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Novel reproductive mode in a torrent frog *Micrixalus saxicola* (Jerdon) from the Western Ghats, India

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Abstract

Reproductive modes in anurans are highly diverse despite external fertilization being a constraint. There are 39 reproductive modes documented so far (Wells, 2007). An apparently new reproductive mode is reported in a torrent frog, *Micrixalus saxicola*, an endemic and ancient anuran frog of the Western Ghats, considering the type of cavity made inside the lotic water body, involvement of the female in digging the cavity and concealing the eggs.

Key words: *Myristica* swamps, Micrixalidae, oviposition, foot flagging, visual signaling

Introduction

The Micrixalidae is a frog family endemic to the Western Ghats, India, of very ancient origins, of about 65 million years before present (Roelants *et al.* 2007). Currently, there are 11 recognized species in this family (Dinesh *et al.* 2009). Habitat features, acoustics and visual signaling/communication is well documented in *Micrixalus saxicola* and *M. fuscus* (Malhotra & Davis, 1991; Vasudevan, 2001; Reddy *et al*. 2002; Krishna & Krishna, 2006). However, there is no information on reproductive modes in this family. In the present paper, an apparently new reproductive mode as compared to the 39 modes known for anurans (Haddad & Prado, 2005) is reported in *Micrixalus saxicola.*

Material and methods

Study area. The study was conducted in Kathalekan, a *Myristica* swamp Forest located in Uttara Kannada district, Karnataka state of the central Western Ghats, India (14.27414°N 74.74704°E 572 m above sea level). *Myristica* swamp forests are considered to be relict forests of ancient origin. They are characterized by perennial streams and evergreen vegetation like *Myristica fatua*, *Gymnacranthera canarica*, *M. dactyloides*, *M. malabarica*, *Elaeocarpus* sp., *Holigarna* sp., *Madhuca neerifolia*, *Pandanus* sp., *Semecarpus kathalekanensis, Pinanga dicksonii, Knema attenuata* and *Mastixia arborea* (Chandran *et al*. 2010). The swamp area comprises first and second order streams originating from the nearby hillock (Figure 1a), which eventually joins River Sharavathi. *Micrixalus saxicola* inhabits the small falls and splash regions in the swamp area with continuous ambient background noise.

Methods. Observations on *Micrixalus saxicola* were made at stream in Kathalekan on 16th September 2009 from 8:30AM to 10:00PM (Indian Standard Time). Measuring tapes were used to measure depth of water and distance between individuals. Snout-vent length (SVL) and diameter of eggs were measured in the field to the nearest 0.01 mm with a digital caliper. Supplementary video clips on male-male interactions, foot flagging, digging aquatic subterranean cavity and concealing the same are available at http://amphibiaweb.org

Species. *Micrixalus saxicola* is a small sized torrent frog measuring about 25–30 mm in SVL (Krishna & Krishna, 2006). It is endemic to the Western Ghats and its threat status is considered vulnerable (IUCN, 2009).

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