

A new species of *Astyanax* (Ostariophysi: Characidae) from the headwaters of the arheic Río Sucuma, Catamarca, Northwestern Argentina

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A new species of *Astyanax* is described from the arheic system of Río Sucuma, in Catamarca, Northwestern Argentina. The new species is distinguished from its congeners by a combination of characters including the presence of a broad vertical humeral spot, absence of maxillary teeth, and absence of *circuli* in posterior field of scales. Furthermore, this species is distinguished by the orbital diameter, head length, branched anal-fin rays, perforated lateral-line scales, transverse scales, dentary teeth with abrupt decrease in size. This species is, to date, the single known fish endemic of Río Sucuma basin.

Keywords: Arheic system, Characiformes, Cryptic species, Endemic species, Phylogeny.

Una nueva especie de *Astyanax*, se describe del Sistema arheico del Río Sucuma, en Catamarca, Noroeste de Argentina. Esta nueva especie se distingue de sus congéneres por una combinación de caracteres que incluyen la presencia de una gran mancha humeral, verticalmente elongada, ausencia de diente en el maxilar, ausencia de *circuli* en el campo posterior de las escamas, además se distingue por un ojo relativamente pequeño, longitud de la cabeza, radios ramificados en la aleta anal; escamas perforadas en la línea lateral; escamas transversas; dentario con dientes que decrecen abruptamente. Esta especie es, a la fecha, el único pez endémico para la cuenca de Río Sucuma.

Palabras clave: Characiformes, Especie críptica, Especie endémica, Filogenia, Sistema arheico.

Introduction

Astyanax Baird & Girard includes almost 150 valid species (Eschmeyer *et al.*, 2016). According to Eigenmann (1917, 1921), this genus is diagnosed by the presence of two series of teeth in the premaxilla: the first series with a variable number of teeth and the second series with usually five, crowns of premaxillary and mandibular teeth usually ridged and denticulated, maxilla with 0-9 teeth, a complete lateral line, absence of a predorsal spine, and naked caudal-fin. Most of these characters are broadly distributed among characids, evidencing that a definition of the genus is necessary (Marinho, Lima, 2009; Mirande *et al.*, 2004, 2006a, 2007). As currently defined, *Astyanax* is the most diverse genus of Characidae and also the most widely distributed, inhabiting from Texas, with *A. mexicanus* (De Filippi), to the north of Argentine Patagonia, with *A. pampa* Casciotta, Almirón & Azpelicueta (Casciotta *et al.*, 2005; Pérez, 2008).

In recent years, several species similar to *Astyanax eigenmanniorum* (Cope, 1894) in the number of branched

anal-fin rays and scales of the lateral line have been described from Argentina (*A. chico* Casciotta & Almirón; *A. endy* Mirande Aguilera & Azpelicueta; *A. hermosus* Miquelarena, Protogino & López; *A. ita* Almirón, Azpelicueta & Casciotta; *A. leonidas* Azpelicueta, Casciotta & Almirón; *A. ojiara* Azpelicueta & Garcia; *A. paris* Azpelicueta, Almirón & Casciotta; *A. puka* Mirande, Aguilera & Azpelicueta; *A. pynandi* Casciotta, Almirón, Bechara, Roux & Ruíz Díaz; *A. troya* Azpelicueta, Casciotta & Almirón; *A. tumbayaensis* Miquelarena & Menni).

Catamarca province, in Northwestern Argentina, has a relatively low diversity of fishes, including only a few members of the Characidae: *Astyanax lacustris* (Lütken) - cited as *A. asuncionensis* Géry or *A. bimaculatus* (Linnaeus) (see Lucena, Soares, 2016) -, *A. eigenmanniorum*, *Bryconamericus iheringii* (Boulenger), and *Cheirodon interruptus* (Jenyns) (Ringuelet, 1975; Azpelicueta *et al.*, 2010; Fernández *et al.*, 2012). The revision of collection specimens from Catamarca allowed us to discover a new species of *Astyanax* from an arheic river basin, which is described in this paper.

Material and Methods

Counts were taken as described by Fink, Weitzman (1974) and Bertaco, Lucena (2006). Counts of vertebrae, supraneurals, procurrent caudal-fin rays, gill rakers, ribs, and caudal-fin rays were taken from cleared and stained (cs) specimens prepared according to Taylor, Van Dyke (1985). Tooth counts were taken in all specimens, including cs specimens. In the descriptions, an asterisk indicates counts of the holotype and the frequency of each count is provided in parentheses.

