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REDESCRIPTION OF *PHALOTRIS NIGRILATUS* FERRAREZZI, 1993 (SERPENTES: COLUBRIDAE: XENODONTINAE)

PIER CACCIALI[1], SANTIAGO CARREIRA[2,4], AND NORMAN SCOTT[3]

[1]*Museo Nacional de Historia Natural del Paraguay, Sucursal 1, Ciudad Universitaria, San Lorenzo, Paraguay*
[2]*Sección Zoología Vertebrados, Facultad de Ciencias, Iguá 4225, CP 11400, Montevideo and Departamento de Herpetología, Museo Nacional de Historia Natural y Antropología, Juan C. Gómez 1436, Montevideo, Uruguay*
[3]*Research Associate, Smithsonian Institution, P.O. Box 307, Creston, CA 93432, USA*

ABSTRACT: *Phalotris nigrilatus* Ferrarezzi, 1993 is a poorly known species described from a single specimen from Paraguay. Two new specimens make possible a more detailed description of the species, including a description of the hemipenis, and support the validity of the species. Hemipenial morphology provides another character that further supports the inclusion of the species in the *nasutus* group. We describe variation within the species, probable sexual dimorphism, and the known distribution. It will be necessary to do further work in Paraguay to establish the conservation status of this apparently rare and endemic species.

Key words: Colubridae; Elapomorphini; Distribution; Hemipenis; Paraguay; *Phalotris nigrilatus*; Redescription; Serpentes

THE COLUBRID snake genus *Phalotris* Cope, 1862 is composed of three species groups (Ferrarezzi, 1993): the *nasutus* group includes five species (Lema, 2002*a*,*b*), the *tricolor* group includes four species (Leynaud et al., 2005), and the *bilineatus* group includes three species (Puorto and Ferrarezzi, 1993). The genus was revalidated by Ferrarezzi (1993) who defined it as a monophyletic group near *Apostolepis*. With *Elapomorphus*, these genera form the subfamily Elapomorphinae (Ferrarezzi, 1994; Hofstadler-Deiques and Lema, 2005). Species of the genus are found mainly in open areas from central Brazil and southern Bolivia to Patagonia in Argentina (Ferrarezzi, 1993); the species are semifossorial, and in some cases their biology is totally unknown.

Although differences among groups are seen in external anatomy (e.g., cephalic scutelation, shape of the body and head, etc.), morphological characters of the hemipenis also show important differences. The *tricolor* group has a hemipenis that is slightly or deeply bilobed with few developed spines, and a *sulcus spermaticus* bifurcated in the proximal region (Ferrarezzi, 1993). In contrast, the hemipenis of members of the *bilineatus* group has a single, slender hemipenis, with apical bifurcation in the *sulcus spermaticus* (Ferrarezzi, 1993). The anatomy of members of this hemipenis in the *nasutus* complex is known for *P. nasutus* and *P. lativittatus* (Ferrarezzi, 1993). The hemipenes of members of this group are deeply bilobed, calyculate and semicapitate, with enlarged lateral spines, and with the *sulcus spermaticus* bifurcated proximally (Ferrarezzi, 1993; Lema, 2002*b*; Zaher, 1999).

Phalotris nigrilatus Ferrarezzi, 1993 belongs to the *nasutus* group, which also includes *P. nasutus* (Gomes, 1915), *P. concolor* Ferrarezzi 1993, *P. lativittatus* Ferrarezzi 1993, and *P. labiomaculatus* Lema 2002*b*. These species have a pointed snout, prominent rostral scales, and fusion of the second and third temporals as synapomorphies.

Phalotris nigrilatus is known only from the holotype from Carumbé, San Pedro, Paraguay. The specimen (FML 0709) was collected in 1973 by Rodolfo Golbach, and the first reference to it was made by Laurent (1974) as *Elapomorphus nasutus*. *Elapomorphus nasutus* (now *P. nasutus*) was restricted to Brazil (Peters and Orejas-Miranda, 1970); with the Golbach record, the geographic distribution was extended ca. 810 km. No other species of the *nasutus* group or additional *P. nigrilatus* specimens are known from Paraguay. Ferrarezzi (1993) noted several differences between the types of *P. nigrilatus* and *P. nasutus* in

[4] CORRESPONDENCE: e-mail, carreira@fcien.edu.uy

general body color pattern. In addition, both forms are widely allopatric. Nevertheless, Ferrarezzi (1993) found no definite autopomorphies to support the specific separation of the two taxa, treating them as a metaspecies; he pointed out the necessity of obtaining more material to understand the systematics of the *nasutus* group. He had only one specimen, and we know nothing of differences between sexes in the species. Because the holotype is a female, hemipenial morphology is unknown.

