

A new species of *Stenocercus* (Squamata, Iguania) from central-western Brazil with a key to Brazilian *Stenocercus*

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Abstract

A new species of *Stenocercus* (Squamata, Iguania) from central-western Brazil with a key to Brazilian *Stenocercus*. A new species of *Stenocercus* from central-western Brazil differs from other *Stenocercus* by the following combination of characters: head and body scales strongly keeled, posthumeral and postfemoral mite pockets absent, nostrils laterally oriented, supraciliary scales not enlarged or projected, and caudal fracture planes absent. Morphologically, the new species more closely resembles *S. prionotus* and *S. caducus*. The latter species has been reported in Brazil based on misidentified specimens from Mato Grosso that correspond to the new species described herein. However, it is very likely that *S. caducus* occurs in Brazil because it has been reported from geographically close areas. Therefore, I recognize seven species of *Stenocercus* from Brazil and provide a dichotomous key to assist in the identification of specimens.

Keywords: Squamata, Iguania, *Stenocercus sinesaccus* sp. nov., central-western Brazil.

Introduction

The neotropical lizard genus *Stenocercus* Duméril and Bibron (1837) includes more than 50 species that occur mostly in the Andes and adjacent lowland areas from northern Colombia and Venezuela to central Argentina. More than half of the species of *Stenocercus* (Iguanidae of Macey *et al.* 1997, Tropiduridae of Frost *et al.* 2001, Tropidurinae/Tropidurini of Schulte *et al.* 2003) occur in Peru, where many new species

continue to be discovered (Fritts 1972, Cadle 1991, 1998, 2001, Lehr 2002, Torres-Carvajal 2005a, b). In contrast, only seven species have been recorded for Brazil. Ávila-Pires (1995) reported *S. dumerilii*, *S. fimbriatus*, and *S. roseiventris* for Brazilian Amazonia; however, Ávila-Pires (1995) reported *S. roseiventris* for Acre based only on the account provided by R. Etheridge in Peters and Donoso-Barros (1970), which does not list voucher specimens. I confirm the presence of *S. roseiventris* in Brazil based on specimen MCZ 133219 collected in the upper valley of Purus river, Acre. Two additional species were reported from southern Brazil - *S. azureus* and *S. pectinatus* (Peters and

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Donoso-Barros 1970, Cei 1993) - although no verified records of *S. pectinatus* from this area are available (Avila 1999). *Stenocercus tricristatus* was described from Brazil without specific locality data (Duméril 1851), but it is possible that this species occurs in Minas Gerais (Ávila-Pires 1995). Finally, *S. caducus* has been reported repeatedly from Mato Grosso (Cope 1887, Boulenger 1903, Peters and Donoso-Barros 1970, Cei 1993) based on misidentified specimens that correspond to a new species described herein.

Materials and Methods

This description is based upon examination of four specimens deposited in the herpetological collections of the Academy of Natural Sciences of Philadelphia (ANSP), British Museum of Natural History in London (BMNH) and Museum of Comparative Zoology in Cambridge (MCZ). Specimens of other species of *Stenocercus* examined in this study are listed in Appendix I. Snout-vent length (SVL) and tail length (TL) measurements were taken with a ruler and recorded to the nearest millimeter. All other measurements were made with digital calipers and recorded to the nearest 0.1 mm. Sex was determined by noting the presence of hemipenes. X-ray radiographs were taken with a FTI Corporation Unit at 5 mA and 50 kV for 40–50 s using Kodak's Industrex SR-1 film. I followed the terminology of Cadle (1991) and Torres-Carvajal (2000, 2004) for characters included in the description.

Stenocercus sinesaccus sp. nov.

Stenocercus caducus; Cope, 1887:55; Peters and Donoso-Barros (part), 1970:213; Cei (part), 1993:302.

Holotype - BMNH 1903.3.26.7, an adult male, from Chapada [Chapada dos Guimarães, 15°26' S, 55°45' W, 690 m], Mato Grosso, Brazil, collected by M. A. Robert.

Paratopotypes - ANSP 12947 (adult male), 12948 (adult female), collected by H. H. Smith;

MCZ 171198 (formerly BMNH 1903.3.26.9, adult male), same data as holotype.