Measurements were taken as point-to-point linear distances measured with digital caliper with a precision of 0.01 mm, on the left side of the specimen. Measurements are expressed as percent of standard length (SL) except for subunits of the head, which are recorded as percent of head length (HL) and follow Fink, Weitzman (1974). Maxillary and postorbital lengths are measured as in Mirande *et al.* (2004, 2006a, 2006b, 2007). Maxillary length is measured from its articulation with the premaxilla to the maxillary tip. Postorbital distance is measured from the posterior margin of the orbit to posteriormost point of the opercular flap.

The diagnosis is presented according to the procedures described by Lucena *et al.* (2013) and followed by Bertaco, Vigo (2015).

Examined specimens belong to the following institutions: ANSP, Academy of Natural Sciences of Drexel University; CFA-IC, Fundación Felix de Azara, Buenos Aires; CI-FML, Colección Ictiológica Fundación Miguel Lillo, Tucumán; MACN, Museo Argentino de Ciencias Naturales, Buenos Aires; MFA-ZV- Ic, Museo Provincial de Ciencias Naturales Florentino Ameghino, Santa Fe.

The new taxon is herein added to the character matrix of Mirande (2010) and its phylogenetic relationships evaluated through a parsimony analysis. The analysis is done under extended implied weighting (Goloboff, 1993, 2014), following the procedures described by Mirande (2009) and Mirande *et al.* (2013). Support measures were calculated through symmetric resampling and expressed as GC values (Goloboff *et al.*, 2003) and Bremer supports (Bremer, 1994). As absolute Bremer supports values are not much intuitive in analyses under implied weighting, they have been rescaled from 0 to 1000 using as limits the fit of the most parsimonious trees and those of the best of 100 Wagner trees (from different random addition sequences). Therefore, clades that collapse in most parsimonious trees will have a value of 0, while those that are monophyletic in trees which are as suboptimal as the used Wagner tree, will have a value of 1000. Those values have been calculated only for the clade of *Astyanax*. All searches have been done with TNT (Goloboff *et al.*, 2008).

Results

Astyanax powelli, new species

Figs. 1-2; Tab. 1

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Holotype. CI-FML 6797, 52.3 mm SL, male, Argentina, Catamarca Province, El Alto, Río Sucuma, tributary of the arheic Río Las Tunas, 28°14'21"S 65°22'45"W, ca. 800 meters above sea level, 22 Jun 2015, C. I. Butí.



Fig. 1. *Astyanax powelli*, new species. CI-FML 6797, holotype, 52.3 mm SL, Argentina, Catamarca province, Río Sucuma. Scale bar = 10 mm.

Paratypes. CI-FML 6798, 40, 35.5-60.2 mm SL, (5 cs, 36.0-56.8 mm SL) collected with the holotype.

Non-types (inadequate fixing process). CI- FML 6799, 11, 37.5-55.1 mm SL, (2, 41.6-46.6 mm SL), Argentina, Catamarca Province, Río Sucuma, tributary of the arheic Río Las Tunas, 24 Jun 2015, C. I. Butí.