In 2005, we located two specimens catalogued as *P. nasutus* from Paraguay in the Natural History Museum in Montevideo (MNHN). A detailed review of this material showed them to be specimens of *P. nigrilatus*. In this work, we redescribe the holotype of *P. nigrilatus*, include a description of the hemipenis from the new material, and comment on variation in the species. The known geographic distribution of this Paraguayan endemic is expanded.

Materials and Methods

The new material was fixed and stored in 10% formalin. The holotype in the Fundación Miguel Lillo collection (FML) was examined in Argentina. Ventral scales were counted following Dowling (1951) and compared with Peters (1964) because of the difference between the data given by Laurent (1974; 197 ventrals) and Ferrarezzi (1993; 202 ventrals). Subcaudal counts included neither the pair contacting the vent nor the terminal spine of the tail. All symmetric characters are presented as left/right. Coloration is based on preserved specimen because scientists have not examined live specimens. Snout–vent length (SVL) and tail length (TL) were measured in the preserved specimens using a cord and then measured with a ruler. Other standard measurements were taken using a slide-caliper (0.01 mm). To minimize error in the measurements, data are given to a precision of 0.1 mm. External morphology was observed under a stereoscope. For descriptions of hemipenes, we largely follow the terminology of Dowling and Savage (1960) and Zaher (1999). To see the morphology of the hemipenes, we dissected the organs of MNHN 00089. The right hemipenis was dissected in situ, and the left was separated from the body. Both were inflated with agar.

We took the following measurements in mm: head length (HL), from the jaw articulation to the tip of the snout; snout–vent length (SVL), from the tip of the snout to the anal opening; tail length (TL), from the anal opening to the tip of the tail; total length (TTL), from the tip of the snout to the tip of the tail. Additional measurements were: head width (HEW), where the head is largest; neck width (NEW), neck immediately behind the head; mid-body width (MBW), at the region halfway between the neck and the vent; tail base width (TBW), at the level of the vent; and eye diameter (ED).

We took the following measurements of the cephalic scales: (1) Rostral (RO): (a) on the midline, from the prefrontal to the lip margin; (b) from the left rostral margin on the lip to the right rostral margin on the lip. (2) Internasals (IN): (a) from the prefrontal/rostral suture to the nasal/prefrontal suture; (b) from the prefrontal/rostral suture to nasal/rostral suture. (3) Prefrontal (PF): (a) from the loreal/nasal suture on the left to the loreal/nasal suture on the right; (b) from the rostral to the middle of the suture with the frontal. (4) Frontals (FR): (a) from the middle of the suture with the prefrontal to the parietal/parietal suture; (b) from the left prefrontal/supraocular suture to the right prefrontal/supraocular suture. (5) Parietals (PA): (a) from frontal/supraocular suture to furthest contact with dorsal body scales (DBS); (b) from suture frontal/joint of two parietals to suture between temporals. (6) Preoculars (PRO): (a) from center of contact with eye to nasal/prefrontal suture; (b) from prefrontal/supraocular suture to middle of the supralabial. (7) Upper Postoculars (UPO): (a) from supraocular/eye contact to parietal/fifth supralabial contact; (b) from supraocular/eye contact to contact of lower postocular/fifth supralabial. (8) Lower Postoculars (LPO): (a) from eye/upper postocular contact to contact between third/fourth supralabials; (b) from eye/third supralabial contact to parietal/ fifth supralabial suture. (9) Temporals (TE): (a) from parietal/supralabial suture to most posterior contact with dorsal body scales (DBS); (b) from supralabial/DBS contact to parietal/DBS contact. (10) Anterior

Gulars (AG): from suture to first infralabial/second infralabial furthest posterior on the midline. (11) Posterior Gulars (PG): from anterior gular/fourth supralabial contact to most posterior contact with DBS.

