

RESURRECTION OF *STENOCERCUS TORQUATUS* BOULENGER, A SPINY-TAILED IGUANID LIZARD (SQUAMATA: IGUANIA) FROM PERU

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ABSTRACT: We resurrect and redescribe *Stenocercus torquatus* from the Andes of central Peru in departamentos Junín and Pasco at elevations between 800 and 1800 m. This species was erroneously synonymized with *Stenocercus crassicaudatus*, which occurs allopatrically in the Andes of southeastern Peru, departamento Cusco. In addition to several scale counts, *Stenocercus torquatus* differs from *S. crassicaudatus* in having a black antehumeral collar, two black transverse bands anterior to the antehumeral collar, a shorter tail, the ability to change color, and an arboreal life-style.

Key words: Iguania; Peru; *Stenocercus*; Systematics

CAREFUL examination of recent and old collections is revealing an amazing diversity of amphibians and reptiles in the Andes of central Peru (e.g., Duellman et al., 2004; Lehr, 2002; Lehr et al., 2004a,b). With more than 50 species, the neotropical lizard genus *Stenocercus* Duméril and Bibron (1837) is one of the most diverse and widely distributed reptile taxa on the Andes. Most species of *Stenocercus* occur in the northern and central Andes from Colombia and Venezuela to Argentina. Moreover, more than half of the species of *Stenocercus* (approximately 30) occur in Peru, where a considerable number of new species continue to be discovered as new areas are explored (Cadle, 1991, 1998, 2001; Fritts, 1972; Lehr, 2002). This rate of species discovery suggests that the diversity of *Stenocercus* has been largely underestimated. Here we resurrect and redescribe *Stenocercus torquatus* Boulenger from the eastern slopes of the Andes in central Peru. This species was synonymized with the morphologically similar *S. crassicaudatus* (Burt and Burt, 1931) from departamento Cusco.

MATERIALS AND METHODS

We follow the terminology of Cadle (1991) and Torres-Carvajal (2000, 2004) for characters included in the description. Museum

abbreviations follow Leviton et al. (1985) and Frost (2004), with the addition of MTD (Museum für Tierkunde Dresden, Germany) following Fritz (2002). Snout-vent length (SVL) and tail length (TL) measurements were taken with a ruler and recorded to the nearest 1 mm; all other measurements were made with digital calipers and recorded to the nearest 0.1 mm. Osteological characters and clutch size were determined from digital x-ray radiographs. Egg volume was calculated by the formula for a prolate spheroid: $V = 4/3 \pi (\text{length}/2) (\text{width}/2)^2$. In addition, sex was determined either by dissection, or by noting the presence of hemipenes. Differences in quantitative characters between *S. torquatus* and *S. crassicaudatus*, and between both sexes in *S. torquatus* were evaluated with *t*-tests. One of the assumptions of the *t*-test for two samples is that the variances of both samples are equal; therefore, *F*-tests also were performed for each character to test for equality of variances. If the variances were not the same (i.e., $P < 0.001$), an unequal variance *t*-statistic (Welch test) was used. Statistical tests were performed in PAST 1.27 (Hammer et al., 2004). Stephens and Taylor's (1983) ornithological gazeteer of Peru and Global Gazetteer Version 2.1 (Falling Rain Genomics, Inc.) were used to georeference most localities. Specimens examined in this study are listed in Appendix I.

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SYSTEMATICS

Stenocercus torquatus Boulenger

Stenocercus torquatus Boulenger, 1885:133.

Holotype: BM 61.5.22.4, a male from "Peru." Type locality herein restricted to María Teresa, 19 km on road Oxapampa-Llaupi (10° 42' 05" S, 75° 27' 22" W), 1470 m, Departamento Pasco, Peru.

Stenocercus crassicaudatus (part) Burt and Burt, 1931:287; Peters and Donoso-Barros, 1970; Fritts, 1974:45. Synonymy fide Burt and Burt (1931).

Diagnosis.—*Stenocercus torquatus* differs from all other species of *Stenocercus* except *S. bolivarensis*, *S. carrioni*, *S. chlorostictus*, *S. crassicaudatus*, *S. empetrus*, *S. eunetopsis*, and *S. simonsii* in having granular scales on the posterior surface of thighs and spinose caudal scales. It differs from these species in having a black antehumeral collar complete middorsally in adult males, subadult females, and juveniles, two black transverse bands anterior to the antehumeral collar, and the ability to change colors between emerald green and dark brown or grey. An antehumeral collar also is present in all species mentioned above except *S. crassicaudatus*; however, in these species the collar is usually incomplete middorsally. Similarly, two black transverse bands anterior to the antehumeral collar have been reported in *S. eunetopsis* (Cadle, 1991), but they are not as distinct as in *S. torquatus*.

