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A new species of *Phalotris* from the eastern lowlands of Bolivia
(Reptilia, Squamata, Colubridae)

Martin Jansen & Gunther Köhler

Abstract

We describe a new species of *Phalotris*, *Phalotris sansebastiani* n. sp., from the eastern lowlands of Bolivia; the male holotype is deposited in the Museo Noel Kempff Mercado, Santa Cruz de la Sierra, Bolivia. The new species differs from all the other species in the genus by having a triangular projection of the red snout colouration reaching onto the parietals. Additionally, the new species is diagnosed by the following set of characters: head same width as neck; snout pointed; snout and anterior supralabials reddish; white collar (usually 4–6 dorsal scales long) subequal in length to black collar (usually 4–6 dorsal scales long); white mental region mottled with black; and dorsal colour brilliant red. The species is known only from the Chiquitano Region, Provincia Ñuflo de Chávez, Bolivia.

K e y w o r d s : *Phalotris tricolor* group, Chiquitano Region, identification key.

Una nueva especie de *Phalotris* de las tierras bajas del Oriente de Bolivia (Reptilia, Squamata, Colubridae)

R e s u m e n : Se describe una nueva especie de serpiente perteneciente al género *Phalotris*, *Phalotris sansebastiani* n. sp., de las tierras bajas del este de Bolivia, el holotipo es un macho y está depositado en el Museo Noel Kempff Mercado, Santa Cruz de la Sierra, Bolivia. La nueva especie difiere de todas las demás especies del género por tener una proyección triangular de la coloración del hocico que alcanza las escamas parietales. Adicionalmente, el diagnóstico de la nueva especie cumple: cabeza de la misma anchura que cuello; hocico puntiagudo; hocico y supralabiales anteriores rojizos; collar blanco (normalmente de 4–6 escamas dorsales de largo) subigual en longitud al collar negro (normalmente de 4–6 escamas dorsales de largo); región mental blanca y moteada de negro; y coloración dorsal rojiza. La especie es conocida únicamente de la Región de Chiquitanía, Provincia Ñuflo de Chávez, Bolivia.

Eine neue Art der Gattung *Phalotris* aus dem östlichen Tiefland Boliviens (Reptilia, Squamata, Colubridae)

Z u s a m m e n f a s s u n g : Wir beschreiben eine neue Art der Gattung *Phalotris*, *Phalotris sansebastiani* n. sp., aus dem östlichen Tiefland Boliviens; der männliche Holotypus wurde im Museo Noel Kempff Mercado, Santa Cruz de la Sierra, Bolivien, hinterlegt. Die neue Art unterscheidet sich von allen anderen Vertretern der Gattung durch eine dreieckige Verlängerung der roten Schnauzenfärbung, die bis zu den Parietalschilden reicht. Des weiteren kann die neue Art durch die folgende Merkmalskombination diagnostiziert werden: Kopf und Halsbereich gleich breit; Schnauze zugespitzt; Schnauze und vordere Supralabialschilde rötlich; weißer Nackenring (normalerweise 4–6 Dorsalia lang) etwa gleichlang wie schwarzer Nackenring (normalerweise 4–6 Dorsalia lang); Mentalregion weiß mit verstreuten schwarzen Flecken; und dorsale Grundfärbung kräftiges Rot. Die Art ist bisher nur aus der Chiquitanía, Provinz Ñuflo de Chávez, Bolivien, bekannt.

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Introduction

Species of the genus *Phalotris* display fossorial habits; therefore, they are difficult to collect, and information and specimens are rare. Several changes in taxonomy of the genera *Elapomorphus* and *Phalotris* have been proposed in the past; e.g., Lema (1984) divided the genus *Elapomorphus* into the subgenera *Elapomorphus* and *Phalotris*; Ferrarezzi (1993) elevated *Phalotris* to generic rank. Lema et al. (2005) analyzed the types of *P. tricolor* (Duméril, Bibron & Duméril 1854) and *P. punctatus* (Lema 1979) and synomized *P. punctatus* with *P. tricolor*. Additionally, they described *P. matogrossensis* Lema, D'Agostini & Cappellari 2005, a new species of the *tricolor* group.