Specimens examined included the following: FML 0709 (holotype), Carumbé, Departamento San Pedro, Paraguay. July 1973. Col.: R. Golbach.; MNHN 00089, MNHN 00091, Colonia Primavera, Alto Paraguay, Paraguay. November 1957. Col.: Nigel Wolf.

Note that the last two specimens were collected before the type specimen. In the time when the collection took place, all sites north of the Departamento Central (where the capital, Asunción, is located) were often called Alto Paraguay. Accordingly, the Alto Paraguay referred to is a large region, not the present-day Departamento of the same name. The locality is in Departamento San Pedro.

Results

Phalotris nigrilatus Ferrarezzi, 1993

Holotype.—FML 0709; type locality: Paraguay: Departamento San Pedro, Carumbé.

Synonymy

1974 *Elapomorphus nasutus* Laurent, Acta Zoológica Lilloana 31: 65.

1984 *Elapomorphus nasutus* (partim) Lema, Iheringia 64: 72, fig. 12.

1993 *Phalotris nigrilatus* Ferrarezzi, Mem. Inst. Butantan, 55: 30.

2002*a Phalotris nigrilatus* Lema, Acta Biologica Leopoldensia 24: 213.

Diagnosis

P. nigrilatus differs from *tricolor* and *bilineatus* groups by having a prominent rostral scale and fusion of the second and third temporals (synapomorphies that it shares with species of the *nasutus* group). Within the *nasutus* group, *P. nigrilatus*, *P. concolor* and *P. labiomaculatus* lack the first temporal, and the parietals contact the fifth supralabials.

Among the *nasutus* group, *P. nigrilatus* is distinguished from *P. concolor* and *P. labiomaculatus* by the absence of the first temporal (temporals 1 + 1 in *P. concolor* and *P. labiomaculatus*) and from *P. nasutus* by the presence of lateral dark bands along the body and tail and a vertebral stripe. Finally, *P. nigrilatus* can be distinguished from *P. lativittatus* by the contact between the rostral and prefrontal scales (separating the internasals), the loss of the nuchal collar, and a blackish head and belly with lateral black spots. The hemipenis of *P. nigrilatus* has curved spines; spines of the hemipenes of the rest of species in *nasutus* group are almost straight. The hemipenis of *P. nigrilatus* can be differentiated from species of the *bilineatus* group by the presence of two distinct lobes with well developed lateral spines. It can be distinguished from hemipenes of the *tricolor* group by having more developed, curved spines, and deeper hemipenial lobes.

Redescription of the Holotype (an Adult Female)

Coloration.—Dorsal, lateral, and ventral scales of head dark brown, with rostral plate paler than rest of head. Immediately behind posterior tips of parietal plates, coloration becomes paler, turning into a cream-colored middorsal band, five scales wide. Sides of neck dark brown. Thin middorsal stripe, formed by streaks from bases to apices of vertebral scales. Stripe starts five scales behind parietal plates, and ends 22 scales before tip of tail. Stripe is discontinuous on tail. Sides of body dark brown (almost black), from midpoint of fifth dorsal scale row down to contact with ventral scales. Belly bottom color yellowish cream with dark brown spots in tips of ventral scales, formed by continuation of lateral dark bands of body sides. Dots form a spotted line along ventral tips. Free edges of ventral scales not pigmented. Tail coloration with same pattern as rest of body. Ventral region of tail cream with lateral incursion of dark dorsal color, like midbody. Tip of tail yellowish.

Pholidosis.—Muzzle prominent with rostral scale projecting. Rostral scale touching prefrontal, separating internasals. Internasals subtriangular. Prefrontal wider than frontal scale. Frontal in contact with supraoculars on both sides. Frontal and supraoculars reach parietals. Parietals almost twice as long as wide. Nasals long, with nostrils in the anterior tip of the scale. Nasal in contact with preocular. Preoculars subpentagonal, little bigger than eye width. Two postoculars.

Upper postocular smaller than eye, and lower postocular smaller than upper. Six supralabials, with second to fourth contacting orbit. Fourth supralabial in contact with lower postocular. Fifth supralabial bigger than the others, touching parietal and temporal. Left temporals 0 + 1 + 2; and right 0 + 1 + 4. Anterior temporal long and narrow, lying between last supralabial and parietal. Seven infralabials on each side, first to fourth contacting chinshield scales. Third infralabial contacting first as well as second chinshield.

