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FIRST RECORD OF EGG DEVELOPMENT TIME AND HATCHLING MORPHOLOGY OF *Amerotyphlops paucisquamus* (DIXON & HENDRICKS 1979) (SCOLECOPHIDIA: TYPHLOPIDAE), NORTHEASTERN BRAZIL

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ABSTRACT

We present the first description of the morphology and mass of hatchlings of the blindsnake *Amerotyphlops paucisquamus,* as well as information on litter size and egg development time. The clutch size was three eggs and the time of incubation was 37 days. This record seeks to fill gaps in knowledge, since data on the reproduction of this species are not yet known. These data can be used comparatively for other scolecophidians helping to clarify systematic aspects and morphological variations in geographic scale.

Keywords: Offspring; Reproduction; Snake; Blindsnake.

RESUMO

Primeiro registro do tempo de desenvolvimento dos ovos e morfologia de filhotes de *Amerotyphlops paucisquamus* (Dixon & Hendricks 1979) (Scolecophidia: Typhlopidae), nordeste do Brasil. Apresentamos a primeira descrição da morfometria e massa de filhotes de *Amerotyphlops paucisquamus*, além de informações sobre tamanho da ninhada e tempo de desenvolvimento dos ovos, sendo o tamanho da ninhada de três ovos e o tempo de incubação de 37 dias. Esse registro busca preencher lacunas quanto a reprodução desta espécie, visto que dados sobre o assunto são insipientes. Esperamos que esses dados possam ser utilizados de forma comparativa para outras scolecofidias, ajudando a esclarecer aspectos sistemáticos e variações morfológicas em escala geográfica.

Palavras-chave: Prole; Reprodução; Serpente; Cobra-Cega.

INTRODUCTION

The infraorder Scolecophidia Cope, 1864 is divided into five taxonomic families: Anomalepididae, Gerrhopilidae, Xenotyphlopidae, Typhlopidae and Leptotyphlopidae (Hedges et al., 2014; Pyron and Wallach, 2014). Among Scolecophidia the most diverse and most widely distributed snakes belong to the family Typhlopidae (Merrem, 1820), with about 60% of the diversity of the infraorder (Hedges et al., 2014; Wallach et al., 2014) and comprises 274 described species (Uetz et al., 2020). A review of this family was

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conducted based on morphological and phylogenetic data establishing a new generic arrangement within the subfamilies, allocating New World species into four distinct genera: *Amerotyphlops*, *Cubatyphlops*, *Antillotyphlops* and *Typhlops*. All snakes of the genus *Amerotyphlops* are found in Central and South America (Hedges et al., 2014).

The *Amerotyphlops* snakes, popularly known as the blindsnakes, are small species with approximately 200 mm of total length. *Amerotyphlops* are aglyphous, nocturnal, fossorial, oviparous, with seasonal reproduction, and feed on ants and termites, including larvae and eggs (Ávila et al., 2006). When threatened they usually press tail-tip or discharge cloacal secretions (Marques et al., 2019). Also, they are able to occupy a variety of habitats, from deserts to rainforests, building tunnels and ground galleries (Tipton, 2005).

In northeastern Brazil there are five species described: *Amerotyphlops brongersmianus*; *A. paucisquamus*; *A. amoipira*; *A. yonenagae* and *A. arenensis* (Graboski et al., 2018). Among these, *A. paucisquamus* is endemic from northeastern Brazil and occurs in the Atlantic Forest (Maranhão, Paraíba, Pernambuco and Rio Grande do Norte) and Caatinga (Alagoas and Ceará) (Guedes et al., 2014; Wallach et al., 2014; Graboski et al., 2015; 2018). There are no reports in the literature on offspring size, egg incubation time and morphometric data of *Amerotyphlops paucisquamus* hatchlings.

On September 7, 2019, we collected a pregnant female *Amerotyphlops paucisquamus* (Figure 1A), measuring 159 mm snout-vent length (SVL), 3.93 mm in tail length (TL) and weighing 4.1g. The snake was caught on a pitfall trap installed in the Área de Proteção Ambiental da Barra do Rio Mamanguape (6º47'23.56"S, 34º55'07.92"W; WGS 84; elev. 7 m), in a restinga area of Paraíba State, northeastern Brazil. On September 16, 2019, while in captivity, the female hatched three eggs (Figure 1C) with an average of 18.81 mm in length and 6.44 mm in width and an average weight of 1.8 g. The eggs were kept incubated at room temperature in a semi-buried vermiculite glass container, measured at the widest point using a digital calliper (accuracy = 0.1mm), and weighed on a digital scale (precision = 0.1g).

