

Apistogramma sororcula, a new dwarf cichlid (Teleostei: Cichlidae) from the drainage of the rio Guaporé in Bolivia and Brazil

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Abstract

Apistogramma sororcula sp. n. is described from the drainage of the the rio Guaporé in Bolivia (Departamento Beni) and Brazil (Estado Mato Grosso). It can be distinguished from all the other described *Apistogramma* species by the following combination of characters of the males: upper pectoral spot present, chin with dark band just below lower lip, a suborbital stripe becoming ventrally much wider, on bases of anterior abdominal scales several short vertical streaks forming oblique stripes, small round caudal spot, lateral band reaching caudal fin or caudal spot, produced dorsal-fin lappets, truncate caudal fin with streamers and distinct pattern of narrow vertical stripes, filamentous extensions of the pelvic fins and only three infraorbital pores. It is most similar to *Apistogramma staecki* KOSŁOWSKI, 1985, but differs from this species by the higher number of 10 to 12 vertical stripes on the caudal fin of adult males, a lateral band reaching caudal fin or caudal spot, short vertical abdominal stripes on bases of scales of the anterior body and produced dorsal-fin lappets.

Resumen

Se describe *Apistogramma sororcula* sp. n. de la cuenca del río Guaporé en Bolivia (Departamento Beni) y Brasil (Estado de Mato Grosso). Puede distinguirse de todas las demás especies de *Apistogramma* descritos por la siguiente combinación de características de los machos: mancha en la base de la aleta pectoral superior presente; barbilla con banda oscura justo debajo del labio inferior; banda suborbital convertirse ventral mucho más amplio; franjas verticales cortas que pigmentan la porción final y basal de las escamas delanteras y forman líneas oblicuas en la zona abdominal; pequeña mancha caudal redonda; una banda lateral que se extiende hasta la aleta caudal o la mancha caudal; aleta dorsal con membranas prolongadas, aleta caudal recortada con prolongaciones filamentosas cortas en cada uno de los lóbulos y con un patrón rayado (generalmente 10 a 12 barras transversales); aletas pélvicas con extensiones filamentosas; tres únicos poros infraorbitarios. Es más similar a *Apistogramma staecki* KOSŁOWSKI, 1985, pero difiere de esta especie por el mayor número de 10 a 12 rayas verticales en la aleta caudal, una banda lateral que se prolonga hasta la aleta caudal o la mancha caudal, franjas verticales cortas que pigmentan la base de las escamas delanteras y forman líneas oblicuas en la zona abdominal y una aleta dorsal con membranas prolongadas.

Kurzfassung

Apistogramma sororcula sp. n. wird aus den Einzugsgebieten des Rio Guaporé im Departamento Beni in Bolivien und im Estado Mato Grosso in Brasilien beschrieben. Die neue Art lässt sich von allen anderen bisher beschriebenen *Apistogramma*-Arten durch die Kombination folgender diagnostischer Merkmale der Männchen abgrenzen: oberer Brustfleck vorhanden, Suborbitalstreifen in Richtung Kehle wesentlich verbreitert, am Grund der vorderen Schuppen kurze vertikale Streifen, die schmale schräge vertikale Linien in der unteren Körperregion bilden, kleiner runder Schwanzwurzelfleck, Längsband erstreckt sich bis zur Schanzflosse oder dem Schwanzwurzelfleck, Flossenhäute der Rückenflosse verlängert, Schwanzflosse gestutzt, oben sowie unten zu einer Spitze ausgezogen und mit deutlichem dichten Streifenmuster, Bauchflossen fädig verlängert und nur drei Infraorbitalporen. Die neue Art ist *Apistogramma staecki* KOSŁOWSKI, 1985 am ähnlichsten, unterscheidet sich jedoch durch die höhere Zahl von zehn bis zwölf vertikalen Streifen in der Schwanzflosse, das bis in die Schwanzflosse oder zum Schwanzwurzelfleck reichendes Längsband, kurze vertikale Striche am Grund der vorderen Körperschuppen und verlängerte Häute in der Rückenflosse.