Holotype with anterior gulars diverging anteriorly and contacting first infralabials. Posterior gulars in anterior contact, with lateral projections contacting fourth infralabials. Second chinshield on right side divided into two scales. Dorsal scales rows with reduction one head length behind the head (17-15-15) without apical pits. Using Peters' (1964) method, starting with the first ventral scale wider than long, there are 205 ventral scales. However, starting with the first ventral scale that contacts the first dorsal row (Dowling, 1951), the count is 203. Subcaudals consist of 27 pairs. Anal plate divided.

Measurements (mm).—HL: 15.7; SVL: 692; TL: 59; TTL: 751. HL/TTL = 0.021; TL/TTL = 0.078. HEW: 10.1; NEW: 8.6; MBW: 11.6; TBW: 8.0; ED: 1.2. Table 1 shows measurements of cephalic scales.

TABLE 1.—Measurements of cephalic scales of the specimens analyzed (given in mm). RO: Rostral; IN: Internasal; PF: Prefrontal; FR: Frontal; PA: Parietal; PRO: Preocular; UPO: Upper postocular; LPO: Lower postocular; TE: Temporal; FG: First gular; SG: Second gular. See text for explanation of measurement methodology.

	FML 0709	MNHN 0089	MNHN 0091
RO	2.4 × 3.1	2.4 × 3.8	2.3 × 3.5
IN	2.5 × 1.1	2.5 × 1.4	2.4 × 1.4
PF	5.1 × 3.2	5.5 × 3.2	5.6 × 3.4
FR	3.5 × 3.7	3.9 × 4.7	3.7 × 4.2
PA	7.1 × 3.5	7.4 × 4.5	6.8 × 3.6
PRO	1.4 × 0.9	1.6 × 1.2	1.9 × 1.3
UPO	0.9 × 0.9	1.0 × 0.7	1.0 × 0.7
LPO	0.8 × 1.0	0.8 × 0.9	0.5 × 0.7
TE	5.3 × 2.8	5.2 × 1.7	4.8 × 2.0
FG	4.1	2.9	3.2
SG	4.4	4.3	9.6

Variation (Based on Two Males: MNHN 00089 (Fig. 1) and MNHN 00091)

Coloration in preservative.—Head brown on top and sides. Left side of head of MNHN 00089 blackish brown (including third through sixth supralabials, and temporal). Supralabials and rostral scales of MNHN 00091 spotted with dark gray. Ventral region of head dark brown, with mental, infralabials, and chinshields profusely spotted with dark gray. Dorsal color pattern with wide, pale pink middorsal stripe, six scales wide at mid body in MNHN 00089 and 00091. A fine, dark brown vertebral line, formed by elongate spots on tips of vertebral scales. Vertebral line starting at the level of the first ventral scale, finishing at the level of the vent (MNHN 00089) or starting at level of second ventral scale and extending a short distance behind vent (MNHN 00091). Sides of body uniform blackish brown, from first to fourth (MNHN 00091) or fifth (MNHN 00089) dorsal scale row. Ventral ground color light cream; blackish brown color of body sides continuing as spots on lateral tips of ventral scales. Spots small on the anterior ventrals and larger at mid body. Spots less noticeable in MNHN 00091. Tail with color pattern similar to rest of body. Vertebral stripe of MNHN 00089 replaced on tail by line of dots that reach tip. Tips of light cream subcaudals spotted like ventral scales. Ventral spots only on lateral tips of subcaudals in MNHN 00091 but also small spots in centers of subcaudal scales in MNHN 00091. Terminal 1/3 of apical spine white.

Pholidosis.—Rostral prominent but not so evident as in holotype, in contact with prefrontal. Preocular long and pentagonal. Both specimens with one preocular (or loreal), two postoculars, and temporals 0 + 1 on each side. MNHN 00089 with six supralabials (second and third contacting the orbit) on both sides, but MNHN 00091 with six supralabials on left and seven (third and fourth contacting the orbit) on right side. Fifth supralabial in contact with parietal in MNHN 00089 (as in the holotype); MNHN 00091 the same on the left side, and sixth supralabial contacting parietal on right side. Both specimens with eight infralabials on each side, with the first four contacting chinshields. In MNHN 00089, anterior gulars almost rectangular and without projections. Anterior gulars in MNHN 0091