Diagnosis. *Astyanax powelli* can be distinguished from its congeners of the *Astyanax bimaculatus* group (e.g. *A. abramis* and *A. lacustris*) by the vertical humeral spot (vs. horizontally oval) and the absence of *circuli* on posterior field of scales (vs. presence). The new taxon differs from the remaining species of *Astyanax* by the absence of maxillary teeth (vs. presence, in a variable number). *Astyanax powelli* bears few denticles on the base of the first ceratobranchial gill rakers (vs. broad denticles on anterior, lateral, and posterior edges of first ceratobranchial gill rakers in *A. puka*). Also, the dentary teeth decrease abruptly posterior to the fourth tooth in *A. powelli* (Fig. 2b) (vs. decreasing gradually in *A. puka* and *A. eigenmanniorum*). *Astyanax powelli* bears two humeral spots (vs. one in *A. rutilus* (Jenyns)). In addition, males of *A. powelli* have bony hooks restricted to anal and pelvic-fins (vs. bony hooks in all fins in *A. chico*, *A. tumbayaensis*, and *A. hermosus*). Additionally, *A. powelli* is distinguished from *A. latens* Miranda, Aguilera & Azpelicueta by the longer prepelvic distance (46.8-51.8 vs. 42.6-45.8% of SL), longer preanal distance (64.3-69.9 vs. 57.6-63.3% of SL), and shorter anal-fin base length (24.4-29.7 vs. 32.3-36.7% of SL). Furthermore *A. powelli* differs from *A. hermosus* and *A. tumbayaensis* by the relatively longer head (27.9-31.0 vs. 23.5-27.1% of SL and 24.0-26.7% of SL). Also, in *Astyanax powelli* the snout is relatively straight (vs. markedly convex in *A. endy* and *A. tumbayaensis*). *Astyanax tumbayaensis* has a reticulated pigmentation pattern formed by finely dotted scales, especially in its posterior border, which is not evident in *A. powelli*. *Astyanax powelli* can be easily distinguished from *A. lineatus* (Perugia) by the absence of *circuli* on posterior field of scales (vs. presence) and the lack of lateral stripes on the flanks (present in *A. lineatus*). The possession of 34-38 perforated scales of the lateral line distinguishes the new species from *A. abramis* and *A. cordovae* (Günther) (vs. 42-48 and 43-45). *Astyanax tupi* Azpelicueta, Miranda, Almirón & Casciotta and *A. stenohalinus* Messner, possess 2-4 maxillary teeth (vs. absent in *A. powelli*). The new species can be further distinguished from *A. tupi* and *A. stenohalinus* by the anal-fin origin located posterior to the vertical through last dorsal-fin ray insertion (vs. anal-fin origin located anterior to the vertical through last dorsal-fin ray insertion). *Astyanax tupi* also possesses a supraopercular spot that is absent in *A. powelli*. *Astyanax stenohalinus* is further distinguished by the possession of bony hooks on all fins of males (vs. bony hooks present only in anal and pelvic-fins). *Astyanax pynandi*, *A. ita*, and *A. correntinus* (Holmberg) may be distinguished from the new taxon by the possession of one distally expanded maxillary tooth with

5-9 cusps (vs. tooth absent). Also, *A. pynandi* bears hooks on all fins of males (vs. bony hooks present only in anal and pelvic fins). The relatively low number of branched anal-fin rays (20-26) allows the distinction of the new species from *A. correntinus* (29-33), *A. pelegrini* Eigenmann (41-47), and *A. erythropterus* (Holmberg) (38-45). Also, *Astyanax powelli* has fewer perforated scales in the lateral line (34-38 vs. 39-42, 46-52, and 47-54, respectively). *Astyanax leonidas* and *A. troya* have been described for the headwaters of streams that drain in the upper portion of the Río Parana in Argentina. Those species bear a maxillary tooth and a horizontally shaped humeral spot superimposed to a vertically elongated one (vs. tooth absent and a vertically elongated spot in *A. powelli*). *Astyanax aramburui* Protogino, Miquelarena & Lopez can be distinguished from the new taxon by the presence of a maxillary tooth (vs. absent in *A. powelli*). As well, *A. aramburui* bears one humeral spot (vs. two in *A. powelli*) and has hooks in all fins of mature males (vs. hooks restricted to anal and pelvic fins).



Fig. 2. *Astyanax powelli*, paratype CI-FML 6798. **a.** 57.6 mm SL, maxilla and premaxilla. **b.** Dentary, lateral view, anterior to right. **c.** 45.7 mm SL, premaxilla, medial view, anterior to left. Scale bars = 1 mm.

Description. Morphometric data of holotype and 35 paratypes are presented in Tab. 1. Body slender. Maximum depth at dorsal-fin origin. Dorsal profile convex from snout to dorsal-fin origin and straight from this point to caudal peduncle; gently concave from adipose fin, along caudal peduncle, to base of caudal-fin rays. Ventral profile of body convex from lower-jaw tip to pelvic-fin origin; straight to anal-fin origin; slanted dorsally to end of anal fin, and almost straight under caudal peduncle. Dorsal-fin origin equidistant from snout tip and caudal-fin origin. Pelvic-fin origin located slightly anterior to vertical through dorsal-fin origin. Anal-fin origin just behind vertical line through base of posteriormost dorsal-fin rays. Tip of pectoral fin surpassing pelvic-fin origin and tip of pelvic fin reaching anal-fin origin in most of specimens.

Tab. 1. Morphometric data for holotype and paratypes of *Astyanax powelli*, n = 41 (including holotype) from Río Sucuma basin, Catamarca, Argentina. SD = standard deviation.