Key words

Ichthyology, taxonomy, Cichlinae, Geophagini, new species, rio Guaporé, río Iténez, Departamento Beni (Bolivia), Estado de Mato Grosso (Brazil).

Introduction

The South American cichlid genus *Apistogramma* REGAN is extremely rich in species for at present there are 84 (VARELLA & SABAJ PÉREZ, 2014) valid taxa. In addition, more than 30 species not formally described are listed in the aquarium literature (KOSLOWSKI, 2002; STAECK, 2003; RÖMER, 2006; STAECK & LINKE, 2006). Most *Apistogramma* species are small fishes for the males, usually greater than females, generally have only a standard length of less than 50 mm. Pronounced sexual dimorphism in morphology, fin shape and colour patterns is common in the genus. Males of different species are usually more distinct from each other than females.

Many *Apistogramma* species have an extremely restricted geographical distribution and are confined to very small areas, sometimes only to the catchment of a single river basin or to the drainage of a few adjacent tributaries (e.g. STAECK, 2003; RÖMER, 2006; BRITZKE & MEHANNA 2010; MESA & LASSO, 2011). This is especially a characteristic of species distributed in the tropical forests in the Orinoco and Amazon basins.

Three *Apistogramma* species have been recorded from the drainage of the rio Guaporé (referred to as río Iténez in Bolivia), viz. *A. trifasciata* (EIGENMANN & KENNEDY, 1903), *A. inconspicua* KULLANDER, 1983 and *A. staecki* KOSLOWSKI, 1985 (originally described from the Rio Mamoré basin). However, the record of *A. staecki* from the drainage of the rio Guaporé (KULLANDER, 2003) probably goes back to a misidentification and refers to the species described here in the following. CARVAJAL-VALLEJOS *et al.* (2014) listed additional species of *Apistogramma* occurring in the basin of the rio Guaporé. But this needs further investigation since several of their records are based on misidentifications.

The dwarf cichlid described below from the rio Guaporé drainage is an example of the many *Apistogramma* species, which have become well-known in the aquarium literature long before the material for a scientific description was available. It was discovered in 1987 and in the aquarium literature later provisionally referred to by the name *Apistogramma* sp. “Guaporé” or *Apistogramma* sp. “Rio Guaporé” (STAECK, 2003; RÖMER, 2006; STAECK & LINKE, 2006). The objective of this paper is to present a formal description of this species.

Material and methods

The type specimens were fixed in formalin and later transferred into 75% ethanol. The holotype and the majority of paratypes are deposited in the fish collection of the Museum für Tierkunde Dresden, Germany (MTD F). Two paratypes are deposited in the Centro de Investigación de Recursos Acuáticos, Universidad Técnica del Beni, Trinidad, Bolivia (CIRA-UTB).

The techniques for taking measurements and meristic data follow those described in KULLANDER (1980; 1986). Measurements were made with an electronic digital caliper reading to the nearest 0.1 mm. Specimen lengths are given as standard length (SL). Scale rows are numbered as described in KULLANDER (1990). Numbers in brackets after counts indicate the number of specimens examined with that condition. The number of the dark transverse bars on the caudal fin includes the last on its distal margin.

In accordance with current taxonomic publications on the genus *Apistogramma* (e.g. MESA & LASSO, 2011; VARELLA & SABAJ PÉREZ, 2014), the new species is diagnosed on external characters. The species concept used here is the diagnostic variant of the phylogenetic species concept (cf. NIXON & WHEELER, 1990).

Comparisons were made with the following specimens of *Apistogramma staecki*: ZFMK 13400 (holotype, male, 20.8 mm SL); MTD-F 33634–33636, 3 ex., 32.1–38.3 mm SL, Bolivia, Depto. Pando, drainage of rio Manuripi in the vicinity of Puerto Rico *leg.* W. Staeck, 2012.

Apistogramma sororcula sp. n.

Figs. 1–3, 5–6, 9–10, table 1

Holotype. MTD-F 33580, adult male, 40.1 mm SL, Bolivia, Depto. Beni, rio San Martin, approx. 5 km upstream of the village Bella Vista, *leg.* W. Staeck, 2004.

