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HERPETOFAUNA OF THE QUATERNARY SAND DUNES OF THE  
MIDDLE RIO SÃO FRANCISCO: BAHIA: BRAZIL. VII. *TYPHLOPS*  
*AMOIPIRA* SP. NOV., A POSSIBLE RELATIVE OF *TYPHLOPS*  
*YONENAGAE* (SERPENTES, TYPHLOPIDAE)

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## ABSTRACT

*A new species of a small typhlopidae snake is described from Ibiraba, in the sand- dune area of the left bank of Rio São Francisco, State of Bahia, Brazil. Typhlops amoipira sp. nov. is a small, light brown, and slightly pigmented Typhlops characterized by an incomplete nasal suture, 18 scale rows around the body (SAB), and 212-242 dorsal scales. The geographic and morphologically closer species, Typhlops yonenagae (18 SAB, 259-291 dorsals) lives in the same area, in the sands of the opposite side of the river.*

KEYWORDS: Serpentes, Typhlopidae, *Typhlops amoipira*, Brazil, Caatingas, Taxonomy.

## RESUMO

*Descreve-se uma nova espécie de Typhlops de Ibiraba, no campo de dunas da margem esquerda do Rio São Francisco, Bahia, Brasil. Typhlops*

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*amoipira sp. nov. é um pequeno tiflopídeo castanho claro, pouco pigmentado, caracterizado por apresentar 18 fileiras de escamas ao redor do corpo e 212 a 242 dorsais. A espécie geográfica e morfológicamente mais próxima, Typhlops yonenagae, ocorre na mesma área, nas areias da margem oposta do rio e, embora também tenha 18 fileiras de escamas ao redor do corpo, apresenta 259 a 291 escamas dorsais.*

**PALAVRAS-CHAVE:** Serpentes, Typhlopidae, Typhlops amoipira, Brazil, Caatingas, Taxonomia.

#### INTRODUCTION

The sand dune area crossed by the middle Rio São Francisco in the Brazilian domain of semiarid Caatingas, State of Bahia, has emerged in the last years as an unparalleled case of an extraordinary newly discovered squamate fauna. The uniqueness of this example of “new age’s discovery” (*sensu* Donoghue and Alverson, 2000), derives from the study at a smaller spatial scale of the presumably well-known Caatingas domain. Most squamates living within the 800.000 km<sup>2</sup> area covered by the dry forest caatingas, were considered widespread in the domain and the whole fauna relatively well known (Vanzolini, 1974). Overall caatinga faunal predictability was considered high and after intensive field studies (summary in Vitt, 1995, and references cited) a comprehensive book on reptiles from the area was published (Vanzolini *et al.*, 1980). Occasionally, one or two new species were described after intensive surveys across large areas. These new species, most of them cryptic or very similar to previously known relatives, were only recognized after detailed comparisons with material from museum shelves (see Rodrigues, 1986 for an example).

Work in the dune region of Rio São Francisco have shown a remarkable contrast to the picture of the caatinga squamate fauna as a well-known and highly-predictable faunistic component. From a sandy area with about 7.000 km<sup>2</sup> surrounding the banks and adjacent areas of Rio São Francisco, four new genera and a total of 20 new species of squamates (32% of the fauna, most endemic) were described (Rodrigues, 1984a,b,c, 1986, 1991a,b,c,d, 1993a,b, 1996; Rodrigues *et al.*, 1988; Vanzolini, 1991a,b). New species of other vertebrates have been also described from there (Rocha, 1995, a new rodent; Lencioni-Neto, 1994, a new bird).

Some of the new genera and most of the new species revealed adaptations to fossoriality or to life in sand unsuspected to exist among South American squamates or rodents (Rocha, 1995; Rodrigues, 1996). Furthermore, some endemic squamates likely form vicariant allopatric sister species pairs occupy-

ing adjacent and opposite sand areas along the river (Rodrigues, 1996). As among these species pairs are psamophilic lizards, snakes and amphisbaenians represented, this fauna became the focus of ecological, biogeographical, and integrative evolutionary studies (Martins, 1995, 1997; Rodrigues, 1995, 1996; Renous *et al.*, 1995, 1999; Yonenaga-Yassuda *et al.*, 1996; Rocha, 1998; Pellegrino *et al.*, 1999, 2001; Passoni *et al.*, 2000; Benozzatti and Rodrigues, 2002).

Surveys continue in the area and are revealing the existence of additional undescribed lizards, snakes, amphisbaenians, and frogs. Most of the invertebrate fauna yet remains largely unexplored.

We report here on a new species of a fossorial snake, genus *Typhlops*, obtained in a recent trip. The only species of the genus previously known from the area is the endemic *Typhlops yonenagae* Rodrigues, 1991, described from Santo Inácio, in the sands of the right bank of the Rio São Francisco. The new species, obtained in the sands of the opposite side of the river, almost in front of Santo Inácio, differs clearly from *Typhlops yonenagae* but share several features with the latter as to lead us to conclude that it could form another example of vicariant species pair for the area (see Rodrigues, 1996 for other examples of species pairs of squamates in the area).