	Holotype	Range	Mean	SD
Standard length (mm)	52.3	35.5-60.2	46.5	-
Percents of standard length				
Predorsal distance	52.2	50.3-55.9	53.3	1.2
Prepelvic distance	47.7	46.8-51.8	49.6	1.3
Prepectoral distance	28.5	26.6-31.4	28.7	0.9
Preanal distance	64.4	64.3-69.9	66.9	1.6
Depth at dorsal-fin origin	36.0	34.6-40.2	37.4	1.2
Caudal peduncle depth	13.3	12.4-14.3	13.2	0.5
Caudal peduncle length	10.4	9.3-12.1	10.3	0.6
Anal-fin base length	29.7	24.4-29.7	26.9	1.3
Dorsal-fin length	14.2	12.8-16.1	14.3	0.8
Pelvic-fin length	20.4	16.5-24.8	18.9	1.7
Pectoral-fin length	24.1	18.4-25.9	23.2	1.7
Head length	29.8	27.9-31.0	29.2	0.8
Distance from pectoral-fin origin to pelvic-fin origin	20.3	19.9-25.2	22.5	1.3
Distance from pelvic-fin origin to anal-fin origin	17.6	17.5-20.7	19.2	0.8
Percents of head length				
Snout length	22.0	20.1-24.8	22.6	1.0
Upper jaw length	35.7	33.5-38.0	35.8	1.2
Maxillary length	23.8	21.5-26.2	23.8	1.2
Orbital diameter	35.6	31.2-36.4	34.0	1.3
Interorbital width	31.8	30.7-36.0	32.6	1.4
Postorbital distance	50.0	45.1-53.5	48.9	1.9

Mouth terminal; placed at level of inferior half of eye. Premaxilla bearing two series of teeth; outer row with 2 to 5 penta- to hexacuspitate teeth; inner row with 4(3) or 5(27*) teeth; 11 specimens with 4 teeth on one side and five on other (four specimens with 4 teeth on the left side, 7 specimens with 4 teeth on the right side). Distally expanded teeth, slightly concave anteriorly; first tooth slender with 5 cusps, second to fourth teeth with 5 or 6 cusps and fifth tooth, when present, with 3 cusps. Ascending process of maxilla broad, expanded over distal part of premaxillary alveolar ramus; laminar process of maxilla short, without teeth. Dentary with 8-10 abruptly decreasing teeth, first 4 large hexa- to heptacuspitate and posterior ones tricuspidate or conical.

Eye moderately small. Third infraorbital not contacting laterosensory canal of preopercle either ventrally or posteriorly, leaving small space.

Dorsal-fin rays iii,8(2), 9(39*); first unbranched dorsal-fin ray mostly visible in cs specimens; distal margin of dorsal fin straight, with last unbranched and first branched dorsal fin rays longest. Anal-fin rays iv-v, 20(3), 21(2), 22(10), 23(16*), 24(5), 25(4), or 26(1). Males with bony hooks on distal half of last unbranched anal-fin ray and posterior branch of first 5-9 branched anal-fin rays; usually one pair of hooks per segment. Caudal-fin rays: i,16,i(1); i,17i(39*); or i,19,i(1). Pectoral-fin rays i,11(4), 12(20), 13(14*), or 14(3). Pelvic-fin rays i,7(41*); males bearing bony hooks on posterior branch of pelvic-fin rays 2 to 7, one pair of hooks per segment. Hooks restricted to medial branches of pelvic-fin rays.

Scales cycloid, without *circuli* on posterior field. Lateral line complete, with 34(4), 35(10), 36(17), 37(4*), or 38(1) perforated scales. Scales rows between dorsal-fin origin and lateral line 6(24) or 7(12*); scales rows between lateral line and pelvic-fin origin 5(36*). Scales rows around caudal peduncle 14(15), 15(10), 16(8*), or 17(3). Predorsal scales 10-14*, forming relative regular row. One row of scales forming a sheath, covering base of unbranched and first 8-14 branched anal-fin rays. Few scales covering base of caudal-fin lobes.

In cs specimens (5), first gill arch with 20-22 rakers: 7-8 on epibranchial, 1 on cartilage, 9-11 on ceratobranchial, and 2-3 on hypobranchial; posterior margin of first epibranchial with a second row of 4-6 gill rakers. Thirty-four total vertebrae (17 precaudal and 17 caudal). Five supraneurals, 11 pairs of ribs. Caudal fin with 8 or 9 dorsal and 9 or 10 ventral procurent rays.