Paratypes. MTD-F 33581–33582, 2 ex., 35.0–40.3 mm SL, collecting data like holotype. CIRA-UTB 3271–3272, 2 ex., 35.9–41.7 mm SL, collecting data like holotype. MTD-F 33583–33598, 16 ex., 16.2–34.6 mm SL, Brazil, Estado Mato Grosso, rio Guaporé, vicinity of Vila Bela da Santissima Trindade, *leg.* W. Staeck, 1987. MTD-F 33599–33603, 5 ex., 35.9–41.0 mm SL, Bolivia, Depto. Beni, rio San Martin, vicinity of the village Bella Vista, *leg.* W. Staeck, 2006. MTD-F 33604–33633, 30 ex., 16.8–23.0 mm SL, Brazil, Estado Mato Grosso, rio Guaporé, vicinity of Vila Bela da Santissima Trindade, *leg.* W. Staeck, 1987.

Non-type specimen (collection of the authors), 28 ex. 17.0–25.9 mm SL, Bolivia, Depto. Beni, rio San Martin, brooks and lagoons in the vicinity of the village Bella Vista, *leg.* W. Staeck, 2007.

Diagnosis. A small, comparatively slender geophagine cichlid. Males differ from other *Apistogramma* species by the combination of the following characters: (1) caudal fin truncate, with streamers on ventral and dorsal parts and distinct pattern of up to 12 narrow vertical stripes; (2) anterior dorsal-fin lappets long, produced, with prolongations; (3) caudal spot small, round; (4) lateral band reaching base of caudal fin; (5) upper pectoral spot on the dorsal base of the pectoral fin present; (6) chin with dark band just beneath lower lip; (7) suborbital stripe becoming ventrally much wider; (8) short vertical stripes on bases of anterior abdominal scales; (9) pelvic fins of males with long filamentous extension; (10) only three infraorbital pores.



Fig. 1. Male *Apistogramma sororcula* sp. n., holotype, MTD-F 33580.

Tab. 1. Morphometric data of holotype and eight male paratypes of *Apistogramma sororcula* in percent of SL (in mm); min = lowest value, max = highest value, mean = arithmetic mean, sd = standard deviation.

	min	max	mean	sd
Standard length (mm)	35.0	41.7	39.0	2.28
Total length	130.4	140.7	134.8	3.31
Head length	29.5	33.4	31.2	1.45
Snouth length	7.1	11.2	9.3	1.32
Body depth	31.1	34.1	32.8	1.18
Eye diameter	9.9	11.2	10.7	0.46
Interorbital distance	8.6	11.0	9.8	0.80
Preorbital length	3.3	3.8	3.6	0.18
Peduncle depth	10.1	12.4	11.0	0.78
Peduncle length	14.5	16.4	15.4	0.71
Pectoral-fin length	23.2	28.8	25.7	1.94
Pelvic-fin length	42.1	63.3	51.4	6.36
Length last D spine	13.7	17.7	16.0	1.57
Dorsal-fin base length	57.1	63.2	61.3	2.12
Anal-fin base length	20.7	23.3	22.0	0.89

Description. General appearance and colour pattern illustrated in figs. 1–3 & 5–6. Morphometric data are summarized in table 1. A comparatively slender species (body depth 30–34 % of SL) with distinct sexual dimorphism and sexual dichromatism. Predorsal and preventral contours about equally steep. Snout short, rounded in lateral and dorsal views. Mouth terminal, lower jaw slightly longer anteriorly; maxilla extending to margin of orbit. Eye located supralateral, margin slightly distant from predorsal contour. Head length about one third (30–32 %) of SL. Caudal peduncle higher than long. Dorsal fin in adult males with distinctly produced lappets. Soft dorsal and anal fin in males pointed, with prolongation. Caudal fin with 3 procurent and 8 principal rays in each lobe; in females rounded, in males truncate, comparatively long (up to about 40 % of SL, streamers included), with short

streamers produced by 4th or 5th ray of each lobe. Pelvic fins with long thread-like prolongation extending beyond spiny portion of anal fin (pelvic-fin length in males up to 58 % of SL). Pectoral fins rounded (pectoral-fin length 25–29 % of SL).

