To avoid predators and increase their chances of survival, snakes have developed a diverse repertoire of anti-predation mechanisms (Greene, 1988; 1997; Martins, 1996; Martins et al. 2008). Although a large number of factors may have played a role in shaping these behaviors (such as using cryptic color to both defense and hunting; Henderson, 2002), it is believed that they are mostly directed to the avoidance of predators (Greene, 1988; Marques and Sazima, 2003; Martins et al. 2008). For many snakes, the defensive repertoire is still largely unknown (Martins, 1996), especially for the small species and even for the best known species, further details of defensive behavior are still being described (e.g. Marques et al. 2001; Marques et al. 2006; Martins et al. 2008).

*Erythrolamprus miliaris* (Linnaeus, 1758) is a medium sized Neotropical snake (about 1 m long), which can be found in southeastern Brazil, where it is regarded as a common species (Marques et al. 2001). The species seems to be generalist in its habits, showing both diurnal and nocturnal activity, semi-aquatic habits (making use of both land and water) and exploring a great diversity of prey species amongst anurans and fish (Sazima and Haddad, 1992; Marques, 1998; Hartmann et al. 2009). Martins et al. (2008) observed three visual defensive displays in *E. miliaris*: body depression, cryptic coloration, and head elevation. However, there is no detailed account on these defensive tactics in *E. miliaris* in the literature.

On 8 July 2013, during a fieldwork in the Brazilian Atlantic Forest, municipality of Sete Barras (24°19’S; 48°7’W), southeastern São Paulo, Brazil, while being photographed two specimens of *E. miliaris*, an adult (Fig. 1A) and a juvenile (Fig 1B) flattened their bodies while keeping their anterior portions of the body elevated. This behavior was observed repeatedly every time their way was blocked by the photographer during an escape attempt.

Defensive displays such as head elevation, sigmoid curvature of the anterior portion of body, mouth opening and throat inflation tend to be more common in arboreal species, while dorsal-ventral depression and cryptic coloration tend to be more common in terrestrial species (Greene, 1979; Senter, 1999; Martins et al. 2008).

*Erythrolamprus miliaris* (Linnaeus, 1758) is a medium sized Neotropical snake (about 1 m long), which can be found in southeastern Brazil, where it is regarded as a common species (Marques et al. 2001). The species seems to be generalist in its habits, showing both diurnal and nocturnal activity, semi-aquatic habits (making use of both land and water) and exploring a great diversity of prey species amongst anurans and fish (Sazima and Haddad, 1992; Marques, 1998; Hartmann et al. 2009). Martins et al. (2008) observed three visual defensive displays in *E. miliaris*: body depression, cryptic coloration, and head elevation. However, there is no detailed account on these defensive tactics in *E. miliaris* in the literature.

On 8 July 2013, during a fieldwork in the Brazilian Atlantic Forest, municipality of Sete Barras (24°19’S; 48°7’W), southeastern São Paulo, Brazil, while being photographed two specimens of *E. miliaris*, an adult (Fig. 1A) and a juvenile (Fig 1B) flattened their bodies while keeping their anterior portions of the body elevated. This behavior was observed repeatedly every time their way was blocked by the photographer during an escape attempt.

Defensive displays such as head elevation, sigmoid curvature of the anterior portion of body, mouth opening and throat inflation tend to be more common in arboreal species, while dorsal-ventral depression and cryptic coloration tend to be more common in terrestrial species (Greene, 1979; Senter, 1999; Martins et al. 2008).

Hooding behavior is typical and well known for the old world Elapidae, specifically the Cobras (e.g. *Naja* spp, *Haemacatus* spp., *Ophiophagus* spp. and *Aspidelaps* spp.) (Greene, 1997; Kahn, 2011; Pyron et al., 2013). When facing a threat, these snakes extend their elongated anterior ribs and stretch their neck skin for- and sideways, while the head is elevated in an aggressive display (Greene, 1997). Although this behavior is mostly displayed by some members of the Elapidae family, it has been described in some New World non-venemous genera: *Erythrolamprus* (e.g., Greene, 1979; Martins and Oliveira, 1998), *Thamnodynastes* (Franco et al. 2003), *Hydrodynastes* (Young and Kardong, 2010), and *Xenodon* (e.g., Martins and Oliveira, 1998; Kahn, 2011). These are all members of Xenodontinae, a group which is phylogenetically distant from the Elapidae family.
suggesting convergent defensive tactics in these species, as suggested by Greene (1979). Myers (1986) also suggests that hooding behavior might be a synapomorphy for Xenodontinae snakes.

Ecologically, it is well accepted that hooding is an aposematic display that increases the apparent size of the individual and advertises the predator about the risk it may be taking, even though it may be a fake (Greene, 1988, 1997; Young and Kardong, 2010).

Although it is not known whether the functional basis of this behavior in *E. miliaris* is triggered by the same morphological mechanisms of the Old World cobras (see Young and Kardong, 2010), we suggest that they have the same ecological function.

**Acknowledgements.** The authors are grateful to Mr. Matias M. Mickenhagen for letting us conduct studies on Eta farm and to Marcelo R. Duarte and Marcio Martins for valuable suggestions on the manuscript. F.A. Menezes thanks Department of Health of the State of Sao Paulo, B.F. Fiorillo thanks the Sao Paulo Research Foundation (FAPESP, grant # 2011/00507-2) and R.C. Gonzalez thanks CNPq (fellowship # 130990/2012-4).

**References**


Hooding behavior in *Erythrolamprus miliaris*


