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Papéis Avulsos de Zoologia, São Paulo: Museu de Zoologia da Universidade de São Paulo, v. 53,
<http://www.producao.usp.br/handle/BDPI/45028>

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Papéis Avulsos de Zoologia

Museu de Zoologia da Universidade de São Paulo

Volume 53(19):261-283, 2013

www.mz.usp.br/publicacoes
http://portal.revistasusp.sibi.usp.br
www.scielo.br/paz

ISSN impresso: 0031-1049
ISSN on-line: 1807-0205

NATURAL HISTORY OF PSEUDOBOINE SNAKES

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ABSTRACT

*Even though natural history information is crucial for answering key ecological, evolutionary, and conservation questions, basic studies are still lacking for Neotropical snakes. This study aims at contributing to the knowledge of the Neotropical tribe Pseudoboini, based on literature data, analysis of museum specimens and unpublished data. The tribe is mainly composed of moderate-sized snakes, although small and large-sized snakes also occur in the clade. Mean fecundity ranged from two (*Rodriguesophis iglesiasi*) to 29 eggs (*Clelia plumbea*) and the species are predominantly terrestrial and nocturnal. Most species are diet specialists and lizards are the most commonly consumed prey (found in the diet of 29 species), followed by small mammals (consumed by 20 species) and snakes (consumed by 18 species). Although the tribe Pseudoboini appears to be well studied, for 15 species (32%) only a small amount of information or none was available. We hope that our study can motivate research on the least known species.*

KEY-WORDS: Ecology; Diet; Microhabitat; Reproduction; Dipsadidae.

INTRODUCTION

Natural history information is essential for answering key biological questions in several disciplines, such as ecology, evolution and conservation (Greene & Losos, 1988; Greene, 1993, 2005; Bury, 2006; McCallum & McCallum, 2006). Although natural history studies on Neotropical snakes have improved in the last decade, for many species basic information is still lacking (Sazima & Haddad, 1992; Barbo *et al.*, 2011). Furthermore, most studies focusing on natural history are restricted geographically, instead of taxonomically (*e.g.*, Vitt & Vangilder, 1983; Strüssmann & Sazima, 1993; Di-Bernardo, 1998; Marques, 1998; Martins & Oliveira, 1998; Cechin, 1999; Bernarde

& Abe, 2006; Sawaya *et al.*, 2008; Barbo *et al.*, 2011; but see Martins *et al.*, 2001). Hence, the goal of this study is to contribute to the knowledge of a Neotropical group of snakes, the tribe Pseudoboini, based on literature data and *unpublished data* (original or provided by other researchers). Ecological and evolutionary analyses involving the data presented here will be explored elsewhere.

The tribe Pseudoboini belongs to the family Dipsadidae, sub-family Xenodontinae, and has been considered as a monophyletic group by several authors (*e.g.*, Vidal *et al.*, 2000; Zaher *et al.*, 2009; Vidal *et al.*, 2010; Grazziotin *et al.*, 2012). The tribe is composed mainly of moderate-sized snakes (Pizzatto & Marques, 2002; Scott Jr. *et al.*, 2006) and encompasses

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47 species in eleven genera (*Boiruna*, *Clelia*, *Drepanoides*, *Mussurana*, *Oxyrhopus*, *Phimophis*, *Paraphimophis*, *Pseudoboa*, *Rhachidelus*, *Rodriguesophis* and *Siphlophis*). Most species seem to be terrestrial (e.g., *Clelia* spp., *Boiruna* spp., *Mussurana* spp., *Pseudoboa* spp.), but there are also semi-arboreal (e.g., *Drepanoides anomalous*, *Siphlophis* spp.), and semi-fossorial species (e.g., *Phimophis* spp., Cunha & Nascimento, 1978, 1983; Martins & Oliveira, 1998; Bernarde & Abe, 2006). Scattered information concerning the natural history of pseudoboines indicates that most species feed mainly on lizards and small mammals, inhabiting forests and savannas (Vitt & Vangilder, 1983; Andrade & Silvano, 1996; Martins & Oliveira, 1998; Prudente *et al.*, 1998; Pinto & Lema, 2002).

MATERIAL AND METHODS

Data Collection

To characterize the natural history of pseudoboine species we gathered information from the literature, museum specimens, and *unpublished data* provided by other researchers on body size, substrate use, daily activity, diet, and reproduction. For each museum specimen the following data were taken: snout-vent length (SVL) and tail length (TL) to the nearest millimeter, sex, gut contents, diameter of largest ovarian follicle and/or presence of oviductal eggs (*cf.* Martins & Oliveira, 1998). The following Brazilian scientific collections were visited: Instituto Butantan (IBSP, São Paulo, SP), Museu de História Natural Capão da Imbuia (MHNCL, Curitiba, PR), Museu de Zoologia da Universidade de São Paulo (MZUSP, São Paulo, SP), Museu Paraense Emílio Goeldi (MPEG, Belém, PA), Pontifícia Universidade Católica do Rio Grande do Sul (PUCRS, Porto Alegre, RS), Coleção Herpetológica da Universidade de Brasília (CHUNB, Brasília, DF), and Universidade Federal do Mato Grosso (UFMT, Cuiabá, MT). Information on microhabitat and daily activity were obtained from the literature, by the authors and other researchers. We followed the taxonomy of Grazziotin *et al.* (2012) and made no distinction among subspecies.

Because the tail length of snakes is affected by microhabitat use (Lillywhite & Henderson, 1993; Martins *et al.*, 2001; Pizzatto *et al.*, 2007), and among pseudoboines there are both terrestrial (e.g., *Clelia clelia*) and semi-arboreal species (e.g., *Siphlophis longicaudatus*), we used snout to vent length (SVL) to characterize body length instead of total length. When available, the maximum known SVL is also indicated.

Microhabitat was considered as the position of the animal in the environment while active. We considered the following categories: terrestrial, arboreal, semi-arboreal, and fossorial (*cf.* Martins & Oliveira, 1998). Snakes caught in pitfall traps were not considered for microhabitat data since they could be either terrestrial, cryptozoic or fossorial. Time of activity is considered as the period during which the snake performs its activities (most commonly foraging, *cf.* Martins & Oliveira, 1998). We considered the categories diurnal (active under day light) and nocturnal (active in the dark), but we indicated when the snake was found active during twilight. Prey categories considered were: amphibians, fishes, birds, bird eggs, lizards, lizard eggs, mammals, and snakes. The original data is indicated between parentheses, and when available, the number of prey and its identification to the lower taxonomic level possible. For reproduction, we considered published data (e.g., Pizzatto & Marques, 2002; Pizzatto, 2005) and we also counted the number of eggs and/or secondary vitellogenic follicles larger than 10 mm in preserved specimens (following Shine, 1977a,b). When available, the size of the smallest mature female and male are indicated.

RESULTS

Species accounts

Boiruna maculata (Boulenger, 1896)

Distribution: *Boiruna maculata* is distributed from central Brazil to central Argentina with records in Uruguay (Abalos *et al.*, 1964; Lema, 1994; Zaher, 1996; Achaval & Olmos, 1997; Nogueira, 2001; Leynaud & Bucher, 2005; Briguera *et al.*, 2006; Gallardo & Scrocchi, 2006; Kacoliris *et al.*, 2006b; Scott Jr. *et al.*, 2006; Hartmann & Giasson, 2008; Ghizoni *et al.*, 2009). It appears to be a rare snake in Central Brazil (França & Araújo, 2006).

Habitat and time of activity: Only scattered ecological information exists about this large pseudoboine (maximum SVL = 1919 mm, female; this study). It seems to inhabit savannas and forests (Zaher, 1996; Leynaud & Bucher, 2005; França *et al.*, 2006; Condez *et al.*, 2009), and can also be found in disturbed areas (Sawaya *et al.*, 2008; R. Bérnils, *unpublished data*; P. Hartmann, *unpublished data*; C. Strüssmann, *unpublished data*). It is apparently a terrestrial species ($N = 5$; Gallardo *et al.*, 2006; R. Bérnils, *unpublished data*; P. Hartmann, *unpublished data*; C. Strüssmann, *unpublished data*), although there is one arboreal record (Gallardo

et al., 2006). Data on the time of activity of this species is very scarce. There are two observations of *B. maculata* in activity during the night (Gallardo *et al.*, 2006; P. Hartmann, *unpublished data*), one at twilight (Hartmann & Giasson, 2008) and one active during the day (R. Machado & R. Bérnils, *unpublished data*).

Feeding: *Boiruna maculata* is a diet generalist that feeds primarily on snakes ($N = 18$; two *Atractus* sp., one *Liophis almadensis*, *Liophys typhlus*, *Lystrophis dobignyi*, *Oxyrhopus petola*, one *Sibynomorphus* sp.), but also on birds ($N = 5$; *Gallus gallus*), small mammals ($N = 5$; *Akodon serrensis*), lizards ($N = 3$; one scincid, one *Ameiva ameiva*, one *Tropidurus torquatus*), and fish (one *Symbranchus marmoratus*) (Lema *et al.*, 1983; Pinto & Lema, 2002; Gallardo *et al.*, 2006; Hartmann & Giasson, 2008; this study).

Reproduction: Clutch size varies from four to 15 eggs (mean = 7.9 eggs, $N = 13$; Vitt & Vangilder, 1983; Pizzatto, 2005; Gallardo & Scrocchi, 2006; Scott Jr. *et al.*, 2006; this study) and this species presents a continuous reproductive cycle (Pizzatto, 2005). Pizzatto (2005) found a significant sexual size dimorphism in snout-vent length for *B. maculata*, where females attain larger body size than males. The smallest mature female was 974 mm SVL (this study) and the smallest mature male was 745 mm SVL (Pizzatto, 2005).

Defense: When handled, *B. maculata* rarely tries to bite (Achaval & Olmos, 1997).

***Boiruna sertaneja* Zaher, 1996**

Distribution: *Boiruna sertaneja* is found throughout northeastern Brazil (Cordeiro & Hoge, 1973; Vitt & Vangilder, 1983; Zaher, 1996; Guedes, 2006; Lira-da-Silva *et al.*, 2009; Loebmann & Haddad, 2010) and it appears to be a locally rare species (Loebmann & Haddad, 2010).

Habitat and time of activity: *Boiruna sertaneja* is a large pseudoboine (maximum SVL = 1940 mm, female; Zaher, 1996) and the few available records suggests that it inhabits open xeric vegetation in the Caatinga domain in northeastern Brazil (Vitt & Vangilder, 1983; Zaher, 1996; Guedes, 2006). The only available microhabitat data (Guedes, 2006), as well as its stout body, indicate that *B. sertaneja* is terrestrial. There is no data concerning its time of activity.

Feeding: *Boiruna sertaneja* is a snake specialist ($N = 10$; two *Oxyrhopus* cf. *trigeminus*; three *Phyllodrias* sp., and

five unidentified) but lizards can also be taken ($N = 4$; one *Tropidurus torquatus*, two *Ameiva ameiva*, one *Diploglossus lessonae*) (Vitt & Vangilder, 1983; this study).

Reproduction: Clutch size varies from four to 14 eggs (mean = 9.25 eggs, $N = 8$; Vitt & Vangilder, 1983; this study). The smallest mature female was 1147 mm SVL (this study) and the smallest mature male was 1074 mm SVL (this study).