Characterization.—(1) Maximum total length in males 84 mm ($n = 27$); (2) maximum total length in females 74 mm ($n = 16$); (3) vertebrae 83–115; (4) paravertebrals 103–151; (5) scales around midbody 102–137; (6) supraoculars 6–8; (7) internasals 4–6; (8) postrostrals 6–8; (9) loreals 2–5; (10) gulars 47–67; (11) lamellae on Finger IV 22–29; (12) lamellae on Toe IV 26–32; (13) posthumeral vertical wrinkle present, pocket Type 2 of Cadle (1991); (14) postfemoral pocket shallow, Type 3 of Cadle (1991); (15) parietal eye absent; (16) occipital scales small, smooth, juxtaposed; (17) projecting angulate temporals absent; (18) enlarged supraoculars occupying most of supraocular region in one row absent; (19) scales on frontonasal region juxtaposed; (20) preauricular fringe short; (21) antegular, antehumeral, gular, longitudinal, oblique, postauricular, supra-auricular, and transverse

antegular neck folds present; (22) lateral and dorsal nuchals similar in size; (23) posterior gulars smooth, imbricate, with apical pit; (24) lateral and dorsal body scales similar in size; (25) vertebrae slightly enlarged, forming inconspicuous longitudinal row between fore and hind limbs; (26) dorsolateral crests absent; (27) ventrals smooth, imbricate; (28) scales on posterior surfaces of thighs granular; (29) prefemoral fold present; (30) inguinal groove present; (31) preanals not projected; (32) tail not strongly compressed laterally in adult males; (33) tail length 47–54% of total length; (34) two caudal whorls per autotomic segment; (35) caudals spinose; (36) dark stripe extending anterodorsally from subocular region to supraciliaries absent; (37) color pattern of gular region in adult females without dark marks, similar to ventral color pattern; (38) color pattern of gular region in adult males without dark marks, similar to ventral color pattern; (39) black blotch on ventral surface of neck in adult males absent; (40) dark midventral stripe in adult males absent; (41) black patches on ventral surface of thighs in adult males absent; (42) background color of dorsum grey, brown, or green; (43) postxiphisternal inscriptional ribs not articulating midventrally.

Description of holotype.—Male (Fig. 1); SVL = 80 mm; TL = 86 mm; maximum head width = 14 mm; head length = 18.8 mm; head height = 11.8 mm; posterior dorsal head scales small, smooth, juxtaposed (Fig. 2); parietal eye not visible; supraoculars in seven rows, smooth, slightly imbricate, with the lateral most three rows less than half the size of the medial adjacent rows; distinct circum-orbitals absent; canthals two; internasals four; postrostrals six, approximately as wide as long; supralabials five; infralabials six; loreals three; lorilabials in one row; preocular divided into two scales, the dorsal most in contact with posterior canthal; lateral temporals granular; gulars in 54 rows between tympanic openings; all gulars cycloid, smooth, imbricate, each bearing one apical pit; second infralabial in contact with first three sublabials; first pair of postmentals in contact medially; mental in contact with first pair of infralabials and first pair of postmentals; dorsal and lateral scales of body and neck granular; scales around midbody 121; vertebrae enlarged, slightly keeled, imbricate, in 98 rows, forming distinct

