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A new species of *Astyanax* (Teleostei, Characiformes, Characidae), with breeding tubercles, from the Paraná and Uruguay river basins

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Abstract

A new species of *Astyanax*, which is unusual in having breeding tubercles in mature males, is described from the Paraná and Uruguay river basins. The new species is distinguished from all other members of the genus by this feature, together with the following unique combination of characters: a round or trapezoidal humeral spot; a branch of the infraorbital sensory canal directed ventrally, continued as a series of pores totally or partially traversing the third infraorbital; body relatively slender (31.8–37.4 %SL); eye large (41.1–45.8 %HL); snout short (15.5–20.9 %HL); caudal peduncle relatively slender (10.3–12.0 %SL); maxilla with 1 pentacuspid tooth; 38–42 perforated scales in lateral line and v–vi, 23–29 anal fin rays. Males have dermal contact organs on all fins and epidermal breeding tubercles on the head and scales.

Key words: Ostariophysi, *Astyanax*, new species, taxonomy, biodiversity, mesopotamic region, Argentina

Resumen

Una nueva especie de *Astyanax*, particular por tener tubérculos reproductivos en los machos maduros, es descripta de la cuenca de los ríos Paraná y Uruguay. La nueva especie se distingue de todas las otras del género, por este último carácter junto con la siguiente combinación de caracteres: una mancha humeral redondeada o trapezoidal; una rama del canal sensorial del infraorbital, dirigida ventralmente, se continúa en una serie de poros atravesando parcial o totalmente al tercer infraorbital; cuerpo relativamente delgado (31.8–37.4 %SL); ojo grande (41.1–45.8 %HL); hocico corto (15.5–20.9 %HL); pedúnculo caudal relativamente delgado (10.3–12.0 %SL); un diente maxilar pentacúspide; 38–42 escamas perforadas en la serie lateral y v–vi, 23–29 radios en la aleta anal. Los machos tienen órganos de contacto dérmicos en todas las aletas y tubérculos nupciales epidérmicos en la cabeza y escamas.

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Introduction

The genus *Astyanax* Baird & Girard comprises approximately one-hundred valid species, occurring from southern United States of America to northern Patagonia in Argentina (Miquelarena & Menni, 2005). It is probable, however, that this genus, like several other genera included within the Characidae (e.g. *Hyphessobrycon*, *Moenkhausia*, *Bryconamericus*, *Hemigrammus*), is not monophyletic (Weitzman & Fink, 1983; Zanata, 1997; Weitzman & Malabarba, 1998; Lima *et al*., 2003; Castro & Vari, 2004).

In this paper we describe *Astyanax aramburui*, a new species of the diverse genus *Astyanax*, collected from creeks, small ponds and swamps in the flood plains within the Paraná and Uruguay River basins in Entre Ríos province of eastern Argentina. Entre Ríos province represents, along with the rest of the Mesopotamic region, one of the areas of highest biodiversity in Argentina (López *et al*., 2005). From an ichthyofaunistic standpoint, it is part of the Paranoplatensean Province (Ringuelet, 1975) and the Subtropical Potamic Axis and Lower Uruguay River ecoregions (López *et al*., 2002).

Material and methods

Measurements and counts were made following Fink & Weitzman (1974). Additional counts include row of scales at base of anal fin. Morphometric data for the holotype are presented separately in the table; in which SD stands for “standard deviation”, and “n” stands for the number of specimens measured. Counts of vertebrae, supraneurals, gill-rakers on the first arch, teeth, and procurrent caudal-fin rays were taken from cleared and stained specimens (c&s), prepared according to Taylor & Van Dyke (1985). Total vertebral counts include the four vertebrae of the Weberian apparatus, and the terminal centrum counted as a single element. The breeding tubercles were prepared for observation with Scanning Electron Microscope (SEM). Specimens used for preparation of histological serial cross sections were fixed with alcoholic Bouin and stained with hematoxylin and eosin. All measurements are expressed as percents of standard length (SL), except for head measurements, which are expressed as percents of head length (HL). For all counts, frequencies are given in parentheses and the holotype is indicated by an asterisk. The following institutional abbreviations were used: ILPLA—Instituto de Limnología “Dr. Raúl A. Ringuelet”, Argentina; and MLP—Museo de La Plata, Argentina.

Astyanax aramburui new species

Fig. 1

Holotype. ILPLA 1712, male, 61.1 mm SL; Villaguay Creek at Balneario (31º55’S 59º03’W), Gualeguay River basin, Entre Ríos Province, Argentina; coll.: A. Miquelarena, *et al*., November 2004.

Paratypes. ILPLA 569, (13), 7 males, 6 females, 59.2–78.9 mm SL; Brazo Chico Creek, 10 km from Uruguay River (33º45'S 58º32'W), Entre Ríos Province, Argentina, coll: N. Landoni, January 1985; ILPLA 1709, (4) 2 males, 2 females (c&s), 60.2–80.9 mm SL; same locality as previous specimen; ILPLA 1710, (7) males, 55.0–60.6 mm SL; ILPLA 1711, (5) 4 males, 1 juv. (c&s), 41.0–74.2 mm SL; ILPLA 1713, (4) males, 57.7–66.0 mm SL, MLP 9672, male, 55.0 mm SL, collected with holotype.

TABLE 1. Morphometric data of *Astyanax aramburui*. SD: standard deviation.