#### SPECIES DESCRIPTION

##### ***Typhlops amoipira* sp. nov.**

Holotype: MZUSP 12298, Ibiraba (10°48'S, 42°50'W): state of Bahia: Brazil, collected by Flora Acuña Juncá on 5 March 2000; field number 200170.

Paratypes: MZUSP 12299-12303, 6-9.iii.2000; other data as for the holotype.

Etymology: A homage to the extinct Amoipira indians, a Tupi tribe that lived in the area in the XVI century and probably went extinct by the end of the XVII century (Souza, 1942; Niemendadju, 1946). By coincidence, *amoipira*, in Tupi, also means "the relative from the other side" (Souza, 1942).

Diagnosis: A small, slightly pigmented *Typhlops* with incomplete nasal suture, 18 scales around the body (without reduction), and 212-242 dorsals.

Description of the holotype: (Figs 1-3). Rostral broad, longer than wide, extending about two thirds on dorsal face of head, with a pronounced narrowing at nostril level; narrowest at labial level and touching labial border. Posterior margin of rostral rounded, reaching the level of the anterior margin of eye. Nasal long, convex anteriorly, concave posteriorly, imbricating and contacting

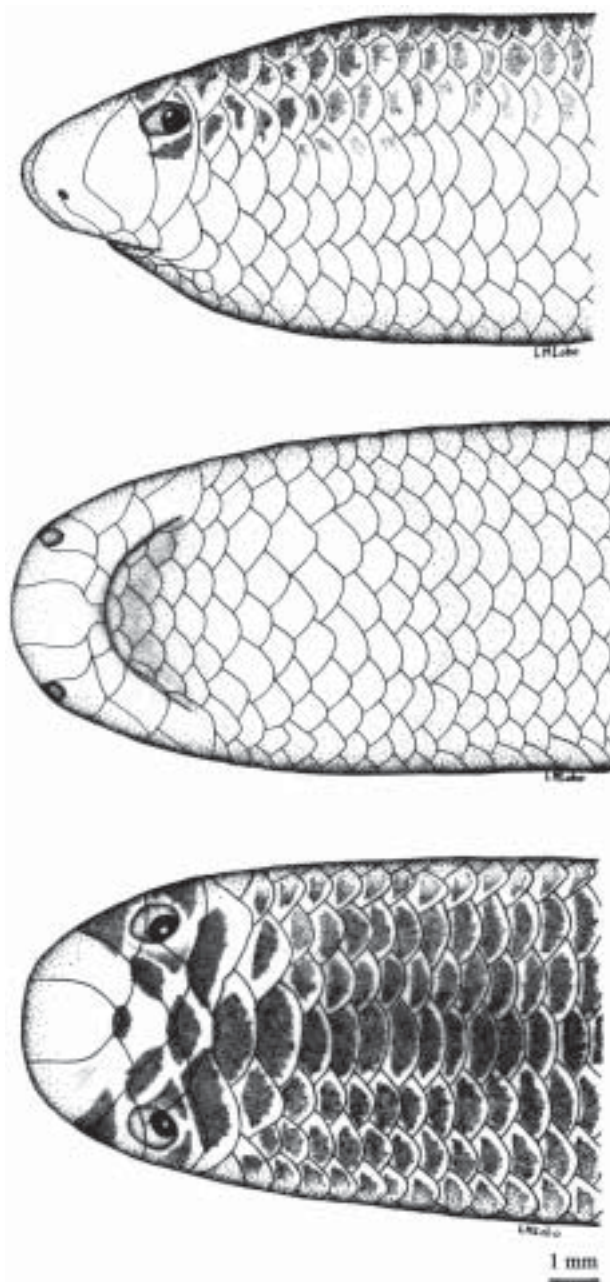


Figure 1. *Typhlops amoipira*, sp. nov.: lateral, ventral, and dorsal views of head (MZUSP 12298, holotype)



Figure 2. *Typhlops amoipira* (MZUSP 12299, paratype) from Ibiraba, State of Bahia, Brazil.



Figure 3. *Typhlops amoipira* (MZUSP 12299, paratype) from Ibiraba, State of Bahia, Brazil.

rostral, preocular, first and second supralabials, and frontal. Nasal wider than frontal and wider at nostril level, narrower posteriorly. Nostril in the posterior part of nasal, at the level of inferior part of ocular. Nasal suture incomplete, occupying the inferior third of nasal and coincident with suture between first and second labials. Frontal as long as large, cicloid, contacting rostral and preventing midline contact between nasals. Following frontal two imbricate and cicloid scales, the first identical to frontal in size and shape, the second wider. A pair of longer than wide distinctive supraoculars, diagonally oriented, minimally separated by frontal at midline. Supraocular covers the superior part of ocular; anterior part of supraocular imbricates under part of frontal, nasal, and preocular. Preocular large, wider at nostril level, contacting second and third supralabials, covering anterior part of ocular and supraocular, and reaching the