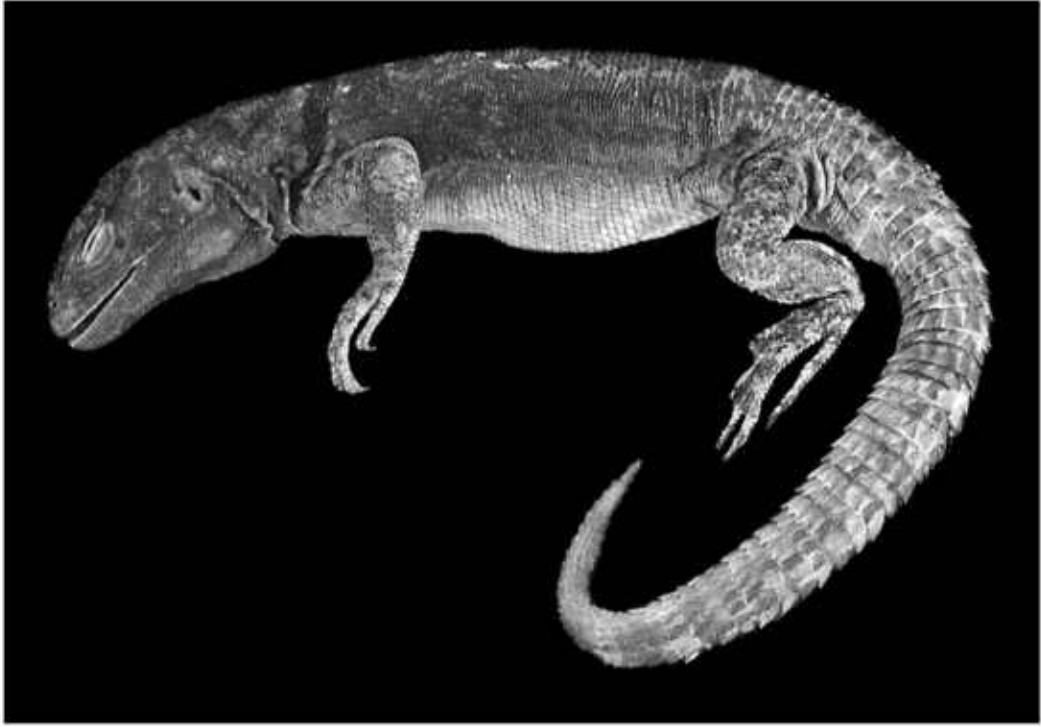


FIG. 1.—*Stenocercus torquatus*, holotype, BM 61.5.22.4, male, 80 mm SVL.

vertebral row; paravertebrals adjacent to vertebral row slightly enlarged, keeled, and imbricate; paravertebrals 115; ventrals smooth, imbricate, more than twice the size of dorsals; preauricular fringe short, composed of four enlarged, posteriorly projected granular scales; antegular, antehumeral, gular, longitudinal, oblique, postauricular, supra-auricular, and transverse antegular neck folds present; ventrolateral and prefemoral folds present; dorsal scales of fore limbs imbricate, keeled; dorsal scales of hind limbs imbricate, strongly keeled, mucronate; ventral humeral scales granular; ventral scales of forearms and hind limbs imbricate, smooth; palmars and plantars imbricate, keeled, with tridentate margin; lamellae on Finger IV 27; lamellae on Toe IV 29; tail rounded; caudals strongly keeled, mucronate, imbricate; basal subcaudals smooth, imbricate; vertical fold in axilla (posthumeral pocket Type 2 of Cadle, 1991); distinct postfemoral pocket with slit-like opening (Type 5 of Cadle, 1991).

Color in preservative of holotype.—Dorsal surfaces and throat dark olive; black dorsal transverse bar from one antehumeral fold to

the other; pectoral region blue; belly pinkish white (Boulenger, 1885).

Variation.—Measurements, scutellation, and other morphological characters of *Stenocercus torquatus* are presented in Table 1. Loreals 2–5 (mode = 3); supralabials 4–5 (mode = 4); second infralabials not in contact with third sublabials in 38% of specimens; first pair of postmentals not in contact medially in 40% of specimens; two xiphisternal and two postxiphisternal pairs of inscriptional ribs, of which the posterior pair is short (Pattern 1B of Torres-Carvajal, 2004). All quantitative characters examined in this study are significantly similar between males and females (Table 2).

An adult male (MTD 45921, SVL = 74 mm) had the following coloration in life: dorsum emerald green with yellow spots anteriorly and greyish green with irregular black marks posteriorly; flanks of posterior third of body purple with yellow spots; fore limbs dark green with diffuse yellow spots and irregular black marks dorsally; hind limbs grey with irregular black marks and light yellow spots; head greyish green, darker dorsally and lighter

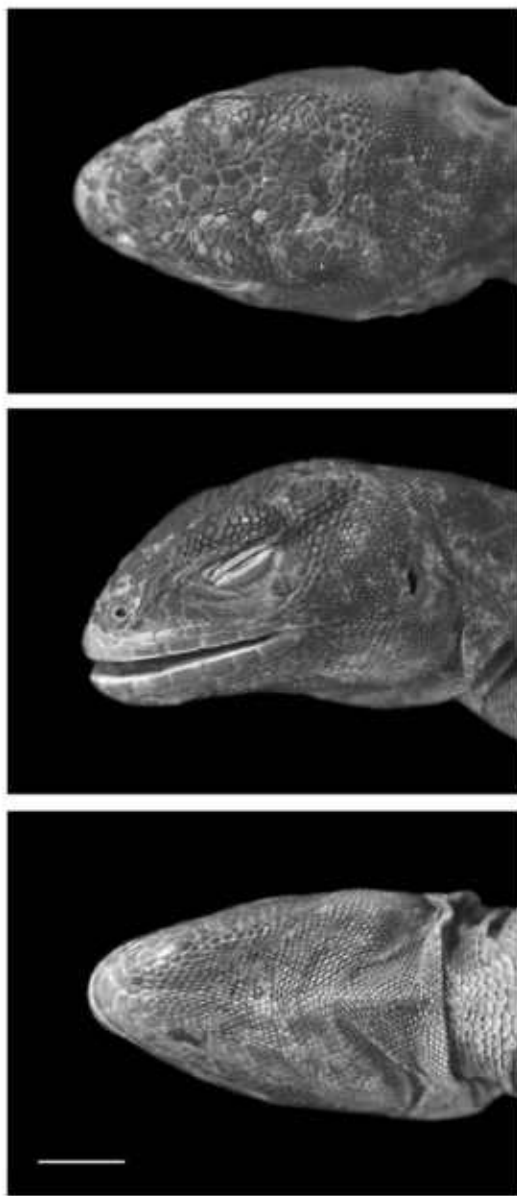


FIG. 2.—Dorsal (top), lateral (middle), and ventral (bottom) views of the head of *Stenocercus torquatus*. Holotype, BM 61.5.22.4, male. Scale bar = 5 mm.