Dorsal fin XV.6(3), XV.7(5), or XVI.6(3). Anal fin III.5(1), III.6(5), or III.7(5). E1 row scales 21(1), 22(9) or 23(1). Tube bearing scales in upper lateral line 5(1), 6(2), 11(2), 12(1), 13(3), or 14(2); in lower lateral line 4(3), 5(2), 6(3), 7(2), or 8(1). Pectoral fin rounded with usually 12 rays. Base of dorsal and anal fin, pectoral and pelvic fins without scales; caudal fin base densely scaled (up to about one third of its length). Three infraorbital pores. External gill rakers on first ceratobranchial 1(1), or 2(10). Lower pharyngeal tooth-plate (dissected from one specimen of 36.1 mm SL) wider than long (length about 75 % of width), with 13/14 teeth in posterior and 5/6 teeth in median row.

Coloration in life. Based on observations immediately after capture and on specimens kept in aquarium. Adult males of *Apistogramma sororcula* show a distinct polychromatism with a yellow and a bluish colour morph. Males of the yellow morph have bright yellow cheeks and gill covers. Blue males have a predominantly whitish or bluish lower region of the head.

Forehead, nape and dorsal region dark grey or yellowish-brown, rest of body light grey to whitish. With dark band covering chin just below lower lip. Lower portion of suborbital stripe ventrally much wider, often reduced to a conspicuous black spot in the corner of the opercle. Blackish pectoral spot at the base of the upper margin of the pectoral fin. Usually without lateral spot or vertical bars. Bases of anterior abdominal scales with short vertical streaks often forming 5 or 6 oblique abdominal stripes. Postorbital stripe continued as narrow lateral band, posteriorly running in a zigzag, approx. one scale deep, and terminating on the base of caudal fin. Small roundish caudal spot, not extended beyond lateral



Fig. 2. Adult male of *Apistogramma sororcula* sp. n. (yellow colour morph) from type locality, photographed in the aquarium.



Fig. 3. Adult male of *Apistogramma sororcula* sp. n. (bluish colour morph) from type locality, photographed in the aquarium.

band. Black midventral stripe and vent region. Iris dark red.

Dorsal fin dark grey or bluish, with two black anterior membranes, usually with a dark base and two or three vertical rows of dark dots on posterior part of soft fin. Caudal fin hyaline, but with a distinct reticulate pattern of up to twelve (13 in one specimen) narrow dark transverse bars on caudal fin. Pelvic fins blue or greyish. Anal fin bright blue, with up to nine vertical rows of dark dots

on posterior part of soft fin. Pectoral fins colourless and hyaline.

Females usually beige coloured, frequently with yellow head and belly, with lateral band or sometimes a small roundish lateral spot not extending beyond the lateral band, conspicuous black suborbital stripe with much wider lower portion, midventral stripe and hyaline to grey fins. Caudal and posterior part of soft anal fin with pattern of vertical spot-stripes. First two anterior dorsal-



Fig. 4. *Apistogramma staecki* from the drainage of rio Manuripi in the vicinity of Puerto Rico (approx. 5 cm TL) in a photo tank immediately after capture.



Fig. 5. Female of *Apistogramma sororcula* sp. n. from Rio San Martin during brood care in the aquarium.

fin and anal-fin membranes and anterior portion of ventral fins black. During brood care fins and body bright lemon yellow, usually without lateral band or lateral spot. Suborbital stripe often reduced to a black spot in the corner of the gill cover.

Coloration in alcohol. Body, head and fins greyish, slightly darker in dorsal region. Scales with dark margins and light centre. Dark markings and patterns on body

and fins as described above. Suborbital stripe prominent. Neither vertical bars and lateral band nor lateral spot visible, but both sexes with midventral stripe.

Distribution. *Apistogramma sororcula* is known from several localities in the drainage of the upper and lower rio Guaporé in the province of Beni in Bolivia and in the state of Mato Grosso in Brazil. Confirmed collecting sites in Brazil are situated in the vicinity of the village



Fig. 6. Female paratype of *Apistogramma sororcula* sp. n. from Rio Guaporé with vertical streaks forming oblique abdominal stripes.