The species of the *tricolor* group have the following characteristics in common (Ferrarezzi 1993): rostral rounded, little prominent; temporals 1+1+2, dorsal colouration red or light brown, without dark longitudinal lines; venter white; two ventrally incomplete postcephalic bands, occupying more than three dorsal scale rows, the anterior one white, the posterior one black; hemipenis bilobed or slightly bilobed, with little developed spines, sulcus spermaticus proximally divided. This species group consists of *P. mertensi* (Hoge 1955), restricted to Brazil, *P. cuyanus* (Cei 1984), which is considered an endemic species of the Monte biogeographic province in Argentina (Leynaud et al. 2005), *P. tricolor*, widely distributed in Brazil, Paraguay and Bolivia, and *P. matogrossensis* from Brazil and Paraguay.

During a survey of the herpetofauna of the Hacienda San Sebastián in the Chiquitano Region (Bolivia, Department of Santa Cruz, Provincia Ñuflo de Chávez) by the first author, four specimens of *Phalotris* from the *tricolor* group were obtained. Comparisons with a series of *P. tricolor* at the Museo Noel Kempff Mercado (Santa Cruz de la Sierra, Bolivia), the Forschungsinstitut und Naturmuseum Senckenberg (Frankfurt am Main, Germany), and the Museo Regionale di Scienze Naturali (Torino, Italy), showed that the specimens from San Sebastián and three from two nearby localities represent an undescribed species. Herein, we describe this new species.

Material and methods

We studied 21 specimens of the *tricolor* group (see Appendix I). Specimens of the new species were collected at the Hacienda San Sebastián, Provincia Ñuflo de Chávez, Department of Santa Cruz, Bolivia, from October 2005 to March 2007 by workers on the farm. Collected specimens were deposited at the Museo Noel Kempff Mercado (MNKR), Santa Cruz de la Sierra, Bolivia, and the Forschungsinstitut und Naturmuseum Senckenberg (SMF), Frankfurt am Main, Germany. Comparative material included in the study was taken from the collection of the Museo Noel Kempff Mercado, the Forschungsinstitut und Naturmuseum Senckenberg, and the Museo Regionale di Scienze Naturali (MZUT), Torino, Italy. Additional data were taken from Hoge (1955), Lema et al. (2005) and Leynaud et al. (2005). Abbreviations used are SVL (snout-vent length) and TL (tail length). SVL and TL were measured to the nearest 1 mm with a flexible ruler. All other measurements in millimeters by using a digital caliper. Means are given ± 1 SD. Sex was determined by evaluating the shape of the base of tail, the ratio of TL and SVL, and the number of subcaudals. Morphological description and scale counts follow Dowling (1951).

Results

Phalotris sansebastiani sp. n.

Holotype ♂ (adult): MNKR 4345 (Fig. 1), Hacienda San Sebastián, S 16°21.676', W 62°0.017', 550 m, Provincia Ñuflo de Chávez, Departament of Santa Cruz, Bolivia; collected I. 2007 by farmworkers of Hacienda San Sebastián.

Paratypes (in total 2 ♂♂, 4 ♀♀): MNKR 4353, 1 ♀ adult (495 mm SVL, 35 mm TL), MNKR 4354, 1 ♀ subadult (223 mm SVL, 14 mm TL), both from Reserva Privada Alta Vista near Concepción (San Antonio de Lomerío), Provincia Ñuflo de Chávez, Departament of Santa Cruz, Bolivia; both collected 2001 by L. Gonzales in Chiquitano Dry Forest; MNKR 1004, 1 ♂ adult (420 mm SVL, 49 mm TL), Campamento Kas Petas, Oquiriquia, Río San Martin; no additional data available; SMF 86653, 1 ♀ adult (413 mm SVL, 26 mm TL), Hacienda San Sebastián; collected I. 2007; SMF 86654, 1 ♂ adult (402 mm SVL, tail not complete), Hacienda San Sebastián; collected III. 2007; MNKR 4346, 1 ♀ subadult (239 mm SVL, 16 mm TL, Fig. 2), Hacienda San Sebastián; collected 27. X. 2005; all paratypes from San Sebastián were collected by farmworkers.

