

# Status of *Apostolepis borellii* PERACCA 1904 (Serpentes, Xenodontinae), with restriction of the *A. nigroterminata* concept

## Status de *Apostolepis borellii* PERACCA 1904 (Serpentes, Xenodontinae), com restrição do conceito de *A. nigroterminata*

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### Abstract

*Apostolepis borellii* has been considered a junior synonym of *A. nigroterminata*. However, examination of the holotypes showed significant differences between the species, such as head narrow (vs. wide, stocky), slandering snout (vs. wide and rounded), background color brown (vs. red), black nuchal collar wide, reaching the gular region (vs. short, not reaching gular region), tail extremity slandering with conic tip (vs. stocky, rounded tip), tail blotch complete reaching dorsals and subcaudals (vs. only dorsal, with white ring anteriorly). *Apostolepis borellii* occurs in the Cerrado, while *A. nigroterminata*, in the Amazonian Forest, two diverse biomes. The former may constitute a new group of small sized species, own from central-western Brazil to Bolivia; the latter is allocated in the *nigrolineata* group, both presented herein.

**Keywords:** Brazil, Peru, Cerrado, Amazonian Forest, revalidation.

### Resumo

*Apostolepis borellii* tem sido considerada sinônimo de *A. nigroterminata*. No entanto, o exame dos holótipos mostrou diferenças significativas justificando a revalidação da primeira. Principais diferenças: cabeça estreita (vs. robusta), focinho afilado (vs. largo e arredondado), cor de fundo dorsal parda (vs. avermelhada), colar preto nuchal largo atingindo a região gular, onde se alarga bastante (vs. vestigial, quase indistinto, não atinge região gular), extremidade caudal afinando com ponta cônica (vs. grossa, ponta alta, arredondada), mancha caudal e sendo completa atingindo dorsais e subcaudais (vs. apenas dorsal precedida de anel branco). *Apostolepis borellii* ocorre no Cerrado, enquanto *A. nigroterminata*, na Floresta Amazônica, dois biomas distintos. A primeira pode representar um novo grupo de espécies pequenas e próprias do Brasil central para oeste na Bolívia; e a última é realocada no grupo *nigrolineata*, ambos aqui apresentados.

**Palavras-chave:** Brasil, Peru, Cerrado, Floresta Amazônica, revalidação.

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## Introduction

*Apostolepis nigroterminata* BOULENGER 1896 was described based on a specimen from Ucayali Valley, eastern Peru, and housed in The Natural History Museum, London (BMNH). *Apostolepis borellii* PERACCA 1904 was described on the basis of a specimen from the Urucum Massif, in Mato Grosso do Sul, Brazil, and housed in the Museo de Storia Naturale de Torino (MZUT).

Parker (1928) presented, summarily, three specimens determined by him as *A. borellii*, from Santa Cruz Department, Bolivia, and housed in BMNH; the data presented are insufficient to recognize the species. Amaral (1930a) considered *A. borellii* as a junior synonym of *A. nigroterminata*, without argumentation. Ferrarezzi (1993) revalidated *A. borellii*, citing a specimen from Mato Grosso, housed in the Museu de Zoologia da Universidade de São Paulo, Brazil. Harvey (1999) considered again *A. borellii* as a junior synonym of *A. nigroterminata*, as well as a specimen from Tapirapés River, Mato Grosso, housed in the American Museum of Natural History, New York, and some specimens from Bolivia, housed in several institutions, alleging the differences due by polymorphism. Strüssmann (2000) indicated as *Apostolepis* sp., several specimens found in a faunal rescue of the Hydro-electric Power Plant, in Manso, Chapada dos Guimarães, Mato Grosso, Brazil, housed in the Museu de Ciências e Tecnologia, Porto Alegre, Brazil. Herein we examined the holotypes of both species, the specimens described by Parker (1928), and the specimens from Mato Grosso, which results are here presented for discussion. The specimens from Manso will be the subject of another study, but certainly do not belong to the two species that are the focus of this article.