Vila Bela da Santíssima Trindade and in Bolivia in the drainage of the rio San Martín approx. 5 km upstream of the village Bella Vista. In addition, the species is also said to be exported for the aquarium hobby from the Lago das Cobras in the drainage of the rio Pacaás Novos in the southeast of the town Guajará-Mirim in the Estado Rondonia, Brazil (KOSLOWSKI, 2002).

Ecological notes. Our field observations revealed that *Apistogramma sororcula* is a lentic-adapted species capable of dealing with a comparatively wide range of physicochemical environmental conditions. The fish live in clear water and white water habitats or a mixture of these two water types. Water data of several collecting sites in the drainages of the Guaporé and the San Martín are: pH 6.2–6.7, total and temporary hardness <1 °dH, electrical conductivity 5–20 µS/cm, water temperature 24–28 °Celsius.

Apistogramma sororcula lives along the banks of lagoons and rivers in the littoral zones with extremely shallow water, i.e. in a water depth between approximately 5 and 40 cm. We found it either in a thick layer of dead leaves covering the bottom of the bank sides or among aquatic and submerged terrestrial vegetation. There is a distinct positive correlation between the available shelter and the abundance of the species. The highest population density occurs where a thick layer of dead leaves provides plenty of cover and protection. At the collection sites in the drainage of rio San Martín the associated fish fauna includes *A. trifasciata* and *A. inconspicua*.

In the rio San Martín the seasonal fluctuation of the water level is considerable. The normal seasonal difference between high and low water is eight meters. In the high-water season the river water floods into the ripar-

ian forest and inundates the vegetation. *Apistogramma sororcula* apparently breeds in the flooded riparian forest during the high-water season. At the beginning of the dry season, the water level rapidly falls and the river water returns into its main channel. At that time, the still sub-adult fishes leave the riparian forests, which mostly dry up.

Reproductive behaviour. Observations under aquarium conditions revealed that *Apistogramma sororcula* is a polygynous cave spawner. Males defend a territory containing several potential spawning sites. Each of them may serve as the focus of a smaller territory occupied by a female. Like most cave brooders these dwarf cichlids place their eggs on the bottom side of a horizontal surface. The preferred spawning site is the underside of a stout plant leaf.

At 27 °C hatching occurs about three days post-spawning. The fry attempt swimming approximately five days thereafter. After spawning the female drives the male energetically from the close proximity of the spawning site. Parental care is exclusively maternal in this species, although the male may indirectly assist by defending the territory against predators.

Etymology. The species epithet is a Latin noun which means 'little sister'. It refers to the similarity and the close relationship with *Apistogramma staecki*.

Discussion. *Apistogramma sororcula* is a member of the *A. cactuoides* species complex (KULLANDER, 1986; KOSLOWSKI, 2002; STAECK, 2003; RÖMER, 2006; BRITZKE & MEHANNA, 2010). Species of this complex are characterized by only three infraorbital pores and both a distinct



Fig. 7. Collecting site of *Apistogramma sororcula* sp. n. at the rio Guaporé in the vicinity of Vila Bela da Santíssima Trindade.



Fig. 8. Habitats of *Apistogramma sororcula* sp. n. at the rio San Martin (vicinity of Bella Vista).

sexual dimorphism and dichromatism. Adult males have a dark marking on the chin just below the lower lip, a lyrate caudal fin with dorsal and ventral streamers and a pattern of spot-stripes, a dorsal fin with two black anterior membranes and produced lappets, a lateral spot, a longitudinal band usually extending to the base of the caudal fin and abdominal markings in the anterior body region. Females possess a pectoral spot and a midventral stripe.

KOSLOWSKI (1985) counts among the diagnostic characters of *A. staecki* (closely related to *A. sororcula*) the low number of tube-bearing scales in the lower lateral line. However, the data obtained from the specimens of *A. sororcula* we examined revealed that their number increases during ontogenesis, i.e. there is a positive correlation between the size of the fish and the number of tube-bearing scales in its lower lateral line (fig. 9). Their number, therefore, depends on the age of the fish (KULLANDER, 1980).