Etymology: The name *sansebastiani* is derived from the type locality Hacienda San Sebastián, Provincia Ñuflo de Chávez, Departament of Santa Cruz, Bolivia.

Diagnosis

Phalotris sansebastiani is a small fossorial snake (up to 495 mm total length) of the *tricolor* group (as defined by Ferrarezzi 1993). The new species can be distinguished from the other species of the *tricolor* group by having a triangular projection of the red snout colouration reaching onto the parietals. Additionally, *P. sansebastiani* differs from the other species of the group by the following characteristics (conditions for *P. sansebastiani* in parantheses):

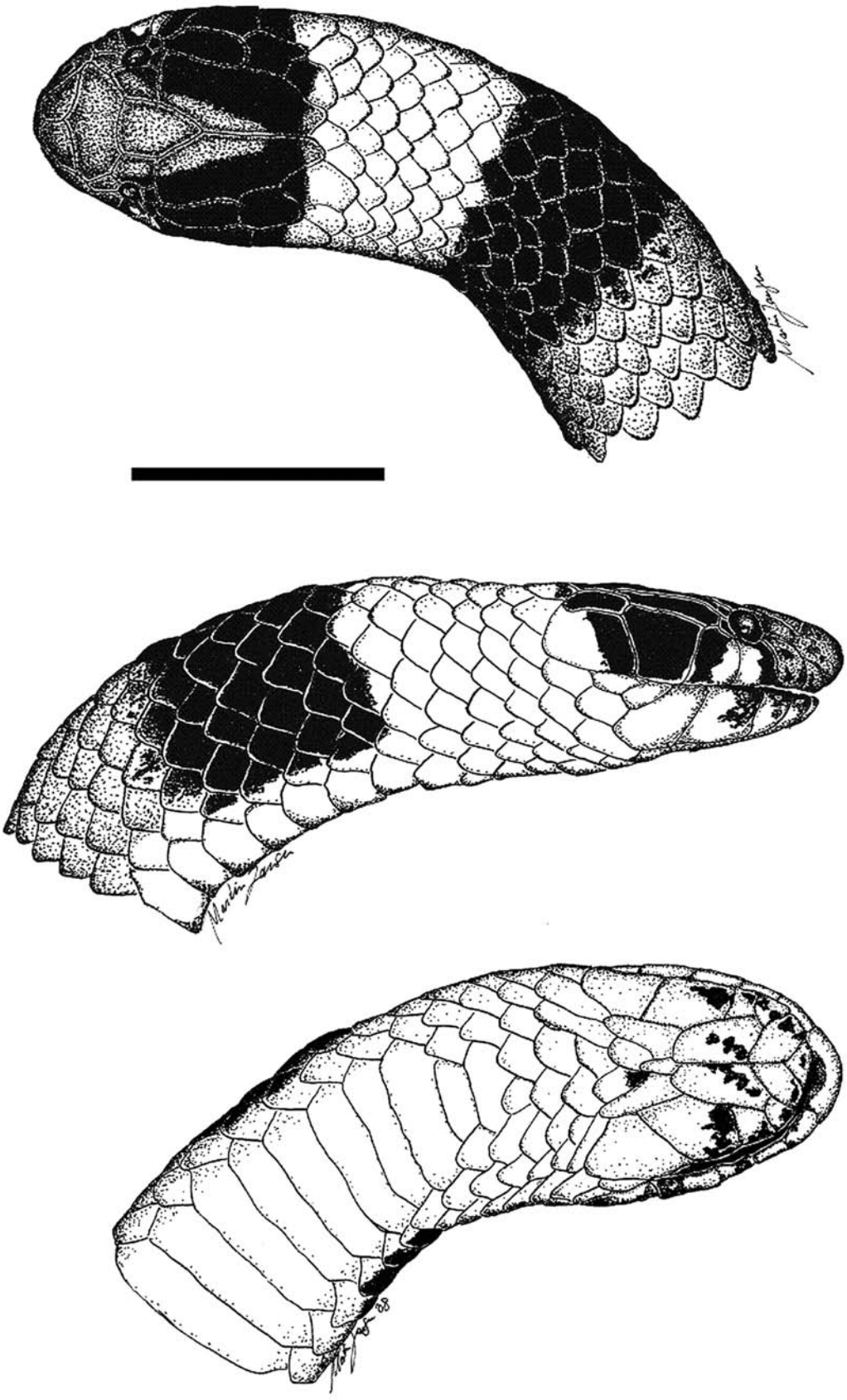

Fig. 1. Dorsal (above), lateral (center) and ventral view (below) of head of holotype of *Phalotris sansebastiani* (MNKR 4345). Scale bar = 10 mm.

Fig. 2. Paratype of *Phalotris sansebastiani* (MNKR 4346). Subadult ♀, 245 mm total length. Hacienda San Sebastián, Provincia Ñuflo de Chávez, Departament of Santa Cruz, Bolivia. Photo: M. Jansen.

From *P. mertensi:* black tips on bright red dorsals present (absent); length of black collar 3.0–3.5 dorsal scales (usually 4–5 dorsal scales); number of ventrals 223–236 in ♂♂ and 234–252 in ♀♀ (193–205 in ♂♂ and 212–215 in ♀♀); maximum total length 1.5 m (0.5 m).

From *P. cuyanus:* ground colour greyish-yellow to ochre (red); number of ventral scales in ♂♂ 216–224, mean 220.3 (193–205, mean 200).

From *P. tricolor:* white nuchal collar 1.5–6.0 scales long, usually 3–4, shorter than the black collar (white and black nuchal collar usually subequal and 4–6 dorsal scales long); the black collar reaches onto the ventrals, in some specimens black collar forming a complete ring (usually reaches first scale row, reaches the extreme tips of the ventrals); head totally black in adults, the snout is grey in juveniles (anterior supralabials, snout and forehead reddish, forming a red, triangular blotch on the snout; blotch has sharp edges, reaches the parietals and nearly contacts the white collar); lower side of head