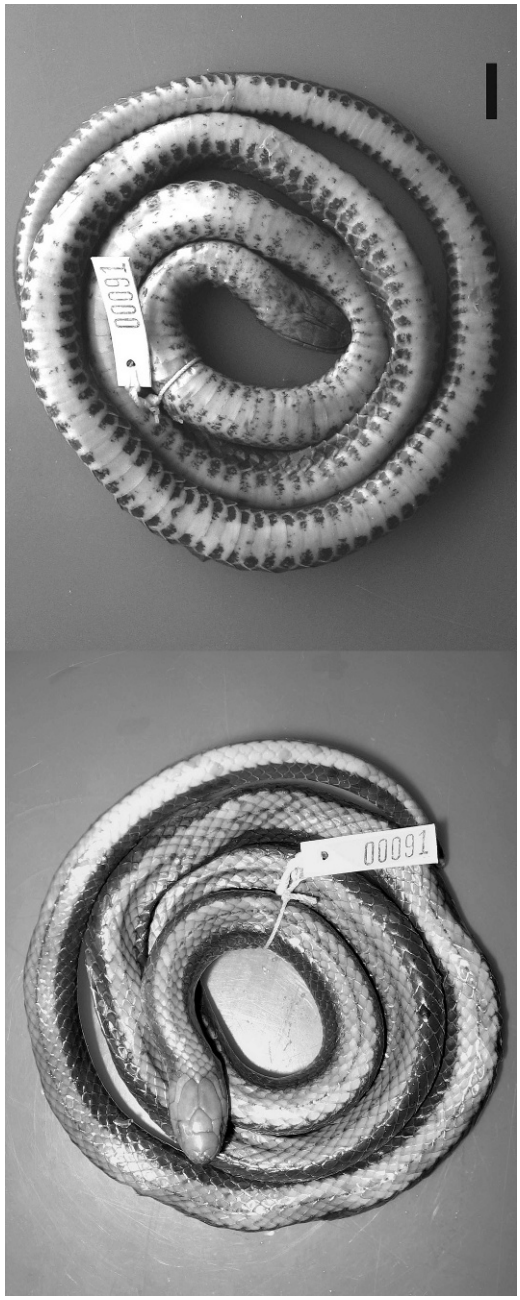

FIG. 1—Ventral and dorsal view of the specimen MNHN 00091.

deeply separated anteriorly and in broad contact with first and second infralabials. In MNHN 00089, posterior gulars divergent and completely separated except at their most anterior projection. MNHN 00091 with second gulars unusually long and narrow, in contact through their anterior half, but curving laterally and becoming widely divergent in their posterior half. Dorsal scale rows without reduction, with 15-15-15 anterior, middle and posterior rows, respectively. Following Peters (1964), MNHN 00089 with 184 ventral scales, and MNHN 00091 with 186. Using the system of Dowling (1951), ventral scale counts 183 and 185, respectively. Both specimens with anal plate divided. MNHN 00089 with 35 subcaudals, and MNHN 00091 with 33. Dorsal body scales without apical pits.

Measurements (mm).—MNHN 00089: HL: 18.0; SVL: 809; TL: 182; TTL: 991. HL/TTL = 0.018; TL/TTL = 0.184. HEW: 11.1; NEW: 9.2; MBW: 11.9; TBW: 7.4; ED: 1.4. Measurements of cephalic scales are shown in Table 1.

MNHN 00091: HL: 17.3; SVL: 727; TL: 171; TTL: 898. Ratios of head and tail by total length are 0.019 and 0.190 respectively. HEW: 9.6; NEW: 8.1; MBW: 9.5; TBW: 6.7; ED: 1.2.

Sexual dimorphism.—There are no differences in color pattern between males and the female, but there are differences in morphological ratios and scale counts between sexes. The female has a shorter tail (ratio: 0.078) in proportion to the body length, while males have a longer tail (Ratios: 0.184 and 0.190). The female has 203 ventral scales, while the males have 183 and 185. Subcaudals are 27 in the female, and 33 and 35 in the males.

Hemipenial Description (Based on MNHN 00089)

Retractor muscle of hemipenis originating at level of 29th subcaudal scale. Hemipenis bilobed and semicapitate (Fig. 2). Capitula less than one-third of total length, semicalyculate, and marked at base by large pockets and grooves on asulcate and lateral faces. Central body almost naked, with scattered spinules; two rows of large spines on each side, and a series of smaller spines towards base. Sulcate face with spinulate calyces, becoming gradually smaller towards base of lobes. Spermatic groove divided in distal two-thirds of organ. Each lateral surface of central

FIG. 2—Hemipenis of MNHN 00089 showing sulcate and asulcate sides.