On October 23, 2019, after 37 days of incubation, a hatchling was born (Figure 1B), and on October 24, 2019, at 09:13 h the second egg tried to hatch unsuccessfully, and when no movement of the hatchling was recorded within the egg, it was dissected. Finally, the last egg was dissected and contained a dead embryo. However, this last embryo was stuck and dry, making measurements impossible. The hatchlings showed no difference in coloration compared to the mother and were measured and weighed immediately after birth. The measurements taken were snout-vent length (SVL), tail length (TL), body width (BW); body height (BH), head width (HW), head height (HH), head length (HL), distance between the nostrils (NW) and mass (Table 1). The dead neonate was deposited at Herpetological Collection of the Universidade Federal da Paraíba (CHUFPB 30486; Sisbio Collect Permit 68444-1).

The hatchling remained in the Laboratory of Animal Ecology at UFPB for growth monitoring. After the first measure we offered ants, termites and pupae for the newborn with feeding intervals of 4 days, totalizing 3 feeds. After five days of birth, on october 28, the hatchling presented an opaque colour (Figure 1D) and on November 5, 2019 made its first shedding. We did another round of measurements and it was released right after in Área de Proteção Ambiental da Barra do Rio Mamanguape. On November 2, 2019 the mother died and was deposited at Herpetological Collection of the Universidade Federal da Paraíba (CHUFPB 30485).

Figure 1. The reproduction of *Amerotyphlops paucisquamus*, specimen colleted CHUFPB 30485 A- An *A. paucisquamus* adult female; B- First *A. paucisquamus* newborn hatching from the egg; C- The three *Amerotyphlops paucisquamus* eggs, D- The *A. paucisquamus* newborn presenting an opaque color before the first shedding.

Table 1. Morphometry (mm) and mass (g) of adult female and hatchlings of *Amerotyphlops paucisquamus*. Measured of hatchlings in the day of birth (Setember 23, 2019). SVL= snout-vent length; TL= tail length; BW= body width; BH= body height; HW= head width; HH= head height; HL= head length; NW= inter-nasal distance. Measurement of the only live hatchling after first ecdysis* (November 5, 2019); **stillborn; ***Adult female.

Voucher	SVL	TL	BW	BH	HW	HH	HL	NW	MA
Indiv. 1	53.70	2.93	2.93	2.47	2.83	2.17	3.83	1.56	0.4
Indiv. 1*	54.13	2.98	2.69	2.31	2.64	1.98	3.83	1.56	0.5
CHUFPB 30486**	44.13	2.44	2.17	2.26	2.86	1.73	3.67	1.34	0.2
CHUFPB 30485***	159	3.93	6.0	6.4	4.17	2.45	6.0	1.89	4.1

Despite advances in studies with American typhlopids increasing in recent years there is still little information on the period of its reproduction. The reproduction of *A. paucisquamus* seems to follow the same pattern of Australian typhlopids, since they both occur on rainy season (James and Shine, 1985; Webb et al., 2001). Regarding clutch size our findings do not differ from previous works with other typhlopids, such as Shine and Webb (1990) described for the genus *Anilios* (formerly *Ramphotyphlops*, now relocated to the genus *Anilios* by Hedge et al., 2014) with 3-10 eggs and *Amerotyphlops brongersmianus* in the Brazilian Pantanal (Ávila et al., 2006), with 4-5 eggs. Incubation period of *A. paucisquamus* lasted 37 days, which is lower then *A. brongersmianus* that lasted 55 (Sandoval et al., 2020) which can be related to the

difference in the hatchling size, since *A. paucisquamus* ranges between 44.1mm - 53.7 mm (see table 1) and *A. brongersmianus* ranges between 74.5 mm - 92.6 mm (Khouri et al., 2020).

The knowledge of the morphometric variation of a snake, since its birth until adult sizes can be important to elucidate taxonomic and systematic questions and understand shifts in physiology and behaviour, to determine phenotypic plasticity in ecological traits of widely distributed species (Da Silva et al., 2019). In snake studies, morphological data are frequently used to describe and compare biological assemblages (Martins and Oliveira, 1998; França et al., 2008) or even to investigate variations within the same species (Boback, 2006). Our data can be used comparatively among other scolecophidias, helping to clarify systematic aspects and morphological variations in geographic scale.