Characters	Holotype male	Paratypes					
		males (n=14)			females (n=6)		
		Range	Mean	SD	Range	Mean	SD
Standard length (mm)	61.1	55.0–77.9	63.6		62.5–78.9	71.5	
Percentage of SL							
Head length	23.9	22.6–25.2	24.0	0.94	23.7–24.9	24.2	0.44
Body depth	33.8	31.8–37.4	33.4	1.52	33.9–36.0	35.0	0.71
Snout to dorsal-fin origin	48.9	45.9–50.5	48.3	1.22	47.7–49.3	48.7	0.53
Snout to pectoral-fin origin	21.0	20.9–24.1	22.3	1.14	22.8–23.6	23.1	0.32
Snout to pelvic-fin origin	43.3	39.8–41.6	40.9	0.63	41.2–44.2	43.0	1.26
Snout to anal-fin origin	61.1	54.5–61.5	59.1	1.94	58.3–61.8	60.4	1.16
Caudal peduncle length	10.5	7.8–11.2	9.9	1.11	9.2–11.2	10.0	0.76
Caudal peduncle depth	11.0	10.3–12.0	11.0	0.42	10.6–11.2	10.9	0.25
Dorsal-fin base length	14.2	12.6–15.2	13.9	0.70	12.5–14.2	13.6	0.60
Anal-fin base length	33.3	31.6–34.7	33.1	0.79	30.2–33.2	31.3	1.12
Pectoral-fin length	23.9	21.0–24.1	22.4	1.02	22.0–23.9	22.9	0.80
Pelvic-fin length	19.2	16.8–20.4	18.5	1.08	17.4–19.3	18.3	0.76
Dorsal-fin length	26.7	23.1–27.3	25.0	1.06	22.8–26.1	24.9	1.30
Percentage of HL							
Horizontal eye diameter	44.6	41.2–45.8	43.8	1.24	41.1–44.2	42.5	1.15
Snout length	15.9	15.5–20.9	18.0	1.43	16.1–19.5	17.6	1.11
Interorbital width	33.5	30.8–35.3	32.7	1.31	30.3–34.1	33.0	1.41
Upper jaw length	39.6	36.1–43.6	39.8	2.15	40.3–41.6	41.0	0.42

Diagnosis: *Astyanax aramburui* is distinguished from all congeners by the following unique combination of characters: round or trapezoidal black humeral spot, dorsal to the lateral line; a branch of the infraorbital sensory canal directed ventrally, continued as a series of pores totally or partially traversing the third infraorbital; body relatively slender (31.8–37.4 % SL); eye large (41.1–45.8 % HL); snout short (15.5–20.9 % HL); caudal peduncle relatively slender (10.3–12.0 % SL); one pentacuspid maxillary tooth; 38–42

perforated scales in lateral line; and v–vi, 23–29 anal-fin rays. In addition, the species is characterized by the presence, in males, of breeding tubercles on the head and scales, and bony hooks on all fins.

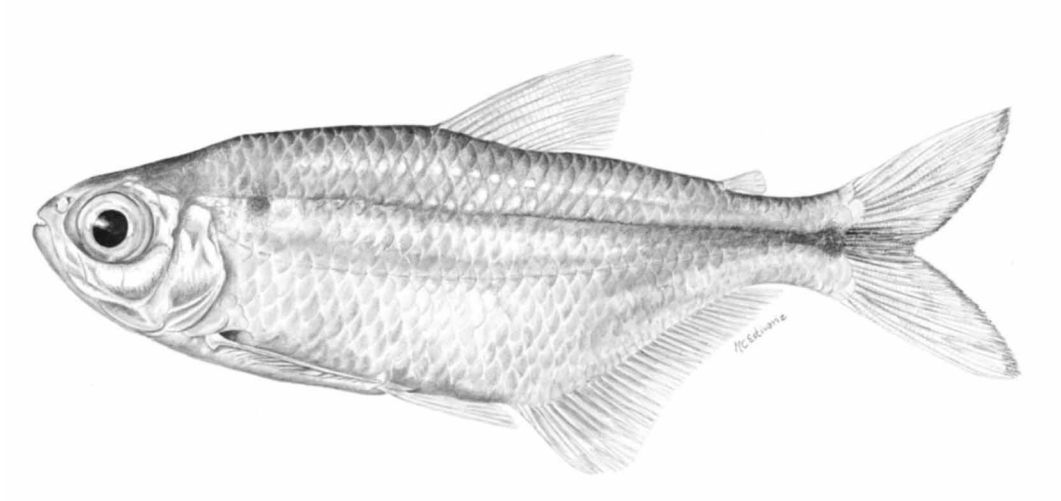

FIGURE 1. *Astyanax aramburui* **sp. n**., ILPLA 1712. Holotype, male, 61.1 mm SL.

Description: Morphometric data appear in table 1. Body elongate, with maximum body depth at dorsal-fin origin (31.8–37.4% SL). Dorsal body profile convex, slightly concave between eye and supraoccipital process, relatively straight from that point to dorsal-fin origin and descending slightly to adipose-fin origin. Dorsal and ventral margins of caudal peduncle slightly concave. Caudal peduncle relatively slender (10.3–12.0% SL). Ventral body profile convex between tip of snout and pelvic-fin origin, nearly straight between that point and anal-fin origin. Body compressed posteriorly from anal-fin origin. Head short (22.6–25.2% SL). Snout short (15.5–20.9% HL). Eye large (41.1–45.8% HL). Interorbital less than eye diameter (30.3–35.3% HL). Mouth terminal or slightly superior, lower jaw included. Maxilla relatively long, extending slightly beyond anterior edge of orbit.

Dorsal-fin origin almost equidistant between tip of snout and base of caudal-fin. Tip of pectoral fin surpassing pelvic-fin origin in both males and females. Tip of pelvic fin almost never reaching anal-fin origin in most females (except in one specimen). Tip of pelvic fin of males either falling short of, reaching or surpassing anal-fin origin. Bony hooks present on rays of all fins in matures males. Hooks mostly present on posterior branches of rays. Usually one pair of bony hooks per ray segment.

Dorsal-fin rays ii,9 (6*); iii,9 (4); posterior margin of dorsal fin typically straight, the last unbranched ray and first two branched rays longest. Bony hooks of males small, scattered on branches of first to eighth fin rays.

Pectoral-fin rays i,12 (3); i,13 (6); i,14 (1*). Bony hooks of large specimens small and scarce, 4–6 hooks on a few branched rays.