Diagnosis - *Stenocercus sinesaccus* (Figure 1) differs from all other species of *Stenocercus* except *S. caducus*, *S. dumerilii*, *S. prionotus*, and *S. tricristatus* in having strongly keeled and mucronate body scales, laterally oriented nostrils, and in lacking a postfemoral mite pocket. It differs from *S. caducus* and *S. prionotus* in lacking a posthumeral mite pocket; the latter two species have a deep posthumeral mite pocket covered by an axillary flap (Figure 2; Cadle 2001). In addition, *Stenocercus sinesaccus* lacks caudal fracture planes, a condition only shared by *S. dumerilii*, *S. scapularis*, and *S. tricristatus*. The new species differs from *S. dumerilii* and *S. tricristatus* in lacking enlarged post-supraciliaries (Ávila-Pires 1995); *S. scapularis* differs from *S. sinesaccus* in having a distinct postfemoral mite pocket and projected supraciliaries.

Characterization - (1) Maximum total length in males 257 mm (N = 3); (2) maximum total length in females 272 mm (N = 1); (3) vertebrals 28–30; (4) paravertebrals 32–34; (5) scales around midbody 31–34; (6) supraoculars 4; (7) internasals 6; (8) postrostrals 4–5; (9) loreals 3; (10) gulars 12–14; (11) lamellae on Finger IV 13–16; (12) lamellae on Toe IV 23–25; (13) posthumeral pocket absent; (14) postfemoral pocket absent; (15) parietal eye visible; (16) occipital scales large, imbricate, strongly keeled; (17) one enlarged, non-projected angulate temporal; (18) row of enlarged supraoculars absent; (19) scales on frontonasal region imbricate; (20) preauricular fringe absent; (21) neck folds absent; (22) lateral and dorsal nuchals similar in size; (23) posterior gulars in adults keeled, imbricate, mucronate, not notched; (24) lateral and dorsal body scales similar in size; (25) vertebral crest prominent; (26) dorsolateral crest present; (27) ventrals in adults keeled, imbricate, mucronate; (28) scales on posterior surfaces of thighs keeled, imbricate, mucronate; (29) prefemoral fold absent; (30)



Figure 1 - Dorsal (top) and ventral (bottom) views of *Stenocercus sinesaccus* sp. nov. Holotype, BMNH 1903.3.26.7, male, 73 mm SVL.

inguinal groove absent; (31) preanals projected; (32) tail not strongly compressed laterally in adult males; (33) tail length 72–73% of total length; (34) caudal fracture planes absent; (35) caudals not spinose; (36) dark stripe extending anterodorsally from subocular region to supraciliaries in males; (37) gular region of adult females cream; (38) gular region of adult males cream; (39) black blotch on ventral surface of neck in adult males absent; (40) thin black or dark brown midventral line absent; (41) black patch on ventral surface of thighs absent; (42) background color of dorsum in males brown in preservative; (43) postxiphisternal inscriptional ribs in contact medially (Pattern 6A of Torres-Carvajal 2004). Sexual variation in measurements and scale counts are presented in Table 1.

Description of holotype - Male (Figures 1 and 3); SVL = 73 mm; TL = 184 mm; maximum head width = 12.5 mm; head length = 17.4 mm; head height = 10.5 mm; occipitals, parietals, interparietal, and postparietals large, strongly keeled, imbricate; parietal eye visible; supraoculars in four rows, keeled, imbricate; canthal single, separated from nasal by a tiny scale; scales in frontonasal region keeled, imbricate; internasals six, the two medialmost as long as

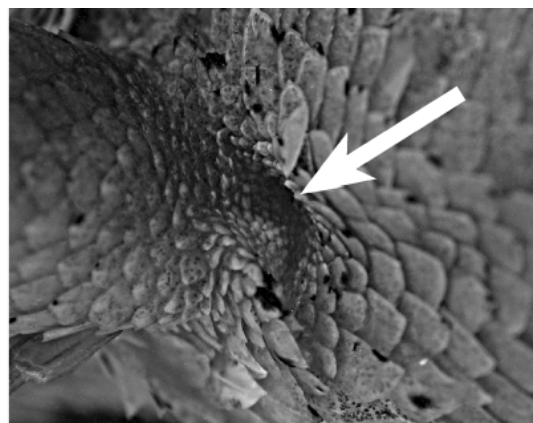


Figure 2 - Left axillae of *Stenocercus sinesaccus* sp. nov. (left, holotype, BMNH 1903.3.26.7) and *Stenocercus caducus* (right, UTA 38046) in lateral view. Posthumeral mite pocket in *S. caducus* is indicated by white arrow.