Color in alcohol. Uniformly yellowish, darker dorsally. Two humeral spots. Anterior one conspicuous, black, vertically elongated, upper portion wider and darker; extended from third row over the lateral line to second row under lateral line. Second spot large, diffuse, and dark, continuous with dark lateral stripe. Lateral stripe silvery in specimens with less time in formaldehyde. Lateral stripe limited posteriorly by a black, triangular, caudal spot extended, although not conspicuously, to tip of middle caudal-fin rays. Dorsal, anal, pelvic, and adipose fins hyaline (Fig. 1).

Sexual dimorphism. Males bear hooks in the first 5 to 9 branched anal-fin rays and in all branched pelvic-fin rays excepting the last one. Fusion of the anteriormost gill filaments, as in other species of *Astyanax* (Terán *et al.*, 2015) was found in mature males. Protogino *et al.* (2006) mentioned the presence of breeding tubercles in head and scales in mature males of *A. aramburui*. These tubercles were not found in this species, but they were found in some specimens of *A. eremus* Ingenito & Duboc (Ingenito, Duboc, 2014), *A. gymnodontus* (Eigenmann) (CI-FML 7138), *A. ojiara* (CI-FML 6779), *A. parahybae* (Eigenmann) (CI-FML 7174), and *A. troya* (CI-FML 7175) and may have a wider distribution in the genus. These tubercles are probably related with the sexual maturity and their presence in *A. powelli* cannot be discarded.

Geographical distribution. Headwaters of Río Sucuma upstream of Dos Afluentes dam, in Department El Alto, Province of Catamarca (Figs. 3, 4).

Ecological notes. The new species inhabits mountain environments with high flow velocity and gravel substrate with clear waters. The river has abundant water vegetation such as *Myriophyllum aquaticum* and undetermined Poaceae and floating vegetation (*Hydrocotyle ranunculoides* and *Azolla filiculoides*). As well, the presence of green algae is common in these environments.

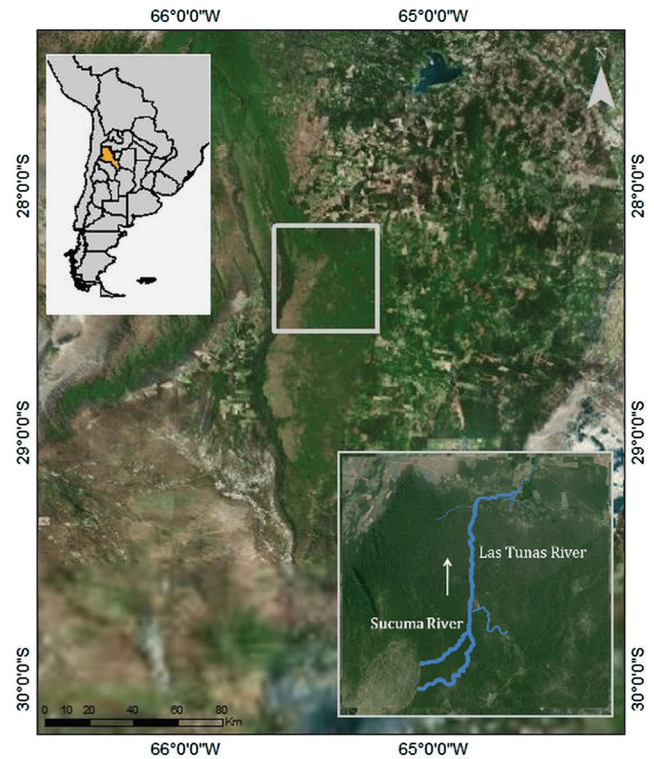


Fig. 4. Map of northwestern Argentina, showing the type locality of *Astyanax powelli*, Río Sucuma, Catamarca. Arrow indicates sense of flow.



Fig. 3. Headwaters of Río Sucuma, type locality of *Astyanax powelli*, Catamarca province, Argentina.

Astyanax powelli is confined to the arheic system of the Río Sucuma. This area belongs to the ecorregion of Mar Chiquita - Salinas Grandes, according to Hales, Petry (2015), which comprises several arheic and endorheic basins. Even though the upper portion of the river does not present mayor threats, the lower portion of this river system is under strong anthropic pressure, with the whole river outrageously channeled to satisfy demands from agriculture and population.

Etymology. The species name, *powelli* is in honor and memory to the late Dr. Jaime Eduardo Powell; prominent paleontologist, dear friend, and colleague. A noun in genitive case.

Conservation status. Even though the known geographic distribution of *A. powelli* is restricted and that the lower portion of the basin is entirely channeled for agriculture, no threats to the species were detected in the upper portion of the basin. Therefore, *Astyanax powelli* can be classified as Least Concern (LC), according to the International Union for Conservation of Nature (IUCN) categories and criteria (IUCN, 2016).

