

See discussions, stats, and author profiles for this publication at: <https://www.researchgate.net/publication/275334887>

# Natural history note; INDIRANA SEMIPALMATA (Brown Leaping Frog). REPRODUCTION.

Article in *Herpetological Review* · January 2011

---

CITATIONS

4

READS

92

3 authors, including:



Benjamin Tapley

ZSL

79 PUBLICATIONS 403 CITATIONS

SEE PROFILE

Some of the authors of this publication are also working on these related projects:



Assessment of release strategies for confiscated and Endangered Big-headed turtles in Vietnam [View project](#)



Mountain Chicken Recovery Programme [View project](#)



FIG. 1. Adult male *Leptodactylus latrans* predated an adult male *Hypsiboas raniceps*.

*Leptodactylus latrans* is also a medium-sized anuran with a wide distribution in South America, occurring in Paraguay, Argentina, Uruguay, and practically all of the Brazilian territory (Oliveira et al. 2009. Biodivers. Pampeana 7[1]:44–46).

On 29 Aug 2010 at 1930 h an adult male *L. latrans* (81.6 mm SVL) was observed predated an adult male *H. raniceps* (72.3 mm SVL) (Fig. 1). The observation occurred 6 m from the margin of a temporary pond at the U.C. Refuge for Wildlife Mata do Junco (10.291037°S, 36.583701°W, 120 m elev.), in the city of Capela, Sergipe, Brazil. The anurans are deposited in the Herpetological Collection of the Federal University of Sergipe (CHUFS C0607, C0608). *Leptodactylus* spp. are well known predators of small anurans (Haddad and Sazima 1992. Unicamp. FAPESP 321 pp.), and may contribute significantly to the anuran community structure in this region.

**ANTHONY SANTANA FERREIRA** (e-mail: anthonyferreira@hotmail.com), **RENATO GOMES FARIA**, **IZABEL REGINA SOARES DA SILVA**, and **SOFIA CERQUEIRA SCETTINO**, Laboratório de Herpetologia, Universidade Federal de Sergipe, CEP 49000-000, São Cristóvão, Aracaju, Sergipe, Brazil.

**INDIRANA SEMIPALMATA (Brown Leaping Frog). REPRODUCTION.** The ranid frog genus *Indirana* contains 11 species, all of which are endemic to the Western Ghats Mountains of southern India. Limited information is available regarding the breeding biology of this genus other than anecdotal notes, mostly about the most widespread species, *I. beddomii* (Daniels 2002. The Book on Indian Reptiles and Amphibians. Bombay Nat. Hist. Soc., Oxford Press, Mumbai, India. 238 pp.; Daniels 2005. Amphibians of Peninsular India. Universities Press India: Hyderabad 268 pp.; Das and Dutta 2007. Hamadryad 31:152; Inger et al. 1984. J Bombay Nat. Hist. Soc. 81[2]:406; Roelants et al. 2004. Mol. Phyl. Evol. 31:730), all of which remark that *Indirana* breed on rock faces in the immediate surroundings of splashing water. The semi-terrestrial tadpoles of *I. beddomii* are morphologically specialized with strongly hooked beaks and a long, strongly developed tail with reduced fin membranes which allow the tadpoles to skip across the rock surfaces on which they feed (Bossuyt and Milinkovitch 2000. PNAS 97:6585; Kuramoto and Joshy 2002. Hamadryad 27:71). *Indirana semipalmata* is a rarely encountered species, the life history of which is unknown, except for a study on its tadpoles by Kuramoto and Joshy (2002, *op. cit.*). Herein we report observations of egg laying sites of *I. semipalmata*.

Observations were made during the southwest monsoons, in the month of July at the Agumbe Rainforest Research Station (ARRS),

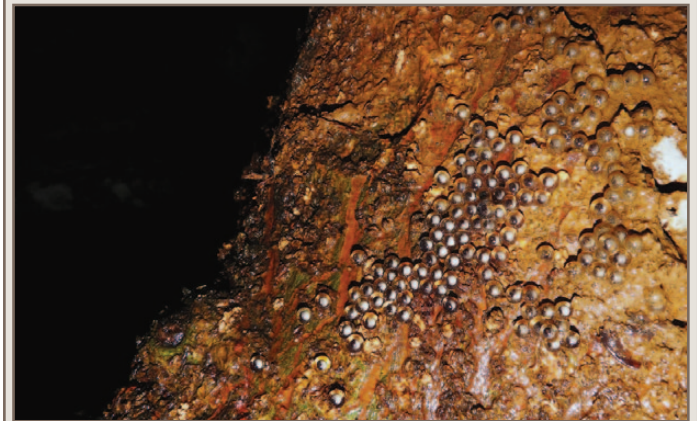


FIG. 1. Egg clutch of *Indirana semipalmata* on the bark of *Erythrina variegata*.