Table 1 - Sexual variation in scutellation and measurements (mm) of *Stenocercus sinesaccus* sp. nov. Range followed by mean \pm standard deviation is given for quantitative characters if applicable.

CHARACTER	Males (N = 3)	Female (N = 1)
Scales around midbody	31 – 34 (32.33 \pm 1.53)	33
Vertebrales	28 – 30 (28.67 \pm 1.15)	28
Paravertebrals	32 – 34 (33.33 \pm 1.15)	33
Gulars	12 – 14 (12.67 \pm 1.15)	14
Supraoculars	4	4
Internasals	6	6
Subdigitals Finger IV	15 – 16 (15.67 \pm 0.58)	13
Subdigitals Toe IV	23 – 24 (23.33 \pm 0.58)	25
Tail length/total length	0.70 – 0.73 (0.72 \pm 0.02)	0.70
Maximum SVL	73	81

wide, and the four lateralmost more than two times longer (longitudinally) than wide; postrostrals four, more than two times wider than high; supralabials four, keeled, more than three times longer than high; infralabials five, keeled, more than three times longer than high; loreals three, keeled; lorilabials in one row, keeled; preocular in contact with canthal; lateral temporals imbricate, keeled; gulars in 12 rows between tympanic openings; all gulars strongly keeled, imbricate, without apical pits or caudal notches; second infralabial in contact with first three sublabials; mental in contact with first pair of infralabials and first pair of postmentals; dorsal and lateral scales of body and neck keeled, imbricate, mucronate; scales around midbody 31; vertebrales 28, about 1.5 times larger than adjacent paravertebrals, forming a prominent serrate crest; paravertebrals 34; ventrals keeled, imbricate, mucronate; preauricular fringe absent; neck and body folds absent; limb scales keeled, imbricate; lamellae on Finger IV 15; lamellae on Toe IV 23; tail not compressed laterally; caudals and subcaudals keeled, imbricate; vertebral crest extending less than half length of tail; tail length 2.5 times SVL; posthumeral (Figure 2) and postfemoral pockets absent (Type 1 of Cadle 1991); postxiphisternal inscriptional ribs I-III in

contact medially (pattern 6A of Torres-Carvajal, 2004); caudal fracture planes absent.

Color in preservative of holotype - Dorsum of head and body light brown; subocular and loreal regions whitish cream; dark brown bar extending anterodorsally from commissure of mouth to eye; gular and ventral surfaces golden brown; ventrolateral edges (approximately two scales wide) of body between hind and fore limbs iridescent pink; tail with alternating dark and light brown rings.

Natural History - Data on natural history was not available for the specimens examined. Scrocchi *et al.* (1985) reported that the brown background color of *S. caducus* provides camouflage against the substrate (e.g., leaf litter, tree trunks). This is probably the case for *Stenocercus sinesaccus* sp. nov., which also has a brown background color. In addition, Scrocchi *et al.* (1985) described a very interesting defense behavior in *S. caducus*. They observed individuals of this species that remained immobile after adopting a position in which the pink ventrolateral edges of the body between fore and hind limbs were displayed. Moreover, as part of this behavior, the snout was moved downwards



Figure 3 - Dorsal (top), lateral (middle), and ventral (bottom) views of the head of *Stenocercus sinesaccus* sp. nov. Holotype, BMNH 1903.3.26.7, male. Scale bars = 5 mm.

giving the lizard the appearance of being dead (Scrocchi *et al.* 1985). Given that the ventrolateral edges of the body between fore and hind limbs in *S. sinesaccus* also are pink, it is very likely that this species adopts the same defense behavior as *S. caducus*.

