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RESEARCH ARTICLE

A new species of burrowing snake (Serpentes: Dipsadidae: *Apostolepis*) from the state of Mato Grosso, Central-West region of Brazil

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ABSTRACT. During a faunal rescue conducted at a hydroelectric power station constructed in a Cerrado savanna area in the state of Mato Grosso, a sample of five small stripe-patterned individuals of snakes of the genus *Apostolepis* Cope, 1862 document the existence of an undescribed species, which is named herein. The new species can be distinguished from its congeners by a combination of scale counts, number of maxillary teeth and color pattern. The new species is most similar to *Apostolepis borellii* Peracca, 1904, *A. lineata* Cope, 1887, *A. nelsonjorgei* Lema & Renner, 2004, *A. nigroterminata* Boulenger, 1896, *A. serrana* Lema & Renner, 2006 and *A. underwoodi* Lema & Campbell, 2017 in its coloration pattern. However, it is distinguished from these species by having a pair of triangular blotches covering portions of the third to sixth supralabials, a white nuchal collar, the shape of the fourth supralabial and the shape of the tip of tail, the number of supralabials in contact with parietals, the size of the anterior chinshields, the color pattern of the paraventral side, parietal and terminal scales, the width of dorsal stripes, and a distinct number of subcaudals. The new species occurs in areas within the Cerrado biome.

KEY WORDS. Biodiversity, Cerrado, Chapada dos Guimarães, Elapomorphini, taxonomy.

INTRODUCTION

The taxonomic history of the South American Dipsadinae genus *Apostolepis* Cope, 1862 has been rather confusing, and researchers have long recognized the lack of a comprehensive review of taxonomy and phylogenetic relationships in this genus (Ferrarezzi et al. 2005, Nogueira et al. 2012). The genus presently comprises 38 species (Curcio et al. 2011, Lema 2016, Cabral et al. 2017, Lema et al. 2017 and Uetz et al. 2018) distributed in five groups – *dimidiata*, *dorbignyi*, *flavotorquata*, *longicaudata* and *nigroterminata* (Nogueira et al. 2012). Additional groups were referred to by Lema (2003a), Martins and Lema (2015) and Lema and Renner (2016) – including *ambinigra*, *assimilis*, *lineata*, *nigrolineata*, *phillipsi*, *polylepis*, *quinquelineata* and a *borellii* group, which presently includes only *A. borellii* Peracca, 1904 and *A. underwoodi* Lema & Campbell, 2017. However, with the exception of the *ambinigra* (Lema and Martins 2016), *assimilis* (Ferrarezzi et al. 2005) and *dimidiata* groups (Nogueira et al. 2012), the remaining groups have not yet been formally described and we refrain from considering them.

Apostolepis is particularly speciose in Brazil, where 32 species have already been recorded (Costa and Bérnils 2018). Contributions to the taxonomy of these burrowing snakes in Central-West region of Brazil were initially made by Cope (1887),

who described two species – *Apostolepis lineata* and *A. vittata* – from the municipality of Chapada dos Guimarães, state of Mato Grosso. Subsequently, Koslowsky (1898) described *A. intermedia* from Miranda, state of Mato Grosso do Sul. A few years later, Peracca (1904) described *A. borellii* based on a specimen from Urucum massif, near Corumbá, Mato Grosso do Sul; Amaral (1925) described *A. rondoni* based on a specimen from "Matto Grosso" (=the former name of a huge region which presently comprises three Brazilian states: Mato Grosso do Sul, Mato Grosso, and Rondônia), and Prado (1942) described *A. goiasensis* based on a specimen from Rio Verde, Goiás. More recently, Lema (2002a,b, 2003a), and Ferrarezzi et al. (2005), respectively, described *A. albicollaris* from Brasília, Distrito Federal, *A. christineae* from Barra do Bugres, presently Porto Estrela, Mato Grosso, *A. cerradoensis* from Minaçú, Goiás, and *A. ammodites* from Palmas, Tocantins, whereas Lema and Renner (2006) and Lema (2016) described two new species from Serra do Roncador, Mato Grosso, *A. serrana* and *A. roncadori*, respectively. Additionally, Martins and Lema (2015) and Lema and Renner (2016) removed *A. borellii* from the synonymy of *A. nigroterminata*.

During a faunal rescue conducted at a hydroelectric power station constructed in a Cerrado savanna area in the state of Mato Grosso, a sample of five small stripe-patterned individuals of snakes of the genus *Apostolepis* document the existence of an undescribed species, which is named herein.

MATERIAL AND METHODS

Institutional acronyms are as listed in Sabaj (2016), except for UFAC (Coleção Herpetológica da Universidade Federal do Acre, Rio Branco, Acre, Brazil) and UFMT (Coleção Zoológica de Vertebrados da Universidade Federal de Mato Grosso, Cuiabá, Mato Grosso, Brazil). Specimens of the new species were compared with 85 museum specimens of 15 species of *Apostolepis* (see Appendix) and data from the literature (e.g., Amaral 1925, Harvey et al. 2001, Lema 2003b, 2004, 2016, Lema and Renner 2004, 2016, Curcio et al. 2011, Albuquerque and Lema 2012, Nogueira et al. 2012, Borges-Nojosa et al. 2016, Cabral et al. 2017, Lema and Campbell 2017).

All measurements were made to the nearest 0.1 mm using digital calipers, except for snout-vent (SVL) and tail (TL) lengths, which were taken with a flexible ruler to the nearest 1.0 mm. Ventral scales were counted according to Dowling (1951). Bilateral variation is reported as right/left. When no everted hemipenis was available, the sex of each specimen was determined by making a post-cloacal incision between the eighth and tenth subcaudals to verify the presence of the hemipenes. The hemipenial description is based on right organs from two preserved specimens (UFMT-R 1933 and MCP 14524), which were prepared according to the method described in Pesantes (1994) and Zaher and Prudente (2003). UFMT-R 1933 was not expanded or inflated since it was irreversibly damaged during filling of the hemipenial body. On the other hand, MCP 14524 was fully inflated with red petroleum jelly. Terminology for hemipenial morphology followed Dowling and Savage (1960) and Zaher (1999). The distribution map was made using the free Quantum GIS software. We use the names *A. quinquelineata* and *A. nigrolineata* in the sense of Lema (1997) and Lema and Renner (1998), respectively (but see Curcio et al. 2011).