laterally; posterolateral part of head and adjacent neck region light green with white blotches; upper and lower eyelids light yellow; black longitudinal stripe extending posterodorsally from preocular region to anterodorsal aspect of neck, posterior to this stripe is a middorsal black blotch; extracolumella me-

tallic green; black antehumeral collar bordered with yellow bands anteriorly and posteriorly; yellow bands become green dorsally and white ventrally; two short, black transverse bands anterior to antehumeral collar; ventral surface of body light grey; pectoral and gular regions yellowish grey with light spots laterally; ventral surface of fore limbs grey with light grey spots; ventral surface of hind limbs cream with irregular grey marks; preanal region purple; tail purple laterally and grey dorsally.

An adult female (MHNSM 18432, SVL = 66 mm) differed from the above description as follows: dorsum and flanks emerald green with white and black dots anteriorly and brownish grey posteriorly; fore limbs dark green with white and black dots dorsally; hands white with black irregular marks; hind limbs and feet dark grey with white and black dots dorsally; dark green antehumeral collar bordered with lime green band posteriorly and white spots anteriorly; lime green band becomes white ventrally; ventral surface of fore and hind limbs cream with irregular black marks; preanal region white with grey dots; tail grey with dark reddish-brown bands that become darker and narrower distally; anterior portion of tail white midventrally.

A juvenile (ML field number 936, SVL = 44 mm) had the following coloration in life: anterior three quarters of dorsum and flanks emerald green with white and black spots; black spots bigger dorsally; dorsal surface of hind limbs and posterior quarter of body grey with black and white spots; dorsal surface of fore limbs dark green with black dots; head greyish green, darker dorsally; upper and lower eyelids whitish green; sublabials emerald green; black longitudinal stripe extending posterodorsally from preocular region to anterodorsal aspect of neck, posterior to this stripe is a middorsal black blotch and a smaller blotch is in between; posterolateral part of head and adjacent neck region green with light green spots; antehumeral collar dark green, bordered with transverse row of lime green spots (lighter ventrally) anteriorly and posteriorly; two dark green transverse bands anterior to and shorter than antehumeral collar; preanal region white; ventral surface of body grey with light spots laterally; gular region and throat yellowish grey with light spots; ventral surface of fore limbs grey with light spots;

TABLE 1.—Summary of morphological characters, measurements (mm), and color patterns of *Stenocercus torquatus* and *S. crassicaudatus*. For each quantitative character, the *F*-value, *t*-value, and corresponding *P*-values are given. For those characters with unequal variances (i.e., *F*-test $P < 0.001$), an unequal variance *t*-statistic (Welch test) is presented. Range (first line), mean \pm standard deviation or range (second line), and *n* (third line) are given for quantitative characters.

Character	<i>S. torquatus</i>	<i>S. crassicaudatus</i>	<i>F</i> -value	<i>P</i>	<i>t</i> -value	<i>P</i>
Scales around midbody	102–137 116.96 \pm 8.21 46	97–121 108.87 \pm 5.99 31	1.753	0.107	4.861	<0.001
Vertebrales	83–115 98.86 \pm 7.94 43	83–97 89.80 \pm 3.74 31	4.618	<0.001	6.511	<0.001
Paravertebrales	103–151 124.05 \pm 12.17 43	107–166 126.67 \pm 12.21 31	1.067	0.834	–0.672	0.504
Gulars	47–67 54.09 \pm 4.58 46	44–55 49.57 \pm 2.73 31	2.201	0.025	5.093	<0.001
Supraoculars	6–8 7 47	6–8 6 31	1.552	0.176	–0.203	0.840
Internasals	4–6 4 46	4–7 6 30	3.032	<0.001	–7.222	<0.001
Subdigitals finger IV	22–29 25.76 \pm 1.49 46	23–32 28.53 \pm 1.80 31	2.014	0.033	–6.226	<0.001
Subdigitals toe IV	26–32 28.96 \pm 1.55 45	26–38 33.00 \pm 2.86 31	3.510	<0.001	–6.857	<0.001
Tail length/total length	0.47–0.54 0.51 \pm 0.02 26	0.57–0.62 0.59 \pm 0.01 17	1.453	0.442	–15.494	<0.001
Maximum SVL males	84	95				
Maximum SVL females	74	85				
Posthumeral pocket	wrinkle	wrinkle				
Postfemoral pocket	moderate	moderate				
Black antehumeral collar	present	absent				
Dorsal background color	dark brown, grey or emerald green	dark brown or grey				

ventral surface of hind limbs cream with irregular black markings; tail cream ventrally and grey dorsally with dark rings approximately two scales wide; tail darker distally.

