010–2011. Accessed at [http://destripura.nic.in/review2010\\_11.pdf](http://destripura.nic.in/review2010_11.pdf), 21 December 2014.
- Evans, S.E. 2003. At the feet of the dinosaurs: the origin, evolution and early diversification of squamate reptiles (Lepidosauria: Diapsida). Biological Reviews 78(4): 513–551. doi: [10.1017/S1464793103006134](https://doi.org/10.1017/S1464793103006134)
- Grismer, L.L., T. Neang, T. Chav, P.L. Wood Jr., J.R. Oaks, J. Holden, and Jesse L. Gr. 2008. Additional amphibians and reptiles from the Phnom Samkos Wildlife Sanctuary in northwestern Cardamom Mountains, Cambodia, with comments on their taxonomy and the discovery of three new species. The Raffles Bulletin of Zoology 56(1): 161–175.
- Grismer, L.L. C.K. Onn, J.L. Grismer, P.L. Wood Jr., and Norhayati A. 2010. A checklist of the herpetofauna of the Banjaran Bintang, Peninsular Malaysia. Russian Journal of Herpetology 17(2): 147–160.
- Majumder, J., P.P. Bhattacharjee, K. Majumdar, C. Debnath and B.K. Agarwala. 2012. Documentation of herpatofaunal species richness in Tripura, northeast India. NeBio 3(1): 60–70. <http://www.nebio.info/2012/03/nebio-march-2012.html>
- Pawar, S.S., G.S. Rawat and B. Choudhury. 2004. Recovery of frog and lizard communities following primary habitat alteration in Mizoram, northeast India. BMC Ecology 4(1): 10. doi: [10.1186/1472-6785-4-10](https://doi.org/10.1186/1472-6785-4-10)
- Reza, A.H.M.A. and Mukul, S.A. 2009. Geographic distribution. *Calotes emma* (Spiny-headed Forest Lizard). Herpetological Review 40(4): 451.
- Sanyal, D.P., B. Dattagupta and N.C. Gayen. 2002. Reptilia: state fauna series: fauna of Tripura. Zoological Survey of India 7(1): 159–177.
- Schmidt, K.P. 1925. New Chinese amphibians and reptiles. American Museum Novitates 175: 1–3. <http://hdl.handle.net/2246/4468>
- Smith, M.A. 1935. The fauna of British India, including Ceylon and Burma. Reptilia and Amphibia. Vol. II. — Sauria. London: Taylor and Francis. 185 pp. <https://archive.org/details/FBISmithReptiles2>
- Venugopal, P.D. 2010. An updated and annotated list of Indian lizards (Reptilia: Sauria) based on a review of distribution records and checklists of Indian reptiles. Journal of Threatened Taxa 2(3): 725–738. <http://threatenedtaxa.org/index.asp?jid=45>
- Vindum, J.V., H. Win, T. Thin, K.S. Lwin, A.K. Shein and H. Tun. 2003. A new *Calotes* (Squamata: Agamidae) from the Indo-Burman range of western Myanmar (Burma). Proceedings of California Academy of Science 54(1): 1–16. <http://biodiversitylibrary.org/page/40724258>
- Vitt, L.J., E.R. Pianka, W.E. Cooper Jr. and K. Schwenk. 2003. History and the global ecology of squamate reptiles. American Naturalist 162(1): 44–60. doi: [10.1086/375172](https://doi.org/10.1086/375172)

**Authors' contribution statement:** JM did the field study and wrote the text; BKA revised the final text.

**Received:** April 2013

**Accepted:** December 2014

**Editorial responsibility:** Olivier Pauwels