TAXONOMY

Apostolepis kikoi sp. nov.

http://zoobank.org/BBCB6A9D-79D1-4326-8254-C17907E533A8
Figs 1–3, Table 1

Apostolepis sp. – Strüssmann 2000: 163. [Cresonymy]
Apostolepis sp. 1 – Martins and Lema 2015: 102; Lema and Renner 2016: 71. [Cresonymy]
Apostolepis sp. 3 – Martins and Lema 2015: 102 (*partim*). [Cresonymy]
Apostolepis aff. *borellii* – Lema and Campbell 2017: 28 (*partim*). [Cresonymy]

Holotype. A female (MCP 12096) collected in 2000 at the Manso multi-use reservoir and hydroelectrical power plant – locally known as APM Manso – constructed at the confluence of the rivers Manso and Casca, Chapada dos Guimarães (15°27'39"S, 55°45'00"W; 811 m.a.s.l.), Mato Grosso, Brazil, by the faunal rescue team. Paratypes. three males and one female, same locality as the holotype: MCP 14524 (male), MCP 14525 (male) and MCP 11372 (female), date of collection unknown, collected by the faunal rescue team, and UFMT-R 1933 (male) collected on 1 December 1999 by the faunal rescue team.

Diagnosis and comparison with other species. *Apostolepis kikoi* sp. nov. can be distinguished from all other *Apostolepis* by the combination of having five dorsal stripes (vs. dorsal stripes absent in *A. ambiniger*, *A. ammodites*, *A. assimilis*, *A. breviceps*, *A. cearensis*, *A. dorbignyi*, *A. flavotorquata*, *A. multicincta*, *A. roncadori* and *A. tertulianobeui*; the presence of seven stripes on the dorsum in *A. gaboi* and *A. niceforoi*; three stripes on the dorsum in *A. cerradoensis*, *A. goiasensis*, *A. nigrolineata*, *A. quirogai* and *A. tenuis*; a pair of narrow lateral stripes in *A. barrioi*; a pair of wide lateral stripes in *A. albicollaris*, *A. dimidiata* and *A. polylepis*); the presence of a white nuchal collar (vs. white nuchal collar absent in *A. ambiniger*, *A. barrioi*, *A. breviceps*, *A. christineae*, *A. goiasensis*, *A. intermedia*, *A. lineata*, *A. longicaudata*, *A. niceforoi*, *A. nigrolineata*, *A. polylepis*, *A. quinquelineata*, *A. rondoni*, *A. serrana*, *A. striata*, *A. thalesdelemai* and *A. vittata*); the presence of a triangular blotch covering portions of the third, fourth, fifth and sixth supralabials (vs. a light lateral spot below the eye, usually occupying the third and fourth supralabials in *A. mariae*); 15 scale rows at midbody (vs. 17 in *A. polylepis*); six supralabials (vs. five in *A. breviceps*, *A. christineae*, and *A. vittata*); second and third supralabials entering orbit (vs. only the third supralabial entering orbit in *A. breviceps*); preocular contacting nasal (vs. nasal and preocular separated by prefrontal in *A. ammodites*, *A. arenaria*, *A. assimilis*, *A. breviceps*, *A. cearensis*, *A. dorbignyi*, *A. gaboi*, *A. goiasensis*, *A. intermedia*,

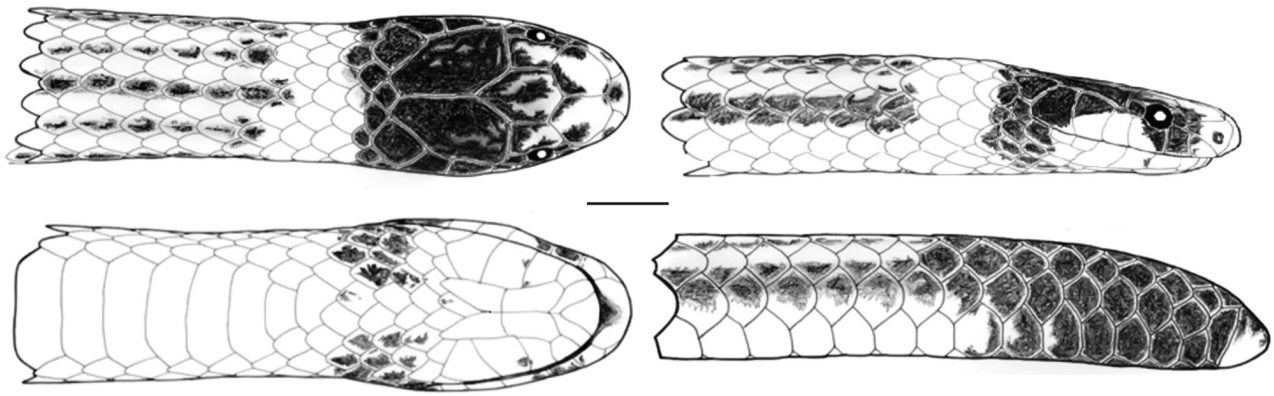
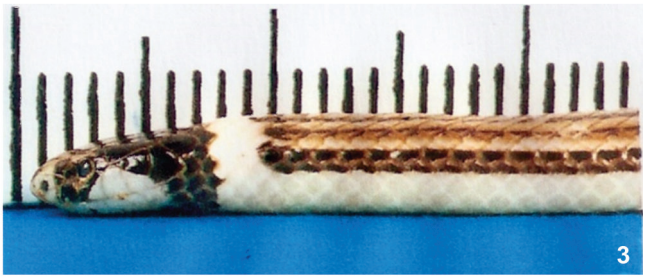


Figure 1. Line drawings from holotype of *Apostolepis kikoi* sp. nov. (MCP 12096) from the reservoir of Manso hydroelectrical power plant, Chapada dos Guimarães, Mato Grosso, Brazil. Scale bar: 2 mm (Eduardo Melloni Lucchesi del.).