is entirely black (anterior supralabials reddish, with one or more white blotches under the eye, followed posteriorly by black supralabials); infralabials, gular and mental region heavily spotted with black, or uniform black (mental region and infralabials are whitish with scattered grey to black dots); background colour of dorsum yellowish to chestnut-brownish red, generally with scattered black points on dorsum forming middorsal and dorsolateral lines (uniformly brilliant red without black markings); ventral colour generally citron yellow (whitish).

From *P. matogrossensis:* Length of white nuchial collar more than 6 dorsal scales (usually 4–6 dorsal scales long); white nuchal collar is longer than the black collar, which is generally 5 scales long (white nuchal collar is subequal to black collar, usually not more than 1 scale different in length from the black collar, which is usually 4–6 dorsal scales long); the black collar hardly reaches the first dorsal scale row, and never reaches the ventrals (usually reaches first scale row; reaches the extreme tips of the ventrals in some individuals); dorsal side of head black, snout with small red blotch darkened with black spots; red blotch not forming a triangle and not with sharp edges (anterior supralabials, snout and forehead reddish, forming a red, triangular blotch on the snout; blotch has sharp edges and reaches the parietals and

nearly contacts the white collar); lower side of head white, supralabials whitish or only faintly mottled with black, and dark blotches only from angle to the mouth to fourth supralabial (lower side of head not white, anterior supralabials reddish, with one or more white blotches under the eye, followed posteriorly by black supralabials); infralabials, gular and mental region immaculate white (infralabials, gular and mental region whitish with scattered grey to black dots or mottled with black); head wider at level of eyes than neck (head of the same width as the neck); shape of snout in adults rounded (shape of snout in adults pointed).