***Clelia clelia* (Daudin, 1803)**

Distribution: *Clelia clelia* is the most widely distributed pseudoboine. It occurs from Mexico to Argentina, except for Chile (Abalos *et al.*, 1964; Duellman, 1978; Dixon & Soini, 1986; Campbell, 1998; Zaher, 1996; Scott Jr. *et al.*, 2006; Cisneros-Heredia *et al.*, 2007; Silva *et al.*, 2010; M. Martins, *unpublished data*; this study).

Habitat and time of activity: *Clelia clelia* is the second largest pseudoboine (maximum SVL = 2398 mm, male; this study) and occurs mainly in forested areas (Duellman, 1978, 2005; Dixon & Soini, 1986; Vanzolini, 1986; Murphy, 1997; Martins & Oliveira, 1998; Santos-Costa, 2003; McCranie & Castañeda, 2005; Maschio, 2008). It is primarily terrestrial ($N = 12$; Duellman, 1978; Dixon & Soini, 1986; Murphy, 1997; Martins & Oliveira, 1998; Santos-Costa, 2003; Maschio, 2008), but it was also found in the water ($N = 2$; Duellman, 1978, 2005); furthermore, it is able to climb trees ($N = 2$, Teixeira *et al.*, 1991; Duellman, 2005). One individual was found active in the leaf litter of a terra-firme forest (Martins & Oliveira, 1998). *Clelia clelia* is primarily nocturnal ($N = 12$; Duellman, 1978; Campbell, 1998; Martins & Oliveira, 1998; Maschio, 2008), but it can also be found in activity during the day ($N = 6$; Duellman, 1978, Teixeira *et al.*, 1991; Santos-Costa, 2003; Maschio, 2008).

Feeding: *Clelia clelia* is a generalist species that feeds primarily on snakes ($N = 20$; *Boa constrictor*, *Drepanoides anomalus*, *Helicops angulatus*, *Xenodon* sp., one Viperidae) but also consume lizards ($N = 11$; *Basiliscus vittatus*, *Tropidurus* sp., *Ameiva* sp., *Tupinambis* sp., two teiids; *Nesticurus* sp.), small mammals ($N = 8$) and birds ($N = 1$, *Troglodytes aedon*) (Beebe, 1946; Duellman, 1978, 2005; Dixon & Soini, 1986; Yanosky *et al.*, 1996; Campbell, 1998; Starace, 1998; Vaughan & Ruiz-Gutierrez, 2006; this study). Additionally, M. Martins & M.E. Oliveira (*unpublished data*) encountered four snake eggs in the gut of one specimen of *C. clelia* from the state of Pará.

Reproduction: Clutch size varies from nine to 22 eggs (mean = 12.6 eggs, $N = 6$; Duellman, 1978; Martínez & Cerdas-Fallas, 1986; Strüssmann, 1992; Savage, 2002; Maschio, 2008). The smallest mature female was 973 mm SVL (Duellman, 2005) and the smallest mature male was 650 mm SVL (Pizzatto, 2005). Pizzatto (2005) found no difference in SVL between males and females.

Defense: When handled, *C. clelia* may constrict and expel cloacal gland products (Martins & Oliveira, 1998; Maschio, 2008).

***Clelia equatoriana* Amaral, 1924**

Distribution: *Clelia equatoriana* is distributed from Costa Rica, to Ecuador, through Panama and Colombia (Pérez-Santos & Moreno, 1988; Zaher, 1996).

Habitat, time of activity, feeding, and reproduction: The largest specimen recorded is a female (SVL = 1400 mm; Zaher, 1996). There is no additional information concerning the ecology of *C. equatoriana*.

***Clelia errabunda* Underwood, 1993**

Distribution: *Clelia errabunda* is only known for its type locality, Saint Lucia, West Indies (Underwood, 1993).

Habitat, time of activity, feeding, and reproduction: The largest specimen recorded is a female (SVL = 1380 mm; Underwood, 1993) and there is no other information concerning the ecology of *C. errabunda*.

***Clelia hussami* Morato, Franco & Sanches, 2003**

Distribution: *Clelia hussami* has a restricted distribution in southern Brazil (Morato *et al.*, 2003).

Habitat, time of activity, feeding, and reproduction: The largest specimen recorded is a female (SVL = 1080 mm; Morato *et al.*, 2003). Morato *et al.* (2003) suggest that the habitat of *C. hussami* may be restricted to the Araucaria forests domain. No data was found regarding its time of activity, feeding habits or reproduction.

***Clelia langeri* Reichle & Embert, 2005**

Distribution: *Clelia langeri* is only known from the inter-Andean dry valleys of Bolivia (Reichle & Embert, 2005).

Habitat, time of activity, and reproduction: The only available data is from Reichle & Embert (2005). The largest specimen reported by these authors is a female with 1295 mm in total length. The only known prey item is a murid rodent (Reichle & Embert, 2005). There is no information available on habitat, time of activity or reproduction of this species.

***Clelia plumbea* Wied, 1820**

Distribution: *Clelia plumbea* is distributed throughout Brazil and in Paraguay (Silva, 1993; Lema, 1994; Zaher, 1996; Marques, 1998; Argôlo, 2004; Hartmann, 2005; Morato, 2005; Pizzatto, 2005; Bernarde & Abe, 2006; França *et al.*, 2006; Cicchi *et al.*, 2007; Kunz, 2007; Condez *et al.*, 2009). Additionally, there are known records for Paraguay and northeastern Argentina (Scott Jr. *et al.*, 2006).

Habitat and time of activity: This is the largest pseudo-boine (maximum SVL = 2790 mm, female; Pizzatto, 2005). It occurs mainly in forests (Silva, 1993; Marques, 1998; Argôlo, 2004; Morato, 2005; S. Morato, *unpublished data*; M. Sena, *unpublished data*) and can be found in disturbed areas (Argôlo, 2004; Kunz, 2007). *Clelia plumbea* is terrestrial ($N = 8$; Marques, 1998; Argôlo, 2004; Hartmann, 2005; Bernarde & Abe, 2006; M. Sena, *unpublished data*) and predominantly nocturnal ($N = 13$; Nascimento *et al.*, 1987; Marques, 1998; Hartmann, 2005). It can also be found active during the day ($N = 7$; Argôlo, 2004; Morato, 2005; Bernarde & Abe, 2006; Kunz, 2007; M. Sena, *unpublished data*).

Feeding: *C. plumbea* is a snake specialist ($N = 14$, *Atractus pantostictus*, *Drymarchon corais*, one *Echinantera undulata*, *Echinantera* sp., one *Spilotes pul-latus*, *Micrurus lemniscatus*, *Bothrops jararaca*, *B. jararacussu*, one *Bothrops* sp.), but lizards ($N = 3$, one *Ameiva* sp., one *Ophiodes fragilis*, one *Gonatodes* sp.) and small mammals ($N = 2$, one rodent, one *Metachirus nudicaudatus*) can also be found (Cunha & Nascimento, 1978; Marques, 1998; Pinto & Lema, 2002; Bernarde, 2004; Morato, 2005; Bernarde & Abe, 2006; this study).

Reproduction: Clutch size varies from four to 29 eggs (mean = 12.6 eggs, $N = 14$; Pizzatto, 2005; this study) and this species presents a continuous reproductive cycle (Pizzatto, 2005). Additionally, Pizzatto (2005) found a significant sexual size dimorphism in snout-vent length for *C. plumbea*, where females attain larger body size than males. The smallest mature female was

1125 mm SVL (this study) and the smallest mature male was 1035 mm SVL (Pizzatto, 2005).

***Clelia scytalina* Cope, 1867**

Distribution: *Clelia scytalina* is known from Central and South America, from southern Mexico to north-western Colombia (Pérez-Santos & Moreno, 1988; Zaher, 1996; Torre-Loranca *et al.*, 2006).

Habitat, time of activity, feeding, and reproduction: The largest specimen recorded is a female (SVL = 1190 mm; Zaher, 1996). Nothing is known about the ecology of *C. scytalina*.

***Drepanoides anomalus* Jan, 1863**

Distribution: *Drepanoides anomalus* is distributed throughout the Amazon basin (Cunha & Nascimento, 1978, 1993; Duellman, 1978, 2005; Dixon & Soini, 1986; Vanzolini, 1986; Silva, 1993; Martins & Oliveira, 1998; Vidal *et al.*, 1999; Yuki *et al.*, 1999; Santos-Costa, 2003; Bernarde & Abe, 2006; Maschio, 2008; Prudente *et al.*, 2010; Silva *et al.*, 2010; Ávila & Kawashita-Ribeiro, 2011; Bernarde *et al.*, 2011).

Habitat and time of activity: *Drepanoides anomalus* is a small pseudoboine (maximum SVL = 662 mm, female; Martins & Oliveira, 1998) that inhabits forests (Cunha & Nascimento, 1978; Duellman, 1978, 2005; Dixon & Soini, 1986; Vanzolini, 1986; Silva, 1993; Vidal *et al.*, 1999; Yuki *et al.*, 1999; Santos-Costa, 2003; Bernarde, 2004; Bernarde & Abe, 2006) and can occasionally be found in their surroundings (Duellman, 1978; Dixon & Soini, 1986). This semi-arboreal snake (terrestrial observations: $N = 10$; Duellman, 1978, 2005; Martins & Oliveira, 1998; Vidal *et al.*, 1999; Yuki *et al.*, 1999; Santos-Costa, 2003; arboreal observations: $N = 5$; Vanzolini, 1986; Martins & Oliveira, 1998; Duellman, 2005; R. Recoder, *unpublished data*) is nocturnal ($N = 11$; Duellman, 1978, 2005; Martins & Oliveira, 1998; Vidal *et al.*, 1999; Yuki *et al.*, 1999; R. Recoder, *unpublished data*) and can occasionally be found active during the day ($N = 2$; Vanzolini, 1986; Santos-Costa, 2003).

Feeding: *Drepanoides anomalus* is a lizard egg specialist ($N = 9$; seven *Gonatodes* spp., two unidentified) that occasionally eats lizards ($N = 2$) (Cunha & Nascimento, 1978; Dixon & Soini, 1986; Martins & Oliveira, 1998; Santos-Costa, 2003; Bernarde, 2004; Duellman, 2005; Bernarde & Abe, 2006; Maschio, 2008; Silva *et al.*, 2010; M. Martins, *unpublished data*).

Reproduction: Clutch size varies from two to four eggs ($N = 9$, mean = 2.3 eggs; Martins & Oliveira, 1998; this study). Duellman (2005) reports one clutch with 13 eggs for *D. anomalus* from Cuzco, Peru. However, due to the small size of this species and the large sample gathered here, we believe that this may be an error. The smallest mature female was 461 + 124 mm (SVL + TL, this study) and the smallest mature male was 422 + 153 mm (SVL + TL; this study).

Defense: When handled, *D. anomalus* tries to escape, can thrash the body, and discharge cloacal secretions (Martins & Oliveira, 1998; Yuki *et al.*, 1999; Maschio, 2008).

***Mussurana bicolor* Peracca, 1904**

Distribution: *Mussurana bicolor* is known for southwestern Brazil, Paraguay and northern of Argentina (Scrocchi & Vinas, 1990; Strüssmann, 1992; Yanosky *et al.*, 1996; Zaher, 1996; Giraudo & Scrocchi, 2002; Scott Jr. *et al.*, 2006).