A. multicincta, *A. phillipsi*, *A. polylepis*, *A. quirogai*, *A. tenuis* and *A. tertulianobeui*); temporals absent (usually 0 + 1 in *A. ammodites*, *A. assimilis*, *A. cearensis*, *A. mariae*, *A. niceforoi*, *A. nigrolineata*, *A. quirogai*, *A. tertulianobeui* and *A. thalesdelemai*, and 1 + 1 in *A. flavotorquata* and *A. quinquelineata*); seven infralabials (vs. five in *A. breviceps*; five to six in *A. nelsonjorgei* and *A. vittata*; six in *A. christineae*, *A. intermedia*, *A. multicincta*; eight in *A. gaboi* and *A. quirogai*); four infralabials contacting the first pair of chinshields (vs. three infralabials contacting the first pair of chinshields in *A. dorbignyi*, *A. intermedia*, *A. multicincta*, *A. tenuis* and *A. vittata*); a higher number of ventrals than *A. arenaria* and *A. striata* (203–209 vs. 168–181 and 202, respectively); fewer ventrals than *A. christineae*, *A. intermedia*, *A. longicaudata*, *A. nelsonjorgei*, *A. niceforoi*, *A. phillipsi*, *A. polylepis*, *A. serrana*, *A. tertulianobeui*, *A. thalesdelemai* and *A. vittata* (203–209 vs. 211–248 in the latter eleven species); fewer subcaudals than *A. borellii*, *A. intermedia*, *A. longicaudata*, *A. nelsonjorgei*, *A. serrana* and *A. tertulianobeui* (26–30 vs. 32–55 in the latter six species); a higher number of subcaudals than *A. lineata*, *A. niceforoi* and *A. polylepis* (26–30 vs. 24, 23 and 20–25, respectively) and fewer maxillary teeth than *A. longicaudata* and *A. phillipsi* (4 + 2 vs. 5 + 2 in the latter two species).

Preserved specimens of *Apostolepis kikoi* sp. nov. are most similar to *A. borellii*, *A. lineata*, *A. nelsonjorgei*, *A. nigroterminata*, *A. serrana* and *A. underwoodi* in its general pholidosis and coloration pattern. However, the new species is distinguished from *A. borellii* by having its paraventral sides cream and unblemished (vs. blackish), a pair of triangular blotches covering portions of the third, fourth, fifth and sixth supralabials (vs. a small, trapezoidal blotch covering only the posterior half of the third and the entire fourth supralabial); tip of the tail conical (vs. rounded) and fewer subcaudals (vs. 26–30 vs. 32). *Apostolepis kikoi* sp. nov. can be distinguished from *A. nigroterminata* by having a triangular blotch covering portions of the third, fourth, fifth and sixth supralabials (vs. an irregular blotch on the posterior margin of the third to the anterior margin of the fourth supralabial – see also Harvey 1999: 401, fig. 7 in Lema and Renner 2016, and Figs 4–5 below), a blackish blotch on rostral scale adjacent to anterior border of prefrontals (vs. blotch absent), darker parietals (vs. light blotches irregularly distributed on parietal scales) and a distinct number of maxillary teeth (4 + 2 vs. 3 + 2). Further, it differs from *A. nigroterminata* in having its background color beige (in living specimens) (vs. background color red-orange); paravertebrals distinct (vs. paravertebrals indistinct); first and fifth stripes wider, covering upper half of third and lower half of fourth row on each side (vs. first and fifth stripes also wider, but covering first and about 50% of fourth row of scales on each side). *Apostolepis kikoi* sp. nov. can be distinguished from *A. underwoodi* by having a vertebral stripe one scale wide (vs. vertebral stripe narrow, running on the medial line of each vertebral scale); paravertebral stripes covering sixth row on each side (vs. paravertebral stripes covering half of fifth and half of sixth rows). Finally, *Apostolepis kikoi* sp. nov. is distinguished from *A. lineata*, *A. nelsonjorgei* and *A. serrana* by having its fourth supralabial scale rectangular (vs. triangular in *A. nelsonjorgei*), 4–6 supralabials contacting parietals (vs. 5–6 contacting parietals in *A. nelsonjorgei*), terminal scale black dorsolaterally (vs. terminal scale entirely white in *A. lineata* and *A. nelsonjorgei*), anterior chinshields longer than posterior (vs. anterior and posterior chinshields of about the same size in *A. nelsonjorgei*), the presence of a white nuchal collar (vs. white nuchal collar absent in *A. lineata* and *A. serrana*) and a distinct number of subcaudals (27–30 vs. 40–46 in *A. nelsonjorgei* and 33 in *A. serrana*).

Description of holotype (Figs 1–3). A small female, possibly juvenile, SVL 262 mm, TL 26 mm (9.92% of SVL). Body subcylindrical. Tail very short with tip conical and laterally compressed. Terminal scale pointed. Head slightly distinct from neck, narrower than diameter of midbody. Head length from quadrate-articular jaw joint to tip of snout (in lateral view) 6.56 mm (2.5% of SVL), 4 mm at widest point (60.9% of head length). Snout rounded in dorsal and lateral views, slender and slightly projected beyond jaws; snout length from tip of snout to anterior margin of right orbit 2.37 mm (36.12% of head



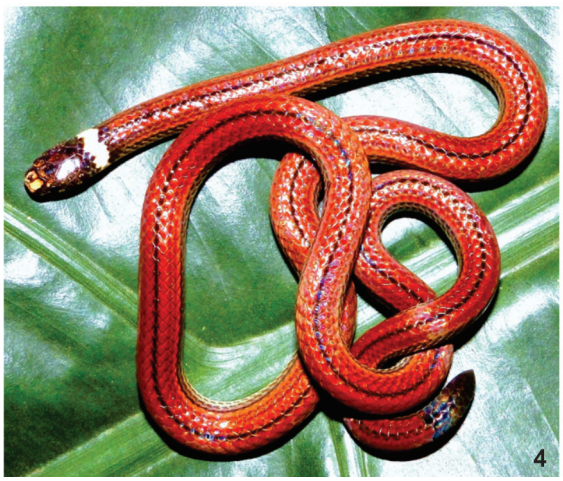


Figure 2–5. (2) Holotype of *Apostolepis kikoi* sp. nov. (MCP 12096) from the reservoir of Manso hydroelectrical power plant, Chapada dos Guimarães, Mato Grosso, Brazil (photo by Marcos Di Bernardo). (3) Lateral view of holotype (preserved) of *Apostolepis kikoi* sp. nov. (MCP 12096) from the reservoir of Manso hydroelectrical power plant, Chapada dos Guimarães, Mato Grosso, Brazil (photo by Marcos Di Bernardo). Dorsal (4) and lateral (5) views of the specimen of *Apostolepis nigroterminata* (UFAC 504) from Campus Universitário da Universidade Federal do Acre, Rio Branco, Acre, Brazil (photo by Danyella Paiva da Silva).

