

An elongated meal: the tegu lizard *Salvator merianae* eats snakes and amphisbaenians

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The tegu lizard *Salvator merianae* Duméril and Bibron, 1839 attains up to 500 mm in snout-vent length and inhabits both forests and tropical open areas of South America (Vanzolini et al., 1980; Ávila-Pires, 1995; Winck, 2007). Previous studies on the diet of *Salvator merianae* have shown that it is a generalized feeder, which eats vegetables (seeds, flowers, fungi, and fruits) and a wide range of invertebrates and vertebrates that were hunted and scavenged (Kiefer and Sazima, 2002; Sazima and D'Angelo, 2013). Although some authors have mentioned snakes as part of the diet of tegu lizards (e.g., Beebe, 1945; Mercolli and Yanosky, 1994), only a few well-documented cases are reported in the literature (e.g., Barreto-Lima and Camilo, 2009; Oliveira-Santos and Leuchtenberger, 2009; Kaiser et al., 2013). On the other hand, the record of predation on burrowing amphisbaenians by tegu lizards remains uncertain (cf. Marques and Sazima, 2004). Here, we present two additional records of the tegu lizard *Salvator merianae* preying on snakes. We also confirm amphisbaenians as a food item of these lizards. Data were obtained by videotaping made by laymen in the field. The videos were a sample of fortuitous events, which were occurring before encountering with the animals. Due to possible interference of the observer, we did not evaluate behavioral aspects involved. Morphology and colour pattern allowed us to recognize the specific identity of both predator and prey, which was confirmed by other experts. Videotapes and photos of the three events of predation are housed at the Laboratório de Ecologia e Evolução, Instituto Butantan.

Two events of ophiophagy were observed in two localities of the Atlantic forest as follow. A tegu *Salvator merianae* (total length, TL ~ 700 mm) was found on November 3, 2006, at 3:30 p.m., near a forested area in the vicinity of Pico Paraná Farm (-25.221389, -48.858611; datum=WGS84; 980 m a.s.l.), Campina Grande do Sul, state of Paraná, Southern Brazil. The tegu was found on the ground with a partially swallowed adult Forest False Pitviper *Xenodon newwiedii* (Dipsadidae) in its mouth (Fig. 1A). The tegu was swallowing the snake head first. After a few seconds of observation, it fled, disappearing in the vegetation with the snake preyed partially swallowed in its mouth. The second event of ophiophagy was observed in February 2013, in Quatro Barras (-25.367222, -49.075; datum=WGS84; ~ 900 m a.s.l.), state of Paraná. A tegu *S. merianae* (TL ~ 900 mm) was found around 2 p.m., at the edge of a road, crossing a forested area with a partially swallowed adult Two-keeled Whipsnake *Chironius bicarinatus* (Colubridae) in its mouth. The snake was being swallowed head first (Fig. 1B). During the observation, the lizard moved into the forest, dragging the snake, whose tail was injured and fractured. The predation on the amphisbaenian occurred on November 27, 2001, in a forested area, in Ibitinga (-21.75861, -48.82944; datum=WGS84; ~ 500 m a.s.l.), state of São Paulo. The event was similar to the two others described above. A tegu lizard was found around 2 p.m. swallowing an *Amphisbaena alba* tail first (Fig. 1C).

In this paper, we summarize the available data on identified snakes and amphisbaenians eaten by tegu *Salvator merianae* and by a similar species of tegu, *Tupinambis teguixin*, in the field (Table 1; see on page 23 of the present paper). The food items include various elongated squamate species, which inhabit a wide range of microhabitats, such as terrestrial, arboreal, fossorial, and aquatic microhabitats. The tegu *S. merianae* is essentially a terrestrial lizard that forages by scratching for food and revolving the substrate (Sazima and

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Figure 1. Three instances of Tegu lizard *Salvator merianae* preying on snakes and amphisbaenids. The lizards are swallowing the following preys: (A) *Xenodon newwiedii*, Dipsadidae; (B) *Chironius bicarinatus*, Colubridae; (C) *Amphisbaena alba*, Amphisbaenidae.

Haddad, 1992). Arboreal, subterranean and aquatic squamates can engage in terrestrial activity and can be captured by the tegu on the ground. However, tegu has digging, climbing and swimming abilities (Yanosky, 1991; Sazima and Haddad, 1992; Olmos, 1995), and

can catch these preys on any type of substrate. Some snakes and amphisbaenians reported as prey could have been found dead and then swallowed by the tegu. However, consistent reports show that tegu species can efficiently subdue snakes alive (Oliveira-Santos and Leuchtenberger, 2009; Kaiser *et al.*, 2013). In this study, predation on venomous snakes by tegu in nature was not observed, although captive specimens have been observed preying on pitvipers, *Bothrops* spp. (A. S. Abe and S. M. Almeida-Santos, pers. comm.). Thus, the tegu lizard *Salvator merianae* may be considered as an efficient predator of any elongated squamate, including biting or even venomous species.

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Table 1. Snakes and amphisbaenians recorded as prey items for tegu lizards *Salvator merianae* and *Tupinambis teguixin*.

Prey	Substrate	Situation	Reference
<i>Amphisbaena microcephalum</i> , Amphisbaenidae [?]	fossorial	swallowing	Marques and Sazima, 2004
<i>Amphisbaena alba</i> , Amphisbaenidae	fossorial	swallowing	this study
<i>Eunectes murinus</i> , Boidae ^N	aquatic	carrying	Rivas, Owen, and Calle, 2001
<i>Chironius bicarinatus</i> , Colubridae	arboreal	swallowing	this study
<i>Leptophis ahaetulla</i> , Colubridae ^(TT)	arboreal	capturing	Oliveira-Santos and Leuchtenberger, 2009
<i>Mastigodryas bifossatus</i> , Colubridae	terrestrial	swallowing	Barreto-Lima and Camilotti, 2009
<i>Pantherophis guttatus</i> , Colubridae	terrestrial	carrying	Kaiser et al., 2013
<i>Sordellina punctata</i> , Dipsadidae	aquatic	gut content	Oliveira-Santos and Leuchtenberger, 2009
<i>Xenodon newwiedii</i> , Dipsadidae	terrestrial	swallowing	this study

?-uncertain record; N-newborn; (TT)-only record for *Tupinambis teguixin* (all other prey items reported for *S. merianae*)

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