Description of holotype

An adult ♂ (Fig. 1), preserved in 70 % alcohol. Head about same width as neck, with a sloping snout which barely projects beyond anterior tip of the chin; diameter of eye about 1.5 times the distance from eye to lip line; iris black and pupil round; nostril in anterior section of nasal scale; body diameter equal in all extension; tail short relative to body, with round tip and terminal plate. Measurements: SVL 475 mm; TL 49 mm; total length 524 mm; headlength 10.5 mm; height of head at level of parietals 6.2 mm; height of head at level of nostrils 3.3 mm; largest width of head at level of parietals 9.3 mm; width of head at level of nostrils 4.2 mm; diameter of orbit 1.2 mm; distance of eye to margin of mouth 1.8 mm; white collar length 8.1 mm; black collar length 6.5 mm; diameter of body at level of neck 8.5 mm; diameter of body at midbody 9.0 mm; diameter of body before cloaca 6.9 mm; diameter of base of tail 5.9 mm; diameter of middle of tail 5.1 mm; diameter of final part at level of last middorsocaudal scale 2.1 mm; width of terminal plate 1.6 mm; length of terminal plate 1.0 mm; width of last middorsocaudal scale 1.9 mm; length of last middorsocaudal scale 1.5 mm; length of ultimate subcaudal 1.0 mm; proportions: TL/SVL 0.103; total length/TL 10.69; head length/total length 0.019.

Pholidosis: Rostral wider than high; portion of visible tip of rostral less than suture between internasals; internasals wider than long, 2.0 mm in width and 1.6 mm in length; prefrontals trapezoidal, wider than long (width 4.5 mm and length 2.4 mm); supraocular small (width 1.3 mm and length 2.4 mm); frontal pentagonal, with triangular posterior portion and rectangular anterior portion (width 2.2 mm and length 3.5 mm); nasal scales 2.5 mm long, higher posteriorly than anteriorly, in contact with preocular; preocular 1/1, pentagonal; loreal absent; postoculars 2/2, small, subequal in size; supralabials 6/6; second and third supralabials in contact with the eye; first supralabial triangular and smaller than the others, second elongated at tip; fourth supralabial below lower postocular and anterior temporal; fifth supralabial largest of series, pentagonal; temporals 1+1 on both sides; anterior temporal long and narrow, extending from middle of fourth supralabial to end of fifth supralabial, anterior temporal narrow and long, posterior temporal higher than anterior, about 0.75 times the length of anterior temporal; dorsal scale between the apices of parietals and posterior temporal on each side abnormally large, about same size as posterior temporal; mental triangular and small (width 2.1 mm and length 1.3 mm); infralabials 7/7, first four in contact with anterior chin shields, fourth and fifth in contact with posterior chin shields, second smallest, sixth and seventh infralabials largest; anterior chin shields longer than posterior chin shields; anterior chin shield wider anteriorly than posteriorly; posterior chin shield pointed posteriorly; gular scales 9; preventrals 2; ventrals 205; cloacal scute divided (width 1.6 mm and length 4.9 mm); subcaudals 29/30; ratio of number of subcaudals/ventrals 0.146; dorsals smooth, in 15–15–15 rows, without apical pits; 12 dorsal scale rows at base of tail, 6 at middle and four before terminal plate.