Pelvic-fin rays i,7 (10*). Bony hooks numerous, more developed on first to fourth branched rays. Origin of pelvic fin anterior to dorsal-fin origin. Pelvic axillary scale without hooks. Posterior margin of pectoral and pelvic fins rounded.

Anal-fin rays v,23 (1); v,24 (1); vi,25 (1*); v,25 (3); v,26 (2); v,27 (1); vi,29 (1). Bony hooks conspicuous, curved, distributed from last unbranched ray to, usually, 15th branched ray. Minute hooks distributed along distal third of some remaining rays. Origin of anal fin anterior to posteriormost dorsal fin ray insertion. Posterior margin of anal fin nearly straight in males, and with anterior one-third slightly falcate in females. Caudal-fin forked, with lobes of similar size. Principal caudal-fin rays i,17,i. Dorsal procurrent rays 11 (1) or 12 (6). Ventral procurrent rays 8 (1), 10 (5), 11(1). Caudal fin with only few bony hooks on principal rays.

Cycloid scales large, deeply striated, regularly distributed on body. Lateral line complete, perforated scales 38 (1), 39 (5), 40 (13), 41 (1*), 42 (1). Scale rows between dorsal-fin origin and lateral line 7 (19*); 8 (2). Scale rows between lateral line and anal-fin origin 6 (5), 7 (16*). Predorsal scales 11 (6), 12 (13*), 13 (2), usually in a regular series. Single row of scales at base of anal fin, 12 (1), 14 (4), 15 (6), 16 (3*), 17 (2), 18 (2), 19 (1), 20 (1), 22 (1). Preventral scales large. Pelvic-fin axillary scale with evident grooves. Males with small regularly-arranged tubercles on posterior edge of scales (see remarks below).

Premaxilla with short ascending process and relatively elongated lateral process, with two series of teeth (Fig. 2a–b). Outer row with 4 to 6 teeth, somewhat irregularly arranged, with 3 to 5 (typically 3) cusps. Inner row with 5 broader teeth, a symphysial tooth, narrowest and highest, with 4 or 5 (typically 5) cusps; the second and third with 6 or 7 cusps; the fourth with 4 to 7 (typically 6) cusps. Fifth tooth smallest and situated internally with respect to fourth, with 4 to 6 cusps (single specimen with only 3). Maxilla (Fig. 2c) with one pentacuspid tooth on upper third (one tricuspid tooth in only two individuals). Dentary with 3 or 4 large teeth with 5–7 cusps, followed by a middle-sized tooth with 4 or 5 cusps, and 3–6 smaller teeth, monocuspid or tricuspid (Fig. 2d).

Vertebrae 36 (6), 37 (2). Supraneurals 5 or 6, typically 5. Infraorbitals 6. A branch of infraorbital sensory canal directed ventrally, continued as a series of pores totally or partially traversing third infraorbital (Fig. 3). Upper gill rakers 9(1), 10(2), 11(3), 12 (2); lower gill rakers 13 (1), 14 (1), 15 (4), 16 (2).

Color in alcohol: Background light yellowish. Dorsum of head and body darker. Bones in infraorbital series and operculum silvery. Small dark humeral spot, round or trapezoidal, often with diffuse margins, centered on third and fourth scales of scale row just dorsal to lateral line. Lateral body stripe broad and dark, extending from behind humeral spot, and ending as a black rhombic caudal spot on middle caudal-fin rays. Lateral body stripe silvery in some specimens. Ventrolateral region of body uniformly colored. Dorsal, anal and caudal fins with scattered dark chromatophores. Pectoral and pelvic fins hyaline.