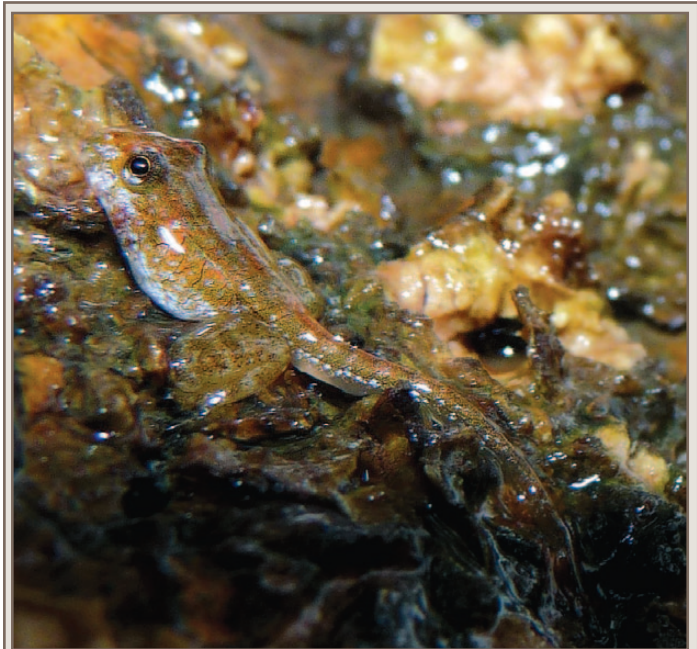


FIG. 2. Tadpole of *Indirana semipalmata* feeding on the bark of *Erythrina variegata*.

Agumbe, Shivamogga District, Karnataka, India (13°N, 75°E, 600–700 m elev). ARRS is a 3.2-ha area consisting of a Betel Nut (*Areca catechu*) plantation and fallow paddy fields bordered by secondary tropical rainforest. Temperature ranges between 10–35°C and average annual rainfall is ca. 7000 mm/yr. Three egg clutches were observed. The eggs were attributed to *I. semipalmata* because adult male frogs were observed sitting alongside possibly guarding the eggs. When the eggs hatched the tadpoles were similar to those of *I. beddomii* “with strongly hooked beaks and a long strongly developed tail with reduced fin membranes” (Kuramoto and Joshy 2002, *op. cit.*). The first egg clutch was observed on 7 July 2010 on the concrete steps of a bungalow located in a Betel Nut plantation. The eggs were laid 68 cm above the ground in a film of water that accumulated from water splashing as it ran from the roof tiles onto the concrete area below the steps. Clutch size was 343 eggs and average egg diameter 2.7 mm. The eggs hatched on 11 July 2010. Tadpoles remained on the concrete surface feeding post hatching.

The second egg clutch was observed on 15 July in a metal dish that had been left on a granite slab which formed the seat of a bench 47 cm off the ground. This granite bench was also situated in the Betel Nut plantation. Clutch size was not determined as the eggs were at different stages of development and inferred to represent multiple clutches. Tadpoles remained on the granite surface post hatching and were observed feeding. The third egg clutch was first observed on 15 July under a piece of wood propped up against the bark of an Indian Coral Tree (*Erythrina variegata*) at the edge of the Betel Nut plantation (Fig. 1). The eggs were laid 75 cm above the ground and the clutch size was 143 eggs with an average egg diameter of 2.9 mm. Eggs began hatching on 19 July. During the day one tadpole with hind limbs (therefore from an earlier clutch) was observed feeding on the bark surface of this tree, indicating that tadpoles remain on the tree once they have hatched (Fig. 2). It was notable that there were no pools of standing water within 3 m of any of the egg deposition sites mentioned.

These observations indicate that the eggs of *I. semipalmata* are laid, develop, and hatch outside of standing water. This differs from previously published accounts (Daniel 2002, *op. cit.*; Daniels 2005, *op. cit.*; Inger et al. 1984, *op. cit.*; Kuramoto and Joshy 2002, *op. cit.*) for other species of this genus. In each of the cases the eggs were hydrated when water was splashed upon them, when it dripped from the leaves or roof tiles above or ran down the branch upon which the eggs were laid. As far as we are aware, this is the first known case where tadpoles have been observed feeding on a bark substrate and subsequently metamorphosing on the bark of a tree. Given that there is such high rainfall in Agumbe, an adaptation where eggs are able to develop out of water may be a localized phenomenon. To determine if this is a viable life history strategy elsewhere would require further study in the Western Ghats.

The highly specialized, semi-terrestrial tadpole of *Indirana* is restricted to the Western Ghats by ecogeographical barriers (Roelants et al. 2004, *op. cit.*). The specialized life history of *I. semipalmata* described here makes them vulnerable to changes in rainfall pattern/climate and at the mercy of the monsoon.