The coloration in *Stenocercus torquatus* varies ontogenetically. The dark antehumeral collar and 2–3 shorter transverse bands anterior to it (Fig. 3) are present in juveniles of both sexes. They are retained in adult males, whereas females gradually lose them with age. A similar condition is present in other species of *Stenocercus*, such as *S. chota* (Torres-Carvajal, 2000) and *S. puyango* (Torres-Carvajal, 2005). However, in these species females and not males retain the neonatal color patterns. In addition, both sexes of *S.*

torquatus have the ability to change their dorsal background color from emerald green to dark brown or grey, for which it has received the local name of “camaleón.” This ability to change colors has not been reported previously for any other species of *Stenocercus*. During color change, the pale spots on the body and yellow eyelids are retained. Color change was observed immediately after capture suggesting that it occurs as a response to stressful situations. The green coloration blends into the color of the mosses and ferns where individuals were found. Although not observed, the dark coloration might provide camouflage against dark backgrounds, such as tree trunks or rocks.

TABLE 2.—Sexual variation in scutellation and measurements (mm) of *Stenocercus torquatus* with *F*-values, *t*-values, and corresponding *P*-values. Range (first line), mean \pm standard deviation (second line), and *n* (third line) are given.

Character	Males	Females	<i>F</i> -value	<i>P</i>	<i>t</i> -value	<i>P</i>
Scales around midbody	103–129	103–137	1.725	0.216	0.278	0.782
	117.59 \pm 7.27	116.88 \pm 9.54				
	27	16				
Vertebrales	83–115	85–114	1.037	0.906	–0.575	0.568
	98.48 \pm 7.68	99.93 \pm 7.82				
	25	15				
Paravertebrales	103–149	112–151	1.192	0.749	–1.060	0.296
	122.88 \pm 12.47	127.07 \pm 11.42				
	25	15				
Gulars	47–67	48–62	2.865	0.037	0.662	0.512
	54.48 \pm 5.39	53.50 \pm 3.18				
	27	16				
Supraoculars	6–7	6–8	2.386	0.050	0.437	0.665
	6.70 \pm 0.47	6.63 \pm 0.72				
	27	16				
Internasals	4–5	4–5	1.582	0.357	0.834	0.409
	4.23 \pm 0.43	4.13 \pm 0.34				
	26	16				
Subdigitals finger IV	22–29	23–29	1.649	0.255	0.211	0.834
	25.85 \pm 1.38	25.75 \pm 1.77				
	27	16				
Subdigitals toe IV	26–32	27–31	1.146	0.737	0.046	0.963
	28.89 \pm 1.45	28.87 \pm 1.55				
	27	15				
Tail length/total length	0.49–0.54	0.47–0.52	1.676	0.426	3.577	0.002
	0.52 \pm 0.01	0.49 \pm 0.02				
	14	8				
Maximum SVL	84	74				

Natural history.—One adult female (AMNH 23151, SVL = 59 mm) contained two eggs. The sizes of these eggs are 18.12 mm \times 8.12 mm and 17.5 mm \times 8.12 mm; their volumes were 625.56 mm³ and 604.16 mm³, respectively. The smallest individual (MTD 46294) was collected on 10 July 2004 and has a total length of 71 mm (SVL = 35 mm, TL = 36 mm).

Distribution and ecology.—*Stenocercus torquatus* inhabits the Chanchamayo Valley and surroundings on the eastern slopes of the Andes in central Peru (Fig. 4). It occurs at elevations of 800–1800 m in departamentos Junín (provincias Chanchamayo and Junín) and Pasco (provincia Oxapampa). The distribution lies within the Selva Alta (400–1000 m) and Yungas (500–2300 m) ecoregions (Brack, 1986; Peñaherrera del Aguila, 1989). Specimens of *S. torquatus* were found between approximately 1–4 m on tree trunks, and some juveniles were observed at higher distances on trees, suggesting that this species is mainly

arboreal. *Stenocercus torquatus* is sympatric with *S. boettgeri*, *S. formosus*, and *S. scapularis* at María Teresa in departamento Pasco. *Stenocercus variabilis* occurs allopatrically at higher elevations (>2500 m) in departamento Junín (Fritts, 1974). Intensive agriculture (coffee plantations), cattle breeding, and uncontrolled deforestation threaten the habitat of these species.