## Materials and methods

Institutional acronyms follow Sabaj-Pérez (2014), except ZUFS, which is the zoological collection of the Universidade Federal de Mato Grosso do Sul, Corumbá campus. The holotypes were examined with loan from BMNH, as well as specimens from Bolivia, and by several photos sent by the manager of the Torino Museum; specimens housed in the Field Museum of Natural History (FMNH.39646) were also examined. Abbreviations: AC, anterior chin-shield; CL, cloacal; DO, dorsal scale; DOR, dead on road; FR, frontal; IL, infralabial; LO, loreal; ME, mental; NA, nasal; OC, occipital; OLS, on the level of the sea; PA, parietal; PC, posterior chin-shield; PF, prefrontal; PR, preocular; PS, postocular; PT, posterior temporal; PV, preventral; PVA, portion visible from above of the RO: RO, rostral; SC, subcaudal; SL, supralabial; SO, supraocular; SPC, DO on tail; SPF, suture between PF; SVL, snout-vent length; TAL, tail length; TE, terminal; TOL, total length; VE, ventral. The

paired structures, when different from one another are indicated as right/left. The measurements are in mm, using a retractable rule and string. In specimens with damaged ventral side, the left side was not included. The sex was determined by a short cut in the ventral basis of the tail.

## Results

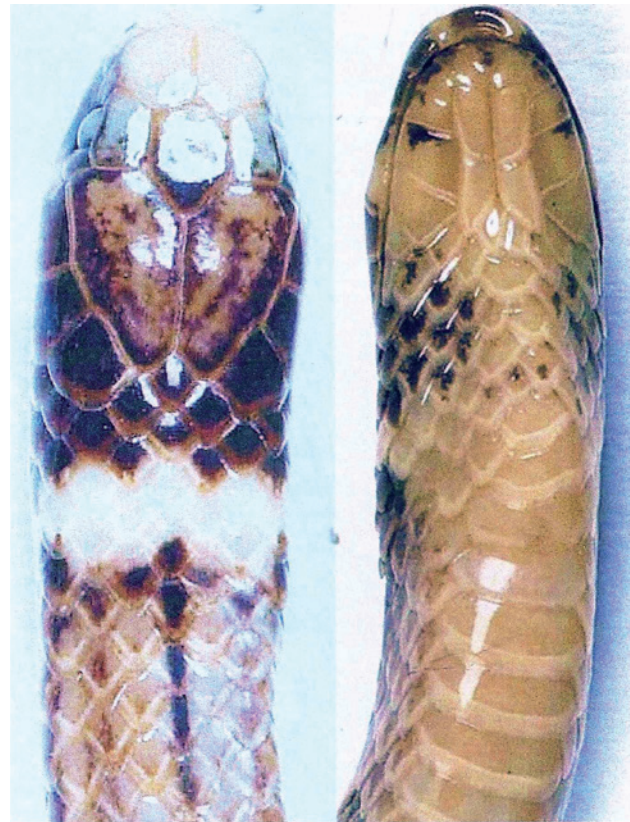
### *Apostolepis borellii* PERACCA 1904

(Figures 1-3)

*Apostolepis borellii* – Peracca, 1904:9, Fig. 9; – Amaral, 1925:37; – Ferrarezzi, 1993:237.

*Apostolepis nigroterminata* – Amaral, 1930a (part):48; 1930b (part):109; 1930c (part):226; –Amaral, 1936 (part):149; – Amaral, 1944:70; – Peters & Orejas-Miranda, 1970 (part):23; –Lema, 1978 (part):30; – Cunha & Nascimento, 1978 (part):8; – Fugler, 1986 (part):46; –Harvey, 1999 (part):399, Fig. 10; – Lema, 2001 (part):38.

**Holotype:** MZUT.962, male, from Urucum Massif, state of Mato Grosso do Sul, Brazil; captured by Alfred Borel, in Torino Museum expedition (Figures 1-3).