Colouration: Cephalic cap uniformly black, reaches onto lateral portions of parietals, postoculars, temporals, fifth supralabial, as well as parts of supraocular, and parts of fourth and sixth supralabials; a distinct triangular projection of red snout colouration reaching onto parietals; blotch with sharp edges, covering one-third of parietals and nearly reaching white collar; first and second supralabials reddish, with a distinct white blotch under the eye, followed by black supralabials; one third of sixth supralabial black, two thirds incorporated into white nuchal collar; ground colour of infralabials, gular and mental region white, but first to fourth infralabial and gulars with irregular black blotches; white collar beginning on tips of parietals, extending 5 dorsals vertebrally and 6 dorsals laterally onto sixth supralabial and gular region, posterior margin relatively straight; black collar middorsally 5 scales and laterally 5 scales long; black collar extends to middle of the paraventral scale row on each side; the venter is whitish without blotches; dorsal colouration in life was uniform brilliant red, without stripes, lightening to pink at first or second dorsal row and furthermore to white near the ventrals; after some months stored in ethanol, the colour faded to paler reddish or pinkish.

Variation

The paratypes agree well with the holotype in most aspects of colouration and pholidosis. Measurements (average, n): SVL 402–495 mm in adults (441 mm, n = 5), 402–475 mm in ♂♂ (432 mm, n = 3), 413–495 mm in ♀♀ (454 mm, n = 2), 223–239 mm in subadult ♀♀ (231 mm, n = 2); TL 32–49 mm in adults (41.3 mm, n = 4), 49 mm in ♂♂ (n = 2), 32–35 mm in ♀♀ (33.5 mm, n = 2), 14–16 mm in subadult ♀♀ (15 mm, n = 2); TL/SVL 0.071–0.117 in adults (0.092, n = 4), 0.103–0.117 in ♂♂ (0.11, n = 2), 0.071–0.077 in ♀♀ (0.074, n = 2), 0.063–0.067 in subadult ♀♀ (0.065, n = 2).

Pholidosis: Second and third supralabial in contact with the eye in 4 specimens (57 %; n = 7), the other 3 having 1/1 subpreoculars and only the third supralabial is in contact with the eye (43 %); SMF 86653 having 1+2