FIG. 3—Map showing type locality of *P. nigrilatus* (triangle) and the position of the two additional specimens (square).

body with 8–12 large spines, disposed in two rows, with rows converging basally. Distal pair of spines on each side markedly larger and usually curved distally, remainder of spines smaller and usually straight. Basal segment with 3–4 stright spinules on sides and 9 spinules on asulcate face.

Measurements (mm) of everted right hemipenis of specimen MNHN 00089: Total length: 23.9; longer lobe: 5.9; shorter lobe: 5.5; width of lobes: 3.9; width at mid body hemipenis: 6.70; length of longest spine: 2.7.

Habitat and distribution.—The two known localities are in Departmento San Pedro, Paraguay, east of and near to the Paraguay River (Fig. 3). The holotype is from Estancia Carumbé and the other specimen is from Colonia Primavera, about 56 km to the S of the type locality.

According to Lema (2002*b*), the type locality corresponds to the Paraguayan Chaco formation. Based on the criteria of ENPAB (2003), both localities (type locality and Primavera) are in a transition zone between Wet Chaco and Alto Paraná Atlantic Rain Forest. Following Keel et al. (1993), the range of the species falls in a transition sector between the Littoral Central Ecoregion and Selva Central Ecoregion, with natural communities including lagoons, swamps, rivers, tall and medium forests, grasslands and rock hills. However, because the distribution of the species is close to the Paraguay River, the habitat is moist, with precipitation and mean temperature values of 1400 mm and 23 C respectively. At the present time, the area's forests are largely replaced by agriculture and cattle grazing.

Life history.—Little is known about the life history of this rare species. *Phalotris nigrilatus* has a modified rostral scale and reduced eyes, which are indicative of fossorial habits. We have not found information concerning diet.

Conservation.—This species seems to be endemic to Paraguay. In the restricted distribution of the species, there are no protected areas. The Secretaría del Ambiente in Paraguay treats this species as "Endangered".

The specimens of the Uruguayan museum were collected in 1957. The holotype was collected in 1973, and the species has not been re-collected in more than 30 yr. More studies near the type locality are needed to better understand the status of this rare species. The littoral regions along the Paraguay River are extremely modified by human populations. With accelerating disturbance as a result of explosive population increases, the future of this and other species along the rivers is precarious.

DISCUSSION

Species of the *nasutus* group are distributed in south-central Brazil (*P. lativittatus*, *P. nasutus*, *P. labiomaculatus* and *P. concolor*) and Paraguay (*P. nigrilatus*). *Phalotris lativittatus* and *P. concolor* are typical of the Cerrado Domain. *Phalotris nasutus* seems to be the most versatile species; it typically can be found in Cerrado Domain, but also occurs in Amazonia and in the Cerrado-Chaco