**Figure 1.** Head of the holotype of *Apostolepis borellii* (MZUT.962), in dorsal and ventral views (Torino Museum courtesy). Scale bar not available.



**Figure 2.** Head of the holotype of *Apostolepis borellii* (MZUT.962), in lateral view (Torino Museum courtesy). Scale bar not available.



**Figure 3.** Dorsal and ventral views of the holotype of *Apostolepis borellii*. (Torino Museum courtesy). Scale bar not available.



**Figure 4.** Distribution of specimens of *Apostolepis nigroterminata*, Peru (triangles), *Apostolepis borellii*, Brazil (circle), and *Apostolepis* sp. (square). The double icons represent the type-localities.

**Type-locality:** Serra do Urucum, District of Corumbá, municipality of Sapezal, Mato Grosso do Sul, Brazil; 19°01'67" S 57°55'W, more than 1,000 m OLS. Urucum massif belongs to several mountains, rich and explored for several useful minerals, such as iron.

**Distribution:** Known from type locality (Figure 4). Two specimens, ZUFMS.1265, ZUFMS.1716, from Corumbá (MS), observed by Nélon Rufino Albuquerque (UFMS), were previously determined as *Apostolepis cf. borellii*, the data of which are not included here.

**Diagnosis:** Similar to *Apostolepis nigroterminata*, differing from it by: slender body (vs. stocky), elongated head (vs. wide, short), slandering snout (vs. wide and rounded), head a little slender (vs. wide, high, wider than neck); background color brown (vs. reddish), black nuchal collar wide, reaching the gular region (vs. vestigial, not reaching gular region), tail extremity slandering, with conic tip (vs. stocky, rounded tip), tail blotch complete reaching DO and SC (vs. only dorsal, with white halo anteriorly), FR hexagonal (vs. almost pentagonal). The species inhabits a diverse ecosystem, the Cerrado, whereas *A. nigroterminata* is from the Amazon Forest.

Holotype description. **Morphology:** Head high, rounded, slightly elongate, with same diameter of neck; snout slightly slender, little projected; eye large, with diameter almost equal to its distance to the oral margin (maybe young). **Measurements:** lengths: SVL 165, TAL 32, TOL 197; ratio TAL/TOL, 0.162; ratio TAL/SVL, 0.198. **Pholidosis:** RO is slightly wider than high, PVA just; FR hexagonal, anterior angle slightly smaller than posterior, more longer than wide, longer than the distance of it to snout tip, a lot smaller than PA length; NA trapezoidal, with apex truncated, and contacting PR; PS as vertical rectangle, being larger than PR; PT absent; PA wide, slandering towards, forming V-shape joint; SL 6/6, all high; the second and third entering the orbit; ME does not make contact with AC (following the original description) according to Amaral (1930), and Harvey (1999), and current data (Figures 1-3). VE 208; SC 32; R 0.154. **Coloration** (in ethyl alcohol): Head cap blackish brown, with light white snout; pilum until FR, marbled light brown internally; SL blotch short, trapezoidal, on posterior half of third and fully fourth. White collar as long as two DO of the vertebral row, crossed by stripes; black collar as long as two DO of the vertebral row. The vertebral stripe is lineal (may be discolored), from the black cervical collar to tail blotch, reaching the adjacent angles of DO (seventh rows); the paravertebral stripes running along each, on the fifth and sixth DO rows, faded, with minute dark dots; they beginning on the white nuchal collar; each lateral stripe on fourth row of DO, with black superior margin, beginning on the black cervical collar reaching tail blotch; between the paravertebral and lateral strip there is a light line, on

the superior half of fourth DO row, contrasting with both stripes, reinforced by dark outline. Lower sides are dark on first to third DO rows. The tail blotch is long, about one fourth of the tail length, reaching DO and SC, more longer dorsally than ventrally; TE is white.