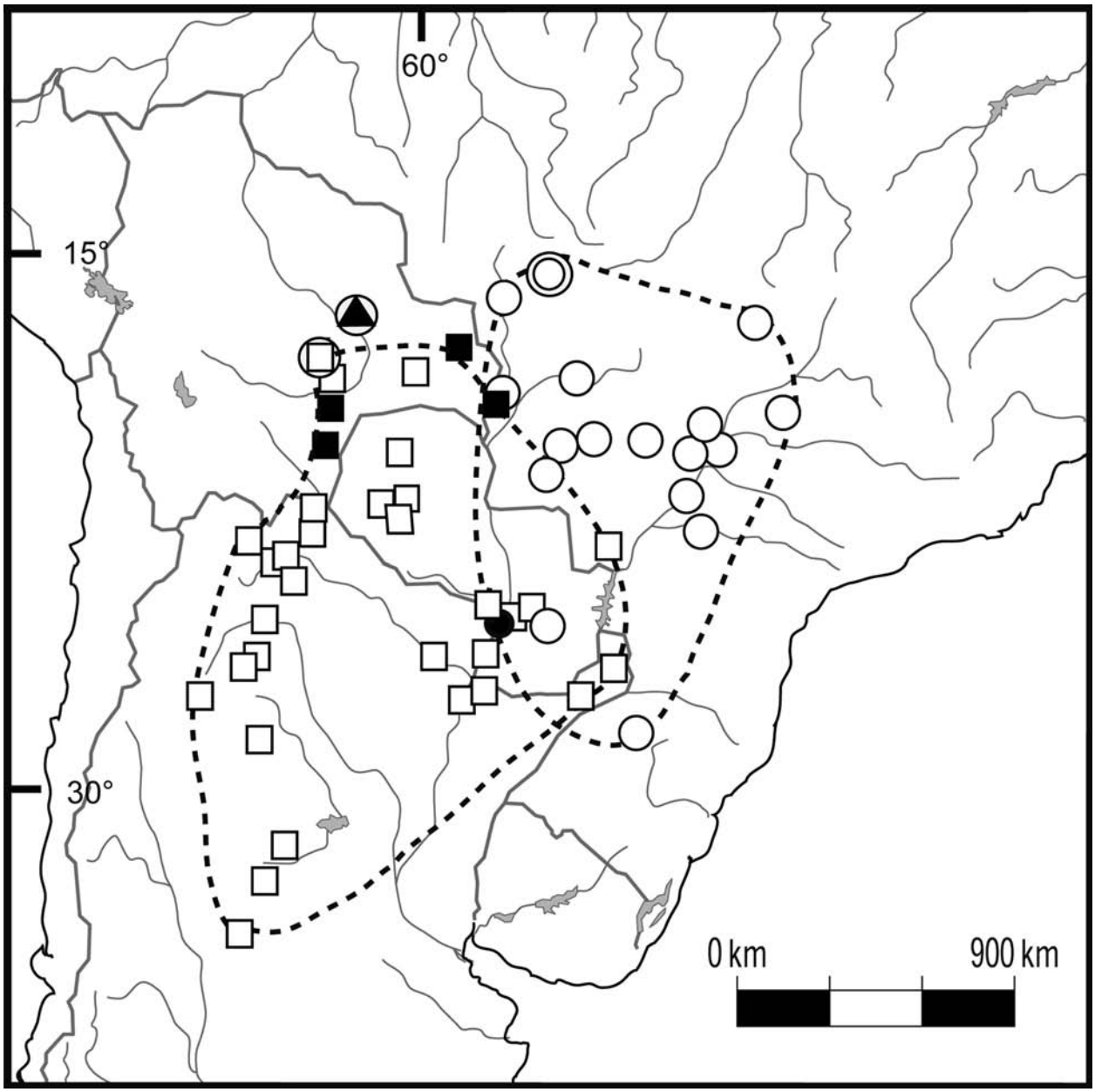

Fig. 3. Type localities (encircled symbols), distributional records from literature (white symbols) and localities of examined material (black symbols) for *Phalotris tricolor* (squares), *P. matogrossensis* (circles) and *P. sansebastiani* (triangle). Symbols can represent one or more nearby localities. Literature records taken from Lema et al. (2005) and Leynaud et al. (2005).

temporals on each side; infralabials 7/7 in 2 specimens (29%), 7/8 infralabials in 5 specimens (71%); ventrals 193–215 in adults (205.4, n = 5), 193–205 in ♂♂ (200, n = 3), 212–215 in ♀♀ (213.5, n = 2), 204–213 in subadult ♀♀ (208.5, n = 2); subcaudals 23–30 in adults, 27–30 in ♂♂ (28.5, n = 2), 23–26 in ♀♀ (24.5, n = 2), 20–21 in subadult ♀♀ (20.5, n = 2).

Colouration: the white collar is usually 4–6 scales long (average 5.1 scales); the black collar is 4–6 scales long (average 4.8 scales); usually the white collar is subequal in length to the black collar with a bias of 0.5 to 1 scales; prefrontal in 6 from 7 specimens immaculate uniformly red; frontal in 4 from 7 immaculate uniformly red, in others red with scattered black dots; in 6 from 7 specimens at least one third of the parietal red; fifth supralabial in 6 from 7 entirely black; sixth supralabial at least one third black, but can be almost entirely black (except of the antior tip of the scale, where the white collar reaches the last supralabial).

Hemipenial morphology

In SMF 86654, the tail is absent but the inverted hemipenes are protuding from the posterior end and are available for examination. The hemipenis is bilobed; the

length of the lobes is about three times the length of the truncus.

Natural history

The snakes were found in Cerrado habitats, savanna used for cattle or Chiquitano Dry Forest. Two specimens (MNKR 4346 and MNKR 4345) were caught active on the ground during the early night. MNKR 4346 was crawling nearby houses; MNKR 4345 was crossing a small road in the savanna. SMF 86653 and SMF 86654 were found during farmwork. MNKR 4353 and 4354 were found in Chiquitano Dry Forest.

