REPTILES & AMPHIBIANS

A Schneider's Toad, *Duttaphrynus scaber* (Schneider 1799) (Anura: Bufonidae), with Anophthalmia from Tirunelveli District, Tamil Nadu

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The health of anurans in any wetland ecosystem can be a strong bioindicator of the health of the ecosystem itself (DeGarady and Halbrook 2006; Ferrante and Fearnside 2020). Malformations in anurans include developmental, morphological, and behavioral abnormalities (Bonin et al. 1997; Rohr and Crumrine 2005; Gurushankara et al. 2007). These have been found to be caused by predators (Bowerman et al. 2010), pollution (Linzey et al. 2003; Motta et al. 2022; Said et al. 2022), habitat quality (Anderson and Arruda 2006; Soto-Rojas et al. 2017), UV radiation (Ankley et al. 2002; Henao et al. 2022), and parasitism (Johnson and Lunde 2005).

Ouellet (2000) estimated less than 2% of wild amphibian populations globally have morphological abnormalities. Anophthalmia (when one or both eyes are missing at birth) is extremely rare in amphibians (Szkudlarek 2020). Wolf (1994) estimated the prevalence of anophthalmia in European Toads (*Bufo bufo*) in urban populations of Osnabrück, Germany, to be 0.0367%. In the Serra da Estrela in Portugal, anophthalmia was the least common deformity in a studied amphibian community (Laurentino et al. 2016). A study completed in sugarcane fields of southern Brazil estimated 0.04% of *Scinax fuscovarius* larvae had anophthalmia (Sánchez-Domene et al. 2018). In India, Gurushankara et al. (2007) demonstrated that the prevalence of anopthalmia was less than all other deformities. Herein we document anophthalmia in a Schneider's Toad (*Duttaphrynus scaber*).

Duttaphrynus scaber is a moderately sized toad endemic to India and Sri Lanka (Dutta 1997). In India, its distribution has been recorded from peninsular India to Odisha to West Bengal in the north (Frost 2022) and in northeastern India (Mathew and Sen 2009). The ideal habitat for adults is in ground cover close to water, with standing water for larvae (Daniels 2005).

At 1940 h on 23 February 2017, GK found an anophthalmic adult *D. scaber* (Fig. 1) in a dry scrub forest fragment near a coconut plantation and other agricultural fields in Ayansingampatti Village, Ambasamudram Taluk, Tirunelveli District, Tamil Nadu, India (8.65552 N, 77.44836 E). The right eye of the individual was missing with the upper eyelid covering the orbit. No morphological aberrations indicative of trauma were present.

Gurushankara et al (2007) recorded anophthalmia in four anuran species—*Limnonectus limnocharis, L. keralensis, L. brevipalmata* and *Tomopterna rufescens*—from the Western Ghats. These species were found in forests, bodies of water, agricultural (paddy) fields, and coffee plantations. Among the four habitats, abnormalities were highest in the coffee plantations, followed by agricultural fields, then bod-

Figure 1. An adult Schneider's Toad (*Duttaphrynus scaber*) with anophthalmia (missing the right eye) from the vicinity of the village of Ayansingampatti in the southern Western Ghats of India. Photograph by Gautam Kadam.

Reptiles & Amphibians ISSN 2332-4961
https://doi.org/10.17161/randa.v30i1.18618

ies of water, and forests. Other reports of anophthalmia in Indian anurans include Asian Toads (*Duttaphrynus melanostictus*) from Nagpur, Maharashtra (Hippargi et al. 2010), and the Similipal Biosphere Reserve, Odisha (Ashaharraza and Mahapatra 2020); a Sreeni's Golden Frog (*Indosylvirana sreeni*) in the southern Eastern Ghats (Ganesh and Arumugam 2015); a critically endangered Amboli Toad (*Xanthophryne tigerina*) from Amboli, Western Ghats (Pardeshi 2017); a Marbled Globular Frog (*Uperodon systoma*) (Regmi et al. (2021) from agricultural fields in Vadusan Village, Gujarat; and a Greater Stream Horned Frog (*Xenophrys major*) from Tamdil National Wetland, Mizoram, the only record so far documented from the northeastern states (Lalremsanga 2022).

The increasing number of reports of amphibian malformations call for more studies integrating ecology, genetics, toxicology, and environmental health to better understand the causes and consequences of these malformations. Further, these studies could shed light on why malformations in frogs occur even in the absence of human disturbances.

Acknowledgements

Gautam Kadam thanks the Ashoka Trust for Research in Ecology and the Environment (ATREE), especially Dr. Soubadra Devy, for providing accommodations at the Agasthyamalai Community-based Conservation Centre (ACCC), Tirunelveli, during his Master's thesis fieldwork when this observation was made.

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