*Apostolepis nigroterminata* BOULENGER 1896

(Figures 5-7)

*Apostolepis nigroterminata* – Boulenger, 1896:235, pl. 10, Fig. 2; – Peracca, 1904:10. – Ruthven, 1927:1; – Parker, 1928:198. – Amaral, 1930a (part):48; – 1930b (part):109; –1930c (part):226; – Amaral, 1936 (part):149; – Amaral, 1944 (part):70; – Peters & Orejas-Miranda, 1970 (part):23; – Lema, 1978 (part):30; – Cunha & Nascimento, 1978 (part):58; – Fugler, 1986:46; – Ferrarezzi, 1993:237; – Carrillo-de-Espinoza & Icochea, 1995:13; – Harvey, 1999 (part):399, Figs. 2, 10; – Lema, 2001 (part):38. – Catenazzi *et al.*, 2013:277.

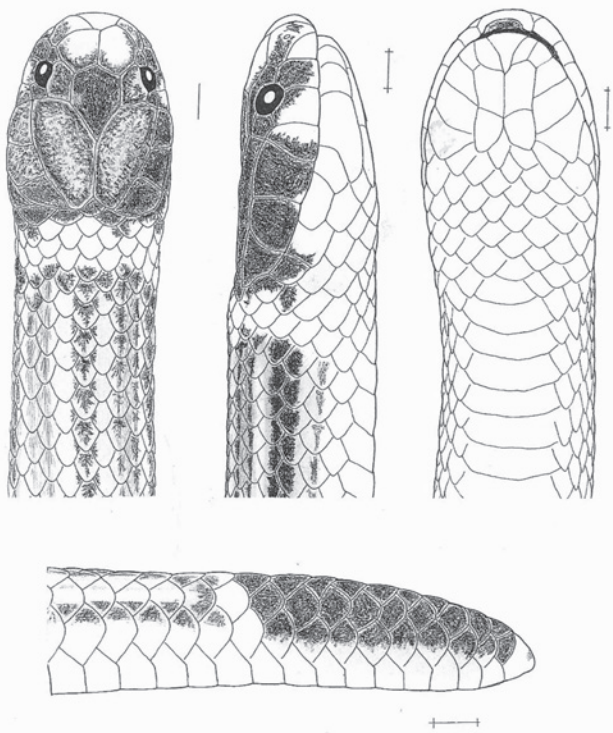
*Apostolepis quinquelineata* – Amaral, 1930a (part): 48; 1930b (part): 109; 1930c (part): 226; –Amaral, 1944 (part): 70.

**Holotype:** BMNH.81.5.13.76 (formerly 81.5.13.76), male. Harvey (1999) affirmed that the head was dissected, becoming wider than when *in vivo*, but it seems to be a mistake, according to drawings presented herein (Figures 5 and 6).

**Type-locality:** Ucayali Valley, at Callaria, between Poznan and Caballococha, Ucayali department, eastern



**Figure 5.** Holotype of *Apostolepis nigroterminata* (BMNH.81.5.13.76). Scale bar not available.



**Figures 6.** Holotype of *Apostolepis nigroterminata* (BMNH.81.5.13.76). The straight is 2 mm (E.M. Luchesi ad. nat. del.).

Peru. Captured on left Ucayali Riverbank, area covered by Amazonian Forest.

**Diagnosis:** Similar to *Apostolepis nigrolineata*, differing by presence of white nape collar (vs. absent in the adult), red dorsum in adult (vs. brown or tan), head wider than neck (vs. head with same diameter of neck); PA in divergent disposition (vs. parallel); PF pentagonal (vs. hexagonal); lateral stripe thin with lower side dark (vs. lateral wider, with yellowish white or one vestigial or dotted stripe). Also similar to *A. borellii*, from which it differs by stocky body (vs. slandering body), head short and wide, with snout round and wide (vs. head narrow, snout slender), wider than neck (vs. equal to neck diameter), red dorsal coloration (vs. brown) (Table 1).