DISCUSSION

Ortiz (1989) designated a juvenile (MHNN 2267) as lectotype of *Stenocercus crassicaudatus*. This specimen lacks the distinctive black collar and nuchal transverse bands (B. Mulhauser, personal communication) of *S. torquatus*; therefore, we conclude that it belongs to the same species as the specimens from Cusco examined in this study. Ortiz (1989) referred to the type locality of *S. crassicaudatus* (Urubamba [departamento Cusco]) given by Tschudi (1846) as an error because “it is far



FIG. 3.—*S. torquatus*, MTD 45921, male, 74 mm SVL; ac = antehumeral collar; nb = nuchal transverse bands.

from the places that Tschudi visited in Peru”; consequently, he restricted the type locality to “surroundings of Rio Perené (departamento Junín)” (Ortiz, 1989). In this study, we conclude that *S. crassicaudatus* is restricted to departamentos Cusco and *S. torquatus* to departamentos Junín and Pasco. Therefore, we accept Tschudi’s (1846) designation of “Urubamba (departamento Cusco), Peru” as the type locality of *S. crassicaudatus*.

In their checklist of South American lizards at the American Museum of Natural History collection, Burt and Burt (1931) synonymized *Stenocercus torquatus* with *S. crassicaudatus* and mentioned that there was much variation in coloration and scutellation within “*S. crassicaudatus*.” Interestingly, this was not questioned by subsequent workers (e.g., Fritts, 1974; Peters and Donoso-Barros, 1970), even though all AMNH specimens in Burt and Burt’s (1931) checklist correspond to *S. torquatus*. Indeed, the black scapular “bars” of some specimens of “*S. crassicaudatus*” reported by Burt and Burt (1931) correspond to the antehumeral collar and nuchal black transverse bands that distinguish *S. torquatus* from *S. crassicaudatus* (Fig. 3). Fritts (1974) noted some differences between specimens of “*S. crassicaudatus*” from departamentos Junín

(i.e., *S. torquatus*) and Cusco, but referred to it as intraspecific variation. Although these two species are similar morphologically (Table 1), *S. crassicaudatus* has significantly fewer scales around midbody (t -test, $t = 4.861$, $df = 75$, $P < 0.001$), fewer vertebrales ($t = 6.511$, $df = 72$, $P < 0.001$), fewer gulars ($t = 5.093$, $df = 75$, $P < 0.001$), more internasals ($t = -7.222$, $df = 74$, $P < 0.001$), more subdigitals on finger IV and toe IV ($t = -6.226$, $df = 75$, $P < 0.001$, and $t = -6.857$, $df = 74$, $P < 0.001$, respectively), and a longer tail ($t = -15.494$, $df = 41$, $P < 0.001$). In addition, *S. crassicaudatus* has dark brown or grey dorsal background with black spots (*S. torquatus* changes colors between green and grey or brown) and lacks a distinct black collar or nuchal bands.

Fritts (1974) reported “*Stenocercus crassicaudatus*” from departamentos Loreto and San Martín based on examination of a neonate (AMNH 57176, SVL = 31 mm, TL = 35 mm) and a subadult male (AMNH 57173, SVL = 65 mm, TL = 65 mm), respectively. Because these two specimens are more similar morphologically to *S. torquatus*, we conclude that *S. crassicaudatus* is restricted to departamento Cusco. In the absence of a reasonable sample from Loreto and San Martín that includes