Remarks. All the analyses performed, see coding in Appendix 1 (S1 - Available only as online supplementary file accessed with the online version of the article at <http://www.scielo.br/ni>), with values of K ranging from 5.26 to 47.35 (see Mirande, 2009 for details), agree in the monophyly of a clade composed of all the analyzed species of *Astyanax* and including also *Astyanacinus Eigenmann*, *Markiana Eigenmann*, *Psellogrammus Eigenmann*, and *Hyphessobrycon anisitsi* (Eigenmann), in a result similar to that obtained by Mirande *et al.* (2011). Relationships within this clade are stable in the most parsimonious trees obtained in the 11 lower (stronger) values of K, ranging from 5.26 to 13.53 (Fig. 5), although most clades are weakly supported, as in previously published phylogenetic hypotheses (Mirande, 2009, 2010). In these analyses, *Astyanax powelli* is the sister group of all the remaining species of the clade, excepting *A. latens* and *A. paris*. In higher (milder) values of K, *A. powelli* is obtained as the sister group of a clade composed of *Astyanacinus moorii* (Boulenger), *Astyanax abramis*, *A. lacustris*, *A. lineatus*, *A. pelegri* Eigenmann, *Markiana nigripinnis* (Perugia), and *Psellogrammus kennedyi* (Eigenmann), in a rather odd result that is also weakly supported.

The aim of this phylogenetic analysis is not to resolve the relationships of *Astyanax*, which is far beyond the scope of this paper, but to obtain some idea about the phylogenetic relationships of *A. powelli* and the cryptic species with which the new taxon is sympatric (*A. cf. eigenmanniorum* and *A. puka*). The new taxon was not obtained as sister group of those species in any of the analyses performed herein.

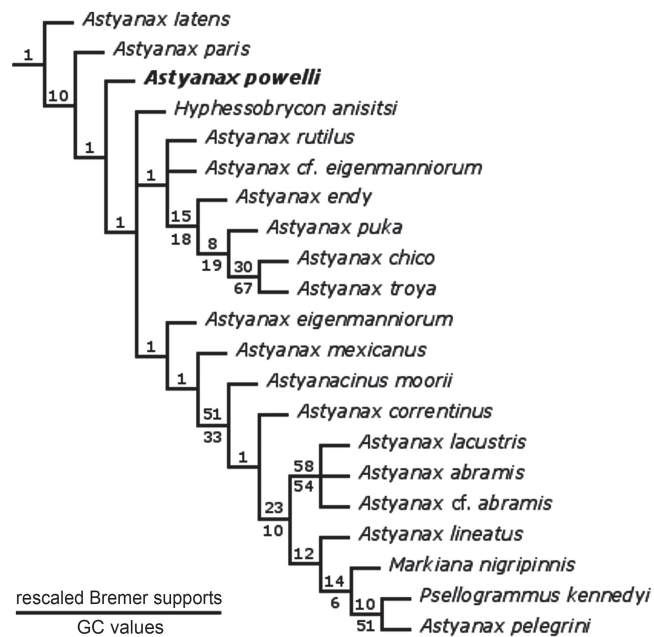


Fig. 5. Detail of the *Astyanax* clade in the most parsimonious tree obtained from values of K between 5.26 and 13.53. Numbers above branches are rescaled Bremer supports (see material and methods section) and numbers below branches are GC values in clades having positive values.

Discussion

The new species shares most of the meristic data with *Astyanax eigenmanniorum*. That species was described from laguna dos Patos system, Rio Grande do Sul, Brazil, but it has a broad distribution and may actually represent a complex of species that should be carefully revised, as noted by Malabarba (1989) and Vari, Castro (2007).

Species of *Astyanax* with similar counts than *A. eigenmanniorum* have been recorded in several basins of Argentina. *Astyanax powelli* can be easily distinguished from all those species by the absence of maxillary teeth. Also, the holotype of *A. eigenmanniorum* has a shorter snout, of 16.2% (Vari, Castro, 2007) vs. 20.1-24.8 % HL in *A. powelli*.

The species of *Astyanax* known to lack maxillary teeth belong to the *A. bimaculatus*-group (as *A. abramis* and *A. lacustris*), which share the presence of an ovate humeral spot and *circuli* on posterior field of scales (e.g. Mirande, 2010). *Astyanax powelli* clearly does not belong to the *Astyanax bimaculatus* species complex (Garutti, Britski, 2000), having a vertical humeral spot and lacking *circuli* on posterior field of scales. The new taxon, also, was not found as closely-related to *A. abramis* and *A. lacustris* in the phylogenetic analysis herein performed. The lack of a maxillary tooth in *A. powelli* is an autapomorphy that readily distinguishes it from closely related species.