Habitat and time of activity: *Mussurana bicolor* is a moderate-sized pseudoboine (maximum SVL = 825 mm, female; Giraudo, 2001). The little information concerning the habitat of *M. bicolor* indicates that it inhabits primarily open areas like those from the Pantanal biome, and can also be found in disturbed areas (Strüssmann, 1992; Couturier & Faivovich, 1996; M. Martins, *unpublished data*). Couturier & Faivovich (1996) found three individuals active on the ground, indicating that this may be a terrestrial species. One individual was constricting a frog on a dry grassy substrate of a swamp at night (M. Martins, *unpublished data*). The five available records indicate that *M. bicolor* is a nocturnal species (Strüssmann, 1992; Couturier & Faivovich, 1996).

Feeding: The scarce information about its feeding habits suggests that *M. bicolor* is one of the few pseudoboine that feeds on amphibians ($N = 3$, *Leptodactylus chaquensis*, *Leptodactylus* sp.; Strüssmann, 1992; Yanosky *et al.*, 1996; M. Martins, *unpublished data*). It can also feed on small mammals ($N = 1$), lizards ($N = 1$), and snakes ($N = 1$ Colubridae) (Strüssmann, 1992; this study).

Reproduction: Clutch size varies from seven to 15 eggs ($N = 8$, mean = 9 eggs; Strüssmann, 1992; this study). The smallest mature female was 601 + 126 mm SVL (this study), and the smallest mature male was 550 mm SVL (Zaher, 1996). There is no difference in SVL between sexes (Scott Jr. *et al.*, 2006).

***Mussurana montana* Franco,
Marques & Puerto, 1997**

Distribution: *Mussurana montana* has a restricted distribution in southeastern Brazil, in the highlands of northwestern São Paulo state and southeastern Minas Gerais state (Franco *et al.*, 1997; Pizzatto, 2005; Hartmann *et al.*, 2009).

Habitat and time of activity: Information in the literature indicates that snout-vent length of adult specimens ranges from 635 to 940 mm (Franco *et al.*, 1997; Pizzatto, 2005), suggesting that this is a moderate-sized pseudoboine. Two individuals found by Hartmann (2005) indicate that *M. montana* probably inhabits forests. There is no information on the time of activity.

Feeding: One specimen analyzed by Franco *et al.* (1997) contained a snake tail in the gut (*Liophis jaegei*) and another one analyzed by Hartmann (2005) contained a lizard (*Cercosaura* sp.).

Reproduction: Franco *et al.* (1997) found two females with seven and 11 eggs. There is no information regarding the size of maturity.

***Mussurana quimi* Franco, Marques & Porto, 1997**

Distribution: *Mussurana quimi* is distributed in central and southeastern Brazil, northeastern Argentina and eastern Paraguay (Franco *et al.*, 1997; Giraudo, 1999; Scott Jr. *et al.*, 2006; Vaz-Silva *et al.*, 2007).

Habitat and time of activity: *Mussurana quimi* is a moderate-sized pseudoboine (maximum SVL = 1078 mm, female; Pizzatto, 2005) and there is only scattered information about its ecology. It seems to inhabit open areas of the Brazilian Cerrado (Vaz-Silva *et al.*, 2007; P. Valdujo, *unpublished data*), and few data indicate that this species may be terrestrial ($N = 2$) and active during the night ($N = 2$) (P. Valdujo, *unpublished data*).

Feeding: *Mussurana quimi* seems to be specialized in small mammals ($N = 6$), but also consumes lizards ($N = 1$) and snakes ($N = 1$, *Helicops modestus*) (Franco *et al.*, 1997; this study).

Reproduction: Clutch size varies from seven to 26 eggs ($N = 8$, mean = 11.3 eggs; Franco *et al.*, 1997; Pizzatto, 2005; this study). Females attain larger body size than males (Pizzatto, 2005). The smallest mature female was 660 mm SVL (Pizzatto, 2005) and the smallest mature male was 573 mm SVL (Pizzatto, 2005).

***Oxyrhopus clathratus* Duméril,
Bibron & Duméril, 1854**

Distribution: *Oxyrhopus clathratus* occurs from eastern to southern Brazil and northeastern Argentina (Marques, 1998; Borges, 2004; Hartmann, 2005; Morato, 2005; Cicchi *et al.*, 2007; Di-Bernardo *et al.*, 2007; Kunz, 2007; Hartmann & Giasson, 2008; Forlani *et al.*, 2010; Bernardo *et al.*, 2012; O.A.V. Marques, *unpublished data*; F.E. Barbo, *unpublished data*), with one known locality for the northeastern coast of Brazil (Bahia state; Argôlo, 2004) and a few in Argentina (Misiones department; Cranwell, 1943; Giraudo, 1999).

Habitat and time of activity: *Oxyrhopus clathratus* is the largest species of the genus *Oxyrhopus* (maximum SVL = 1132 mm, female; this study). It primarily inhabits forested areas but can be occasionally found in open and disturbed areas (Hartmann, 2005; Morato, 2005; Di-Bernardo *et al.*, 2007; Hartmann & Giasson, 2008). *Oxyrhopus clathratus* is a terrestrial species ($N = 31$; Hartmann, 2005; Morato, 2005; Di-Bernardo *et al.*, 2007; Kunz, 2007; Hartmann & Giasson, 2008; Hartmann *et al.*, 2009; Barbo *et al.*, 2011; S. Morato, *unpublished data*; F.E. Barbo, *unpublished data*) that can be found active during the day ($N = 9$) and night ($N = 18$) (Marques, 1998; Hartmann, 2005; Morato, 2005; Kunz, 2007; Hartmann & Giasson, 2008; Barbo *et al.*, 2011; O.A.V. Marques, *unpublished data*; S. Morato, *unpublished data*; F.E. Barbo, *unpublished data*; this study).

Feeding: Although information in the literature suggests that some *Oxyrhopus* species can present an ontogenetic shift in diet (*e.g.*, Andrade & Silvano, 1996; see below), the literature data indicates that *O. clathratus* is a small mammal specialist ($N = 28$; 22 rodents, five murids) that can also feed on lizards ($N = 4$; one *Eupleopus gaudichaudi*, one gymnophthalmid, two scincids) and birds ($N = 2$) (Marques, 1998; Borges, 2004; Hartmann, 2005; Morato, 2005; Kunz, 2007; O.A.V. Marques, *unpublished data*). However, this result must be viewed carefully because a large sample of adult specimens could have biased it.

Reproduction: Clutch size varies from four to 16 eggs ($N = 37$, mean = 7.8 eggs; Marques, 1998; O.A.V. Marques, *unpublished data*; R. Scartozonni, *unpublished data*). The smallest mature female was 612 mm SVL (O.A.V. Marques, *unpublished data*) and the smallest mature male was 510 mm SVL (O.A.V. Marques, *unpublished data*).

Defense: When handled, Hartmann (2005) reported that one individual of *O. clathratus* discharged cloacal secretions and bit, while another tried to escape and hide its head under the body.

***Oxyrhopus doliatus* Duméril,
Bibron & Duméril, 1854**

Distribution: *Oxyrhopus doliatus* is only known for its type locality, Pauji, Distrito Acosta, Falcon State, Venezuela (Shreve, 1947).

Habitat, time of activity, feeding, and reproduction: The only specimen recorded is a male (385 mm in SVL; Shreve, 1947). Nothing is known about its ecology.

***Oxyrhopus erdisii* Barbour, 1913**

Distribution: *Oxyrhopus erdisii* is only known for its type locality in Machu Pichu, Peru (Zaher & Caramaschi, 2000).

Habitat, time of activity, feeding, and reproduction: There is no information on the ecology of *O. erdisii*.

***Oxyrhopus fitzingeri* Tschudi, 1845**

Distribution: *Oxyrhopus fitzingeri* occurs throughout coastal Peru (Zaher & Caramaschi, 2000).

Habitat, time of activity, feeding, and reproduction: There is no information on the ecology of *O. fitzingeri*.

***Oxyrhopus formosus* Wied, 1820**

Distribution: *Oxyrhopus formosus* is distributed throughout the Amazon basin in Brazil, Bolivia, Colombia, Ecuador, the Guianas, Peru, and Venezuela, as well as in eastern Brazil (e.g., Hoge *et al.*, 1972; Cunha & Nascimento, 1978, 1983, 1993; Duellman, 1978; Gasc & Rodrigues, 1980; Silva, 1993; Martins & Oliveira, 1998; Starace, 1998; Mattei & Barrio, 1999; Santos-Costa, 2003; Argôlo, 2004; Frota *et al.*, 2005; Prudente *et al.*, 2010; Silva *et al.*, 2010; Bernarde *et al.*, 2011; H. Zaher, *unpublished data*).

Habitat and time of activity: This moderate-sized pseudoboine (maximum SVL = 897 mm, female; Silva, 1993) inhabits forests and appears to be restricted to pristine habitats (Gasc & Rodrigues, 1980; Martins & Oliveira, 1998; Santos-Costa, 2003; Argôlo, 2004; A. Dourado, *unpublished data*; S. Morato, *unpublished data*). It seems to be a semi-arboreal species

(terrestrial data: $N = 9$; Duellman, 1978; Martins & Oliveira, 1998; Santos-Costa, 2003; A. Dourado, *unpublished data*; S. Morato, *unpublished data*; arboreal data: $N = 6$; Gasc & Rodrigues, 1980; Martins & Oliveira, 1998; Duellman, 2005; P. Bernarde, *unpublished data*), active mainly during the night ($N = 12$; Duellman, 1978, 2005; Gasc & Rodrigues, 1980; Martins & Oliveira, 1998; P. Bernarde, *unpublished data*), but there are two observations of diurnal activity (Santos-Costa, 2003; A. Dourado, *unpublished data*).

Feeding: *Oxyrhopus formosus* feeds on lizards ($N = 7$; Duellman, 1978; Santos-Costa, 2003; this study).

Reproduction: Clutch size varied from four to 17 eggs (mean = 11.3 eggs, $N = 3$; Duellman, 1978; Starace, 1998).

Defense: According to Martins & Oliveira (1998), when handled *O. formosus* can thrash the body, and one adult bit after being handled for a long period. These authors also suggest that the color pattern of young and subadults may represent a case of abstract coral snake mimicry.

Remarks: We are aware that what we are calling *Oxyrhopus formosus* is a complex of distinct species with similar morphology and coloration, including the forms recently treated as *O. occipitalis* in the literature (Lynch, 2009; MacCulloch *et al.*, 2009). Although there has been recent local attempts to clarify the taxonomic problems related to this complex (Lynch, 2009; MacCulloch *et al.*, 2009), the situation is still confusing and we hereby prefer to treat all the populations traditionally considered as *O. formosus* under this name, pending a revision of the complex that is underway (H. Zaher, *pers. com.*).

***Oxyrhopus guibei* Hoge & Romano, 1977**

Distribution: *Oxyrhopus guibei* is widely distributed in central, eastern, and southern Brazil, northeastern Argentina, eastern Bolivia, and southern Paraguay (Sazima & Abe, 1991; Sazima & Haddad, 1992; Yanosky *et al.*, 1996; Zaher, 1996; Xavier-Freire, 1999; Giraudo & Scrocchi, 2002; Argôlo, 2004; Tozetti *et al.*, 2004; Santana *et al.*, 2008).