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REFERENCES

ÁVILA R. W.; FERREIRA V.; SOUZA V. B. 2006. Biology of the Blindsnake *Typhlops brongersmianus* (Typhlopidae) in a semidecidous forest from central Brazil. **Herpetological Journal, 16**:403–405.

BOBACK, S. M. 2006. A morphometric comparison of island and mainland boas (*Boa constrictor*) in Belize. **Copeia, 2006**(2):261-267.

DA SILVA, W. M. et al. 2019. Offspring morphology and early growth of *Thamnodynastes pallidus* (Linnaeus, 1758) in the Brazilian Atlantic Forest (Serpentes; Thachymenini). **Herpetology Notes, 12**:205-209.

FRANÇA, F. G. R. et al. 2008. Phylogeny and ecology determine morphological structure in a snake assemblage in the Central Brazilian Cerrado. **Copeia, 2008**(1):23-38.

GRABOSKI, R. et al. 2015. A new species of *Amerotyphlops* from Northeastern Brazil, with comments on distribution of related species. **Zootaxa, 3920**:443–452.

_____. 2019. Molecular phylogeny and hemipenial diversity of South American species of *Amerotyphlops* (Typhlopidae, Scolecophidia). **Zoologica Scripta, 48**(2):139-156.

GUEDES, T. B. et al. 2014. Diversity, natural history, and geographic distribution of snakes in the Caatinga, Northeastern Brazil. **Zootaxa, 3863**(1):001- 093.

HEDGES, S. B et al. 2014. A taxonomic framework for typhlopid snakes from the Caribbean and other regions (Reptilia, Squamata). **Caribbean Herpetology, 49**:1–61.

JAMES, C.; SHINE, R. 1985. The seasonal timing of reproduction: a tropical-temperate comparison in Australian lizards. **Oecologia, 67**:464-474.

KHOURI, R. S.; ALMEIDA-SANTOS, S. M.; FERNANDES, D. S. 2020. Anatomy of the reproductive system of a population of *Amerotyphlops brongersmianus* from southeastern Brazil (Serpentes: Scolecophidia). **Anatomical Record (Hoboken, N.J.: 2007)**, **303**(9):2485-2496.

MARQUES, O. A.V.; ETEROVIC, A.; SAZIMA, I. 2019. **Serpentes da Mata Atlântica:** guia ilustrado para as florestas costeiras do Brasil. 2. ed. Cotia: Ponto A, 319p.

MARTINS, M.; OLIVEIRA, M. E. 1998. Natural history of snakes in forests of the Manaus region, Central Amazonia, Brazil. **Herpetological Natural History, 6**:78-150.

PEREIRA-FILHO, G. A. et al. 2017. **Serpentes da Paraíba**: diversidade e conservação. João Pessoa: Gráfica Santa Marta, 316p.

PYRON R. A.; WALLACH V. 2014. Systematics of the blindsnakes (Serpentes: Scolecophidia: Typhlopoidea) based on molecular and morphological evidence. **Zootaxa, 3829**:001–081.

SANDOVAL, M. T.; GARCÍA, J. A. R.; ÁLVAREZ, B. B. 2020. Intrauterine and post-ovipositional embryonic development of *Amerotyphlops brongersmianus* (Vanzolini, 1976) (Serpentes: Typhlopidae) from northeastern Argentina. **Journal of Morphology, 281**:523-535.

SHINE, R.; WEBB, J. 1990. Natural history of Australian typhlopid snakes. **Journal Herpetology, 24**:357– 363.

TIPTON, B. L. 2005. **Snakes of the Americas**: checklist and lexicon. Malabar, Florida, USA: Krieger, 477p.

UETZ, P.; GOLL, J.; HALLERMAN, J. The reptile database. Disponível em: <http://www.reptile-database.org>. Acesso em: 26 jul. 2020.

WALLACH, V.; WILLIAMS, K. L.; BOUNDY, J. 2014. **Snakes of the world**: a catalogue of living and extinct species. Boca Raton, FL: CRC Press, 1237p.

WEBB, J. K.; BRANCH, W. R.; SHINE, R. 2001. Dietary habits and reproductive biology of Typhlopid snakes from Southern Africa. **Journal of Herpetology, 35**:558–567.