length). Rostral wider than high, visible from above; portion of rostral trapezoidal from above, 1.52 mm wide; length of rostral visible from above 0.63 mm. Prefrontal-rostral contact broadly separating nasals. Suture between prefrontals 58.4% of length of frontal. Prefrontals almost as wide as long. Frontal hexagonal, longer (2.09 mm) than wide (1.42 mm at widest point). Nostril-orbit distance in right lateral view 1.23 mm (16.49% of head length). Interorbital width (shortest distance between dorsomedial margins of orbits) 2.51 mm (66.57% of head width). Nasal entire, contacting preocular. Preocular rectangular, about 34% of length of nasal. Loreal absent. Parietal almost twice as long (3.08 mm) as wide (1.44 mm at widest point); suture between parietals 1.97 mm; length of suture between parietals 94.2% length of frontal. Supraoculars subretangular, almost twice as long as wide. Maximum diameter of eye 0.70 mm, pupils round. Postoculars pentagonal, higher than wide. Temporals absent. Five occipitals wider than long; median occipital positioned between posterior tips of parietals, smaller than adjacent vertebral; two pairs of lateral occipitals twice as large as dorsals, contacting posterior edges of sixth supralabials. Supralabials 6/6, 1 contacting rostral, 1–2 contacting nasal, 2 contacting nasal and preocular, 2–3 entering orbit, 3–4 contacting single postocular, 4–6 contacting parietal. Supralabials in ascending order of size, with sixth supralabial higher and longer (1.46 mm long, 1.29 mm high) than remaining supralabials. Infralabials 7/7, 1–4 contacting anterior chinshields, 4–7 contacting posterior chinshields. Mental subtriangular, wider (1.14 mm) than long (0.82 mm), separated from anterior chinshields by contact between first infralabials. Anterior chinshields elongated, longer than posterior chinshields. Suture between chinshields 1.82 mm. Chinshields separated from ventrals by four gulars and two preventrals. Gulars in four rows between last supralabial and

Figures 6–7. Hemipenis of *Apostolepis kikoi* sp. nov. (MCP 14524) from the reservoir of Manso hydroelectrical power plant, Chapada dos Guimarães, Mato Grosso, Brazil, showing sulcate (6) and absulcate (7) sides (photo by Fernanda Martins dos Santos). Scale bar: 1 mm.

first preventral. Dorsal scales smooth in 15 rows at midbody. No apical pits. 205 ventrals. 26 paired subcaudals (tail complete). Anal scale divided. 4 + 2 maxillary teeth.

Coloration of holotype in life (Fig. 2). Head dorsally blackish with light blotches irregularly distributed on rostral, nasal, prefrontal, frontal, supraocular and parietal scales. Suture between prefrontals brownish. Dorsally, rostral scale has a blackish blotch adjacent to anterior border of prefrontals; ventrally, rostral scale has a blackish spot in its convex portion. Posterior upper margin of first and fourth supralabials blackish. Second supralabial blackish. Anterior portion and upper half of third supralabial blackish. Blackish head cap covers upper half of fifth and sixth (except for its lower anterior portion) supralabials. Posterior portion of nasal, preocular and postocular scales blackish. Infralabials and chinshields cream, except for small blackish spots on third and fourth scales. Brown pigment of throat region restricted to more laterally positioned gular scales (i.e., evidencing an incomplete gular band). White nuchal collar two and half to three dorsals long. Black nuchal collar absent. Background color beige, with five black stripes; vertebral stripe one scale wide; paravertebral stripes covering sixth and tenth rows, less distinct than remaining dorsal stripes; first and fifth stripes wider, covering upper half of third and lower half of fourth row on each side. Paraventral sides and venter unblemished. Black band on tail extends for nine scales dorsally; seven subcaudals are black. Terminal scale with band of melanophores dorsolaterally and entirely clear ventrally.

Color of holotype in preservative (Fig. 3). Head dorsally brownish with light blotches irregularly distributed on rostral, nasal, prefrontal, frontal, supraocular and parietal scales. Dorsally, rostral scale brown pigmented; this blotch covers anterior border of prefrontals; ventrally, rostral scale with brownish spot on its convex portion. Anterior and posterior parts of prefrontals brown. Anterior and posterior parts of suture between prefrontals brown. Posterior upper margin of first and fourth supralabials brown. Second supralabial brown. Anterior portion and upper half of third supralabial brown. Brown head cap covers upper half of fifth and sixth (except for its lower anterior portion) supralabials. Posterior portion of nasal, preocular and postocular scales brown. Infralabials and chinshields cream, except for small brown spots on third and fourth scales. Brown pigment of throat region restricted to more laterally positioned gular scales (i.e., evidencing an incomplete gular band). White nuchal collar two and half to three dorsals long. Black nuchal collar absent. Background color light brown, with five brown stripes; paravertebral stripes light brown and less distinct than remaining dorsal stripes. Venter immaculate. Dark brown band on tail extends for nine scales dorsally; seven subcaudals are dark brown. Terminal scale with band of melanophores dorsolaterally and entirely clear ventrally.

Variation. Measurements and morphological variation are summarized in Table 1. Largest male (MCP 14524) SVL 310 mm, TL 38 mm. Largest female (MCP 12096, holotype) SVL 262 mm, TL 26 mm. Smallest specimen measured is female (MCP 11372) with SVL 152 mm and TL 16 mm. Fifth and sixth supralabials in

Table 1. Variation in characters of the type series of *Apostolepis kikoi* sp. nov. Supralabials (SL), infralabials (IL), snout-vent length (SVL), tail length (TL), snout length (SL), head length (HL), preventrals (PV), ventrals (VE), subcaudals (SC), number of dorsal scales of black caudal band (DBB) and number of subcaudal scales of black caudal band (SBB). Measurements in mm.

	MCP 11372	MCP 12096 (holotype)	MCP 14524	MCP 14525	UFMT-R 1933
Sex	F	F	M	M	M
SL	6/6	6/6	6/6	6/6	6/6
IL	7/7	7/7	7/7	7/7	7/7
SVL	152	262	310	304	263
TL	16	26	38	37	35
SL	1.74	2.37	2.70	2.61	2.46
HL	5.83	6.56	8.01	7.56	7.44
PV + VE	2 + 207	1 + 205	1 + 209	2 + 208	2 + 203
SC	28	26	29	29	30
DBB	10	9	7	8	9
SBB	6	8	5	3	5