Habitat and time of activity: *Oxyrhopus guibei* is a moderate-sized pseudoboine (Maximum SVL = 1080 mm, female; Pizzatto & Marques, 2002). The extensive amount of habitat use data indicates

that this species inhabits both forested and open areas, and is frequently found in disturbed areas (Sazima & Haddad, 1992; Xavier-Freire, 1999; Argôlo, 2004; Sawaya *et al.*, 2008; Araújo *et al.*, 2010). Data on microhabitat use indicates that *O. guibei* is a terrestrial species ($N = 11$; Sazima & Abe, 1991; Sazima & Haddad, 1992; Santana *et al.*, 2008; F.E. Barbo, unpublished data; C. Strüßmann, unpublished data), although Sawaya *et al.* (2008) have found one individual moving 30 cm above the ground. It is active both during the day ($N = 31$; Sazima & Haddad, 1992; Pereira-Filho, 2007; Sawaya *et al.*, 2008; F.E. Barbo, unpublished data) and night ($N = 30$; Sazima & Abe, 1991; Sawaya *et al.*, 2008; Araújo *et al.*, 2010; Barbo *et al.*, 2011; F.E. Barbo, unpublished data).

Feeding: Andrade & Silvano (1996) suggested that *O. guibei* presents an ontogenetic shift in diet, and our results show that it feeds heavily on mammals ($N = 66$; two *Bolomys lasiurus*, one *Calomys laucha*, one *Mus musculus*, one *Rattus* sp., rodents), but also eat lizards ($N = 18$, three *Ophiodon* sp., six *Hemidactylus mabouia*), and occasionally birds ($N = 1$; *Leptotila* sp.) (Andrade & Silvano, 1996; Sazima & Abe, 1991; Dalmolin, 2000; Barbo *et al.*, 2011).

Reproduction: Clutch size varies from three to 20 eggs ($N = 105$, mean = 12.3 eggs; Pizzatto & Marques, 2002; Sawaya *et al.*, 2008; Barbo *et al.*, 2011; Braz & Manço, 2011; F.E. Barbo, unpublished data) and this species presents a continuous reproductive cycle (Pizzatto & Marques, 2002). The smallest mature female was 612 mm SVL (F.E. Barbo, unpublished data) and the smallest mature male was 388 mm SVL (F.E. Barbo, unpublished data). Pizzatto & Marques (2002) found a significant sexual size dimorphism, females being larger than males.

Defense: When handled *O. guibei* can struggle and discharge cloacal secretions (Pereira-Filho, 2007; Sawaya *et al.*, 2008).

***Oxyrhopus leucomelas* Werner, 1916**

Distribution: *Oxyrhopus leucomelas* occurs in Andean cloud forests of Peru, Ecuador and Colombia (Pérez-Santos & Moreno, 1988; Lynch, 2009).

Habitat, time of activity, feeding, and reproduction: According to Lynch (2009), this is the smallest *Oxyrhopus* species found in Colombia. The largest specimen recorded is a male (TL = 722 mm). Nothing is known about its ecology.

***Oxyrhopus marcapatae* Boulenger, 1902**

Distribution: *Oxyrhopus marcapatae* is only known from southern Peru (Alonso *et al.*, 2001).

Habitat, time of activity, feeding, and reproduction: Available information indicates that this is a terrestrial and nocturnal species ($N = 3$; J. Icochea, unpublished data). Additionally, five individuals were found in cloud forests at night (at Wayrapata; elevation about 2445 m), with no indication whether they were active (Alonso *et al.*, 2001). One male found by J. Icochea was 365 + 108 mm (SVL + TL). Nothing else is known about the ecology of *O. marcapatae*.

***Oxyrhopus melanogenys* Tschudi, 1845**

Distribution: *Oxyrhopus melanogenys* occurs throughout Amazonian Brazil and western Peru (Cunha & Nascimento, 1978; Dixon & Soini, 1986; Nascimento *et al.*, 1987; Pérez-Santos & Moreno, 1988; Zaher, 1996; Frota, 2000; Santos-Costa, 2003; Duellman, 2005; Frota *et al.*, 2005; Bernarde & Abe, 2006; França *et al.*, 2006; Maschio, 2008; Silva *et al.*, 2010; Bernarde *et al.*, 2011; L.J. Vitt, unpublished data).

Habitat and time of activity: *Oxyrhopus melanogenys* is a moderate-sized pseudo-boine (maximum SVL = 901 mm, female; this study) and the data available indicate that this is a terrestrial species ($N = 6$; Santos-Costa, 2003; Maschio, 2008; S. Morato, unpublished data; M. Sena, unpublished data; C. Strüßmann, unpublished data) that inhabits forests and it is active during the night ($N = 6$; Santos-Costa, 2003; Maschio, 2008; S. Morato, unpublished data).

Feeding: *Oxyrhopus melanogenys* is a diet generalist that feeds mainly on small mammals ($N = 24$) and lizards ($N = 25$; two *Ameiva* sp., one *Cnemidophorus* sp., one *Colobossaura* sp., one *Leposoma* sp., one *Hemidactylus* sp.), but also on birds ($N = 3$; two *Ramphocaenus melanurus*) and occasionally on lizard eggs ($N = 1$) (Nascimento *et al.*, 1987; Santos-Costa, 2003; Maschio, 2008; Silva *et al.*, 2010; Martins & Oliveira, unpublished data).

Reproduction: Clutch size varies from seven to 13 eggs ($N = 8$, mean = 9.7 eggs; this study). The smallest mature female was 410 mm SVL (Bitar & Santos-Costa, 2006) and the smallest mature male was 310 mm SVL (Bitar & Santos-Costa, 2006).

Defense: Maschio (2008) reports that when handled *O. melanogenys* can expel cloacal secretions.

***Oxyrhopus petola* Linnaeus, 1758**

Distribution: *Oxyrhopus petola* is widely distributed throughout South and Central America, from Mexico to Argentina (Guyer & Donnelly, 1990; Test *et al.*, 1966; Hoge, 1967; Hoge *et al.*, 1972; Cunha & Nascimento, 1978, 1983; Duellman, 1978, 2005; Dixon & Soini, 1986; McCoy *et al.*, 1986; Pérez-Santos & Moreno, 1988; Silva, 1993; Murphy, 1997; Esqueda & La Marca, 1999; Giraud, 1999; Bernarde & Machado, 2000; Lehr, 2001; Valdujo & Nogueira, 2001; Santos-Costa, 2003; Argôlo, 2004; Carvalho *et al.*, 2005; Frota *et al.*, 2005; Bernarde & Abe, 2006; Torre-Loranca *et al.*, 2006; Ribeiro, 2007; Vaz-Silva *et al.*, 2007; Santana *et al.*, 2008; Lynch, 2009; Prudente *et al.*, 2010; Silva *et al.*, 2010; Bernarde *et al.*, 2011; L.J. Vitt, *unpublished data*).

Habitat and time of activity: The maximum SVL reported for *O. petola* is a female, with 1104 mm of TL (this study). This species appears to inhabit both forested and open areas, and can also be found in disturbed habitats (Beebe, 1946; Test *et al.*, 1966; Duellman, 1978, 2005; Silva, 1993; Murphy, 1997; Argôlo, 2004; Bernarde, 2004; Carvalho *et al.*, 2005; Esqueda *et al.*, 2005; Bernarde & Abe, 2006; Vaz-Silva *et al.*, 2007; Prudente *et al.*, 2010; Silva *et al.*, 2010; Bernarde *et al.*, 2011; C. Strüssmann, *unpublished data*; P. Valdujo, *unpublished data*). It is a terrestrial species ($N = 30$; Test *et al.*, 1966; Duellman, 1978, 2005; Murphy, 1997; Esqueda *et al.*, 2005; Pereira-Filho, 2007; C. Strüssmann, *unpublished data*; P. Valdujo, *unpublished data*), but there are two records of activity on the vegetation (Duellman, 2005). It can be found active both during the day ($N = 16$; Duellman, 1978; Carvalho *et al.*, 2005; Pereira-Filho, 2007) and during the night ($N = 13$; Test *et al.*, 1966; Duellman, 1978, 2005; Pereira-Filho, 2007; C. Strüssmann, *unpublished data*; P. Valdujo, *unpublished data*).

Feeding: *Oxyrhopus petola* is a diet generalist that feeds on small mammals ($N = 6$), lizards ($N = 7$, *Arthrosaura reticulata*, *Cercosaura eigenmanni*, *Cercosaura* sp., *Kentropyx pelviceps*), and birds ($N = 5$, one *Columbina talpacoti*), occasionally consuming amphibians ($N = 1$, *Leptodactylus* sp.) and bird eggs ($N = 1$) (Duellman, 1978, 2005; Cunha & Nascimento, 1983; Dixon & Soini, 1986; Murphy, 1997; Bernarde & Machado, 2000; Santos-Costa, 2003; C. Strüssmann, *unpublished data*; L.J. Vitt, *unpublished data*; this study).

Reproduction: Clutch size varies from two to 12 eggs ($N = 25$, mean = 7.1 eggs; Test *et al.*, 1966; Fitch,

1970; Lynch, 2009; this study). The smallest mature female was 835 mm SVL (this study) and the smallest mature male was 677 mm SVL (this study).

***Oxyrhopus rhombifer* Duméril, Bibrón & Duméril, 1854**

Distribution: *Oxyrhopus rhombifer* occurs in central to northern Argentina, southern to northeastern Brazil, as well as in Paraguay, Bolivia, and Uruguay (Abalos *et al.*, 1964; Cordeiro & Hoge, 1973; Cunha & Nascimento, 1983; Veja & Bellagamba, 1990; Vuoto, 1995; Yanosky *et al.*, 1996; Achaval & Olmos, 1997; Avila & Morando, 1999; Argôlo & Freitas, 2000; Valdujo & Nogueira, 2001; Alvarez *et al.*, 2002; Arzamendia & Giraud, 2002; Maschio & Di-Bernardo, 2002; Vidal, 2002; Maschio *et al.*, 2004; Leynaud & Bucher, 2005; Gallardo & Scrocchi, 2006; França *et al.*, 2006; Kacoliris *et al.*, 2006a,b; Ribeiro, 2007).

Habitat and time of activity: This moderate-sized pseudo-boine (maximum SVL = 958 mm, female; Giraud, 2001) occurs mainly in open areas, but can also be found in forests (Cechin, 1999; Kacoliris, 2006a,b; Ribeiro, 2007; Sawaya *et al.*, 2008; S. Morato, *unpublished data*; C. Strüssmann, *unpublished data*; P. Valdujo, *unpublished data*). It is a terrestrial species ($N = 20$; Di-Bernardo, 1998; Ribeiro, 2007; Sawaya *et al.*, 2008; S. Morato, *unpublished data*; C. Strüssmann, *unpublished data*; P. Valdujo, *unpublished data*), but Sawaya *et al.* (2008) reported two individuals on the vegetation approximately 20 cm above the ground. *Oxyrhopus rhombifer* is mainly nocturnal ($N = 19$; Cechin, 1999; Sawaya *et al.*, 2008; S. Morato, *unpublished data*; C. Strüssmann, *unpublished data*; P. Valdujo, *unpublished data*), but can also be found active during the day ($N = 8$; Cechin, 1999; Sawaya *et al.*, 2008; C. Strüssmann, *unpublished data*; P. Valdujo, *unpublished data*).