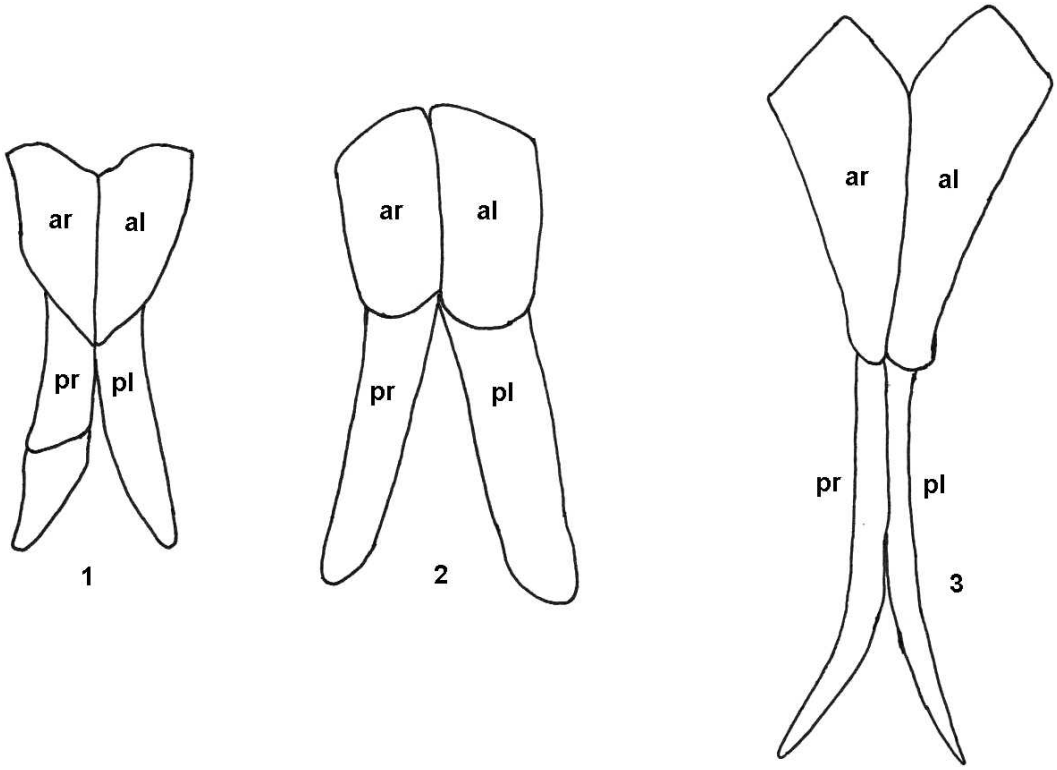

FIG. 4—Shape of gular scales. 1: FML 0709 (Holotype), note the right posterior gular shaped by two scales. 2: MNHN 0089. 3: MNHN 0091. Acronyms of gulars- ar: anterior right; al: anterior left; pr: posterior right; pl: posterior left.

transition zone (Lema, 1999). *Phalotris labiomaculatus* is endemic to the Amazonian Domain (Lema, 2002*b*). Ferrarezzi (1993) pointed out that species in the *nasutus* group are characteristic of open areas such as Cerrado. The habitat of *P. nigrilatus* has more vegetative components of the Atlantic Forest or Chaco than Cerrado.

When Ferrarezzi (1993) described *P. nigrilatus*, he noted that this species has the most derived characters compared with the other species in the *nasutus* group. He wrote: "O acúmulo de material e o auxilio de novos dados comparatives são imprescindíveis para a compreensão das relações sistemáticas no grupo" (Translation: The accumulation of material and the aid of new comparative data are essential to understand the systematic relationships of the group) (Ferrarezzi, 1993:34). Autopomorphies of *P. nigrilatus* (contact between rostral and prefrontal scales, loss of nuchal ring, black head and belly spotted) are now supported by two additional specimens.

Laurent (1974) counted 197 ventral scales in the holotype, but evidently he was mistaken. The gulars are some of the most variable scales (Fig. 4).

P. nigrilatus shows differences in hemipenial morphology from the other species of *nasutus* group in which this organ is known. The hemipenis of *P. labiomaculauts* was described by Lema (2002*a*), and that of *P. nasutus* was described by Ferrarezzi (1993) and Zaher (1999). Ferrarezzi (1993) also gave a brief description of the hemipenis of *P. lativittatus*. The hemipenis in the *nasutus* group seems to be asymmetric, semicaliculate, and semicapitate. In the case of *P. labiomaculatus* and *P. nigrilatus*, the lobes are deeply bifurcate, while in *P. nasutus* the hemipenis is slightly bilobed. A difference between the hemipenes of *P. labiomaculatus* and *P.*

nigrilatus is that the latter has calyces covering all the lobes, while in *P. labiomaculatus* the calyces are absent in the apex of the lobes.

A synapomorphy among the *nasutus* group is the presence of well developed hemipenial spines on the sides of the organ. The curvature in the largest hemipenial spines of *P. nigrilatus* is not seen in other members of the group and may be considered an autapomorphy. The origin of the hemipenial retractor muscle in MNHN 0089 is very posterior, only six subcaudals before the tip of the tail.

Finally, *P. nigrilatus* seems to be the most evolved species in the group, and *P. concolor* retains the most primitive characters (Ferrarezzi, 1993). Both species occupy ranges peripheral to those of other members of the *P. nasutus* group, with *P. concolor* to the northeast and *P. nigrilatus* to the southwest.