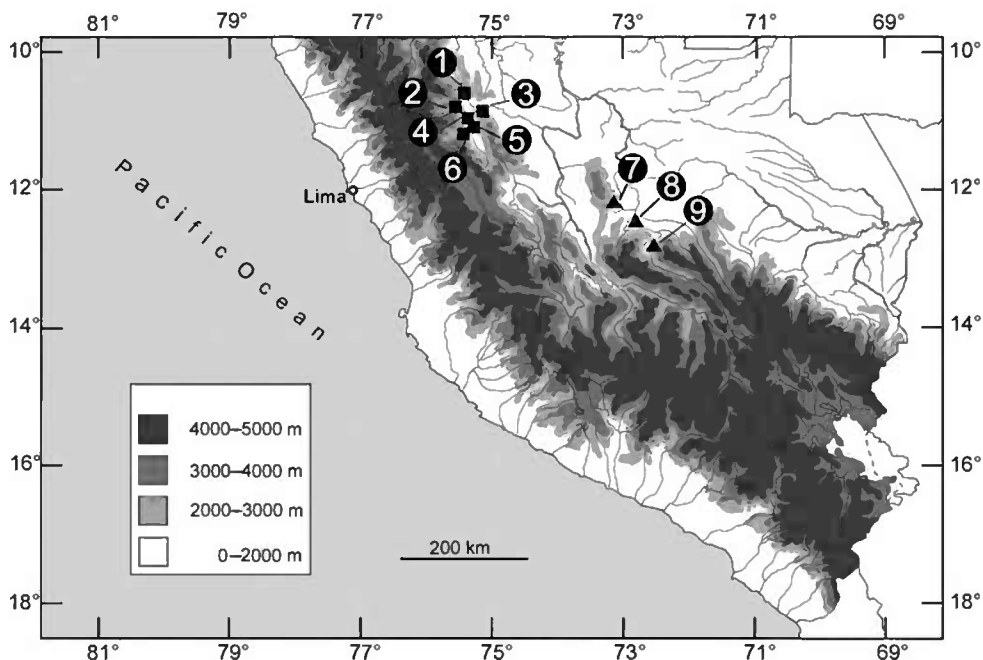


FIG. 4.—Distribution of *Stenocercus crassicaudatus* (triangles) and *S. torquatus* (squares); 1 = María Teresa; 2 = Llaupi; 3 = Perené; 4 = La Merced; 5 = San Ramón; 6 = Huacapistana; 7 = Río Cosireni; 8 = Santa Ana; 9 = Machu Picchu.

adult specimens with data on coloration, we consider *S. torquatus* to be restricted to the Chanchamayo Valley and adjacent areas in departamentos Junín and Pasco. In addition, Fritts (1974) reported two specimens of “*S. crassicaudatus*” from Yungas de Cochabamba, departamento Cochabamba, Bolivia. We could not find this exact locality in any maps or Gazetteers, although there are several localities around Cochabamba that start with “Yungas de.” These specimens (UMMZ 68115) form part of a collection from departamento Cochabamba made by F. B. Steinbach between 1926–1929, which includes specimens of *S. marmoratus* and *S. roseiventris* that are well known to occur in this area (Torres et al., 2000). As noted by Fritts (1974), the UMMZ specimens differ from “*S. crassicaudatus*” in having fewer scales (85–92 around the midbody (97–121 in *S. crassicaudatus* and 102–137 in *S. torquatus*). Moreover, the caudals and the scales on the dorsal surface of hind limbs of these specimens lack projected mucrons as in *S. crassicaudatus* and *S. torquatus*. Therefore, we conclude that Yungas de Cochabamba is a valid locality, but we

prefer to refer to the UMMZ specimens as an undescribed species of *Stenocercus*.

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LITERATURE CITED

- BOULENGER, G. A. 1885. Catalogue of the Lizards in the British Museum (Natural History), Vol. 2. Taylor and Francis, London, U.K.
- BRACK, A. 1986. Las Ecoregiones del Perú. Boletín de Lima 44:57–70.
- BURT, C. E., AND M. D. BURT. 1931. South American lizards in the collection of the American Museum of Natural History. Bulletin of the American Museum of Natural History 61:227–395.