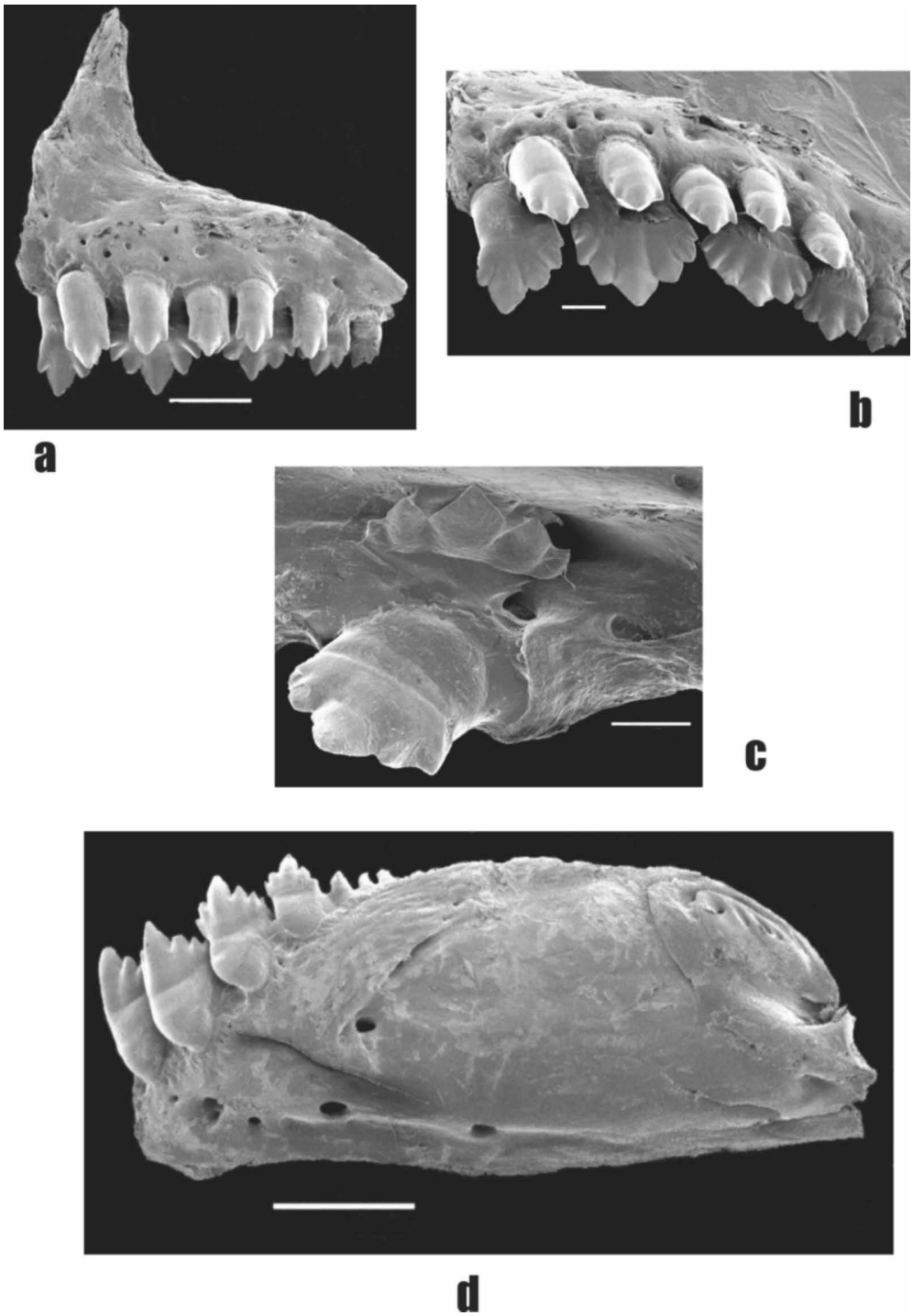

FIGURE 2. Microphotography of jaws of *Astyanax aramburui* **sp. n**., ILPLA 1709. Paratype, female, 60.2 mm SL: a. Left premaxilla, external view, scale X 35, 500µm; b. Detail of premaxilla teeth, scale X 55, 200µm; c. Detail of maxilla tooth, scale X 200, 100µm; d. Left mandible, external view, scale X 20, 1mm.

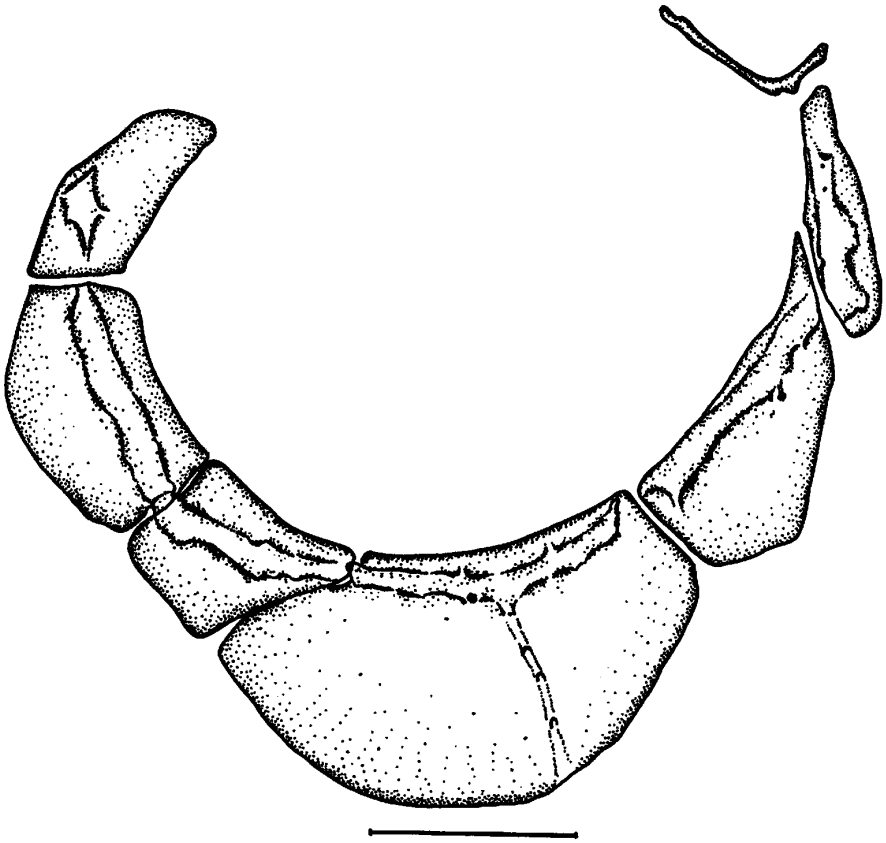

FIGURE 3. *Astyanax aramburui* **sp. n**., ILPLA 1711. Infraorbitals and antorbital, right side, lateral view. Scale bar 2 mm.

Color in life: Body silvery white, iridescent with yellowish hues. Dorsum of head and body with dark chromatophores. Lateral surface of head silvery. Lateral stripe silvery, terminating in black caudal spot continued on to middle caudal-fin rays. Dorsal and anal fins covered with scattered dark chromatophores. Pectoral fin hyaline, except for dark first unbranched ray. Pelvic fin hyaline. Caudal fin grayish, with black distal margin (Fig. 4).

Etymology: Named after Prof. Raúl H. Arámburu (1924–2004), researcher and professor of the Museo de La Plata, Buenos Aires, founder of the first chair of Ichthyology in Argentina.

Distribution and habitat: *Astyanax aramburui* is known from Villaguay Creek and Brazo Chico Creek, which flow into the Paraná and Uruguay Rivers, respectively, in Entre Ríos Province, Argentina (Fig. 5). Villaguay creek is a relatively extensive watercourse, with sections about 50 m wide and pools over 2 m deep. The banks are vegetated with grasses and other plants, and the bottom consists of mud and clay (Fig. 6). Brazo Chico creek is a watercourse situated in the deltaic area known as Islas del Ibicuy.

FIGURE 4. *Astyanax aramburui* **sp. n.**, Villaguay Creek, Entre Ríos province, Argentina, not preserved. Photo by A. Miquelarena.