Distribution - *Stenocercus sinesaccus* sp. nov. is known only from its type locality, Chapada dos Guimarães, 15°26' S, 55°45' W, 690 m, Mato Grosso, Brazil (Figure 4). This city lies within the Cerrado (savanna) Biome and is part of the Chapada dos Guimarães National Park.

Etymology - The epithet *sinesaccus* is derived from the Latin words *sine*, meaning “without” and *saccus*, meaning “pocket, bag.” This name refers to the absence of mite pockets in *S. sinesaccus*, a trait that distinguishes this species from the morphologically similar *S. prionotus* and *S. caducus* (Figure 2).

Discussion

Presence of *Stenocercus caducus* in Brazil remains to be confirmed. Cope (1887) provided the first record of *S. caducus* for Brazil based upon examination of specimens collected by H. H. Smith at or near the “village of Chapada, 30 miles northeast of Cuiabá” (Cope 1887, Vanzolini 1953). This locality seems to correspond to Chapada dos Guimarães, the type locality of the new species herein described. I have examined these specimens and they correspond to the new species described in this paper, which means that Cope (1887) misidentified the two specimens from Mato Grosso as *S. caducus*, a species described 25 years earlier by himself (Cope 1862). This is not surprising because, in his description of *S. caducus*, Cope (1862) did not mention the presence of a deep posthumeral mite pocket, which has later been recognized as a very important taxonomic character (Cadle 2001). I have confirmed the presence of a deep posthumeral mite pocket in the holotype of *S. caducus* (USNM 5852). This structure is absent in the specimens from Mato Grosso examined in this study. In addition, *Stenocercus sinesaccus* sp. nov. has relatively larger scales than *S. caducus*, which is reflected in differences in scale count numbers between these two species (Table 2). The second and only other voucher-based record of *S. caducus* for Mato Grosso was



Figure 4 - Distribution of *Stenocercus sinesaccus* sp. nov.

provided by Boulenger (1903) based on specimens collected in the Percy Sladen expedition to central Brazil by M. A. Robert. These specimens include the holotype and one of the paratypes of *Stenocercus sinesaccus* sp. nov. Later reports of *S. caducus* from Brazil (e.g., Peters and Donoso-Barros 1970, Cei 1993) do not refer to any voucher specimens and are probably based on Cope's (1887) and Boulenger's (1903) accounts. Etheridge (1966) and Gallardo (1959) did not report *S. caducus* from Brazil as suggested by Scrocchi *et al.* (1985). Therefore, the presence of *S. caducus* in Brazil has not been verified, although its occurrence in this country seems likely because it has been reported in Bolivia near the Brazilian border (Cadle 2001).

Cei (1986, 1993) reported *S. pectinatus* from Brazil without reference to voucher specimens. A recent study on the distribution of *S. pectinatus* suggests that these records are mistaken (Avila 1999); therefore, I question the presence

of this species in Brazil in the absence of voucher specimens. Accordingly, I currently recognize seven species of *Stenocercus* from Brazil - *S. azureus*, *S. caducus*, *S. dumerilii*, *S. fimbriatus*, *S. roseiventris*, *S. sinesaccus*, and *S. tricristatus* (Table 2) - although more new species remain to be described (e.g., Ávila-Pires *et al.* 1999).

Key to the species of *Stenocercus* of Brazil


1. Ventral scales smooth, caudal scales with strongly projected mucrons *S. roseiventris*
 Ventral scales keeled, caudal scales not mucronate 2
2. Posthumeral mite pocket present 3
 Posthumeral mite pocket absent 4
3. Axillary flap covering posthumeral mite pocket, dorsal scales strongly keeled, no enlarged supraoculars *S. caducus*
 No axillary flap, dorsal scales weakly keeled, one longitudinal row of enlarged supraoculars *S. fimbriatus*

Table 2 - Summary of morphological characters and measurements (mm) of Brazilian species of *Stenocercus*. Range followed by mean \pm standard deviation is given for quantitative characters. Range followed by mode is given for internasals and supraoculars. Sample size (N) is given at the top of each column or in parenthesis when it varied for individual measurements. Data for *S. caducus*, *S. dumerilii*, and *S. fimbriatus* were mostly taken from the literature (Ávila-Pires 1995, Cadle 2001). Data for *S. tricristatus* are based on the holotype (male, MNHN 6825) and were kindly provided by R. Etheridge.