**Distribution:** The holotype is from the Ucayali Valley in eastern Peru, covered by Amazonian forest. Specimen from SE Peru, FMNH.39646 from Ayachucho, Sivia Riverbank. Another specimen noted on DOR in La Convención, Cuzco (Carrillo-de-Espinoza & Icochea, 1995). Catenazzi *et al.* (2013) recorded to Mana Park, in Peru in submontane rainforest. A neonate was photographed in Madre de Dios (Figure 4).

Description of the holotype. **Morphology:** Head short and wide, rounded and high; Snout rounded, not projected; nostril slightly oval, turned up and toward the front, on anterior half of NA. Tail short, with conical tip (spine),

not compressed, except in the TE. **Measurements:** Head length, 7.3 (not 5.6, as Harvey, 1999); trunk length, 190; TAL, 15 (not 18, as Boulenger, 1896, nor 17 by Harvey, 1999); TOL, 212.3 (not 215 by Boulenger, 1896, nor 213 by Harvey, 1999); ratio TAL/TOL, 0.071, and TAL/SVL, 0.071. Head high in PA, 2.43, and in NA, 1.17; head width in PA, 4.18, and in NA, 1.1. Orbit vertical diameter, 0.46 (not 0.58, by Harvey, 1999); distance from orbit to oral margin, 0.72; ratio orbit diameter/distance to oral margin, 0.64; distance from orbit to nostril, 1.16; distance from orbit to snout tip, 1.86; ratio snout length/head length, 0.255.

**Pholidosis:** RO width a lot larger than height; PVA longer than half of SPF. PF isolated from the second SL, wide and short, rounded and oblique, nearly pentagonal; large, length larger than half of FR length. FR has length larger than width, longer than distance to snout tip; a lot larger than PA; hexagonal, almost pentagonal, with anterior angle a lot smaller than posterior; anterior apex largest, and relatively wide. SO very short and wide, trapeze-rectangular; PA wide, pair disposed in "V" shape; length is one half larger than its width; SPA 88% of the FR length. NA contacting PR, small and trapezoidal; PR a lot smaller than PS, rectangular, opposite to NA, 1/3 of the NA length; PS is nearly pentagonal, angled, curled by the orbit, a little smaller than the PR. SL 6/6, all high; second and third entering the orbit, the second is smaller than third, and the fifth is the largest. TP absent. OC large, a lot higher than its length. The DO on nape zone are cycloid, in 2/2 rows, being narrow and high. ME wider than its length, contacting AC (anomaly, because this never occurs in other species of Elapomorhini); AC is a lot longer than PC, and both are elongated; PC asymmetrical; mental groove depth. IL, 7/7, first to fourth contacting AC; fourth pentagonal, being the largest; fourth and fifth contacting PC. GU, 6/6; five in median line; there is a large GU after it, and similar to fourth IL. PV one (not six as in Harvey, 1999, perhaps he counted the median GU). VE, 213 (not 207 as in Boulenger, 1896, and Harvey, 1999). SC 26/26, ratio SC/VE = 0.122. DO eight, on median tail length, reducing to six which reach TE; TE short, sharpened, and compressed.

**Coloration** (in ethyl alcohol): Head cap dark brown, cream dotted, as curdled milk, on the head and snout; strongly light dotted on the PA, PF, SO, and SL; snout yellow blotched, dark outlined, as well as the PF and RO. SL blotch yellowish triangle-rectangle, on the lower half of the third to anterior fifth SL. Black nuchal collar V-reentrant in the vertebral line, reaching a transversal row of DO cycloid like, ending at level of the IL, not forming sideburns. White collar yellowish, as long as 2-3 DO rows, one DO vertebral and two laterals; black cervical collar vestigial (0.5-1 DO), almost indistinct. Ventral head side is yellowish immaculate. Tail blotch about 1/4 of the tail length, reaching 10 DO, with SC white, only with a few lateral black blotches; TE black dorsally to apex, white in

**Table 1.** Comparative data of the holotypes of *Apostolepis borellii* and *Apostolepis nigroterminata*, and of several specimens of *A. aff. nigroterminata* studied by Harvey (1999). Abbreviations: AC, anterior chin shields; F, female; M, male; PF, prefrontal; R, ratio; SC, subcaudal; SL, supralabial; TE, terminal; SAB, saw from above; VE, ventral.