Resumen

Phalotris nigrilatus Ferrarezzi, 1993, es una especie poco conocida, descrita en base a un único ejemplar procedente de Paraguay. Dos nuevos especimenes, hacen posible una descripción mas detallada de la especie, incluyendo la descripción de hemipene y apoyando la validez de la especie. La morfología del hemipene aporta otro caracter que apoya la inclusión de esta especie en el grupo *nasutus*. Describimos la variación dentro de la especie, probable dimorfismo sexual y distribución conocida. Será necesario realizar un trabajo mas intenso en Paraguay con la finalidad de conocer el estado de conservación de esta aparentemente rara y endémica especie.

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Literature Cited

Dowling, H. 1951. A proposed standard system of counting ventrals in snakes. British Journal of Herpetology 1:97–99.

Dowling, H. G., and J. M. Savage. 1960. A guide to the snake hemipenis: A survey of basic structure and systematic characteristics. Zoologica 45:17–28.

ENPAB. 2003, Estrategia Nacional y Plan de acción para la conservación de la biodiversidad del Paraguay. GEF, SEAM, PNUD, Asunción, Paraguay.

Ferrarezzi, H. 1993. Nota sobre o gênero *Phalotris* com revisão do grupo *Nasutus* e descripção de três novas espécies (Serpentes, Colubridae, Xenodontinae). Memórias do Instituto Butantan 55:21–38.

Ferrarezzi, H. 1994. Uma sinopse dos gêneros e classificação das Serpentes (Squamata): II. Family Colubridae. Pp. 81–91. *In* L. B. Nascimento, A. Tristão, and G. A. Cotta (Eds.), Herpetologia do Brasil 1. Fundação Biodiversitas e Fundação Ezequiel Dias, Belo Horizonte, Minas Gerais, Brazil.

Gomes, J. F. 1915. Contribuição para o conhecimentodos ophidios do Brasil. I. Descriçãode quatro espécies novas e um novo gênerode opistoglyphos. Annales Paulistas de Medicina y Cirurgia, São Paulo 4:121–129.

Hofstadler-Deiques, C., and T. de Lema. 2005. On the cranial morphology of *Elapomorphus*, *Phalotris* and *Apostolepis* (Serpentes: Colubridae), and its phylogenetic significance. Zootaxa 1042:1–26.

Keel, S., A. Gentry, and L. Spinzi. 1993. Using vegetation analysis to facilitate the selection of conservation sites in eastern Paraguay. Conservation Biology 7:66–75.

Laurent, R. F. 1974. Sobre la existencia de *Elapomorphus nasutus* Gomes en el Paraguay. Acta Zoológica Lilloana 31:65–67.

Lema, T. de. 1984. Sobre o gênero *Elapomorphus* Wiegmann, 1843 (Serpentes, Colubridae, Elapomorphinae). Iheringia, Série Zoologia 64:53–86.

Lema, T. de. 1999. *Phalotris nasutus*, geographic distribution. Herpetological Review 30:175.

Lema, T. de. 2002*a*. Nomenclatural note on neotropical elapomorphinae snakes (Colubridae). Acta Biologica Leopoldensia 24:209–214.

Lema, T. de. 2002*b*. New species of *Phalotris* from northern Brazil with notes on the *nasutus* group (Serpentes: Elapomorphinae). Comunicações do Museu de Ciências e Tecnologia da PUCRS, Série Zoologia, Porto Alegre 15:201–214.

Leynaud, G. C., M. Cabrera, and P. Carrasco. 2005. A survey of the southernmost representatives of the *tricolor* species group, genus *Phalotris* (Serpentes, Colubridae). Phyllomedusa 4:103–110.

Peters, J. 1964. Dictionary of Herpetology. Hafner Publishing Company, New York, New York, U.S.A..

Peters, J., and B. Orejas-Miranda. 1970. Catalogue of the Neotropical Squamata: Part I, Snakes. Bulletin of United States National Museum 297:1–347.

Puorto, G., and H. Ferrarezzi. 1993. Uma nova espécie de *Phalotris* Cope, 1862, com comentários sobre o grupo *bilineatus* (Serpentes: Colubridae: Xenodontinae). Memórias do Instituto Butantan 55:39–46.

Zaher, H. 1999. Hemipenial morphology of the South American xenodontine snakes, with a proposal for a monophyletic Xenodontinae and a reappraisal of colubroid hemipenes. Bulletin of the American Museum of Natural History 240:1–168.

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