**BENJAMIN TAPLEY**, 2 Bushy Ruff Cottages, Alkham RD, Temple Ewell, Dover, Kent, England, CT16 3EE (e-mail: ben\_tapley@hotmail.com); **CHETANA BABBURJUNG PURUSHOTHAM**, Agumbe Rainforest Research Station, Suralihalla, Agumbe, Thirthahalli Taluk, Shivamogga District, Karnataka, India (e-mail: chetana.puru11@gmail.com); **SUZAN GIRGIN**, 2 Bushy Ruff cottages, Alkham RD, Temple Ewell, Dover, Kent, England, CT16 3EE (e-mail: suzangirgin@hotmail.com).

#### **LEPTODACTYLUS FUSCUS (Whistling Frog). HABITAT AND DIET.**

*Leptodactylus fuscus* is widely distributed in South America east of the Andes, between Panama and northern Argentina, and is found in open fields, pastures, marshes, degraded forests, and urban habitats (Reynolds et al. 2004. *In* IUCN Red List of Threatened Species. Version 2010.1. <www.iucnredlist.org>. Downloaded 01 June 2010). Here we report on the occurrence of the species in mangrove forests, where the abundant invertebrate fauna is likely an important alimentary resource.

*Leptodactylus fuscus* is a "sit-and-wait" forager (Perry and Pianka 1997. *Trends Ecol. Evol.* 12:360–384), which typically feeds on small arthropods, principally Isoptera and Coleoptera, as well as insect larvae (De-Carvalho et al. 2008. *Biota Neotropical* 18:105–115). Between April 2008 and May 2009, 30 *L. fuscus* (7 males, 10 females, and 13 juveniles) were recorded on the Bragança Peninsula in the Brazilian state of Pará. The local mangrove forests cover a total area of ca. 467 km<sup>2</sup> of mudflats, and are dominated by tree species of the



FIG. 1. Capture of a crab of the genus *Uca* by *Leptodactylus fuscus* in the mangrove forest on the Bragança Peninsula, Pará, Brazil. Photo by R. P. Silva.

genera *Avicennia* and *Rhizophora* (Souza-Filho and El-Robrini 1996. *Geonomos* 4:1–16).

The analysis of stomach contents (males: 52.1 mm SVL, females: 47.3 mm SVL, and juveniles: 39.4 mm SVL) revealed a predominance of arthropods in the diet (Formicidae – 35.2%, Acari – 16.0%, insect larvae – 10.3%, and Coleoptera – 9.8%), as well as a crab of the species *Pachygrapsus gracilis* (Crustacea: Decapoda). The observation of the capture of a crab of the genus *Uca* by a Whistling Frog (Fig. 1) further reinforces the ability of the species to adapt to the diversity of habitats and resources available within its broad geographic distribution. The exploitation of a wide range of invertebrate prey and the occupation of the mangrove ecosystem, which is relatively inhospitable for the majority of ectothermic vertebrates, appears to represent an advantageous adaptive strategy for *L. fuscus*, in particular by reducing competition with other organisms, including anurans, that compete for more typical resources in shared habitats.

**ARTHUR L. R. BRITO** (e-mail: arthur\_raiol@hotmail.com), **ROSIVAN P. SILVA** (e-mail: biovan02@hotmail.com), **MARCUS E. B. FERNANDES** (e-mail: meb@ufpa.br), Laboratório de Ecologia de Manguezal, Instituto de Estudos Costeiros, Campus de Bragança, Universidade Federal do Pará, Al. Leandro Ribeiro s/n, Bragança, 68.600-000, Pará, Brazil.

#### **LEPTODACTYLUS LATRANS (Butter Frog). DIET.**

*Leptodactylus latrans* is a large nocturnal frog that is widely distributed throughout South America east of the Andes (Frost 2010. *Amphibian Species of the World: an Online Reference*. Version 5.4 [8 April 2010]. Electronic database accessible at <http://research.amnh.org/vz/herpetology/amphibia/>). The species inhabits natural environments such as ponds, rivers, and lakes as well as urban areas. Ferreira and Tonini (2010. *Herpetol. Notes* 3:237–238) reported *L. latrans* occupying crab burrows in a mangrove ecosystem, which was the first report of a frog living in this type of habitat. The generalist diet of *L. latrans* is well known (França et al. 2004. *Stud. Neotrop. Fauna Environ.* 39:243–248; Sanabria et al. 2005. *Rev. Peruana Biol.* 12:472–477; Solé et al. 2009. *Herpetol. Notes* 2:9–15; Strussman et al. 1984. *J. Herpetol.* 18:138–146; Teixeira and Vrcibradic 2003. *Cuad. Herpetol.* 17:113–120). *Leptodactylus latrans* feeds on a variety of