

## Death-feigning behaviour in water snakes of the genus *Hydrodynastes* (Dipsadidae) from South America

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Death-feigning or thanatosis is a state of immobility assumed by some animals, including snakes, in response to external stimuli. Apparently it is a fear-mediated response that usually occurs following physical handling or restraint (Gallup, 1977; Misslin, 2003), for instance during a predation attempt. Some hypotheses have been proposed to explain the adaptive significance of death feigning. For example, prey animals feign death: (i) to reduce the motivation of predators which specialize in capturing live prey (Rovee et al., 1976), (ii) to enhance opportunities for escaping from predators which handle prey gently or momentarily release them prior to feeding (Ratner and Thompson, 1960) and (iii) to get opportunities of escape from predators which briefly store their prey after they have “killed” it (Rovee et al., 1976). In snakes, death feigning includes immobility and mouth gaping, often with the tongue hanging out, and in more dramatic situations involves voluntary supination and/or lack of muscle tone (see Gregory, Isaac and Griffiths, 2007). Death feigning in snakes has been observed in Scolecophidia and Caenophidia (Gehlbach, 1970; Vogel and Han-Yuen, 2010). In this latter group, death feigning is widespread among both colubrids and natricids, and occurs also in elapids. Nevertheless, in spite of the high diversity of Neotropical dipsadids, thanatosis has rarely been reported among its representatives (cf. Vogel and Han-Yuen, 2010). Here we report the occurrence of death-feigning behaviour in two species of *Hydrodynastes*, a snake genus endemic to South America. *Hydrodynastes* comprises three species of dipsadid snakes that belong

to the monophyletic tribe Hydrodynastini (Franco et al., 2007; Zaher et al., 2009; Graziotin et al., 2012). These diurnal and large semiaquatic snakes grow to more than 200 cm snout-vent length and appear to have diets composed of aquatic (fishes) or semiaquatic (anurans, snakes and rodents) prey, based on data for *H. gigas* (see Strüssmann and Sazima, 1993, Lopez and Giraudo, 2004; Marques et al., 2005; Weiler and Wood, 2010).

Data were gathered for *H. gigas* (n = 13) during fieldwork in Poconé (16°30'S, 56°45'W), state of Mato Grosso, in the Brazilian Pantanal wetlands (see Strüssmann and Sazima, 1993), and for a captive specimen of *H. melanogigas* caught during a hydroelectric faunal rescue at Palmas (10°12'S, 48°21'W), state of Tocantins, Brazil. After being captured, this specimen (SVL ~ 150 cm) was kept in a wooden box (1.2x1.2x1.0 m). After one week, the snake was then transferred to an open area for observation of its behaviour. For all the snakes (wild or captive), we elicited defensive reactions by approaching, touching, grasping, and handling the animals.

Whenever an observer approached a snake, it tried to escape, sometimes flattening the anterior portion of the body. When touched or grasped, snakes usually elevated the head and flattened the anterior portion of the body; upon capture, snakes attempted to escape by twisting and biting. Five out of 13 specimens (38%) of *H. gigas* feigned death when further molested (handled for about one minute). During death feigning, snakes remained with the mouth either closed or opened (Figure 1). When approached and grasped, the captive *H. melanogigas* showed similar defensive displays (head elevation, compression of the anterior body, twisting, biting). When more intense grasping pressure was applied, the specimen exhibited tonic immobility, together with mouth gaping and the tongue hanging out (Figure 1).

Two recent phylogenetic hypotheses support a clade formed by Hydrodynastini and Pseudoboini (Vidal et al., 2010; Graziotin et al., 2012). The later include several genera of ecologically diverse and relatively abundant snakes (Alencar, 2010; Marques et al., 2004, 2005).

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**Figure 1.** Death feigning in *Hydrodynastes gigas* from Poconé, Mato Grosso (above) and *H. melanogigas* from Palmas, Tocantins (below).

Therefore, investigation of the occurrence of death feigning behaviour among the pseudoboine snakes could indicate that this behaviour is more widespread than presently known.

Despite the potential importance of death feigning for survival, studies examining the influence of intrinsic and extrinsic factors on this behaviour in snakes are scarce (e.g. Gerald, 2008). Thus, further studies on this behaviour in the genus *Hydrodynastes* and other snakes considering intrinsic factors (e.g., size, sex, pregnancy, starvation) under controlled conditions are recommended.

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