Remarks: Of all the families of Neotropical Characiformes, only the Characidae, Parodontidae and Lebiasinidae are known to develop true nuptial tubercles (Wiley & Collette, 1970:164–167; Collette, 1977: 236–241). Those authors state that breeding tubercles are probably present in all species of Parodontidae and at least five species of Lebiasinidae. Within the Characidae, similar structures have been reported in *Bryconamericus emperador* (Eigenmann & Ogle), by Meek & Hildebrand (1916:284); for an unidentified *Bryconamericus* species from Panama by Fink (1976:342); in two species of *Monotocheirodon* by Collette (1977:238); and in two Brazilian species, *Myxiops aphos* Zanata & Akama, and an undescribed species of *Astyanax* by Zanata & Akama (2004:50–51). We were able to observe small tubercles on the dorsal part of the head, as well as on the snout, infraorbital, and opercular region in males of *Parodon carrikeri* Fowler. These structures are irregularly distributed on the scales, particularly in the predorsal area (Figs. 7a–d). In mature males of *A. aramburui*, the tubercles are arranged as in *P. carrikeri* in the cephalic region, but they are distributed regularly on the posterior edge of the scales over most of the body (Figs. 8a–d). Mature male specimens of *Astyanax aeneus* (Günther) and *Bryconamericus thomasi* Fowler also show breeding tubercles arranged as in *A. aramburui*. Histological examination confirmed that they are of epitelial origin, and formed by cells distributed in a concentric manner. In all the above species the breeding tubercles were more noticeable in the specimens collected during October, November and March. Zanata & Akama (2004), in their discussion of characters that

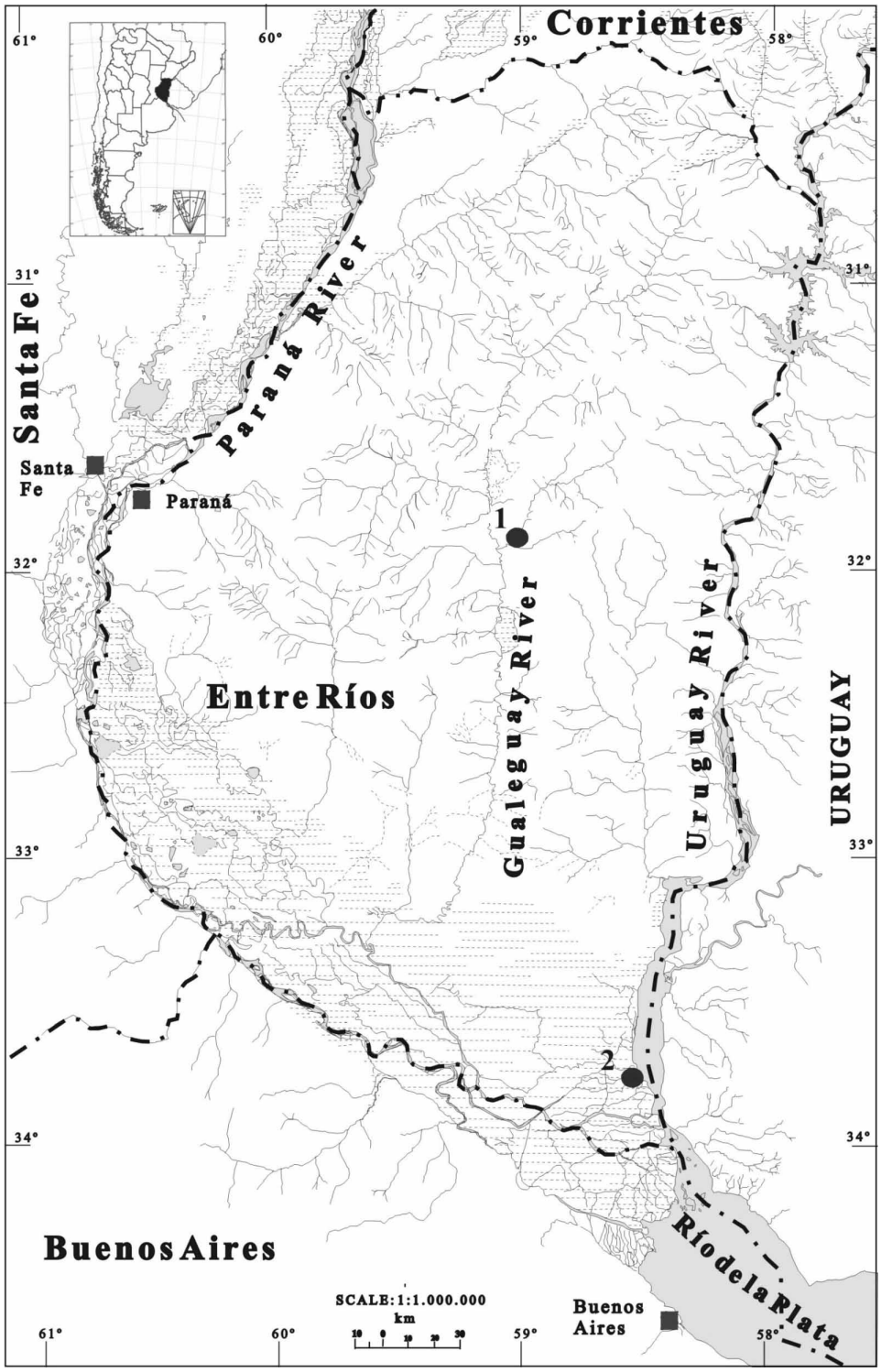

FIGURE 5. Geographic distribution of *Astyanax aramburui* **sp. n**. 1: Villaguay Creek, 2: Brazo Chico Creek.

distinguish the genus *Myxiops*, state that these structures are located along the posterior border of the scales, thus delineating the scale outline; this agrees with our observations of *A. aeneus*, *A. aramburui* and *B. thomasi*. However, in contrast with the condition in the above-mentioned species, the accumulation of epithelial cells of *Myxiops* is more conspicuous in juveniles, and occurs both in males and females (Zanata & Akama, 2004).

FIGURE 6. Type locality of .*Astyanax aramburui* **sp. n**, Villaguay Creek, Entre Ríos, Argentina.