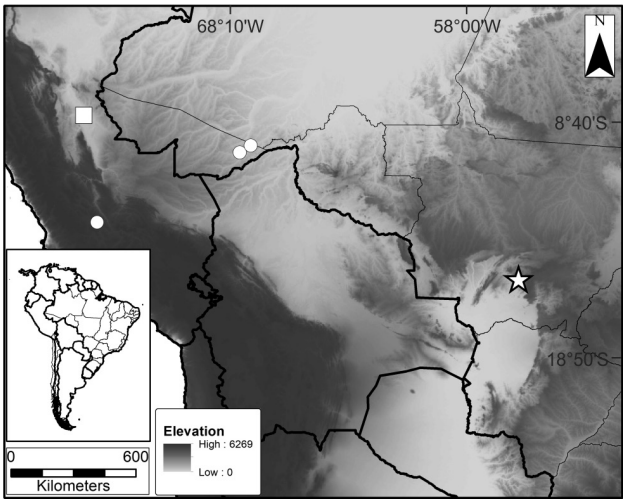


Figure 8. Map of South America, illustrating the type locality (star) of *Apostolepis kikoi* sp. nov. – reservoir of Manso hydroelectrical power plant – Chapada dos Guimarães (15°27'39"S, 55°45'00"W, 811 m a.s.l.), Mato Grosso, Brazil, and locality records for *Apostolepis nigroterminata* (circles) in the Brazilian state of Acre and Peru based upon the material examined. Square indicates the type locality of *Apostolepis nigroterminata*.

contact with parietal in MCP 14524, MCP 14525 and UFMT-R 1933; fourth, fifth and sixth supralabials in contact with parietal in MCP 11372. Head length ranges from 7.44–8.01 mm ($\bar{x}$ = 7.7 ± 0.3) in males, 5.83–6.56 mm ($\bar{x}$ = 6.2 ± 0.5) in females. Number of ventral scales ranges from 203–209 ($\bar{x}$ = 206.7 ± 3.2, n = 3) in males and 205–207 ($\bar{x}$ = 206 ± 1.4, n = 2) in females. Subcaudals range from 29–30 ($\bar{x}$ = 29.3 ± 0.6, n = 3) in males and 26–28 in females ($\bar{x}$ = 27 ± 1.4, n = 2). Preventrals 1 (n = 3) or 2 (n = 2). First infralabial fused with first chinshield in MCP 14524 on right side. Suture between prefrontals entirely pigmented by brown blotch in UFMT-R 1933. White nuchal collar two and a half to three dorsals long (MCP 11372, MCP 14524 and UFMT-R 1933) or two to three dorsals long (MCP 14525). Black nuchal collar vestigial in MCP 11372, MCP 14524 and MCP 14525 and apparent in UFMT 1933. First dorsal stripe, vertebral stripe and fifth dorsal stripe brown; paravertebral stripes light brown and less distinct than remaining dorsal stripes in all specimens. Caudal band extends for length of 7–10 scales dorsally and 3–8 subcaudals. In MCP 11372 fourth supralabial on each side entirely clear; it has a narrow, vestigial band of melanophores on the anterior portion of the terminal scale (dorsally) and small black blotches can be observed on its 22nd, 24th, 25th, 26th and 27th pair of subcaudal scales. Terminal scale with band of melanophores dorsolaterally and entirely clear ventrally in MCP 11372, MCP 14524 and UFMT-R 1933.

Hemipenial morphology (Figs 5–7). Retracted organs extend for length of nine subcaudals. Everted hemipenes subcylindrical, unilobed, unicapitate and noncalyculate. Basal region on sulcate side bears numerous spines of similar size. Several moderate-sized spines present on lateral region of hemipenial body in its absulcate side. Sulcus spermaticus bifurcates about two-thirds before end of organ; branches – which extend centrolineally – reach distal tip of lobe. Basal region on absulcate side also bears numerous spines of similar size, but these are abruptly replaced by two larger spines in middle region of hemipenial body, larger than those disposed on lateral region of hemipenial body. Capitulum confined to sulcate side. Distal region of absulcate side bears transverse papillate flounces, without calyces, whereas a small number of papillae are concentrated above flounces.

Distribution (Fig. 8). All individuals of the type series of *Apostolepis kikoi* sp. nov. were obtained in the area presently occupied by the Manso multi-use reservoir and hydroelectrical power plant (APM Manso), in most part situated in the municipality of Chapada dos Guimarães, Mato Grosso, Brazil. With nearly 428 km^2, the reservoir of APM Manso inundated – from December 1999 – many different Cerrado physiognomies (see Conceição 2000), established over terrains up to 287 m.a.s.l. from the confluence of the Casca and Manso rivers (approximately at 14°52' S, 55°48' W) upwards. Manso is the main tributary to the Cuiabá River, a major tributary of the left bank of the Paraguay River. The local climate is generally hot and semi-humid (classified as "Aw climate" in the Köppen's climate classification map for Brazil, see Alvares et al. 2014), with a well-marked seasonality and rains concentrated in the summer, from October/November to April/May. Mean annual precipitation is 1350 mm; mean annual temperature is around 26 °C. There are four to five months of drought (May to September), and relative air humidity may drop to less than 30% from July to September (Strüssmann and Mott 2009). The Manso River basin is included in the morphostructural domain of the Paraná River sedimentary basin. It is cut across two distinct lithostratigraphic units in nonconformity: the Permeable Mesozoic sandstones belonging to the São Bento (or Botucatu) Group and the inclined Precambrian phyllites and gneisses of the Cuiabá Group, frequently with a lateritic horizon at or near the surface (Barros et al. 1982; Vieira Jr. et al. 2012).

Etymology. The specific epithet honors Francisco Luís Franco ("Kiko"), a specialist in Brazilian snakes, as a tribute to his relentless friendship, dedication and enthusiasm as curator of Herpetological Collection Alphonse Richard Hoge of Instituto Butantan, São Paulo, Brazil (partially and tragically destroyed by fire on 15 May 2010).

Remarks. MCP 12096 was selected as the holotype because the general color in life of *A. kikoi* was described from the live holotype before it was euthanized.

Apostolepis nigroterminata was described by Boulenger (1896) after a single specimen from "Cayaria" (= Callaria, Departamento de Ucayali), eastern Peru. Harvey's (1999) placement of *A. borellii* in the synonymy of *A. nigroterminata* resulted in the inclusion of the latter species in a former Brazilian list of reptiles (see Costa and Bérnils 2015). However, it should be noted that Harvey's (1999) nomenclatural act was based on the analysis of the holotype of

Table 2. Variation in characters of five specimens of *Apostolepis nigroterminata*. Snout-vent length (SVL), tail length (TL), ventrals (VE) and subcaudals (SC). The UFAC specimens presumably are males; the FMNH 39646 specimen is a male. *Holotype, data from Lema and Renner (2016: 67). Measurements in mm.