The following *Astyanax* species occur in the northwestern Argentina: Río Sali basin: *A. abramis*, *A. cf. eigenmanniorum*, *A. lacustris*, *A. rutilus*, and *A. puka*

(Butí, Cancino, 1999, 2005; Mirande *et al.*, 2007); Río Juramento basin: *A. abramis*, *A. cf. eigenmanniorum*, *A. lacustris*, *A. lineatus*, and *A. puka* (Terán *et al.*, 2014). Río Bermejo basin: *A. abramis*, *A. endy*, *A. chico*, *A. lacustris*, *A. latens*, *A. lineatus*, and *A. tumbayaensis* (Mirande *et al.*, 2006a). The following species have been recorded in the lower Río Paraná in Argentina: *A. abramis*, *A. aramburui*, *A. correntinus*, *A. cf. eigenmanniorum*, *A. erythropterus*, *A. lacustris*, *A. leonidas* -Urugua-i-, *A. lineatus*, *A. pelegriini*, *A. pynandi*, *A. rutilus*, *A. stenohalinus*, *A. tupi* -Cuña-Pirú-, *A. troya* -Cuña-Pirú- (Almirón *et al.*, 2015; Azpelicueta *et al.*, 2002; Liotta, 2005; Lucena, Soares, 2016; Mirande *et al.*, 2006b; Protogino *et al.*, 2006). The new species was distinguished from all those species in the Diagnosis section.

Astyanax powelli can be easily distinguished from the remaining species of *Astyanax* that occur in the lower Río Uruguay basin. *Astyanax saguazu* Casciotta, Almirón & Azpelicueta, and *A. paris* possess 2-4 maxillary teeth (*vs.* absent in *A. powelli*). The new species can be further distinguished from *A. saguazu* by the anal-fin origin located posterior to the vertical through last dorsal-fin ray insertion (*vs.* anal-fin origin located anterior to a vertical through last dorsal-fin ray insertion). In addition, *A. paris* possesses a supraopercular spot that is absent in *A. powelli*. The large eye of *A. saguazu* (41.1-45.5% of HL) allows its distinction from *A. powelli* (31.2-36.4% of HL). *Astyanax ojiara* and *A. dissensus* Lucena & Thofehrn may be distinguished from the new taxon by the possession of one distally expanded maxillary tooth with 7-9 cusps (*vs.* tooth absent). Also, *A. ojiara* possesses hooks on all fins of males (*vs.* bony hooks present in anal and pelvic-fins).

Astyanax xiru Lucena, Castro & Bertaco is distributed in the upper Río Uruguay basin (Casciotta *et al.*, 2016; Lucena *et al.*, 2013). This species can be easily distinguished from *A. powelli* by the shape of the first humeral spot: upper portion horizontally elongate and lower portion vertically narrow (*vs.* vertically elongated).

Astyanax pampa is one of the species of Characiformes with the southernmost distribution in South America, inhabiting Las Mostazas stream, the lower Río Colorado basin (southern Buenos Aires Province), and Río Negro drainage (Río Negro Province) (Casciotta *et al.*, 2005; Pérez, 2008). This species is mainly distinguished from *A. powelli* by the presence of one maxillary teeth (*vs.* absent) and a lower number of branched anal fin rays (17-20 *vs.* 20-26 in *A. powelli*); some specimens of *A. pampa* have 5 scales rows between the lateral line and the dorsal-fin origin, while this condition was not found in *A. powelli*, and all the examined specimens have 6 or 7 rows instead.

The Río Sucuma flows northward to Río Las Tunas, forming together an arheic basin. The closest river drainage is the Río Salí basin. The type locality of *Astyanax puka* is in the Río Salí basin and the presence of this species living sympatrically with *A. powelli* at the Río Sucuma may evidence some historical and/or occasional

connection between these two basins, as previously noted by Azpelicueta *et al.* (2010). Species with restricted ranges of distribution, especially those inhabiting arheic systems (*e.g.* *Astyanax powelli* in the Río Sucuma-Las Tunas basin), may be considered as more susceptible to environmental impacts. Therefore, such basins and their faunas should receive special attention in the research efforts and planning of conservation strategies.