Feeding: *O. rhombifer* is a diet generalist that eats mainly lizards ($N = 20$, one *Liolaemus wiegmanii*, three *Cnemidophorus lacertoides*, one *Cnemidophorus* sp., one *Kentropyx* sp, one *Teiús ocellatus*, one *Cercosaura schreibersii*, one *Hemidactylus mabouia*, one *Ophiodes* sp., and six unidentified) and small mammals ($N = 19$, three Cricetidae, two rodents, one *Nectomys squamipes*), but also snakes ($N = 1$, *Epictia munoai*) (Abalos *et al.*, 1964; Lema *et al.*, 1983; Cechin, 1999; Vidal, 2002; Maschio *et al.*, 2003, 2004; Ribeiro, 2007; Sawaya *et al.*, 2008).

Reproduction: Clutch size varies from four to 17 eggs ($N = 12$, mean = 8.3 eggs; Pontes & Di-Bernardo,

1988; Yanosky *et al.*, 1996; Gallardo & Scrocchi, 2006; this study). The smallest mature female was 442 mm SVL (Cunha & Nascimento, 1983) and the smallest mature male was 452 mm SVL (this study).

Defense: Sawaya *et al.* (2008) reports that when handled *O. rhombifer* can thrash the body, expel cloacal gland products, and laterally compress the body.

***Oxyrhopus trigeminus* Duméril,
Bibron & Duméril, 1854**

Distribution: *Oxyrhopus trigeminus* is distributed throughout Brazil (Hoge *et al.*, 1972; Hoge *et al.*, 1976/77; Cordeiro & Hoge, 1973; Cunha & Nascimento, 1983; Vitt & Vangilder, 1983; Rodrigues, 2003; Carvalho *et al.*, 2005; Frota *et al.*, 2005; Rocha *et al.*, 2005; Vaz-Silva *et al.*, 2007; L.J. Vitt, *unpublished data*; this study).

Habitat and time of activity: This moderate-sized pseudoboina (maximum SVL = 860 mm, female; this study) inhabits open areas (Carvalho *et al.*, 2005; Vaz-Silva *et al.*, 2007; M. Sena, *unpublished data*; C. Strüssmann, *unpublished data*; P. Valdujo, *unpublished data*). It is predominantly terrestrial ($N = 26$; Rocha *et al.*, 2005; Pereira-Filho, 2007; M. Sena, *unpublished data*; C. Strüssmann, *unpublished data*; P. Valdujo, *unpublished data*), but C. Strüssmann (*unpublished data*) reports one individual on the vegetation and another active in the water. *Oxyrhopus trigeminus* may be active both during the day ($N = 6$; Pereira-Filho, 2007) and night ($N = 8$; C. Strüssmann, *unpublished data*; P. Valdujo, *unpublished data*).

Feeding: *O. trigeminus* is a diet generalist that feeds mainly on lizards ($N = 17$, one *Tropidurus hispidus*, four *Tropidurus torquatus*, three *Tropidurus* sp., three *Ameiva ameiva*, three *Cnemidophorus ocellifer*, one scincid, two *Hemidactylus mabouia*) and small mammals ($N = 11$, five *Necromys lasiurus*, two *Oligoryzomys* sp., one *Akodon* sp., one *Nectomys squamipes*, two unidentified rodents, one *Didelphis albiventris*) (Cunha & Nascimento, 1983; Vitt & Vangilder, 1983; Ávila-Pires, 1995; Rocha *et al.*, 2005; Alencar *et al.*, 2012; C. Strüssmann, *unpublished data*; this study). In addition, Alencar *et al.* (2012) reported three birds (one *Synallaxis* sp., one *Coryphospingus*) and Vitt & Vanglier (1983) reported one lizard egg.

Reproduction: Clutch size varies from two to 12 eggs ($N = 14$, mean = 7.9; Vitt & Vangilder, 1983; Alencar *et al.*, 2012; C. Strüssmann, *unpublished data*;

this study). The smallest mature female was 536 mm (SVL, this study) and the smallest mature male was 439 mm SVL (Alencar *et al.*, 2012).

Defense: Pereira-Filho (2007) reports that when handled *O. rhombifer* can thrash the body and expel cloacal gland products.

***Oxyrhopus vanidicus* Lynch, 2009**

Distribution: *Oxyrhopus vanidicus* is distributed in northern Brazil, in Colombia, northern Peru, and in Ecuador (Duellman, 1978; Dixon & Soini, 1986; Pérez-Santos & Moreno, 1988; Zaher, 1996; L.J. Vitt, *unpublished data*).

Habitat and time of activity: The scattered morphological data indicates that *O. vanidicus* is a moderate-sized pseudoboina (maximum SVL = 906 mm; Silva, 1993). It is a forest inhabitant (Duellman, 1978; Dixon & Soini, 1986; Martins & Oliveira, 1998; Silva, 1993), and predominantly terrestrial ($N = 13$; Duellman, 1978; Dixon & Soini, 1986; Martins & Oliveira, 1998). Martins & Oliveira (1998) reported one individual moving on a shrub one meter above the ground and three moving in the leaf litter accumulated within the leaf petioles of low palms. This species is mainly nocturnal ($N = 12$; Duellman, 1978; Martins & Oliveira, 1998; Starace, 1998), but can also be found active during the day ($N = 5$; Duellman, 1978).

Feeding: *Oxyrhopus vanidicus* seems to be a diet generalist, feeding on small mammals ($N = 3$, rodents) and lizards ($N = 3$, one *Arthrosaura reticulata*, one *Iphisa elegans*; one *Lepsoma parietale*) (Duellman, 1978; Dixon & Soini, 1986).

Reproduction: The only available clutch size record is 12 eggs from a female of 819 mm (SVL; Duellman, 1978). There is no information regarding the smallest mature female or male.

Defense: When handled, *O. vanidicus* may thrash the body and occasionally vibrate the tail (Martins & Oliveira, 1998).

***Paraphimophis rusticus* Cope, 1878**

Distribution: *Paraphimophis rusticus* is known from southeastern and southern Brazil, northeastern Argentina, and Uruguay (Zaher, 1996; Achaval & Olmos, 1997; Franco *et al.*, 1997; Gallardo & Scrocchi, 2006; Kacoliris *et al.*, 2006b; Scott Jr. *et al.*, 2006).

Habitat and time of activity: *Paraphimophis rusticus* is a moderate to large-sized pseudoboine (maximum SVL = 1850 mm, female; Pizzatto, 2005). It inhabits forests (Di-Bernardo, 1998; S. Morato, *unpublished data*) and can be found in disturbed areas (Veja & Bellagamba, 1990; R. Bérnils, *unpublished data*). The scattered information concerning microhabitat use and time of activity indicates that this species may be terrestrial ($N = 2$) and diurnal ($N = 3$) (Di-Bernardo, 1998; R. Bérnils & I. Opuskevitch, *unpublished data*).

Feeding: *Paraphimophis rusticus* is a generalist species that consumes mainly small mammals ($N = 5$; one *Akodon* sp.) and snakes ($N = 4$, one *Oxyrhopus rhombifer*, two *Philodryas olfersii*), occasionally feeding on lizards ($N = 1$) (*Ophiodes fragilis*; Pinto & Lema, 2002; Vidal, 2002; this study).

Reproduction: Clutch size varies from seven to 13 eggs ($N = 12$, mean = 8.9 eggs; Vaz-Ferreira *et al.*, 1970; Pizzatto, 2005; Gallardo & Scrocchi, 2006; Carreira & Baletta, 2007; this study). Pizzatto (2005) found a significant sexual size dimorphism in snout-vent length for *P. rusticus*, with females attaining larger body size than males. The smallest mature female was 849 + 137 mm (SVL + TL; this study) and the smallest mature male was 750 mm SVL (Pizzatto, 2005).

Defense: When handled *P. rusticus* is very docile and does not try to bite (Achaval & Olmos, 1997).

***Phimophis guerini* Duméril,
Bibron & Duméril, 1854**

Distribution: *Phimophis guerini* is distributed in central and southeastern Brazil, Paraguay, and northern Argentina (Abdala, 1990; Lema, 1994; Vuoto, 1995; Leynaud & Chiaraviglio, 1996; Yanosky *et al.*, 1996; França *et al.*, 2006; Vaz-Silva *et al.*, 2007).

Habitat and time of activity: *P. guerini* is the largest *Phimophis* species (maximum SVL = 1038 mm; Sawaya, 2003) and inhabits different types of open vegetation throughout its distribution (Sawaya, 2003; Vaz-Silva *et al.*, 2007; Sawaya *et al.*, 2008; Neto, 2009; C. Strüssmann, *unpublished data*; P. Valdujo, *unpublished data*). There are only two records in disturbed areas (Sawaya *et al.*, 2008; Queissada, 2009). It seems to be primarily terrestrial ($N = 11$; Sawaya *et al.*, 2008; S. Morato, *unpublished data*; C. Strüssmann, *unpublished data*; P. Valdujo, *unpublished data*), and nocturnal ($N = 8$; Sawaya, 2003; P. Valdujo, *unpublished data*).

Feeding: *Phimophis guerini* is a lizard specialist ($N = 11$, one *Ameiva ameiva*) that may occasionally eat small mammals ($N = 1$) (Sawaya *et al.*, 2008; this study).

Reproduction: Clutch size varies from three to seven eggs ($N = 3$, mean = 4.7; this study). The smallest mature female was 699 mm SVL (this study) and the smallest mature male was 435 mm (SVL; this study).

Defense: When handled, *P. guerini* may trash the body, expel cloacal gland products, and bite (Sawaya *et al.*, 2008).

***Phimophis guianensis* Troschel, 1848**

Distribution: *Phimophis guianensis* is distributed in the extreme north of Brazil, in Colombia, Guyana and Venezuela (Gasc & Rodrigues, 1980; Pérez-Santos & Moreno, 1988; Oliveiros *et al.*, 2000; Cornejo & Prieto, 2001; Moreno-Bejarano & Álvarez-León, 2003; França *et al.*, 2006).

Habitat and time of activity: This small pseudoboine (maximum SVL = 649 mm, female; this study) inhabits savannas and dry forests (Swanson, 1945; Oliveiros *et al.*, 2000; Rueda-Solano & Castellanos-Barliza, 2010; M. Martins, *pers. obs.*) and seems to be active during the day ($N = 2$; Oliveiros *et al.*, 2000). No data is available regarding the diet or reproduction of this species.

***Phimophis vittatus* Boulenger, 1896**

Distribution: *Phimophis vittatus* is distributed in central to northern Argentina (Abdala, 1990; Giraud & Scrocchi, 2002; Leynaud & Bucher, 2005; Kacoliris *et al.*, 2006a).

Habitat, time of activity, and feeding: This is a small pseudoboine (maximum SVL = 651 mm, female; this study), and there is no information regarding its ecology.

Reproduction: The only available clutch size record for *P. vittatus* is from a female (651 + 94 mm, SVL + TL) with five secondary vitellogenic follicles (this study).

***Pseudoboa coronata* Schneider, 1801**

Distribution: *Pseudoboa coronata* is distributed in central Brazil, throughout the Amazon basin to coastal Venezuela (Griffin, 1920; Beebe, 1946; Hoge *et al.*, 1972; Cunha & Nascimento, 1978, 1983; Duellman,

1978, 2005; Gasc & Rodrigues, 1980; Dixon & Soini, 1986; Pérez-Santos & Moreno, 1988; Silva, 1993; Martins & Oliveira, 1998; Fuenmayor & La Marca, 2001; Frota *et al.*, 2005; Ribeiro, 2007).