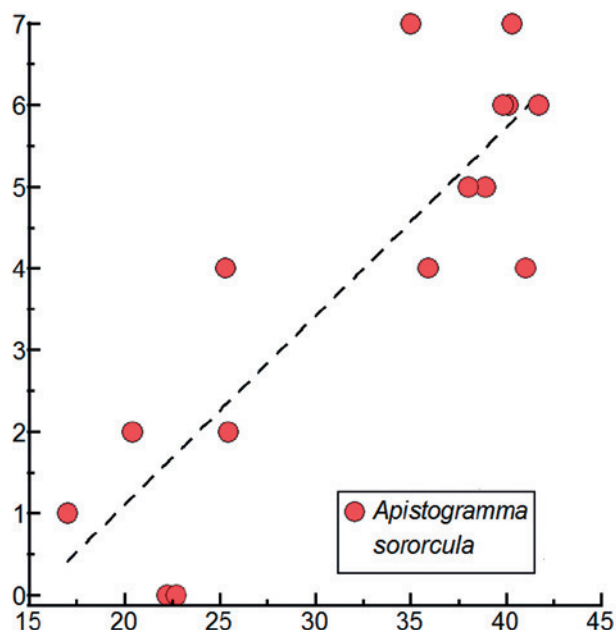


Fig. 9: Relation between standard length (x-axis) and the number of tubed scales in lower lateral line (y-axis) in *Apistogramma sororcula* sp. n.; dashed line = linear regression ($r = 0.86$, $a = -3.52$, $b = 0.23$).

Apistogramma sororcula is most similar to its probable sister species *A. staecki*, but differs from it by the higher number of (usually) 11 to 12 (or even 13) vertical stripes on the caudal fin of adult males (versus up to 8, rarely 9 in male specimens of *A. staecki*; see figs. 1–4 and 10), a lateral band reaching the caudal fin or caudal spot (versus not continuous with caudal spot), short vertical abdominal stripes on the bases of the anterior scales (fig. 6), distinctly produced dorsal-fin lappets (versus only lappets 4–6 produced) and a dark marking on its chin (versus no dark mark in comparative material of *A. staecki*). Additionally, bars 4 and 5, which are vertically divided in *A. staecki*, are usually not split into two narrow stripes in *Apistogramma sororcula* (refer to fig. 4 and photographs in KOSŁOWSKI, 2002; STAECK, 2003; RÖMER, 2006; STAECK & LINKE, 2006 for a comparison).

Apistogramma sororcula and *A. staecki* have a vicariant distribution in the rivers draining the Bolivian lowlands (see below). Such allopatric species pairs may pose problems because morphological differences are often small and hence discrimination and classification difficult (MAYR, 1969). However, minor deviations in the coloration or the patterns of dark markings may be of biological significance. For in cichlids mating preferences and mate choice are based on visual factors (e. g. COULDRIDGE & ALEXANDER, 2002; BLAIS *et al.*, 2009), and the females of *Apistogramma* species can discriminate between conspecific and heterospecific courting males even if they are closely related and look very similar (RÖMER & BEISENHERZ, 2005). As the males display their caudal with an intensified bar pattern in front of the females during courtship, the differences in the number of