Comparative material examined. *Astyanax abramis*. Argentina. Corrientes. CI-FML 5422, 26, 63.7-90.3 mm SL. CI-FML 5173, 10, 60.1-78.9 mm SL. CI-FML 6770, 8, 98.3-107.6 mm SL. *Astyanax aramburui*. Argentina. Entre Ríos. CFA-IC 11712, 61.1 mm SL, holotype. *Astyanax chico*. Argentina. Salta. CI-FML 3913, 6, 65.2-80.41 mm SL. *Astyanax correntinus*. Argentina. Corrientes. CI-FML 3826, 10, 68.7-75.6 mm SL. *Astyanax dissensus*. Argentina. Corrientes. CI-FML 6183, 20, 54.3- 88.6 mm SL. *Astyanax eigenmanniorum*. Brazil. Rio Grande do Sul. ANSP 21599-601, 3, 35.4-47.3 mm SL, paratypes. CI-FML 5468, 20, 43.3-56.9 mm SL. *Astyanax cf. eigenmanniorum*. Argentina. Catamarca. CI-FML 7178, 6, 43.2-65.2 mm SL. Tucumán. CI-FML 3037, 40, 45.6-60.6 mm SL. *Astyanax endy*. Argentina. Salta. CI-FML 3834, 55.8 mm SL, holotype. CI-FML 3835, 14, 48.6-56.3 mm SL, paratypes. *Astyanax erythropterus*. Argentina. Santa Fe. MFA-ZV- Ic 2872, 12 of 22, 35.4-69.2 mm SL, MFA-ZV- Ic 2874, 9, 47.0-71.2 mm SL. *Astyanax hermosus*. Argentina. Córdoba. CFA-IC 11690 78.5 mm SL, holotype. *Astyanax ita*. Argentina. Misiones. CI-FML 7121, 2, 58.0-59.7 mm SL. *Astyanax lacustris*. Argentina. CI-FML 3416, 6, 42.1-50.1 mm SL. CI-FML 5802, 15, 51.1-64.8 mm SL. Paraguay. Bahia Negra. CI-FML 3910, 50, 44.9-62.6 mm SL. *Astyanax latens*. Argentina. Salta. CI-FML 3400, 44.3 mm SL, holotype. CI-FML 3401, 5, 46.8-52.4 mm SL, paratypes. CI-FML 3402, 10, 42.8-47.8 mm SL, paratypes. *Astyanax leonidas*. Argentina. Misiones. CI-FML 5470, 71, 52.1-73.9. *Astyanax lineatus*. Argentina. Salta. CI- FML 3884, 54, 71.1-83.5. *Astyanax mexicanus*. United States of America. Texas. ANSP 162587, 4, 39.4-48.5 mm SL. Argentina. Misiones. CI-FML 6779, 15, 42.4-65.03 mm SL. *Astyanax paris*. Argentina. Misiones. CI-FML 3919, 16, 48.8-66.3 mm SL. *Astyanax pelegriini*. Paraguay. Bahia Negra. CI-FML 3847, 35, 50.4-73.3 mm SL. *Astyanax puka*. Argentina. Tucumán. CI-FML 3844, 50.3 mm SL, holotype. CI-FML 3849, 19, 44.8-59.5 mm SL, paratypes. CI-FML 3850, 3, 42.7-50.0 mm SL. CI-FML 7176, 1, 54.35 mm SL. *Astyanax pynandi*. Argentina. Buenos Aires. CI- FML 7105, 2, 46.8-54.0 mm SL. *Astyanax rutilus*. Argentina. Rosario. CI-FML 7013, 16, 35.1-69.9 mm SL. Tucumán. CI-FML 7177, 4, 46.2-63.6 mm SL, Simoca. *Astyanax saguazu*. Uruguay. Artigas. CI-FML 5807, 15, 46.4-73.6 mm SL. *Astyanax stenohalinus*. Uruguay. Durazno. CI-FML 5811, 2, 59.1-70.9 mm SL. Argentina. Jujuy. CFA-IC 11702, 68.8 mm, holotype. CI-FML 3845, 15, 57.1-75.8 mm SL. CI-FML 5123, 7, 42.7-46.1 mm SL. *Astyanax tupi*. Argentina. Misiones. MACN-ICT 8646, 70.1 mm. SL, holotype. *Astyanax troya*. Argentina. Misiones. CI-FML 3920, 16, 56.3-91.0 mm SL, CI-FML 5466, 16 (2cs) 52.7-89.4 mm SL, CI-FML 7140, 4, 73.0-76.8 mm SL.

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