Table 1. Measurements (mm) of the type series of *Typhlops amoipira*, sp. nov. (\* = holotype)

MZUSP number	Total length	Tail length	Diameter at midbody	Head width	Eye diameter
12298*	208	4	7.5	5.2	2.0
12299	147	3	6.1	3.0	1.8
12300	142	3	5.2	3.2	1.8
12301	141	3	5.1	3.5	1.8
12302	73	2	3.2	2.5	1.6
12303	155	4	6.3	3.5	2.0

eye. Preocular indenting deeply the suture between second and third supralabials; ventrally reaching about the same level of preocular. Ocular larger than preocular, in contact with third supralabial with the eye in the superior two thirds of scale. Posterior to ocular, ventrally, a small, higher than wide temporal; dorsally, in larger contact, two identical and successively imbricate wider than long "parietals". The first "parietal" contacts supraocular. Three supralabials, first smallest, third the largest. Third supralabial followed posteriorly by a larger scale which contacts the base of ocular and temporal. Three infralabials.

Dorsals smooth, cicloid, slightly larger than long, in 18 longitudinal rows, without reduction; 212-242 transversal rows between rostral and tip of tail; 7-12 subcaudals.

Ground color creamy brown, few pigmented. In the anterior dorsal part of body and tail, a fine darker brown reticulum, particularly concentrated in the central part of dorsal head scales. In juveniles, an inconspicuous longitudinal mid-dorsal, one scale wide, brown line extends from posterior part of head to the first third of body; the line disappears progressively towards tail. Snout, imbricate part of dorsal head scales, labials, and the rest of body, immaculate.

Measurements of the type series are shown in Table 1.

#### DISCUSSION

*Typhlops* is a large and poorly known genus of pantropical fossorial snakes for which there is no available phylogenetically oriented studies of relationships. For this reason, we based our comparisons to South American species. Data on scale-count variation and maximum snout-vent length was taken from specimens examined at the MZUSP collection, and complemented by data from Dixon and Hendricks (1979) and Rodrigues (1991d).

*Typhlops amoipira* shares the presence of an incomplete nasal suture with five other South American species of *Typhlops*: *T. reticulatus*, *T. brongersmianus*, *T. minuisquamus*, *T. paucisquamus*, and *T. yonenagae*. *Typhlops lehneri*, from northern Venezuela, the only other known South American species of *Typhlops*,

has a complete nasal suture as the other Caribbean and Central-American congeners. *Typhlops brongersmianus* and *T. reticulatus* are larger species (maximum length, respectively, 320 mm and 522 mm – against a maximum of 200 mm in *T. amoipira*) and have 20 scales without reduction around midbody. *Typhlops brongersmianus* is a widespread species in South America, occurring in almost all habitats; it is largely sympatric with *T. reticulatus* in Amazonia, which is also known from an isolated population in northeastern Brazil. *Typhlops minusquamus* is a large, sharply bicolored species (maximum size 361 mm) restricted to Amazonia, and has 18 SAB with scale row reduction (20 to 14, 18 to 14 or 18 to 12). *Typhlops paucisquamus* is restricted to the Atlantic forest of northeastern Brazil. Although *T. paucisquamus*, *T. yonenagae*, and *T. amoipira* have similar sizes (maximum of 200 mm) and 18 SAB, the former has the lowest dorsal counts in the genus (169-182). The only differences between *T. yonenagae* and *T. amoipira* are the total number of dorsal scales (212-242 in *T. amoipira*; 259-291 in *T. yonenagae*) and color pattern. Specimens of *T. yonenagae* are creamy brown, with a conspicuous middorsal line along body extending from posterior part of head to tail. Specimens of *T. amoipira* are less pigmented and the line, mostly inconspicuous, is present only in the anterior third of body in juveniles.

Even considering the absence of strong evidence, morphological similarity, ecological preferences, and the geographic distribution of *T. amoipira* and *T. yonenagae* make their close relationship very probable. If this possibility is confirmed, it will be interesting to know if they diverged contemporaneously with the other pairs of vicariant species in the area.

The type series of *Typhlops amoipira* was obtained in a grid of 100 pitfall traps consisting of 10x10 parallel lines of 30 liter buckets, each one with three 1.5 m drift fences. Distance between parallel lines was 7.5 m. The grid was placed in a sandy and flat area bordering a large sand dune, close to the river. Total effort was equivalent to 600 pitfalls/day, for a sampled area of about 5000 m<sup>2</sup>. The six specimens were taken from buckets early in the morning (see Rodrigues, 1991a, 1996, for a detailed description of the area). The presence of a juvenile in the sample obtained suggests that egg laying most likely occurred during the dry season which extends from November to March in this region (see Rodrigues, 1996).

Material of *Typhlops yonenagae* examined: MZUSP 10086, 10087, 12497-12506, Santo Inácio, Bahia, Brazil.

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