Gastrotheca albolineata (Lutz and Lutz, 1939) (Amphibia: Anura: Hemiphractidae): Defensive behaviors in a Protect Area of Atlantic Forest, southeastern Brazil

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The relations between predators and prey may influence the distribution and abundance of species (Begon *et al.,* 1996) and can lead to morphological and physiological adaptation (Gans 1986). In some cases, individuals may show behavioral adaptations (Toledo *et al.,* 2011). Although species commonly present defensive behaviours, records and descriptions of these strategies are, with few exceptions, limited and dispersed in the literature (Toledo *et al.,* 2011). In a review on defensive behaviors Toledo *et al.* (2010) reported only the mouth-gaping behaviour for *Gastrotheca helenae* (Duellmann and Trueb 1994). In this paper we present two new records of defensive behaviors for species of the genus *Gastrotheca* and the first defensive behavior records for *Gastrotheca albolineata* (Lutz and Lutz, 1939).

The genus *Gastrotheca* Fitzinger, 1843 occurs in Costa Rica and Panama, northern and western South America southward to northern Argentina and in the east and southeast of the Brazilian Atlantic Forest (Duellman, 1984; Caramaschi and Rodrigues, 2007; Frost, 2015). The type specimen of *G. albolineata* comes from Serra dos Órgãos, a mountain chain in the state of Rio de Janeiro and in subsequent years the species was found in new localities in the same state (Carvalho-e-Silva *et al.,* 2008; Siqueira *et al.,* 2011; Pontes *et al.,* 2012), in the state of Espírito Santo (Almeida *et al.,* 2011), and in the municipality of Ubatuba, on the northeastern coast of the state of São Paulo (Gressler *et al.,* 2008).

On 30 September 2015, around 19h00, we recorded a specimen of *G. albolineata* (23°27.543' S; 45°08.574' W, Datum WGS84, 16 m elevation). An adult male (56 mm snout vent length) was found calling on a bush 160 cm from the ground. When it was captured, the specimen displayed two defensive behaviors unknown for *Gastrotheca:* puffing up the body and thanatosis.

As soon as the researcher captured the specimen, it began puffing up the body (behavior 7 in Toledo *et al.,* 2010), considerably increasing its size, and remained in that posture for around 15 seconds, providing the opportunity for photographic documentation (Fig. 1). Following that, the specimen deflated and relaxed its body completely, including the legs, and remained inert and unresponsive (Fig. 2). In the first behavior, according to Stebbins and Cohen (1995) and Williams *et al.* (2000), the frog fills its lungs with air to inflate its body and seem larger to its predator. In the second one, described as thanatosis, the animal adopts a posture that makes it seem to be dead (behavior 3 in Toledo *et al.,* 2010). The synergistic effect of association between inflating the body followed by thanatosis may amplify the effectiveness of inhibiting or averting a potential predator's attack (Honma *et al.,* 2006). After the observations, the specimen was released on the same branch it was found.



Figure 1. *Gastrotheca albolineata* **inflating its body in defensive behaviour after capture. Photo Alex Mariano**



Figure 2. *Gastrotheca albolineata* **playing dead with all legs relaxed, in textbook thanatosis. Photo Edelcio Muscat**

The observations presented here contribute in the understanding of defensive behaviors displayed by anurans as the poorly studied marsupial frog *Gastrotheca albolineata*.

ACKNOWLEDGMENTS

The authors would like to thank Alex Mariano for help during fieldwork and to Ibere Machado of the Instituto Boitatá for the early corrections and suggestions in text.

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Pseudoboa cf. *nigra,* Canaã dos Carajás, PA. Foto: Rodrigo Tinoco.