Habitat and time of activity: This moderate-sized pseudoboina (maximum SVL = 1093 mm, female; Silva, 1993) is a forest inhabitant that may be found in disturbed areas (Beebe, 1946; Cunha & Nascimento, 1978, 1993; Duellman, 1978, 2005; Dixon & Soini, 1986; Silva, 1993; Martins & Oliveira, 1998; P. Bernade, *unpublished data*; M. Hoogmed, *unpublished data*; M. Sena, *unpublished data*; F. Stender, *unpublished data*). It is a terrestrial species ($N = 14$; Beebe, 1946; Duellman, 1978, 2005; Silva, 1993; Martins & Oliveira, 1998; P. Bernade, *unpublished data*; M. Sena, *unpublished data*; F. Stender, *unpublished data*), although Duellman (1978) reports one individual in the water. *Pseudoboa coronata* appears to be active both during the day ($N = 3$; Duellman, 1978, F. Stender, *unpublished data*) and during the night ($N = 6$; Duellman, 1978, 2005; Martins & Oliveira, 1998; Starace, 1998; P. Bernade, *unpublished data*).

Feeding: *Pseudoboa coronata* seems to be a generalist species that feeds mainly on lizards ($N = 4$, *Ameiva ameiva*, one scincid), and also eat small mammals ($N = 3$, two rodents and one marsupial), occasionally ingesting snakes ($N = 1$, *Tantilla melanocephala*) and eels ($N = 1$) (Beebe, 1946; Duellman, 1978, 2005; Martins & Oliveira, 1998, this study).

Reproduction: Clutch size varies from three to six eggs ($N = 5$, mean = 4.58; Duellman, 1978; Martins & Oliveira, 1998; this study). The smallest mature female was 576 mm SVL (this study) and the smallest mature male was 556 mm SVL (this study).

Defense: Martins & Oliveira (1998) reported that a single individual of *P. coronata* thrashed the body and constricted when handled.

***Pseudoboa haasi* Boettger, 1905**

Distribution: *Pseudoboa haasi* is found in southern Brazil and northeastern Argentina (Gallardo, 1992; Lema, 1994; Morato *et al.*, 1995; Giraudo, 1999, 2001; Morato, 2005; Kunz, 2007).

Habitat and time of activity: It is a large species of *Pseudoboa* (maximum SVL = 1293 mm, female; this study) that inhabits both open and forested areas (Morato, 2005; R. Bérnils & R.P. Rocha, *unpublished data*; R.

Bérnils & G. Montingelli, *unpublished data*; R. Bérnils & E.M. Wistuba, *unpublished data*; G.V. Bianconi & C.E. Conte, *unpublished data*; S. Morato, *unpublished data*); it may be occasionally found in disturbed areas (R. Bérnils, *unpublished data*). The information available indicates that *P. haasi* is a terrestrial species ($N = 7$; Morato, 2005; Kunz, 2007; R. Bérnils & G. Montingelli, *unpublished data*; R. Bérnils & E.M. Wistuba, *unpublished data*; G.V. Bianconi & C.E. Conte, *unpublished data*; S. Morato, *unpublished data*), although Morato (2005) reports one individual inside the soil. *Pseudoboa haasi* is a diurnal species ($N = 4$; Morato, 2005; R. Bérnils & G. Montingelli, *unpublished data*; R. Bérnils & E.M. Wistuba, *unpublished data*; G.V. Bianconi & C.E. Conte, *unpublished data*).

Feeding: *Pseudoboa haasi* feeds mainly on small mammals ($N = 9$), and also eat snakes ($N = 3$, two *Atractus* cf. *taeniatus*, one colubrid), lizards ($N = 2$, one *Placosoma* sp., one gymnophthalmid) and occasionally snake eggs ($N = 1$) (Esteves, 2005; Morato, 2005).

Reproduction: Clutch size varies from three to 10 eggs ($N = 11$, mean = 5.36; this study). The smallest mature female was 913 mm SVL (this study) and the smallest mature male was 767 mm SVL (this study).

***Pseudoboa martinsi* Zaher, Oliveira & Franco, 2008**

Distribution: *Pseudoboa martinsi* is distributed in the western Amazon basin in Brazil (Martins & Oliveira, 1998; Zaher *et al.*, 2008).

Habitat and time of activity: *Pseudoboa martinsi* is moderate-sized snake (maximum SVL = 1090 mm, female; Zaher *et al.*, 2008) that may be found both in well preserved forests and in disturbed areas (Martins & Oliveira, 1998; Zaher *et al.*, 2008). The only habitat and time of activity records available for this species consists of one individual found in activity on the ground during the day (Martins & Oliveira, 1998). A resting individual was coiled on a ground bromeliad in a primary forest at night (Martins & Oliveira, 1998).

Feeding: The only prey record for *P. martinsi* is a snake (Martins & Oliveira, 1998).

Reproduction: One female of *P. martinsi* had six eggs (Martins & Oliveira, 1998).

Defense: Martins & Oliveira (1998) report that when handled this species does not attempt to bite.

***Pseudoboa newwiedii* Duméril,
Bibron & Duméril, 1854**

Distribution: *Pseudoboa newwiedii* is distributed from central Brazil to the Amazon basin, coastal Venezuela, Trinidad & Tobago, West Indies, and Panama (Beebe, 1946; Shreve, 1947; Hoge, 1967; Gasc & Rodrigues, 1980; Cunha & Nascimento, 1983; Pérez-Santos & Moreno, 1988; Schwartz & Henderson, 1991; Murphy, 1997; Martins & Oliveira, 1998; Esqueda & La Marca, 1999; Oliveiros *et al.*, 2000; Kornacker, 2001; Frota *et al.*, 2005; L.J. Vitt, *unpublished data*).

Habitat and time of activity: *Pseudoboa newwiedii* is a relatively small species of *Pseudoboa* (maximum SVL = 972 mm, female; this study) that inhabits both open and forested areas (Martins & Oliveira, 1998; Murphy, 1997; Oliveiros *et al.*, 2000; M. Hoogmed, *unpublished data*). Regarding microhabitat there are records of activity on the ground ($N = 5$; Beebe, 1946; Martins & Oliveira, 1998; F. Sarnento, *unpublished data*), on the vegetation ($N = 1$; M. Hoogmed, *unpublished data*), and within the leaf litter ($N = 3$; Martins & Oliveira, 1998; Murphy, 1997). It seems to be predominantly nocturnal ($N = 6$; Martins & Oliveira, 1998; Oliveiros *et al.*, 2000; F. Sarnento, *unpublished data*), but one individual was found in activity during the day (Martins & Oliveira, 1998) and another during the twilight (M. Hoogmoed, *unpublished data*).

Feeding: The scattered information available indicates that *P. newwiedii* feeds on lizards ($N = 2$, one *Ameiva ameiva*), small mammals ($N = 1$, rodent), and snakes ($N = 1$) (Murphy, 1997; Martins & Oliveira, 1998; this study).

Reproduction: Clutch size varies from three to 12 eggs ($N = 5$, mean = 5.6; this study). The smallest mature female was 723 mm SVL (this study) and there is no information for the smallest mature male.

Defense: When handled *P. newwiedii* can thrash the body, constrict, and occasionally bite (Beebe, 1946; Martins & Oliveira, 1998).

***Pseudoboa nigra* Duméril,
Bibron & Duméril, 1854**

Distribution: *Pseudoboa nigra* is widely distributed in Brazil (occurring in Cerrado, Atlantic Forest, Caatinga, Pantanal, Chaco, and Amazonian savanas), with a few records in Bolivia (Cordeiro & Hoge, 1973; Cunha & Nascimento, 1983; Vitt & Vangilder, 1983; Strüssmann, 1992; Moura-Leite *et al.*, 1996; Argôlo,

2004; Carvalho *et al.*, 2005; França *et al.*, 2006; Ribeiro, 2007; Vaz-Silva *et al.*, 2007; R. Orofino, *unpublished data*).

Habitat and time of activity: This large-sized snake (maximum SVL = 1261 mm, R. Orofino, *unpublished data*) can be encountered predominantly in open areas and disturbed habitats, although there are records in forests (Strüssmann, 1992; Argôlo, 2004; Carvalho *et al.*, 2005; Guedes, 2006; Vaz-Silva *et al.*, 2007; Sousa *et al.*, 2010; M. Sena, *unpublished data*; C. Strüssmann, *unpublished data*; P. Valdujo, *unpublished data*). It is a terrestrial snake ($N = 12$; Strüssmann, 1992; Carvalho *et al.*, 2005; Guedes, 2006; M. Sena, *unpublished data*; C. Strüssmann, *unpublished data*; P. Valdujo, *unpublished data*), and Carvalho *et al.* (2005) report one individual on the vegetation. *Pseudoboa nigra* is predominantly nocturnal ($N = 6$; Strüssmann, 1992; Guedes, 2006; M. Sena, *unpublished data*; C. Strüssmann, *unpublished data*; this study), occasionally found active during the day ($N = 1$; M. Sena, *unpublished data*) and during twilight ($N = 1$; Strüssmann, 1992).

Feeding: *Pseudoboa nigra* is a lizard specialist ($N = 53$, four *Tropidurus hispidus*, one *Tropidurus* cf. *itamбере*, eight *Tropidurus torquatus*, eight *Tropidurus* sp., 13 *Ameiva ameiva*, one *Cnemidophorus ocellifer*, one *Cnemidophorus* sp., five teiids), but may also feed on small mammals ($N = 4$, one Cricetidae) and lizard eggs ($N = 2$) (Vanzolini *et al.*, 1980; Ribeiro, 2007; Palmuti *et al.*, 2009; Orofino *et al.*, 2010). Orofino *et al.* (2010) report one snake and one amphibian as prey during the flooding of a hydroelectric station dam. There is no evidence of ontogenetic change in diet (Orofino *et al.*, 2010).

Reproduction: Clutch size varies from three to 24 eggs ($N = 18$, mean = 9.5; Orofino *et al.*, 2010; R. Orofino, *unpublished data*). The smallest mature female was 561 mm SVL (R. Orofino, *unpublished data*) and the smallest mature male was 548 mm SVL (R. Orofino, *unpublished data*).

***Pseudoboa serrana* Morato, Moura-
Leite, Prudente & Bérnils, 1995**

Distribution: *Pseudoboa serrana* has a restricted geographic distribution in the Atlantic Forest of southeastern Brazil, at altitudes higher than 600 m (Morato *et al.*, 1995; Bérnils *et al.*, 2010; Sousa *et al.*, 2010).

Habitat, time of activity, feeding, and reproduction: *Pseudoboa serrana* is a moderate-sized species

(maximum SVL = 1243 mm) that inhabits forests but may also be found in disturbed areas (Bérnils *et al.*, 2010; Sousa *et al.*, 2010). It seems to be associated to high altitude grasslands within forests containing *Araucaria* trees (R. Bérnils, unpublished data). It seems to be nocturnal and terrestrial (Martins *et al.*, 2008) and Marques *et al.* (2009) suggest that it feeds on lizards and mammals. There is no information on its reproduction.

***Rhachidelus brazili* Boulenger, 1908**

Distribution: *Rhachidelus brazili* is distributed from central and southeastern Brazil (Moura-Leite *et al.*, 1996; Fernandes & Passos, 2002), with one record for Misiones, Argentina (Giraud & Scrocchi, 2002).