	BMNH 1946.1.9.77*	FMNH 39646	UFAC 383	UFAC 397	UFAC 504
Sex	M	M	M	M	M
SVL	199	301	210	261	238
TL	18	26	17	19	18
VE	213	234	209	216	219
SC	26	28	24	27	25

A. borellii (a specimen from Urucum massif, Mato Grosso do Sul, Brazil), one specimen collected at the confluence of Rio Araguaia and Tapirapé, Tapirapé Village, Mato Grosso do Sul (AMNH 87942) – that was subsequently re-identified as *A. phillipsi* by Martins and Lema (2015) – and several other specimens from Bolivia and Peru. Recently, Lema and Renner (2016) removed *A. borellii* from the synonymy of *A. nigroterminata* and restricted the distribution of the latter to some localities in Peru. However, these authors also listed a specimen of *A. nigroterminata* from "Brazil: Acre: Rio Branco" in Appendix as "UFAC w/n". The species was also included in an updated list of Brazilian reptiles and referred to occur in the states of Acre, Mato Grosso, and Pará (Costa and Bérnils 2018). Besides the unvouchered mention to Acre in Lema and Renner (2016), Lema et al. (2017) presented a picture of a specimen from Acre without a clear locality description or voucher number, which also provides little evidence for the occurrence of this species in Brazil. The record for Pará is also unvouchered (Maschio et al. 2012), while the specimen (UFMT 10672) from Nobres, Mato Grosso, referred to the species by Santos et al. (2011) was examined and is reidentified here as *Apostolepis* sp. Therefore, we argue that the specimens examined herein (UFAC 383, UFAC 397, UFAC 504) represent not only three locality records of *A. nigroterminata* for the state of Acre, Brazil, but also the first documented record of the species for the country. The specimens collected in Rio Branco (UFAC 397, UFAC 504) extend the geographic distribution of *A. nigroterminata* about 760 km northeastward from Callaria. In particular, the specimen depicted in Figs 4–5 matches the original description of Boulenger (1896) and that given by Lema and Renner (2016) in most details of scalation and color pattern of this species (see Table 2).

Two other species of *Apostolepis* – *A. lineata* and *A. vittata* – were also described from Chapada dos Guimarães (Cope 1887). Although the only existing syntype of *A. lineata* is in very bad condition, Harvey's (1999) redescription is sufficiently complete to allow it to be unambiguously distinguished from *Apostolepis kikoi* sp. nov. Together with *A. assimilis* (Fig. 9) and *A. vittata* (Fig. 10), the description of *Apostolepis kikoi* sp. nov. increases the number of species of *Apostolepis* reported to occur sympatrically in the Manso reservoir area to three.

Figure 9. *Apostolepis assimilis*. A specimen deposited at the Universidade Federal de Mato Grosso (UFMT-R 11088) from district of São Vicente, Santo Antonio do Leverger, Mato Grosso, Brazil (photo by Christine Strüssmann).

Figure 10. *Apostolepis vittata*. A specimen deposited at the Universidade Federal de Mato Grosso (UFMT-R 12259) from the National Park of Chapada dos Guimarães, Cuiabá, Mato Grosso, Brazil (photo by Christine Strüssmann).

An attempt was made to identify all the specimens of *Apostolepis kikoi* sp. nov. using Nogueira et al.'s (2012) key. However, the specimens could not be characterized beyond couplet 1, because of the many overlapping characters presented in the couplets. The assignment of *Apostolepis kikoi* sp. nov. into a formal group should await a more comprehensive phylogenetic arrangement than is available for the genus.

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LITERATURE CITED

Albuquerque NR, Lema T (2012) Description of the second known specimen of *Apostolepis intermedia* (Serpentes, Colubridae, Xenodontinae). Zootaxa 3325: 53–58.

Alvares CA, Stape JL, Sentelhas PC, Gonçalves JLM, Sparovek G (2014) Köppen's climate classification map for Brazil. Meteorologische Zeitschrift 22(6): 711–728. https://doi.org/10.1127/0941-2948/2013/0507

Amaral A (1925) Ophidios de Matto Grosso (Contribuição II para o conhecimento dos ophidios do Brasil). Commissão de Linhas Telegraphicas Estrategicas de Matto Grosso ao Amazonas. História Natural, Zoologia 84(5):1–29.

Barros AM, Silva RH, Cardoso ORFA, Freire FA, Souza JJ Jr, Rivetti M, Luz DS, Palmeira RCB, Tassinari CCG (1982) Geologia. In: Brasil. Projeto RADAMBRASIL. Rio de Janeiro, Ministério das Minas e Energia, 25–192.

Borges-Nojosa DM, Lima DC, Bezerra CH, Harris DJ (2016) Two new species of *Apostolepis* Cope, 1862 (Serpentes: Elapomorphini) from brejos de altitude in northeastern Brazil. Revista Nordestina de Zoologia 10(2): 74–94.

Boulenger GA (1896) Catalogue of the Snakes in the British Museum (Natural History). London, British Museum (N.H.), vol. 3, xiv+727 pp.

Cabral H, Lema T, Renner MF (2017) Revalidation of *Apostolepis barrioi* (Serpentes: Dipsadidae). Phyllomedusa 16(2): 243–254. https://doi.org/10.11606/issn.2316-9079.v16i2p243-254

Conceição PN (2000) Os hábitats da área de influência do APM Manso. In: Alho CJR (Ed.) Fauna silvestre da região do rio Manso – MT. Brasília, IBAMA, 31–127.

Cope ED (1887) Synopsis of the Batrachia and Reptilia obtained by H. H. Smith in the Province of Mato Grosso, Brazil. Proceedings of the American Philosophical Society 24: 24–60.

Costa HC, Bérnils RS (2015) Répteis brasileiros: lista de espécies 2015. Herpetologia Brasileira 4(3): 75–93.

Costa HC, Bérnils RS (2018) Répteis do Brasil e suas Unidades Federativas: Lista de espécies. Herpetologia Brasileira 7(1): 11–57.

Curcio FF, Nunes PMS, Harvey MB, Rodrigues MT (2011) Redescription of *Apostolepis longicaudata* (Serpentes: Xenodontinae) with comments on its hemipenial morphology and natural history. Herpetologica 67(3): 318–331. https://doi.org/10.1655/HERPETOLOGICA-D-10-00043.1

Dowling HG (1951) A proposed standard system of counting ventral scales in snakes. British Journal of Herpetology 1: 97–99.

Dowling HG, Savage JM (1960) A guide to the snake hemipenis: a survey of basic structure and systematic characteristics. Zoologica 45(2): 17–28.