	<b>MZUT.962</b>	<b>BMNH.1946.1.9.77</b>	<b>Harvey (1999)</b>
	<i>A. borellii</i>	<i>A. nigroterminata</i>	<i>A. aff. nigroterminata</i>
Specimens	Holotype	Holotype	N=14
Origin.	Brazil: Urucum	Peru: Cayaria	Peru, Bolivia, Brazil
Sex	♂ prob.	♂	♂ (10), ♀ (4)
Age	Adult	Possible newborn	All ages
Head diameter	Equal to neck	Larger than neck	?
Head profile	Rounded	Rounded	Rounded
Head from above	Rounded	Rounded	Rounded
Snout height	Low	High	Low
Snout x jaws	Not projecting	Not projecting	Not projecting
Snout SAB.	Rounded	Rounded	Rounded
Nostril position	Anterior	Anterior	Anterior
Eye to oral border	Smaller	Very smaller	Smaller
Tail	Long	Short	Longer
TE	Compressed	Compressed	Compressed
VE	208	207	♂: 200-231 (211.9), ♀: 222-231 (225.8)
SC	32	26	♂: 26-33 (28.7), ♀: 23-26 (25)
R = SC/VE	0.183	0.126	♂: 0.135, ♀: 0.111
TOL	197	207	
TAL	32	18	
SVL	165	199	
R2	0.162	0.083	
R3	0.194	0.090	
SL	6	6	6
SL under orbit	ii-iii	ii-iii	ii-iii
IL	7	7	7(6,8)
ILxAC	i-iv	i-iv	i-iv (i-v, i-vi)
PFxSL	0	0	0 (1)
SL light blotch	iv	ii-iv	½ iii+iv+ ½ v (iii-vi)
Mental region	Spots	Unblemished	Spots
Gular region	Spots	Unblemished	Unblemished (or w. spots)
White nuchal ring	2 dorsals	2-3 dorsals	1.5-3 dorsals
Black cervical ring	0.5-1 dorsal	0.5-1 dorsal	0-2 dorsals
Light SL blotch	IV SL	IV SL	Variable
Lower sides	Dark	Light to dark	Variable
Black tail blotch	Dorsal and ventral	Dorsal	Variable
Terminal	Mainly black	Almost all white	White

the remainder part including the proximal margin. Dorsum pale red (Boulenger, 1896), with five evident darkish brown stripes; the vertebral lineal, darkest, fading towards, creating a zigzag aspect on the tail, due to reduction to 8 DO rows; the paravertebral stripes are light brown, running in the sutures of the fifth and sixth DO rows, being dark outlined, but almost indistinct; lateral stripes very dark, running on the second to fourth DO rows, with dark margins. First row of DO dotted, and second DO with black tip, darkening the lower sides. Venter white (Boulenger, 1896), yellowish white (Harvey, 1999) or immaculate white.

**Hemipenis:** The hemipenis reaching the 17th pair of SC. Maxillary teeth: 3+2/3+1, with large diastema; fangs depth grooved on the anterior side.

#### Another specimens examined

UTA.44687, from Santa Cruz Department, Bolívia, determined as *A. nigroterminata* by Harvey (1999). The author provided drawing of head and a photo of the specimen in dorsal view. Curiously, the drawing is different from the photo, which is similar to the new species described to Mato Grosso, Brazil (*in litteris*). This specimen has the supralabial blotch short trapezoid (as *A. borellii*), whereas in the photo, it is long. It is similar to *A. nigroterminata* on marbled pillum and light snout, but differing by: (a) slender head (vs. broad); (b) head diameter is the same diameter of the neck (vs. wider); (c) snout narrower than head (vs. wide, rounded); (d) long, triangular supralabial blotch (vs. short, trapeze rectangle); (e) white nape collar very narrow (vs. medium). Here we name the specimen as *Apostolepis aff. borellii*.