Discussion

Nineteen species of the genus *Astyanax* have thus far been reported from Argentina (Miquelarena & Menni, 2005). Although *A. fasciatus* Cuvier is indicated, in some references, to be widely distributed in Argentina, Melo & Buckup (2006) concluded that this species is restricted to the São Francisco River drainage, in Brazil. *A. aramburui* resembles *A. fasciatus* in possessing a single humeral spot, a relatively high number of anal-fin rays, and one tooth on the anterior margin of the maxilla. It differs from the São Francisco populations by usually having 5 (vs. 4) teeth in the outer row of the premaxilla [*A. aramburui* 4(3), 5(17), 6(1); *A. fasciatus* 3(1), 4(38), 5(4), 6(1)]. Moreover, *A. fasciatus* is diagnosed by the presence of an elongated dorsal fin in mature males (Melo & Buckup, 2006), a character not shared by *A. aramburui*.

Tetragonopterus rutilus Jenyns, originally described from the Paraná River, was considered by Melo & Buckup (2006:49, 50; table2) as a probable valid species of

Astyanax. An analysis of morphometric and meristic data of the *A. rutilus* holotype provided by those authors shows that *A. aramburui* (21 specimens analyzed unless otherwise indicated) differs from *A. rutilus* in several characters: lesser body depth (31.8–37.4 [mean=33.9] vs. 40% SL), shorter preanal distance (54.5–61.8 [mean=59.6] vs. 66.4% SL), shorter snout length (15.5–20.9 [mean=17.8] vs. 23.0% HL), lower vertebrae count (36–37 [mean=36.2] [8 specimens] vs. 37), lesser number of scale rows between lateral line and dorsal-fin origin (7–8 [mean=7.1] vs. 8) and lesser number of scale rows between lateral line and anal-fin origin (6–7 [mean=6.8] vs. 8). In addition, according to the original description, the fins of *A. rutilus* are "dirty orange or bright red in color" (vs. paired fins hyaline and unpaired fins grayish).

A. aramburui differs from *A. biotae* Castro & Vari, described from the upper Rio Paraná system in southeastern Brazil, by having a greater number of scales in the lateral line (38–42 vs. 32–35), a greater number of scales in transverse series from origin of anal fin to lateral line (6–7 vs. 4–5), and a rounded humeral spot (vs. vertically elongated spot).

A. aramburui exhibits bony hooks on all fins of mature males. This dimorphic character has also been reported in several species that have been recently described from the Paranoplatensean basin: *A. chico* Casciotta & Almirón; *A. hermosus* Miquelarena, Protogino & López; *A. ojiara* Azpelicueta & García; *A. pynandi* Casciotta, Almirón, Bechara, Roux & Ruiz Diaz; *A. troya* Azpelicueta, Casciotta & Almirón; *A. leonidas* Azpelicueta, Casciotta & Almirón (without bony hooks on dorsal fin); and *A. tumbayaensis* Miquelarena & Menni (without bony hooks on pectoral fin). The new species differs from *A.chico*, *A. leonidas*, *A. ojiara*, *A. pynandi*, *A. troya*, and *A. tumbayaensis* by having a coloration pattern that includes a single humeral spot (vs. two humeral spots). *A. aramburui* shares with *A. hermosus* the presence of a single humeral spot, which, however, differs in shape (rounded vs. Y-shaped).

Other characters that distinguish *A. aramburui* from *A. hermosus*, *A. ojiara*, *A. pynandi*, and *A. troya* are: greater number of scales in lateral line series (38–42 vs. 35–38; 36–38; 34–37 and 34–37, respectively); greater number of branched rays in anal fin (23–29 vs. 17–22; 20–23; 21–26 and 18–21, respectively), and shorter snout length (15.5–20.9% HL vs. 18.3–26.6; 24.5–30.9; 22.7–26.9 and 22.9–28.9% HL, respectively). It also differs from *A. hermosus* by the greater eye diameter (41.1–45.8% HL vs. 29.7–34.7% HL) and lesser depth of the caudal peduncle (10.3–12.0% SL vs. 12.6–14.7% SL).

A. aramburui differs from *A. ojiara* in having a greater eye diameter (41.1–45.8% HL vs. 29.1–37.2% HL) and by the presence of one pentacuspid (vs. heptacuspid) maxillary tooth; from *A. pynandi* by a lesser body depth (31.8–37.4% SL vs. 35.4–42.9% SL); from *A. tumbayaensis* by having a greater eye diameter (41.1–45.8% HL vs. 28.9–35.0% HL), lesser body depth (31.8–37.4% SL vs. 39.2–45.3% SL) and lesser depth of the caudal peduncle (10.3–12.0% SL vs. 13.6–15.0% SL); and from *A. chico* by a greater number of branched anal-fin-rays (23–29 vs. 19–24).