Ferrarezzi H, Barbo FE, Albuquerque CE (2005). Phylogenetic relationships of a new species of *Apostolepis* from Brazilian Cerrado with notes on the *assimilis* group (Serpentes: Colubridae: Xenodontinae: Elapomorphini). Papéis Avulsos de Zoologia 45(16): 215–229. https://doi.org/10.1590/S0031-10492005001600001

Harvey M (1999) Revision of Bolivian *Apostolepis* (Squamata: Colubridae). Copeia 1999(2): 388–409. https://doi.org/10.2307/1447485

Harvey M, Gonzales AL, Scrocchi G J (2001) New species of *Apostolepis* (Squamata: Colubridae) from the Gran Chaco in Southern Bolivia. Copeia 2001(2): 501–507. https://doi.org/10.1643/0045-8511(2001)001[0501:NSOASC]2.0.CO;2

Koslowsky J (1898) Ofidios de Matto-Grosso (Brasil). Revista del Museo de La Plata 8: 25–32.

Lema T (1997) A redescription of the tropical Brazilian serpent *Apostolepis nigrolineata* (Peters, 1869), (Colubridae: Elapomorphinae), synonymous with *A. pymi* Boulenger 1903. Studies on the Neotropical Fauna and Environment 32(4): 193–199. https://doi.org/10.1080/01650521.1997.11432422

Lema T (2002a) Nova espécie de *Apostolepis* do grupo *lineata* do sudoeste do Brasil (Serpentes, Elapomorphinae). Facena 18: 41–52.

Lema T (2002b) Nova espécie de *Apostolepis* Cope do grupo *dimidiata* do Cerrado do Brasil (Serpentes: Elapomorphinae). Comunicações do Museu de Ciências e Tecnologia da PUCRS, Série Zoologia 15(2): 227–238.

Lema T (2003a) Descrição de nova espécie de *Apostolepis* Cope do cerrado do Brasil, pertencente ao grupo *dimidiata* (Serpentes, Elapomorphinae). Acta Biologica Leopoldensia 25(1): 123–131.

Lema T (2003b) Reencontro de *A. goiasensis* Prado, 1942, com a redescrição da espécie (Serpentes: Elapomorphinae). Comunicações do Museu de Ciências e Tecnologia da PUCRS, Série Zoologia 16(2): 199–209.

Lema T (2004) Description of a new species of *Apostolepis* Cope, 1861 (Serpentes, Elapomorphinae) from Brazilian Cerrado. Acta Biologica Leopoldensia 26(1): 155–160.

Lema T (2016) Description of new species of *Apostolepis* (Serpentes: Dipsadidae: Xenodontinae: Elapomorphini) from Serra do Roncador, Central Brazil. Caderno de Pesquisa, Série Biologia 28(1): 1–11. Available online at: https://online.unisc.br/seer/index.php/cadpesquisa/article/download/7854/4993

Lema T, Martins LA (2016) The complexity of the *Apostolepis dimidiata* group, with partition in two groups (Serpentes: Dipsadidae: Xenodontinae: Elapomorphini). Caderno de Pesquisa, Série Biologia 28(2): 20–29.

Lema T, Renner MF (1998) O status de *Apostolepis quinquelineata* Boulenger, 1896, *A. pymi* Boulenger, 1903 e *A. rondoni* Amaral, 1925 (Serpentes, Colubridae, Elapomorphini). Biociências 6(1): 99–121.

Lema T, Renner MF (2004) New specimens of *Apostolepis vittata* (Cope 1887) (Serpentes, Elapomorphinae). Caderno de Pesquisa, Série Biologia 16(1): 51–56.

Lema T, Renner MF (2006) A new species of *Apostolepis* with striped pattern from Mato Grosso, Brazil (Serpentes, Elapomorphinae). Ciência em Movimento 8: 13–18.

Lema T, Renner MF (2016) Status of *Apostolepis borellii* Peracca 1904 (Serpentes, Xenodontinae), with restriction of the *A. nigroterminata* concept. Neotropical Biology and Conservation 11(2): 62–71. https://doi.org/10.4013/nbc.2016.112.02

Lema T, Campbell P (2017) New species of *Apostolepis* (Serpentes, Dipsadinae, Elapomorphini) from Bolivia, from the *Apostolepis borellii* group. Journal of Zoological Sciences 5(1): 19–28.

Lema T, Queiroz AN, Martins L (2017) Color variation in *Apostolepis nigrolineata* (Serpentes, Colubridae: Dipsadinae: Elapomorphini), and contribution to the knowledge of the *nigrolineata* group. Cuadernos de Herpetología 31(2): 93–101.

Martins LA, Lema T (2015) Elapomorphini (Serpentes, Xenodontinae) do Brasil sudoeste. Neotropical Biology and Conservation 10(2): 93–102. https://doi.org/10.4013/nbc.2015.102.05

Maschio G, Galatti U, Neckel-Oliveira S, Gordo M, Bitar YOC (2012) Répteis. In: Martins FD, Castilho AF, Campos J, Hatano FM, Rolim SG (Eds) Fauna da Floresta Nacional de Carajás: estudos sobre vertebrados terrestres. Nitro Imagens, São Paulo, 84–101.

Nogueira C, Barbo FE, Ferrarezzi H (2012) Redescription of *Apostolepis albicollaris* Lema, 2002, with a key for the species groups of the genus *Apostolepis* (Serpentes: Dipsadidae: Elapomorphini). South American Journal of Herpetology 7(3): 213–225. https://doi.org/10.2994/057.007.0303

Peracca MG (1904) Viaggio del Dr. A. Borelli nel Matto Grosso Brasiliano e nel Paraguay, 1899. IX. Rettili ed amfibii. Bollettino del Museo Regionale di Scienze Naturali di Torino 19(460): 1–15.

Pesantes OS (1994) A method for preparing the hemipenis of preserved snakes. Journal of Herpetology 28(1): 93–95. https://doi.org/10.2307/1564686

Prado A (1942) Notas ofiológicas. 14. Comentários acerca de algumas serpentes opistóglifas do gênero *Apostolepis*, com a descrição de uma nova espécie. Memórias do Instituto Butantan 16: 7–12.

Sabaj MH (2016) Standard symbolic codes for institutional resource collections in herpetology and ichthyology: an online reference. Washington, DC, American Society of Ichthyologists and Herpetologists, version 6.5. http://www.asih.org [Accessed: 30/5/2017]

Santos MM, Ávila RW, Kawashita-Ribeiro RA (2011) Checklist of the amphibians and reptiles in Nobres municipality, Mato Grosso state, central Brazil. Herpetology Notes 4: 455–461.