Parker (1928) described, summarily, four specimens numbered BMNH.1927.8.1.180, BMNH 1927.8.1.181, and BMNH 1927.8.1.182, from Buena Vista, Santa Cruz Department, Bolivia, determined by him as *A. borellii*, and re-determined by Harvey (1999) as *A. nigroterminata*. We examined the specimens and concluded they represent a new species (*in litteris*) based on specimens from Mato Grosso, Brazil.

Two small specimens determined as *A. borellii* by Nelson Rufino Albuquerque (UFMS, Corumbá), are from Corumbá, state of Mato Grosso do Sul, Brazil, the ZUFS.1265, adult, and ZUFS.1716, neonate. Corumbá is near Urucum, the type-locality of *A. borellii*. The snout is not projected, color of snout white, supralabial blotch short, with one angle, stripes and dark lower sides are similar to *A. borellii*. Tail blotch long, and TE conical, different from the holotype of *A. borellii*. The two specimens may be *A. borellii*, but since they lack more data, we named them here as *A. cf. borellii*. We cannot examine the specimens because the collection is in reorganization, according to the manager, Vanda Lúcia Ferreira.

The FMNH.39646 (Figure 7), male; from Apurimac Riverbank in Sivia, La Mar, Ayacucho Department, southern Peru, was determined as *A. nigroterminata* by Harvey (1999). The Apurimac River is in the southern Cordillera, in a slope of the Peruvian plateau. This habitat is similar to the type-locality of *A. nigroterminata*, which is a forested slope of the Cordillera.

The MHNJP.3463 (MUSMP) from La Camisea, 280 OSL, D.O.R, Municipality of La Convención, Cuzco, Peru;



**Figure 7.** Specimen FMNH.39646, from Apurimac Riverbank, Ayacucho, Peru.

determined by Nelly Carrillo de Espinoza, and Jesus Córdoba (Museo Javier Prado), as *A. nigroterminata*. La Camisea is on the low slope of the Vilcabamba Cordillera, on the riverbank of the Urubumba River, tributary of Ucayali. Nelly C. Espinoza informed that the specimen was killed by her car driving on the road: the VE were partially destroyed, as well the head, but some measurements were taken; she determined it as *A. nigroterminata*, but the data available is insufficient for the determination of the species, as well as the localization. Urubumba River is the same habitat of the Ayacucho, and Ucayali Rivers, slope with forested riverbank.

The photo of a live newborn sent to us (Figure 8) is from Madre de Diós, at SE Peru, a locality adjacent to Brazil, from a region covered by Amazonian Forest. It presents the dorsal coloration brown, different from the adult's.

Catenazzi *et al.* (2013) found the species in slopes of the southern Peru, in the National Park Manu, in sub-montane rainforests, border of Brazil and Bolivia, in slope of the Peruvian southern plateau, altitudes from 500 to 180 m O.L.S., covered by the Amazonia Forest. A photo was sent of a newborn from Madre de Diós, Peru, near the Manu Park.

The species probably occurs in Brazil, and two indications are based in specimens bad determined (see Discussion).

## Discussion and conclusion

The examination of the specimens involved in the concepts of *A. borellii* and *A. nigroterminata* allowed us to make conclusions by the revalidation of the former and restriction of the latter. These two species are very little represented in collections, requiring better improvement to their knowledge. The figures presented here of both holotypes put in evidence the differences between the two species. However, a very important difference is the different ecosystems where the holotypes were found, namely the Cerrado and the Amazon Forest. *Apostolepis borellii* occurs in highlands typical of the Cerrado (“chapadas” and “cordilleras”), whereas *A. nigroterminata*, in forested valleys in eastern Peru, under strong influence of the rainforests, a very wet environment, with frequent tropical rains.

