



Predation on Asian Common Toad, *Duttaphrynus melanostictus* (Lütken, 1864) (Anura: Bufonidae), Tadpoles by a Fish-eating Spider, *Nilus* sp. (Araneae: Pisauridae)

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Predation is regarded as the major source of mortality in tadpoles, which are vulnerable to a wide range of invertebrate and vertebrate predators (Alford 1999). All stages of the life cycle of frogs are vulnerable to spider predation and little is known about the variation in predation risk across metamorphosis (Touchon et al. 2013; Nyffeler and Altig 2020). Herein we report an incidence of predation by a Fish-eating

Spider (*Nilus* sp.) on tadpoles of the Asian Common Toad, *Duttaphrynus melanostictus*.

The Common Asian Toad, which is widely distributed in southern and southeastern Asia, breeds in lentic and lotic habitats and has a seasonal reproductive pattern (Ngo and Ngo 2013; Mahapatra et al. 2017). Amplectant males fertilize long strings of blackish eggs as they are released by females



Fig. 1. A Fish-eating Spider (*Nilus* sp.) approaching Asian Common Toad (*Duttaphrynus melanostictus*) tadpoles in a puddle at the Wildlife Institute of India, Dehradun, Uttarakhand, India. Inset: A detailed view of the tadpoles. Photographs by M.A. Yathumon.



Fig. 2. A Fish-eating Spider (*Nilus* sp.) ingesting an Asian Common Toad (*Duttaphrynus melanostictus*) tadpole in a puddle at the Wildlife Institute of India, Dehradun, Uttarakhand, India. Photograph by M.A. Yathumon.

(Daniels 2005). Eggs hatch in 24–48 h and small, black, gregarious tadpoles metamorphose in 22–30 days (Saidapur and Girish 2001; Mahapatra et al. 2017).

On 6 August 2019, we observed an amplecting pair of *Duttaphrynus melanostictus* in a 0.5 x 1-m temporary puddle in the grass at the Wildlife Institute of India, Dehradun, Uttarakhand, India (30.2836°N, 77.9751°E; WGS84; elev. 602 m asl). We did not observe egg-laying but found long strings of eggs the next morning. We observed hatching larvae at Gosner stages 16–19 (Gosner 1960; Saidapur and Girish 2001) at 2145 h on 7 August 2019. We regularly monitored the tadpoles on subsequent days as the puddle was slowly drying up. To confirm the identity of the tadpoles, we collected and reared a few of them. At 2310 h on 18 August 2019, we encountered a Fish-eating Spider (*Nilus* sp.) catching the tadpoles (Gosner stages 20–25, limbs not yet developed) while floating on the surface (Fig. 1). Tadpoles did not aggregate or exhibit any unusual behavior other than individual escape maneuvers when approached by the spider. The spider moved from the puddle to land several times and usually waited about 10–15 min on land before returning to the water. Although it made several attempts to catch tadpoles, it was successful only three times in a span of 2 h. On those occasions, the spider grabbed the tadpole's body between the plane of eyes and the tail-body junction and subsequently consumed it (Fig. 2). The spider was not captured but identi-

fied from photographs as a dark morph of *Nilus* sp. (Araneae: Pisauridae) with faint lateral white bands. We subsequently released the toadlets reared in the lab into the puddle.

Fishing spiders of the genera *Dolomedes* and *Nilus* (Pisauridae) are cursorial spiders common in semi-aquatic ecosystems where they are known predators of fishes and amphibians (Menin et al. 2005; Toledo 2005; Nyffeler and Pusey 2014; Baba et al. 2019). Pisaurids are known to prey on amphibians of the families Hylidae, Hyperoliidae, Leptodactylidae, Microhylidae, Phrynobatrachidae, Pipidae, Pyxicephalidae, Ranidae, Rhacophoridae, and Bufonidae (Valdez 2020). A recent review (Nyffeler and Altig 2020) indicated that at least five species of the genus *Nilus* are known to prey on frogs, including the tadpoles of White-lipped Frogs (*Amnirana albolabris*), African Clawed Frogs (*Xenopus* sp.), Red Toads (*Schismaderma carens*), and Common Sandfrogs (*Tomopterna cryptotis*) in tropical Africa (Savory 1928; Babangenge et al. 2019), and the eggs of Hansen's Bubble-nest Frogs (*Rohanixalus hansenae*) in southeastern Asia (Poo et al. 2017). However, to the best of our knowledge, this observation is the first report of predation on *D. melanostictus* tadpoles by a pisaurid spider.

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