Geographic range

Phalotris sansebastiani is only known from three nearby localities in the in the Provincia Ñuflo de Chávez: San Sebastián (type locality), Oquiriquia, Río San Martín, Campamento Kas Petas, and Reserva Privada Alta Vista, near Concepción, San Antonio de Lomerío (Fig. 3).

Discussion

The three species of *Phalotris* reported to occur in Bolivia are poorly documented and only a few voucher specimens are available of each, except for *P. tricolor*, which is reasonably well represented in museum collections. The specimens of *P. tricolor* mentioned in Fugler et al. (1995) from the Chiquitano Region probably represent *P. sansebastiani*. *Phalotris lemniscatus* (Duméril, Bibron & Duméril 1854) and *P. nasutus* (Gomes 1915) are known from a single Bolivian locality each. The only Bolivian record of *P. lemniscatus* is based on a historical specimen (Duméril, Bibron & Duméril 1854). *Phalotris nasutus* was recorded only recently at the type locality of *P. sansebastiani* (Jansen, in press). Because *P. matogrossensis* is known from neighboring areas in Brazil and Paraguay, this species is likely to occur in Bolivia and, therefore, is included in the following key.

Key to the species of *Phalotris* in Bolivia

Modified after Peters & Orejas-Miranda (1970), Cei (1993), Lema et al. (2005), and Leynaud et al. (2005).

1 Anterior temporal absent, fifth labial in contact with parietal; prominent rostral scale.... *P. nasutus*

1* Anterior temporal present, separating labials from parietal; rostral normal 2

2 Dorsum with lineate pattern of contrasting black and brick-red longitudinal stripes; dark head and white-black nuchal collar present, but not very evident..... *P. lemniscatus*

2* Dorsum uniform, no longitudinal stripes present; dark head and white-black nuchal collar very evident 3

3 Black collar 6–12 dorsal scales long; white collar much shorter than black (usually 4 scales long); black collar may form a complete ring; lower sides of head entirely black; infralabials, and gular and mental region heavily spotted with black, or uniformly black ..... *P. tricolor*

3* Black collar 6 or fewer dorsal scales long; white collar longer or subequal in length to black collar; black collar never forming a complete ring; lower side of head not entirely black, rather white, faintly mottled, or only black on posterior half; infralabials, and gular and mental region immaculate or spotted with black, but never uniformly black.....4

4 White and black collar subequal in length; triangular projection of the red snout colouration reaching onto parietals; side of head faintly mottled or dark on posterior half; black collar reaches the extreme tips of the ventrals in some individuals; infralabials, gular and mental region spotted with black .....*P. sansebastiani*

4* White collar much longer than black one; no triangular projection of snout colouration onto parietals; side of head white; black collar never reaches ventrals; infralabials, gular and mental region immaculate ..... *P. matogrossensis*

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Appendix

Comparative specimens examined

Phalotris matogrossensis: Paraguay: Asuncion, MZUT 1229.

Phalotris mertensi: Brasil: São Paulo: Novo Horizonte, Sociedad Rural, SMF 51455; São Paulo: Piracicaba, SMF 50028–9 (Paratypes).

Phalotris tricolor: Bolivia: Tarija: Villa Montes, SMF 32612; Santa Cruz: Provincia Cordillera, Perforación, MNKR 1884; Provincia Cordillera, Campamento Cupesí, MNKR 3312; Provincia Andrés Ibáñez, Colinas del Urubó, MNKR 3009; Angel Sandoval, Communidad San Fernando (Pantanal), MNKR 1393; Miss. San Francisco, MZUT R1228; Santa Cruz de la Sierra, Villa Olímpia, MNKR 2516; Brasil: Matto Grosso do Sul: Urucum MZUT R1230.1-2; Río de Janeiro, Lower Parahyba Valley, SMF 20342.

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