Both species are isolated in different species groups. The difference coming from the isolation of *A. nigroterminata*, the white collar, may be a characteristic of young individuals, because other species of the *nigrolineata* group present white collar fully or partially in neonates and early juvenile (*in litteris*). The contact of ME with AC in the holotype of *Apostolepis nigroterminata* sensu Ferrarezzi, 1993 is an anomaly, as well as the contact of the five IL contacting AC, which is not valid for diagnosis, nor for species characterization. The isolation of ME from the first pair of CC is constant for all species of the Tribe Elapomorhini. The relative size of the orbit, in relation to distance of it to the oral margin, is inefficient because it changes during development and, naturally, the eyes of



**Figure 8.** Live newborn of *Apostolepis nigroterminata* from Madre de Diós, Peru.

the neonate are larger than those of the adult. Only after examination of large samples, is it possible to establish the relative eye size in the different species.

The type-locality of *A. nigroterminata* is eastern Peru, in the Amazonian Forest, and the cited occurrence by Santos *et al.* (2011), Harvey (1999), and Maschio *et al.* (2012), in Cerrado, are a different biome. The misunderstanding may be due to the fact that Harvey (1999) made the equalization of *A. borellii* and several similar specimens from Bolivia Cerrado, with *A. nigroterminata*.

*Apostolepis nigroterminata* is similar to *Apostolepis nigrolineata* (PETERS 1869), and *Apostolepis niceforoi* AMARAL 1935, both with reinforced body, head short, wide and high. The three compose the *nigrolineata* group from the Amazonian Forest domain (Lema, 2003). Ferrarezzi (1993) considered *A. nigroterminata* as belonging to an isolated group, but this species presents several characters shared more with those from the Amazonian species. We placed these species, previously, in different species groups, *borellii* in an isolated group, and *A. nigroterminata* in *nigrolineata* group (Lema, 2003). The *nigrolineata* group comprises some species inhabiting northern South America, Brazil, Guyana, Colombia, and Peru, in tropical rain forests, in Amazonia. One species of the *nigrolineata* group was described for a residual forest in northeastern Brazil enclaves (*in litteris*) which presents reddish brown background, with five black dorsal stripes in the young, becoming three very thin ones in the adult.

Another group with striped dorsal pattern is the *philipsae* group, more similar to *borellii* group, occurring in northern Cerrado areas from Brazil to Bolivia, but presenting the head slandering and sharp snout, usually projecting beyond jaws, nucho-cervical collars absent or vestigial, and the five longitudinal dark stripes always evident. The *borellii* group will be composed by *A. borellii*, and, probably, together with the unknown species from Bolivia (Harvey, 1999), and others from Cuiabá and Chapada dos Guimarães, Brazil (Appendix).



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## Annex

**Annex 1.** Voucher specimens of *Apostolepis* from Central-western Brazil and Bolivia.

*Apostolepis borellii*. Brasil: Mato Grosso do Sul: Urucum (MZUT.962, holotype).  
*Apostolepis nigroterminata*. Bolivia (acc. Harvey, 1999): Beni (USNM.280371); Santa Cruz (MNKP.472, MNKP.942; CM.2909, UTA.44687, UMMZ.60773, ZFMK.66375, UMMZ.67962, UMMZ.67963). Brazil: Acre: Rio Branco (UFAC w. n.). Peru: Ayacucho: La Mar: Sivia in Ayacucho River (FMNH.39646). Cuzco: La Convención: Camisea, 280 m OSL (MUSMP.3463). Ucayali Valley: Callaria, Ucayali Riverbank (BMNH.81.5.13.76, holotype).  
*Apostolepis* sp. 1. Bolivia: Santa Cruz: Buena Vista (BMNH.1927.8.1.180, BMNH.1927.8.1.181, BMNH.1927.8.1.182). Brasil: Mato Grosso: Chapada dos Guimarães; UHE Manso (MCP.12096, MCP.14525).  
*Apostolepis* sp. 2. Brasil: Mato Grosso; Tapirapés Riverbank (AMNH.87942).