- CADLE, J. E. 1991. Systematics of lizards of the genus *Stenocercus* (Iguania: Tropiduridae) from northern Perú: new species and comments on relationships and distribution patterns. *Proceedings of the Academy of Natural Sciences of Philadelphia* 143:96.
- . 1998. New species of lizards, genus *Stenocercus* (Iguania: Tropiduridae), from western Ecuador and Peru. *Bulletin of the Museum of Comparative Zoology* 155:257–297.
- . 2001. A new species of lizard related to *Stenocercus caducus* (Cope) (Squamata: Iguanidae) from Peru and Bolivia, with a key to the “*Ophryossoides* Group.” *Bulletin of the Museum of Comparative Zoology* 157: 183–222.
- DUCELLMAN, W. E., E. LEHR, D. RODRÍGUEZ, AND R. VON MAY. 2004. Two new species of marsupial frogs (Anura: Hylidae: *Gastrotheca*) from the Cordillera Oriental in Central Peru. *Scientific Papers University of Kansas Museum of Natural History* 32:1–10.
- DUMERIL, A. M., AND G. BIBRON. 1837. *Erpétologie Générale ou Histoire Naturelle Complète des Reptiles*. Librairie Encyclopedique de Roret, Paris, France.
- FRITTS, T. H. 1972. New species of lizards of the genus *Stenocercus* from Perú (Sauria: Iguanidae). *Occasional Papers University of Kansas Museum of Natural History* 10:1–21.
- . 1974. A multivariate and evolutionary analysis of the andean iguanid lizards of the genus *Stenocercus*. *San Diego Society of Natural History Memoir* 7:1–89.
- FRITZ, U. 2002. Herpetology and herpetological type specimens at the Museum für Tierkunde Dresden with a bibliography of herpetological contributions by Fritz Jürgen Obst (Amphibia, Reptilia). *Faunistische Abhandlungen, Staatliches Museum für Tierkunde Dresden* 23:3–34.
- FROST, D. R. 2004. *Amphibian Species of the World: an Online Reference*. Version 3.0 (22 August, 2004). Electronic Database available at <http://research.amnh.org/herpetology/amphibia/index.html>. American Museum of Natural History, New York, New York, U.S.A.
- HAMMER, Ø., D. A. T. HARPER, AND P. D. RYAN. 2004. PAST – Palaeontological Statistics. Version 1.27, Available from: <<http://folk.uio.no/ohammer/past>>.
- LEHR, E. 2002. Amphibien und Reptilien in Peru. Die Herpetofauna entlang des 10. Breitengrades von Peru: Arterfassung, Taxonomie, Ökologische Bemerkungen und Biogeographische Beziehungen. Natur und Tier-Verlag, Münster, Germany.
- LEHR, E., C. AGUILAR, AND W. E. DUCELLMAN. 2004a. A striking new species of *Eleutherodactylus* from Andean Peru (Anura: Leptodactylidae). *Herpetologica* 60:275–280.
- LEHR, E., C. AGUILAR, AND M. LUNDBERG. 2004b. A new species of *Phyllonastes* from Peru (Amphibia, Anura, Leptodactylidae). *Journal of Herpetology* 38:214–218.
- LEVITON, A. E., R. H. GIBBS, JR., E. HEAL, AND C. E. DAWSON. 1985. Standards in herpetology and ichthyology: Part I. Standard symbolic codes for institutional resource collections in herpetology and ichthyology. *Copeia* 1985:802–832.
- ORTIZ, J. C. 1989. Catalogue des types du musée d'histoire naturelle de Neuchâtel III. Sauriens. *Bulletin de la Société Neuchâteloise des Sciences Naturelles* 112:47–64.
- PENAHERRERA DEL AGUILA, C. 1989. Atlas del Perú. Instituto Geográfico Nacional, Lima, Peru.
- PETERS, J. A., AND R. DONOSO-BARROS. 1970. Catalogue of the Neotropical Squamata. Part 2, Lizards and amphisbaenians. *United States National Museum Bulletin* 297:1–293.
- STEPHENS, L., AND M. A. TAYLOR. 1983. Ornithological gazetteer of Peru. *Museum of Comparative Zoology Harvard University, Cambridge, Massachusetts, U.S.A.*
- TORRES, S., G. J. SCROCCHI, AND M. B. HARVEY. 2000. The South American tropidurid lizard *Stenocercus marmoratus*: redescription, distribution, and natural history. *Journal of Herpetology* 34:129–134.
- TORRES-CARVAJAL, O. 2000. Ecuadorian lizards of the genus *Stenocercus* (Squamata: Tropiduridae). *Scientific Papers University of Kansas Museum of Natural History* 15:1–38.
- . 2004. The abdominal skeleton of tropidurid lizards (Squamata: Tropiduridae). *Herpetologica* 60:75–83.
- . 2005. A new species of iguanian lizard (*Stenocercus*) from the western lowlands of southern Ecuador and northern Peru. *Herpetologica* 61:78–85.
- TSCHUDI, J. J. VON. 1846. *Herpetologie*. Pp. 1–80. In J. J. von Tschudi (Ed.), *Untersuchungen über die Fauna Peruana auf einer Reise in Peru während den Jahren 1838–1842*. Scheitlin & Zollikofer, St. Gallen, Switzerland.

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APPENDIX I

Specimens Examined

Stenocercus crassicaudatus.—PERU: DEPARTAMENTO CUSCO: Huadquiña (13° 7' S, 72° 39' W), 2027 m, USNM 49550; Machu Picchu, 2404 m, KU 133955–71, 139264–66, 163596–601; Río Cosireni, near Yuvini, 1500 m, USNM 60731–32; Santa Ana, 1060 m, USNM 60725.

Stenocercus torquatus.—PERU: DEPARTAMENTO JUNÍN: Chanchamayo, AMNH 23152–53, 56415, 57171, 57177, FMNH 40619–20, 45481–83, MCZ 8081, 45882; La Merced (11° 3' S, 75° 19' W), AMNH 57172; Llaupi (10° 45' 01" S, 75° 31' 32" W), 1400 m, MTD 45921; Perene, 1000–1500 m, AMNH 23126–31, 23133, 23137–39, 23143–44, 23146, 23151, 23188, MCZ 29303–04; San Ramón, 800–1000 m, FMNH 40622–24; Valle Chanchamayo, 800 m, FMNH 134451; DEPARTAMENTO PASCO: María Teresa, 19 km on road Oxapampa-Llaupi (10° 42' 05" S, 75° 27' 22" W), 1470 m, MHNSM 19949–54, MTD 46289–46294.

Stenocercus sp.—BOLIVIA: DEPARTAMENTO COCHABAMBA: Yungas de Cochabamba, UMMZ 68115 (2 specimens).