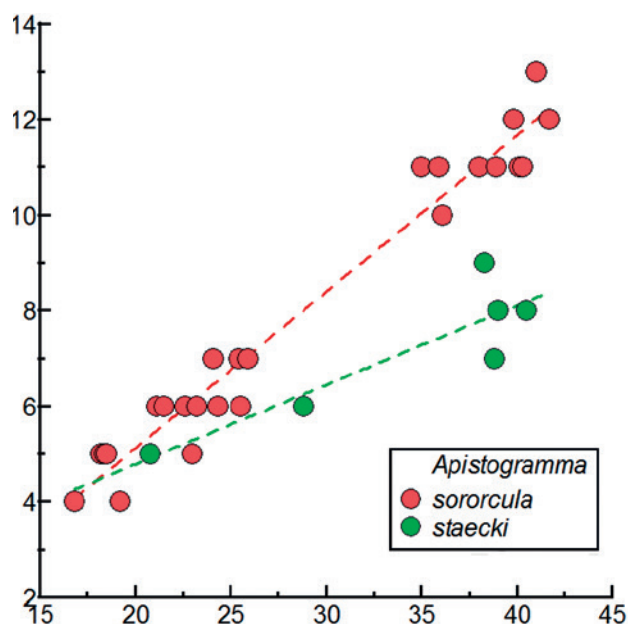


Fig. 10: Number of vertical bars on caudal fin in males (y-axis) of *Apistogramma sororcula* sp. n. and *A. staecki* plotted against standard length (x-axis). Red dashed line = linear regression in specimens of *A. sororcula* sp. n. ($r = 0.98$, $a = -1.45$, $b = 0.33$); green dashed line = linear regression in specimens of *A. staecki* ($r = 0.89$, $a = 1.46$, $b = 0.17$).

vertical bars in the caudal fin of male *Apistogramma sororcula* and *A. staecki* may be a reproductive barrier.

The Bolivian lowlands, where *A. sororcula* and *A. staecki* occur, are part of the Amazonian ichthyographic province (GÉRY, 1969; HUBERT & RENNO, 2006). Its Bolivian subbasin is a semi-isolated region separated from the adjacent main Amazon Basin by the rapids and waterfalls of the upper rio Madeira (SARMIENTO *et al.*, 2014). The major rivers of this subbasin, which encompasses the southern portion of the Madeira drainage, are the rio Madre de Dios, the rio Beni, the rio Mamoré and in the east the rio Guaporé.

The rio Guaporé forming the border between Bolivia and Brazil drains the southeastern edge of this ichthyographic province. Unlike other right bank tributaries of the Madeira draining the Bolivian lowlands, it is the only river that originates on the Brazilian Shield. This results in distinctly different chemical and physical characteristics. The rio Madeira and the rivers draining the Beni plains are characterized by nutrient rich, sediment laden turbid whitewater (pH up to 7.6; usually between 70 and $>100 \mu\text{S/cm}$ (BARBOSA & *et al.*, 1999; ROCHE & FERNANDEZ, 1988, STAECK pers. obs.). In contrast, the rio Guaporé is a nutrient poor, clearwater river with relatively high transparency, slightly acid pH (usually 6.3–6.8), a negligible or moderate concentration of solutes and, consequently, low (usually 20–34 $\mu\text{S/cm}$) electric conductivity (ROCHE & FERNANDEZ, 1988; SARMIENTO & KILLEEN, 1998; SARMIENTO *et al.*, 2014; STAECK pers. obs.).

These differences in the physicochemical environmental conditions combine with other evolutionary fac-

tors to produce significant differences in the ichthyofauna of the the rio Guaporé drainage when compared to the rest of Bolivia (SARMIENTO, 1998). Although it appears that there are no physical barriers between the rio Mamoré basin and the adjacent drainage of the rio Guaporé, there is a number of sister species of dwarf cichlids, which have like *Apistogramma sororcula* and *A. staecki* a marked allopatric distribution, with one species distributed in rivers draining the western parts of the Bolivian lowlands and the other limited to the rio Guaporé basin.

These pairs within the genus *Apistogramma* are *A. erythrura* in the rio Mamoré and *A. trifasciata* in the rio Guaporé as well as *A. linkei* (rio Mamoré) and *A. inconspicua* in the rio Guaporé (STAECK & SCHINDLER, 2008; STAECK, 2003; KULLANDER, 2003). Similar distribution patterns are also described for the two species pairs *Crenicara punctulatum* and *C. latruncularium* (see KULLANDER & STAECK, 1990; KULLANDER, 2003) and *Mikrogeophagus altispinosus* and *M. sp.* “Pindaituba” from the drainage of the rio Sararé, a right bank tributaries of the rio Guaporé (STAECK, 2003; STAECK & LINKE, 2006).

Thus the dispersal of *Apistogramma sororcula* and *A. staecki* is no exception, but agrees with the distribution patterns of several other dwarf cichlid species occurring in the Bolivian lowlands.

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