Habitat and time of activity: This large snake (maximum SVL = 1372 mm, female; this study) appears to inhabit both open and forested areas, and can also be found in disturbed habitats (Sawaya *et al.*, 2008; T.C.C. Margarido, unpublished data; S. Morato, unpublished data; L.A. Silva, unpublished data; P. Valdujo, unpublished data). It appears to be a terrestrial ($N = 5$) and nocturnal species ($N = 5$) (Sawaya *et al.*, 2008; T.C.C. Margarido, unpublished data; P. Valdujo, unpublished data).

Feeding: *Rhachidelus brazili* is a bird egg specialist. There are reports of 12 events of *R. brazili* feeding on bird eggs and two records of birds as prey (O.A.V. Marques, unpublished data; P. Valdujo, unpublished data).

Reproduction: Clutch size varies from two to seven eggs ($N = 6$, mean = 4.5; R. Scartozzoni, unpublished data). The smallest mature female was 984 mm (SVL) and the smallest mature male was 867 mm SVL (R. Scartozzoni, unpublished data).

***Rodriguesophis chui* Rodrigues, 1993**

Distribution: *Rodriguesophis chui* is only known for its type locality, Santo Inacio, Bahia state, Brazil (Rodrigues, 1993).

Habitat, time of activity, feeding, and reproduction: *Rodriguesophis chui* seems to be a fossorial species that occurs in the Caatinga, in sand dunes along the São Francisco River (Rodrigues, 1993, 1996, 2003). No other ecological data is available for *R. chui*. Rodrigues (1993) reports an adult male of 300 + 70 mm (SVL + TL).

***Rodriguesophis iglesiasi* Gomes, 1915**

Distribution: *Rodriguesophis iglesiasi* is distributed in northeastern Brazil (Rodrigues, 1993).

Habitat and time of activity: One of the smallest pseudoboina (maximum SVL = 444 mm, male; this study) inhabits open areas of the Brazilian Cerrado and in the western portions of the Caatinga (Nogueira, 2001; P. Valdujo, unpublished data). It is a common species in open vegetation with sandy soils in the Cerrado (Recoder & Nogueira, 2007; Costa *et al.*, 2010; Recoder *et al.*, 2011). There are no records regarding microhabitat or time of activity.

Feeding: There are only three feeding records of *R. iglesiasi*, all lizards (*Cnemidophorus* sp.; C. Nogueira, unpublished data).

Reproduction: Clutch size is available for only two females, both with two eggs (this study). The smallest mature female was 401 mm SVL (this study) and the only mature male registered was 342 mm SVL (this study).

***Rodriguesophis scriptorcibatus* Rodrigues, 1993**

Distribution: *Rodriguesophis scriptorcibatus* is only known from two localities, Queimadas and Ibiraba, Bahia state, Northeastern Brazil (Rodrigues, 1993).

Habitat and time of activity: The only data available for this species (Rodrigues, 1993) indicates that this is a small pseudoboina (maximum SVL = 316 mm, male) and that it is fossorial ($N = 5$). It is commonly found from 5 to 20 cm inside the sandy soil, sometimes around vegetation patches (Rodrigues, 1993) and it may be both diurnal and nocturnal (Rodrigues, 1993, 1996, 2003).

Feeding: The only two feeding records for *R. scriptorcibatus* are from Rodrigues (1993), both lizards (*Calypotommatus leiroleps*, *Vanzosaura rubricauda*).

Reproduction: No information is available on reproduction for *R. scriptorcibatus*.

***Siphlophis cervinus* Laurenti, 1768**

Distribution: *Siphlophis cervinus* is distributed throughout the Amazon Forest, in Bolivia, Brazil, Colombia, Ecuador, French Guyana, Peru, Suriname, and Venezuela, as well as in Trinidad and Tobago

and Panama (Hoge & Nina, 1969; Cunha & Nascimento, 1978, 1993; Duellman, 1978, 2005; Gasc & Rodrigues, 1980; Dixon & Soini, 1986; Nascimento *et al.*, 1987; Pérez-Santos & Moreno, 1988; Silva, 1993; Murphy, 1997; Barrio *et al.*, 1998; Martins & Oliveira, 1998; Prudente *et al.*, 1998; Zaher & Prudente, 1999; Santos-Costa, 2003; Frota *et al.*, 2005; Maschio, 2008; Silva *et al.*, 2010).

Habitat and time of activity: This small, slender pseudo-boine (maximum SVL = 990 mm; Barrio *et al.*, 1998) inhabits forests, and appears to be restricted to undisturbed habitats (Duellman, 1978, 2005; Dixon & Soini, 1986; Nascimento *et al.*, 1987; Silva, 1993; Martins & Oliveira, 1998; Santos-Costa, 2003; Maschio, 2008; Maschio, *unpublished data*; M. Sena, *unpublished data*; F. Stender, *unpublished data*). It is nocturnal ($N = 12$; Martins & Oliveira, 1998; Duellman, 2005; Santos-Costa, 2003; Maschio, 2008; Maschio, *unpublished data*; M. Sena, *unpublished data*) and semi-arboreal (arboreal data: $N = 9$; Martins & Oliveira, 1998; Santos-Costa, 2003; Duellman, 2005; Maschio, 2008; Maschio, *unpublished data*; M. Sena, *unpublished data*; terrestrial data: $N = 4$; Dixon & Soini, 1986; Santos-Costa, 2003; F. Stender, *unpublished data*).

Feeding: *Siphlophis cervinus* is a lizard specialist ($N = 31$, one Iguania, one *Plica* sp., one *Plica umbra*, one *Polychrus marmoratus*, two *Tropidurus* sp., three tropidurids, one *Bachia trinasale*, one gymnophthalmid, three scincids, three *Thecadactylus rapicaudus*, two *Gonatodes humeralis*, two *Gonatodes* sp., one *Hemidactylus mabouia*, one *Hemidactylus* sp.), although it can also feed on snakes ($N = 5$), and occasionally on amphibians ($N = 1$) (Duellman, 1978; Nascimento *et al.*, 1987; Cunha & Nascimento, 1993; Martins & Oliveira, 1998; Prudente *et al.*, 1998; Santos-Costa, 2003; Maschio, 2008; M. Martins & E. Oliveira, *unpublished data*). Prudente *et al.* (1998) found a bat in the stomach of a *S. cervinus* specimen (*Myotis* sp.).

Reproduction: Clutch size varies from three to six eggs ($N = 5$, mean = 4.9; Martins & Oliveira, 1998; this study). The smallest mature female was 643 (SVL; this study) and the smallest mature male was 518 (SVL; this study).

Defense: According to Martins & Oliveira (1998), when handled *S. cervinus* does not bite, may thrash the body, and forms tight balls with the head hidden within body coils.

Siphlophis compressus Daudin, 1803

Distribution: *Siphlophis compressus* is mainly distributed in the Amazon Forest in Brazil, Colombia, Ecuador, French Guyana, Peru and Trinidad and Tobago, as well as in the Atlantic Forest of eastern and northeastern Brazil (Beebe, 1946; Hoge, 1967; Fitch, 1970; Cunha & Nascimento, 1978, 1993; Duellman, 1978; Gasc & Rodrigues, 1980; Riley & Winch, 1985; Dixon & Soini, 1986; Silva, 1993; Murphy, 1997; Martins & Oliveira, 1998; Prudente *et al.*, 1998; Yuki *et al.*, 1999; Zaher & Prudente, 1999; Santos-Costa, 2003; Argôlo, 2004; Neckel-Oliveira & Gordo, 2004; Frota *et al.*, 2005; Bernarde & Abe, 2006; Maschio, 2008; Prudente *et al.*, 2010; Silva *et al.*, 2010; Ávila & Kawashita-Ribeiro, 2011; Guedes *et al.*, 2011; Vilela *et al.*, 2011).

Habitat and time of activity: *Siphlophis compressus* seems to be the largest species of the genus *Siphlophis* (maximum SVL = 1229 mm, female; this study). It appears to be restricted to forested areas (Duellman, 1978; Silva, 1993; Martins & Oliveira, 1998; Starace, 1998; Yuki *et al.*, 1999; Santos-Costa, 2003; Argôlo, 2004; Bernarde & Abe, 2006; Maschio, 2008; P. Bernarde, *unpublished data*; M.P. Gaiarsa, *unpublished data*; G. Maschio, *unpublished data*; M. Sena, *unpublished data*). It is a semi arboreal species found both on the ground ($N = 18$; Murphy, 1997; Martins & Oliveira, 1998; Bernarde & Abe, 2006; Maschio, 2008; P. Bernarde, *unpublished data*; G. Maschio, *unpublished data*; S. Morato, *unpublished data*; M. Sena, *unpublished data*) and on the vegetation ($N = 10$; Duellman, 1978; Murphy, 1997; Martins & Oliveira, 1998; Yuki *et al.*, 1999; Santos-Costa, 2003; M.P. Gaiarsa, *unpublished data*; S. Morato, *unpublished data*). *Siphlophis compressus* is a nocturnal species ($N = 19$; Duellman, 1978; Murphy, 1997; Yuki *et al.*, 1999; Martins & Oliveira, 1998; Santos-Costa, 2003; Bernarde, 2004; Bernarde & Abe, 2006; Maschio, 2008; G. Maschio, *unpublished data*; M.P. Gaiarsa, *unpublished data*; S. Morato, *unpublished data*), although sporadically it may be found active during the day ($N = 4$; Murphy, 1997; Maschio, 2008; G. Maschio, *unpublished data*; S. Morato, *unpublished data*). There are additional data regarding habitat and microhabitat of *S. compressus* ($N = 11$ terrestrial and $N = 4$ arboreal) available in Argôlo (2004); however these data were not included in the synthesis above because it is not clear whether the individuals found were active.

Feeding: *Siphlophis compressus* is a lizard specialist ($N = 25$, one *Anolis* sp., one *Plica plica*, two *Kentropyx* sp., two teiids, one *Alopoglossus* sp., one

Neusticurus sp., three gymnophthalmids, two *Gonatodes humeralis*, 12 n.i.; Duellman, 1978; Murphy, 1997; Martins & Oliveira, 1998; Santos-Costa, 2003; Maschio, 2008; G. Maschio, *unpublished data*; M. Martins & E. Oliveira, *unpublished data*; L.J. Vitt, *unpublished data*), although there are two records of snakes as prey (Alemu & Rowley, 2008; Maschio, 2008).

Reproduction: Clutch size varies from three to 12 eggs ($N = 12$, mean = 6.2; Martins & Oliveira, 1998; this study). The smallest mature female was 728 mm SVL (this study) and the smallest mature male was 514 mm SVL (this study).

Defense: When handled, this species may rotate and/or trash the body and head, make an s-coil, strike with the mouth closed (false strikes), and vibrate the tail; it does not bite (Martins & Oliveira, 1998; Maschio, 2008).

***Siphlophis leucocephalus* Günther, 1863**

Distribution: *Siphlophis leucocephalus* has a restricted distribution in central and eastern Brazil (Prudente *et al.*, 1998; Zaher & Prudente, 1999; Argôlo, 2004).

Habitat and time of activity: The scattered data indicate that *S. leucocephalus* is a small species (maximum SVL = 708 mm, male; this study) and seems to be terrestrial ($N = 4$; Argôlo, 2004). The only activity record is for a single individual active by day (Argôlo, 2004). It inhabits forests, including cocoa plantations (Argôlo, 2004).

Feeding: There is one record of a lizard as prey for *S. leucocephalus* (Prudente *et al.*, 1998).

Reproduction: There is no information concerning the reproductive biology of *S. leucocephalus*.