CHARACTER	<i>S. azureus</i> N = 6	<i>S. caducus</i> N = 43	<i>S. dumerilii</i> N = 33	<i>S. fimbriatus</i> N = 33	<i>S. roseiventris</i> N = 36	<i>S. sinesaccus</i> N = 4	<i>S. tricristatus</i> N = 1
Scales around midbody	33-39 35.8 \pm 2.48	34-44 38.2 \pm 2.10	41-50 45.3 \pm 2.50	39-51 43.8 \pm 7.83	55-82 69.8 \pm 7.39	31-34 32.5 \pm 1.29	33
Vertebrales	30-37 33.8 \pm 2.48	30-43 35.9 \pm 5.59	24-30 26.9 \pm 1.50	37-52 43.7 \pm 3.24	44-66 53.2 \pm 5.01	28-30 28.5 \pm 1.00	22
Gulars	13-19 17.5 \pm 2.51	16-23 18.6 \pm 1.41	15-20 (17) 16.58 \pm 1.44	17-25 20.1 \pm 2.29	24-32 27.9 \pm 2.12	12-14 13.0 \pm 1.15	—
Internasals	4-5 4	6-7 7	6-7 (17) 6	4-7 6	4-6 5	6	—
Supraoculars	5	4-6 5	3-5 (17) 4	4-6 4	5-7 6	4	—
Subdigitals	10-14	15-21	12-18	14-18	13-20	13-16	16
Finger IV	12.7 \pm 1.51	17.6 \pm 1.16	14.8 \pm 1.10	16.1 \pm 0.83	15.8 \pm 1.78	15.0 \pm 1.41	19
Subdigitals	16-23	23-30	18-24	22-26	17-24	23-25	19
Toe IV	19.5 \pm 2.66	26.0 \pm 1.59	20.6 \pm 1.30	23.4 \pm 1.17	20.7 \pm 1.57	23.7 \pm 0.96	—
Posthumeral pocket	Absent	Present	Absent	Present	Present	Absent	Absent
Postfemoral pocket	Absent	Absent	Absent	Absent	Present	Absent	Absent
Caudal fracture planes	Present	Present	Absent	Present	Present	Absent	Absent
Tail/Total length	0.64 (1)	0.69-0.73 (21) 0.70 \pm 0.01	0.53-0.58 (15) 0.55 \pm 0.01	0.64-0.67 (8) 0.66 \pm 0.01	0.49-0.57 (16) 0.52 \pm 0.02	0.70-0.73 (4) 0.72 \pm 0.02	0.63 (1)
Maximum SVL males	59	72	100	74	99	73	60
Maximum SVL females	83	93	109	91	96	81	—

4. Post-supraciliary enlarged 5
 Post-supraciliary not enlarged 6
 5. Enlarged post-supraciliary distinctly pointed,
 two enlarged scales above ear opening
 *S. dumerilii*
 Enlarged post-supraciliary blunt, no enlarged
 scales above ear opening *S. tricristatus*
 6. Two distinct dorsolateral white or cream
 stripes, tail length less than twice snout-vent
 length, mental in contact with sublabials
 *S. azureus*
 No dorsolateral white stripes, tail length more
 than twice snout-vent length, mental not in
 contact with sublabials
 *Stenocercus sinesaccus* sp. nov.

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Appendix I - Specimens Examined

Stenocercus azureus.—BRAZIL: PARANÁ: Ponta Grossa, AMNH 131858; RIO GRANDE DO SUL: Cruz Alta, MCZ 133257; NO SPECIFIC LOCALITY: BMNH 85.2.3.3. URUGUAY: Cerro Largo, USNM 65535; SORIANO: BMNH 74.10.9.5; NO SPECIFIC LOCALITY: AMNH 17013.