Strüssmann C (2000) Herpetofauna. In: Alho CJR (Ed.) Fauna Silvestre da Região do Rio Manso – MT. Brasília, IBAMA, 153–189.

Strüssmann C, Mott T (2009) Sympatric amphisbaenids from Manso Dam region, Mato Grosso State, western Brazil, with the description of a new two-pored species of *Amphisbaena* (Squamata, Amphisbaenidae). Studies on Neotropical Fauna and Environment 44(1): 37–46. https://doi.org/10.1080/01650520802628295

Uetz P, Freed P, Hošek J (2018) The Reptile Database. http://www.reptile-database.org [Accessed: 26/04/2018]

Vieira Jr HT, Moraes JM, Paula TLF (2012) Geoparque Chapada dos Guimarães (MT): proposta. In: Schobbenhaus C, Silva CR (Eds) Geoparques do Brasil: propostas. Rio de Janeiro, CPRM, vol. 1, 283–316. http://www.cprm.gov.br/publique/media/guimaraes.pdf [Accessed: 13/05/2016]

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.

Zaher H, Prudente ALC (2003) Hemipenis of *Siphlopis* (Serpentes, Xenodontinae) and techniques of hemipenial preparation in snakes: a response to Dowling. Herpetological Review 34(4): 302–307.

APPENDIX 1

Additional specimens examined

Apostolepis sp. Brazil, *Mato Grosso*: Nobres, Gruta da Cantina (UFMT-R 10672).

Apostolepis assimilis. Brazil, *São Paulo*: Barueri (MPEG 19172, MPEG 19173). *Mato Grosso*: Chapada dos Guimarães (MCP 13282). *Mato Grosso do Sul*, Campo Grande, Jardim Autonomista (ZUFMS-REP 256); Campo Grande, Vila Carvalho (ZUFMS-REP 94, ZUFMS-REP 95, ZUFMS-REP 233, ZUFMS-REP 234).

Apostolepis ammodites. Brazil, *Maranhão*: Carolina, U.H.E de Estreito (MPEG 24395). *Minas Gerais*: Pirapora, margem direita do Rio São Francisco (MPEG 18347). *Tocantins*: Barra do Ouro (MPEG 23633), Filadélfia (MPEG 24697).

Apostolepis borellii. Brazil, *Mato Grosso do Sul*: Urucum Massif (MZUT 962, holotype).

Apostolepis aff. *borellii*. Brazil, *Mato Grosso*: Serra do Amolar (UFMT-R 1171, UFMT-R 1173, UFMT-R 1174, UFMT-R 1179, UFMT-R 1182, UFMT-R 1184, UFMT-R 1186, UFMT-R 1214, UFMT-R 1216).

Apostolepis cearensis. Brazil, *Ceará*: Fortaleza (MPEG 18219, MPEG 18220). *Maranhão*: Urbano Santos (MPEG 20550, MPEG 20551, MPEG 20552). *Piauí*: Castelo do Piauí (MPEG 22760, MPEG 22762, MPEG 22810, MPEG 22814).

Apostolepis dimidiata. Brazil, *Mato Grosso do Sul*: Aquidauana (ZUFMS-REP 96, ZUFMS-REP 97, ZUFMS-REP 235); Aquidauana, Camisão (ZUFMS-REP 100); Aquidauana, Vila Cidade Nova (ZUFMS-REP 98); Campo Grande (ZUFMS-REP 1732); Campo Grande, Jardim Autonomista (ZUFMS-REP 256); Chapadão do Sul, Campus da UFMS (ZUFMS-REP 2170); Sidrolândia, Estância Belém (ZUFMS-REP 101). *Mato Grosso*: Chapada dos Guimarães (MCP 13282).

Apostolepis lineata. Brazil, *Mato Grosso*: Chapada dos Guimarães (ANSP 11212, syntype).

Apostolepis longicaudata. Brazil, *Pará*: Portel, Fazenda Riacho Monte Verde (MPEG 22729).

Apostolepis nigrolineata. Brazil, *Pará*: Barcarena, arredores de Barcarena (MPEG 17292); Vila São Francisco, antiga sede de Barcarena (MPEG 16339); Benevides, Estrada da Belágua, Maguari (MPEG 21079); Canaã dos Carajás (MPEG 26453); Itaituba, A.P.A. do Tapajós, Mina do Tocantinzinho (MPEG 24569); Óbidos, ESEC Grão-Pará (MPEG 23737); Oriximiná, Serra do Acarai (MPEG 23681); Santa Bárbara do Pará, Parque Ecológico do Gunma (MPEG 21330, MPEG 21333); Santarém, comunidade Tapari (MPEG 26512, MPEG 26553); Santo Antônio do Tauá (MPEG 3940); Viseu, Curupati (MPEG 10010, MPEG 10884, MPEG 10886, MPEG 10887, MPEG 13260); Viseu, km 220 da BR-316, antigo km 74 de Capanema (MPEG 3581, MPEG 8192, MPEG 10841, MPEG 10851); Viseu, Rio Gurupi, Colônia Nova, próximo do rio, BR-316 (MPEG 11487); Vitória do Xingu, U.H.E. de Belo Monte (MPEG 26189, MPEG 26190, MPEG 26503).

Apostolepis nigroterminata. Brazil, *Acre*: Km-80 da BR-317, Fazenda da Patroa, near Boca do Acre (UFAC 383), Campus Universitário da UFAC, Rio Branco (UFAC 504), Parque Zoobotânico da UFAC, Rio Branco (UFAC 397). Peru: Ayacucho, La Mar, in Sivia, Apurimac River, 760 m.a.s.l. (FMNH 39646); Loreto (MUSM 005); "Cayaria" (= Callaria, Departamento de Ucayali, Peru) (BMNH 1946.1.9.77, holotype).

Apostolepis polylepis. Brazil, *Maranhão*: Estreito, U.H.E. de Estreito (MPEG 63444, MPEG 23645, MPEG 24713). *Tocantins*: Darcinópolis (MPEG 24173), Palmeiras do Tocantins, U.H.E. de Estreito (MPEG 24712, MPEG 24714, MPEG 24715).

Apostolepis serrana. Brazil, *Mato Grosso*: Serra do Roncador, Rio das Mortes (BMNH 1972.430, holotype).

Apostolepis striata. Brazil, *Rondônia*: Vilhena (CHUNB 12794, holotype).

Apostolepis tenuis. Bolivia, *Santa Cruz*: Buenavista (UMMZ 64436, holotype).

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