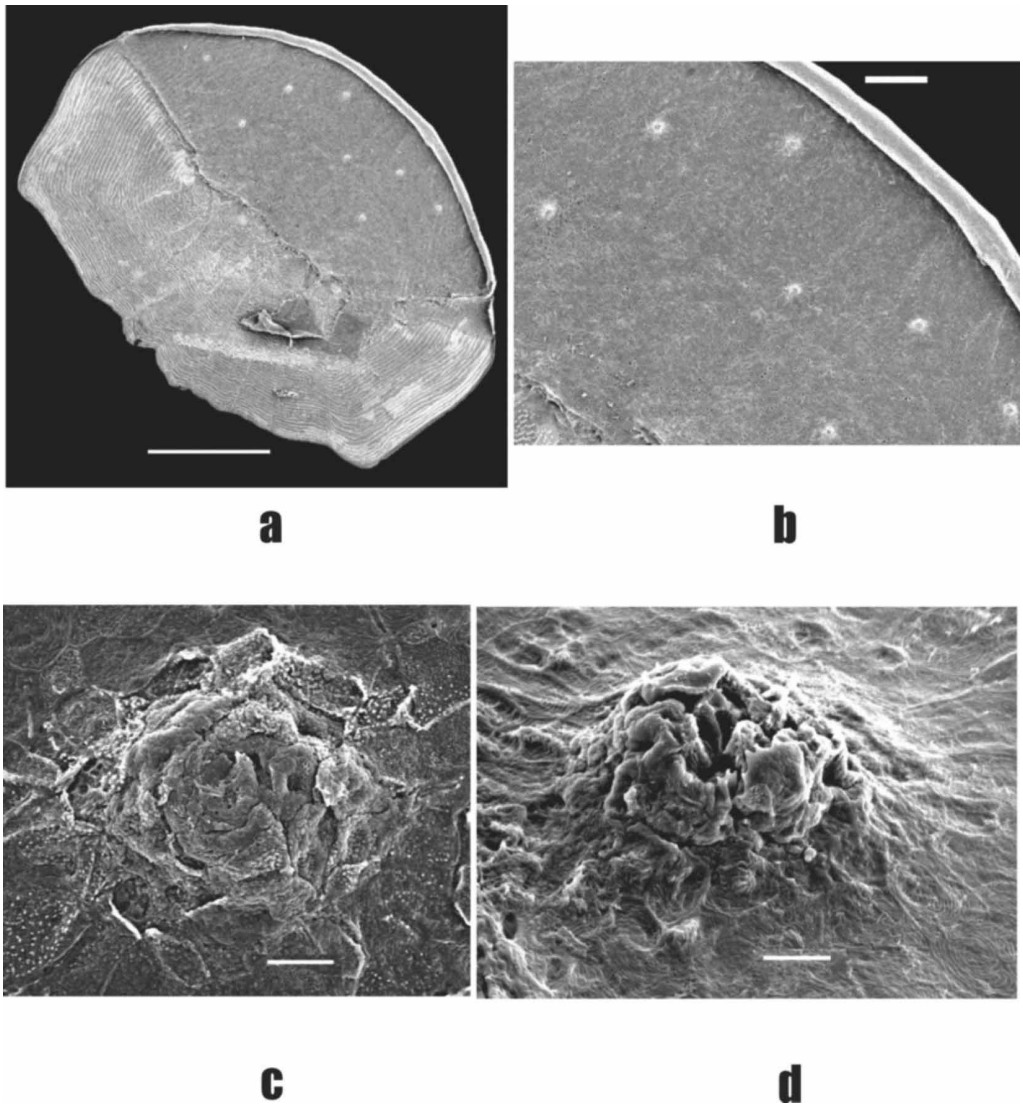

FIGURE 7. Microphotography of scales of *Parodon carrikeri*, ILPLA 1503, male, 83.4 mm SL; a. Scale complete with breeding tubercles, scale X 23 1mm; b. Detail of scale, scale X 55 200µm; c and d. Detail of breeding tubercles, scale X 1300 10µm.

Males of *A. elachylepis* Bertaco & Lucinda, described from the Tocantins River drainage, also have bony hooks on the dorsal, anal, pectoral, and pelvic-fin rays, but that species is easily distinguished from *A. aramburui* by the greater number of perforated scales in the lateral line (48–53 vs. 38–42).

A. aeneus, from Arroyo Las Flores, México, shares with *A aramburui* the presence of breeding tubercles and bony hooks on all fins of mature males, but differs from the latter species by the greater preanal distance (62.1–64.8 vs. 54.5–61.8) and smaller eye diameter (38.8–40.5 vs. 41.1–45.8).