***Siphlophis longicaudatus* Andersson, 1901**

Distribution: *Siphlophis longicaudatus* is distributed in the Atlantic forests of southeastern and southern Brazil (Lema, 1964; Prudente *et al.*, 1998; Zaher & Prudente, 1999; Prudente & Feio, 2001; Alencar *et al.*, 2009).

Habitat and time of activity: This moderate-sized pseudoboine (maximum SVL = 931 mm, female; this study) occurs mostly in forested areas (Lema, 1964; R. Bérnils and F. Stender, *unpublished data*), although there is one record in an open area (Brazilian Cerrado; Alencar *et al.*, 2009). There are only two available microhabitat records, one of an individual active on

the ground (Lema, 1964) and one on the vegetation (R. Bérnils & F. Stender, unpublished data). There is only one record about time of activity, during the day (R. Bérnils & F. Stender, unpublished data).

Feeding: *Siphlophis longicaudatus* seems to be a lizard specialist ($N = 9$, one *Enyalius* sp., one *Placosoma* sp., 7 n.i.), although there are records of snakes as prey items ($N = 3$) (Prudente *et al.*, 1998; this study).

Reproduction: Clutch size varies from five to seven eggs ($N = 6$, mean = 6.0; R. Scartozzoni, *unpublished data*; C. Zatz, *unpublished data*; this study). The smallest mature female was 672 mm SVL (this study) and the smallest mature male was 624 mm SVL (this study).

***Siphlophis pulcher* Raddi, 1820**

Distribution: *Siphlophis pulcher* is distributed in the Atlantic Forest along the eastern and southeastern coast of Brazil (Marques, 1998; Prudente *et al.*, 1998; Zaher & Prudente, 1999; Argôlo, 2004; Hartmann, 2005; Cicchi *et al.*, 2007; Duarte & Sena, 2007; Kunz, 2007; Sena, 2007; Hartmann *et al.*, 2009, 2011; O.A.V. Marques, *unpublished data*).

Habitat and time of activity: This small pseudoboine (maximum SVL = 803 mm, female; this study) inhabits forests, and may be found in disturbed areas (Sazima & Argôlo, 1994; Argôlo, 2004; Hartmann, 2005; Duarte & Sena, 2007; Kunz, 2007; P. Gobbo & C. Conti, *unpublished data*; M. Teixeira, *unpublished data*). *Siphlophis pulcher* is a semi-arboreal species that frequently forages to the ground (terrestrial data: $N = 10$; Sazima & Argôlo, 1994; Marques, 1998; Hartmann, 2005; P. Gobbo & C. Conti, *unpublished data*; O.A.V. Marques, *unpublished data*; M. Teixeira, *unpublished data*; arboreal data: $N = 4$; Sazima & Argôlo, 1994; O.A.V. Marques, *unpublished data*). It is active both during the day ($N = 3$; O.A.V. Marques, *unpublished data*) and during the night ($N = 3$; Marques, 1998; P. Gobbo & C. Conti, *unpublished data*; O.A.V. Marques, *unpublished data*). There is additional information on microhabitat ($N = 1$ terrestrial) in Argôlo (2004), but this information was not included in the synthesis above because it is not clear whether the individuals found were active.

Feeding: *Siphlophis pulcher* is a lizard specialist ($N = 25$, two tropidurids, six *Placosoma* sp., one gymnophthalmid, one scincid, one *Ophiodes fragilis*, three *Ophiodes* sp., one *Gymnodactylus darwini*, one *Hemidactylus mabouia*, one geckonid, eight n.i.),

that occasionally eats snakes ($N = 3$, one *Imantodes cenchoa*) and lizard eggs ($N = 2$) (Sazima & Argôlo, 1994; Prudente *et al.*, 1998; Hartmann, 2005; Duarte & Sena, 2007; O.A.V. Marques, *unpublished data*).

Reproduction: Clutch size varies from two to seven eggs ($N = 4$, mean = 4.0; this study). The smallest mature female was 553 mm SVL (this study) and the smallest mature male was 532 mm SVL (this study).

Siphlophis worontzowi Prado, 1940

Distribution: *Siphlophis worontzowi* is known from western Brazil, northern Bolivia, and southern Peru (Silva, 1993; Prudente *et al.*, 1998; Zaher & Prudente, 1999; Frota *et al.*, 2005; Bernarde & Abe, 2006; Moravec *et al.*, 2009; Costa *et al.*, 2010).

Habitat and time of activity: This small pseudoboine (maximum SVL = 746 mm, male; this study) inhabits forests and open areas, and also disturbed areas (Silva, 1993; Bernarde, 2004; Bernarde & Abe, 2006; P. Bernarde, *unpublished data*). Two individuals were found active on the vegetation (Bernarde, 2004; Bernarde & Abe, 2006) and one on the ground (P. Bernarde, *unpublished data*). This species is active during the night ($N = 2$; Bernarde, 2004; Bernarde & Abe, 2006), and there is one record of an individual active during twilight (Bernarde, 2004).

Feeding: *Siphlophis worontzowi* seems to eat mainly lizards ($N = 5$, *Iphisa elegans*; Prudente *et al.*, 1998; Bernarde & Abe, 2006, 2010; this study), and we also found a frog as prey.

Reproduction: There are no data available regarding *S. worontzowi* reproduction.

Natural history Summary

The tribe Pseudoboini is very diverse in terms of its natural history. The tribe is comprised of small (*e.g.*, *Drepanoides anomalus*, *Oxyrhopus doliatus* and all the *Phimophis*) to large-sized snakes (*e.g.*, *Clelia* and *Mussurana*). The maximum SVL ranges from 300 mm (*Rodriguesophis chui*) to 2790 mm (*Clelia plumbea*).

We were able to gather information of micro-habitat use for 30 species (63%). The majority of species are terrestrial (*e.g.*, *Clelia plumbea*, *Oxyrhopus clathratus* and *Pseudoboa coronata*). However, the genera *Siphlophis* and *Drepanoides* are composed of

semi-arboreal species and the genus *Rodriguesophis* seems to be composed of fossorial species.

Considering the period of activity, we were able to gather information for 30 species (63%). Most species seem to be active during the night (*e.g.*, *Drepanoides anomalus* and *Oxyrhopus formosus*), but there are also diurnal species (*e.g.*, *Pseudoboa haasi*) and species that are found active both during the day and night (*e.g.*, *Oxyrhopus giubei* and *Siphlophis pulcher*).

We gathered dietary information for 33 species (70%). Most pseudoboines seem to be specialized in some sort of prey (one item corresponds to at least 70% of the diet, *cf.* Martins & Oliveira, 1998). Lizards are the most commonly consumed prey, found in the diet of 29 species (except for *Clelia langeri*, *Pseudoboa martinsi* and *Rhachidelus brazili*), followed by small mammals (consumed by 20 species) and snakes (consumed by 18 species).

The mean fecundity ranged from two (*Rodriguesophis iglesiassi*) to 29 eggs (*Clelia plumbea*). Species of the genus *Clelia* are the most fecund (mean clutch size = 10.7), followed by those in the genus *Mussurana*, *Oxyrhopus* and *Boiruna* (mean clutch size = 9.8, 9.6 and 8.6, respectively). On the other hand, the least fecund genus is *Drepanoides* (mean litter size = 2.3), followed by *Rodriguesophis*, *Phimophis* and *Rhachidelus* (mean litter size = 2, 4.8 and 4.5, respectively).

DISCUSSION

The species of the genus *Clelia* are the largest and the most fecund of the tribe Pseudoboini (Duellman, 1978; Martínez & Cerdas-Fallas, 1986; Strüssmann, 1992; Savage, 2002; Maschio, 2008). The species of the genus *Rodriguesophis* presented both the smallest fecundity and the smallest body size (Rodrigues, 1993). On the other hand, *Rhachidelus brazili* is among the largest snakes of the tribe, but has one of the lowest fecundities (*R. Scartozzoni*, *unpublished data*). Therefore, it would be interesting to explore the evolution of reproductive characters in pseudoboines.

Although we here presented a great amount of information on the natural history of pseudoboines, many species in the tribe are still poorly known. More attention should be given to the following species, since these are the species for which the least amount of data was gathered by us or found in the literature: *Clelia equatoriana*, *C. errabunda*, *C. hussami*, *C. langeri*, *C. scytalina*, *Oxyrhopus doliatus*, *O. erdisii*, *O. fitzingeri*, *O. leucomelas*, *O. marcapatae*, *Phimophis giuanensis*, *P. vitattus*, *Pseudoboa serrana*, *Rodriguesophis chui* and *R. scriptoribatus*. They all present a

restricted geographic distribution (Pérez-Santos & Moreno, 1988; Abdala, 1990; Rodrigues, 1993; Underwood, 1993; Morato *et al.*, 1995; Zaher, 1996; Giraudo & Scrocchi, 2002; Morato *et al.*, 2003; Leynaud & Bucher, 2005; Reichle & Embert, 2005; Kacoliris *et al.*, 2006a; Torre-Loranca *et al.*, 2006; this study), and there is virtually no information regarding their microhabitat, time of activity (except for two observations of *Phimophis guianensis*, Oliveiros *et al.*, 2000 and three for *Oxyrhopus marcapatae*, J. Icochea, unpublished data) and fecundity (except for one observation for *Phimophis vittatus*; this study).

Natural history is crucial for detecting species at risk and for implementing conservation programs for threatened species (Greene & Losos, 1988; Greene, 2005; Bury, 2006). We hope our study can aid in the conservation of pseudoboines and motivate research on the least known species of this group.

RESUMO

Apesar de estudos de história natural serem cruciais para responder perguntas de ecologia, evolução e para estudos de conservação, ainda faltam informações básicas para diversas espécies neotropicais. O objetivo deste estudo é contribuir para o conhecimento de uma tribo de serpentes neotropicais, a tribo Pseudoboini, por meio de revisão bibliográfica, análises de espécimens depositados em coleções herpetológicas e dados não publicados. A tribo é composta predominantemente por serpentes de tamanho médio, mas espécies de pequeno e grande tamanho também podem ser encontradas. A fecundidade média variou de dois (Rodriguesophis iglesiasi) a 29 ovos (Clelia plumbea) e a maior parte das espécies parece ser terrestre e exibir hábitos noturnos. Além disso, grande parte das espécies é especialista em algum tipo de presa, sendo que lagarto é o tipo de presa mais consumida, encontrado na dieta de 29 espécies, seguido por pequenos mamíferos (consumidos por 20 espécies) e serpentes (consumidas por 18 espécies). Apesar de ser aparentemente uma tribo bem estudada, para 15 espécies (32%) pouca ou nenhuma informação foi encontrada. Esperamos que este trabalho motive estudos semelhantes com as espécies menos conhecidas.

PALAVRAS-CHAVE: Ecologia; Dieta; Microhabitat; Reprodução; Dipsadidae.

ACKNOWLEDGEMENTS

We are very grateful to all researchers that contributed with unpublished data and personal observations.

We thank the curators of scientific collections who provided access to specimens under their responsibility: F.L. Franco (IBSP), H. Zaher (MZUSP), M.A. de Carvalho (UFMT), A.L. Prudente (MPEG), T. Grant (PUCRS), J.C. Moura-Leite (MHNCI) and G. Colli (UnB); and also V. Germano for the help during the selection and examination of the specimens deposited at IB. This study was funded by FAPESP. MM thanks CNPq for a research fellowship.

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Aceito em: 14/04/2013
 Impresso em: 30/06/2013