Stenocercus caducus.—BOLIVIA: BENI: 6 km W Casarabe, 230 m, AMNH 143054; COCHABAMBA: 6.5 km N Chipiri, KU 133890; CHUQUISACA: Sud Cinti, trail from Rinconada Bufete to El Palmer, UTA 39102; SANTA CRUZ: Buena Vista, AMNH 37813–14, BMNH 1927.8.1.163, FMNH 16165, 21486, 21511, MCZ 20625, 29023; Chiquitos, Canton-El Cerro, Finca Dos Milanos, UTA 38046; Velasco, El Refugio, UTA 38047; Velasco, Inselburgs near Florida, UTA 38048; near Santiago, FMNH 195983; TARIJA: Villa Montes, KU 136354–55; NO SPECIFIC LOCALITY: BMNH 1946.8.29.76. PARAGUAY: Chaco, USNM 69874; ALTO PARA-

GUAY: Parque Nacional Defensores del Chaco, 15 km N Tribu Nueva, Cerro Leon, USNM 347911; Primavera, BMNH 1960.1.2.62; AMAMBAY: Parque Nacional Cerro Cora, ca. 32 km WSW Pedro Juan Caballero, USNM 342019–20; CAAGUAZU: Yhu, MCZ 34214–5; CANINDEYU: ca. 35 km NE Curuguaty, Colonia Chupa Pou, AMNH 143306–11; CENTRAL: Asunción, BMNH 94.3.14.4, FMNH 9496; Colonia Nueva Italia, FMNH 42281; ITAPUA: Parabel, KU 290963; PARAGUARI: Parque Nacional Ybycui, 1 km E Administración, USNM 342021; Parque Nacional Ybycui, Mirador, USNM 342022–23; NO SPECIFIC LOCALITY: USNM 5852 (**holotype**). NO LOCALITY DATA: SDSU 1689–90.

Stenocercus dumerilii.—BRAZIL: PARÁ: km 23 road to Maracanã, MPEG 6032, 6036, 6082–3, 6085, 6252, 6254, 7322–3, 7325, 7327–8; Igarape-Assu, BMNH 1904.7.26.5; Santa Rosa, road to Vigia, MPEG 7376, 7386.

Stenocercus fimbriatus.—PERU: LORETO: Iquitos, AMNH 56780, 56786–7, 56793; Iquitos region, Río Itaya, AMNH 56778–9, 56783–4; Mishuana, KU 212628; UCAYALI: Alto Purus, Igarape Champuia, Alto Curanja, MCZ 61226; Contamana, AMNH 56803; E of Contamana, on trail to Contaya, AMNH 56781–2; Pampa Hermosa, mouth of Rio Cushabatay, AMNH 56788, 56790–2, 56794–6, 56801–2; Utoquinia region, AMNH 56789, 56799, 56800; San Martín: La Pinita, Río Mixiollo, AMNH 56797–8; NO LOCALITY DATA: FMNH 56070.

Stenocercus roseiventris.—ARGENTINA: SALTA: Aguas Blancas, FML 1092; Angosto del Río Pescado, finca Yakúlica, FML 3644; Baritú, FML 1727; Finca Abra Grande, quebrada Tartagal, FML 1584; Macueta-Acambuco, FML 848; Río Blanco, ca. 6 km from Orán, FML 591; JUJUY: Parque Nacional Calilegua, FML 7640;

BOLIVIA: COCHABAMBA: Yungas de Cochabamba, USNM 94094; No specific locality: AMNH 6766. PERU: CUSCO: km 164 Paucartambo-Atalaya road, USNM 346178; Cashiriari-3, S of Camisea River, USNM 538336, 538338; Cordillera Vilcabamba, 12°39' S, 73°40' W, 870 m, AMNH 101384–5; Misión Coribeni, 24 km ENE Rosalina, KU 134156; Pagoreni on Camisea River, USNM 538339; San Martín-3, ca. 5 km N of the Camisea River, USNM 538337; HUANUCO: Río Llullapichis, 4–5 km upstream from Río Pachitea, Finca Panguana, KU 172194–5; LORETO: Monte Alegre, Río Pachitea, AMNH 57200; MADRE DE DIOS: Cusco Amazónico, 15 km E Puerto Maldonado, KU 194939, 204987, 207769, 207770, 209967, 214964, 214966–7, 214969, 220188; PUNO: 1 km W Yanahuaya, USNM 299525; NO SPECIFIC DEPARTMENT: Chanchamayo, 4000–6000 ft, AMNH 56309, 57167, 57170.