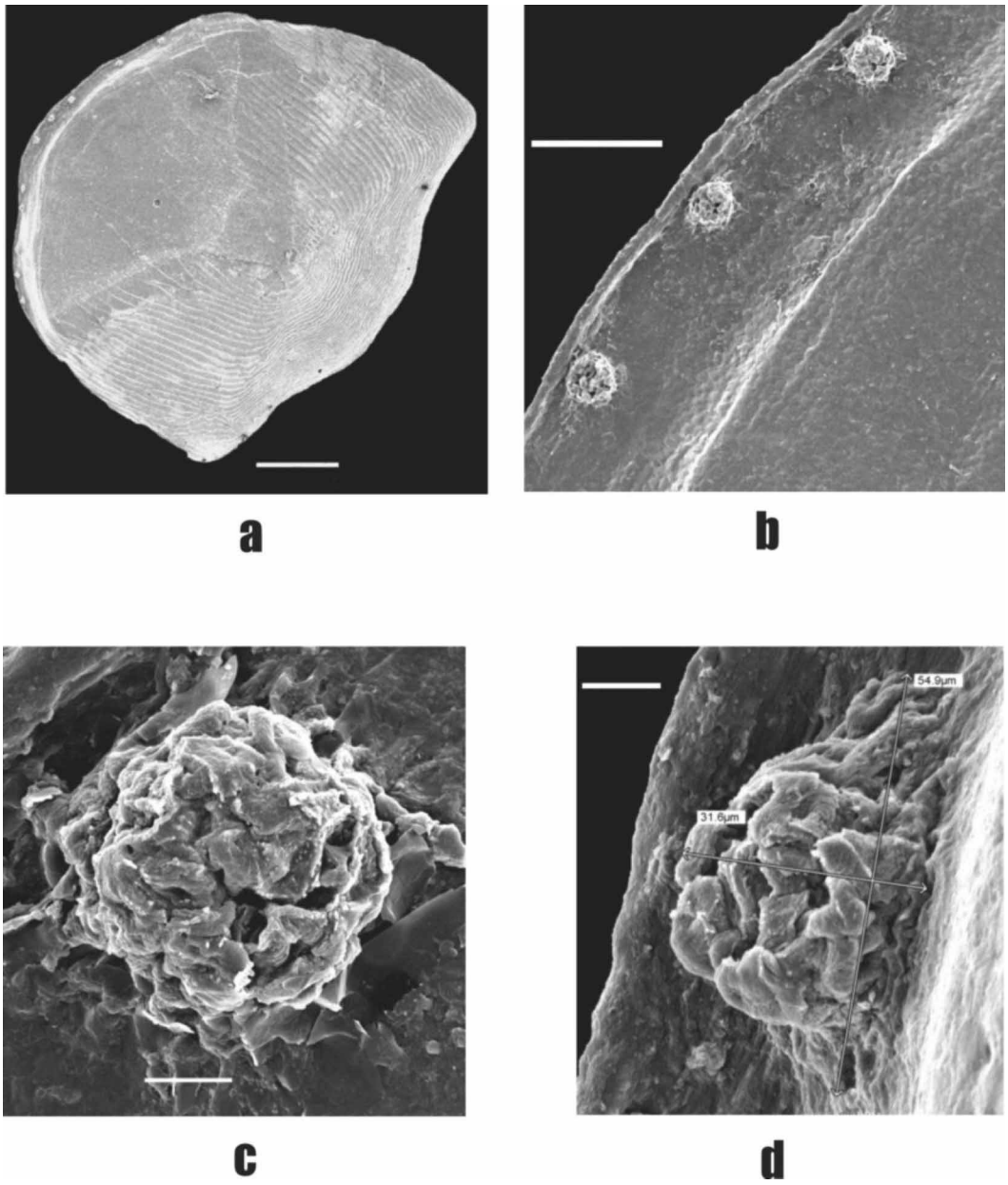

FIGURE 8. Microphotography of scales of *Astyanax aramburui* **sp. n.**, ILPLA 1713, male, 66.0 mm SL; a. Scale complete with breeding tubercles, scale X 30 500µm; b. Detail of scale, scale X 250 100µm; c. Detail of breeding tubercle, dorsal view, scale X 1700 10µm; d. Detail of breeding tubercle, lateral view, scale X 1400 10µm.

Comparative material: *Astyanax aeneus*: MLP 9662, (2) 1 male, 1 female, 66.0–75.0 mm SL, Las Flores stream, Mexico, March 1998. *Astyanax asuncionensis* Géry: ILPLA 382, (2) 44.4–64.8 mm SL, Urugua-í stream, Iguazú Department, Misiones Province, Argentina, coll.: C. R. Guillén, April 1977. A*styanax cordovae* (Günther): ILPLA 44, (2)

84.5–119.3 mm SL, Primero River, Córdoba Province, Argentina, coll.: H. Haro, September 1988. *Astyanax eigenmanniorum* (Cope): ILPLA 705, (5) 53.8–77.1 mm SL, Laguna Chascomús (35º36'S 58º02'W), Buenos Aires Province, Argentina, coll.: C. Togo and H. López, May 1979; ILPLA 716, (4) 51.9–82.9 mm SL, Laguna Chascomús, Buenos Aires Province, Argentina, coll.: O. Padin and J. Iwaszkiw, April 1984. *Astyanax cf. fasciatus*: ILPLA 596, (6) 54.2–63.5 mm SL, Laguna de Lobos (35º17'S 59º07'W), Buenos Aires Province, Argentina, coll.: A. Miquelarena *et al.*, June 1986. *Astyanax hermosus*: ILPLA 1690, holotype, 78.5 mm SL, San Francisco River, Primero River basin, Valle Hermoso (31º 07'S 64º 29'W), Punilla Department, Córdoba Province, Argentina, coll.: O. de Ferreri, January 1965; ILPLA 1691, (19) 6 males (2c&s), 13 females, 48.7–77.9 mm SL; ILPLA 1692, 6 females (c&s), 47.0–51.1 mm SL, same locality as holotype. *Astyanax lineatus* (Perugia): ILPLA 1487, (2) 32.9–36.5 mm SL, Metán River (tributary of Juramento River), on Route 46, road between Punta del Agua and La Costosa, Salta Province, Argentina, coll.: A. Miquelarena *et al*., March 1987; ILPLA 1515, (10) 50.0–74.5 mm SL, an unnamed creek before Huaico Mora Creek, on the road between Zapla and Jujuy City, Jujuy Province, Argentina, coll.: A. Miquelarena *et al*., March 1987. *Astyanax ojiara*: MLP 9470, male holotype, 50.0 mm SL, Benítez stream, headwaters of Yaboty River, Uruguay basin, Misiones Province, Argentina, coll.: O. García, May 1983; MLP 9472, 6 paratypes, 50.2–67.5 mm SL, collected with the holotype. *Astyanax tumbayaensis*: ILPLA 1702, male, 68.8 mm SL; man-made channel near the road crossing Tumbaya village (23º51'S 65º28'W), Grande River basin, Jujuy Province, Argentina, coll. R. Menni & A. Miquelarena, April 1987; ILPLA 1513, 7 females (1 c&s), 41.0–65.4 mm SL, same date as previous specimen. *Astyanax troya*: ILPLA 1152, (12) 60.7–86.3 mm SL, Cuña-Pirú Creek (27º10'S 54º57'W), Cainguás Department, Misiones Province, Argentina, coll.: R. Filiberto & F. De Durana, September 1997; ILPLA 1154, (3) 52.4–67.0 mm SL, Cuña-Pirú Creek (27º10'S 54º57'W), Cainguás Department, Misiones Province, Argentina, coll.: R. Filiberto & L. Protogino, November 1999; ILPLA 1156, (14) 32.6–85.3 mm SL, Cuña-Pirú Creek (27º10'S 54º57'W), Cainguás Department, Misiones Province, Argentina, coll.: A. Miquelarena *et al.*, September 2000. *Bryconamericus thomasi*: ILPLA 1447, (2) 45.2–49.2 mm SL, Río de Las Conchas, Metán, Jujuy, Argentina, coll.: A. Miquelarena *et al*., October 1988. *Parodon carrikeri*: ILPLA 1503, (2) 83.4–88.9 mm SL, Las Cañas River on Rute Prov. Nº5, between Lumbrera and Las Víboras, Salta, Argentina, coll.: R. Menni & A. Miquelarena, October 1988.

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