

# First record of *Astyanax puka* Mirande, Aguilera & Azpelicueta, 2007 (Teleostei: Characidae) in Juramento River basin, Salta, Argentina

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**ABSTRACT:** *Astyanax puka* was described from the endorheic Río Salí basin, Argentina, and it was not previously recorded elsewhere, being considered until now as endemic from that basin. Herein we record for the first time this species in the Río Juramento basin, Río de La Plata system.

DOI: 10.15560/10.5.1231

The fish genus *Astyanax* Baird & Girard (Characiformes: Characidae) is one of the dominant genera of South America freshwaters environments, including more than 140 nominal species (Eschmeyer and Fricke 2014). They present a wide distributional range, latitudinally from Patagonia in Argentina to New Mexico in the United States, and altitudinally from lowlands at sea level to mountain streams. Species of this genus are also found on both slopes of the Cordilleras from Ecuador to Mexico (Eigenmann 1917). This broad distribution is possible because this genus occupies a wide variety of environments in the Neotropical Region (Ringuet 1975).

In recent years, several species similar to *Astyanax eigenmanniorum* (Cope 1894) in the number of anal-fin rays and scales of the lateral line have been described from Argentina, e.g., *Astyanax ojara* Azpelicueta & Garcia, 2000; *Astyanax ita* Almirón, Azpelicueta & Casciotta, 2002; *Astyanax troya* Azpelicueta, Casciotta & Almirón, 2002; *Astyanax leonidas* Azpelicueta, Casciotta & Almirón, 2002; *Astyanax paris* Azpelicueta, Almirón & Casciotta, 2002; *Astyanax pynandi* Casciotta, Almirón, Bechara, Roux & Ruíz Díaz, 2003; *Astyanax chico* Casciotta & Almirón, 2004; *Astyanax hermosus* Miquelarena, Protogino & López, 2005; *Astyanax tumbayaensis* Miquelarena & Menni, 2005; and *Astyanax endy* Mirande Aguilera & Azpelicueta, 2006. *Astyanax puka* Mirande, Aguilera & Azpelicueta, 2007 is one of those species, described from the endorheic Río Salí basin, northwestern Argentina. Mirande *et al.* (2007) considered this species to be endemic of the Río Salí basin, with specimens in the Mandolo and Salí rivers in the province of Tucumán (Figure 1).

Río Juramento-Salado basin is an important fluvial system with about 1500 km from its origins—in the Calchaquies valley—to the Paraná River (Gonzo 2003). The study site corresponds to the upper portion of this basin.

A thorough revision of specimens of *Astyanax* from the Río Juramento basin, El Tunal, Salta, Argentina (Figure 1), revealed that *A. puka* (Figure 2) is also present in that

basin. The specimens were collected near El Tunal dam, Metán department in Salta, Argentina.

*Astyanax puka* is distinguished from the remaining species of the genus by the presence of one distally expanded maxillary tooth with 7–9 cusps and combination of characters given by Mirande *et al.* (2007). Specimens from Río Salí basin and the ones from Río Juramento basin are morphologically indistinguishable, and they belong to the same species.

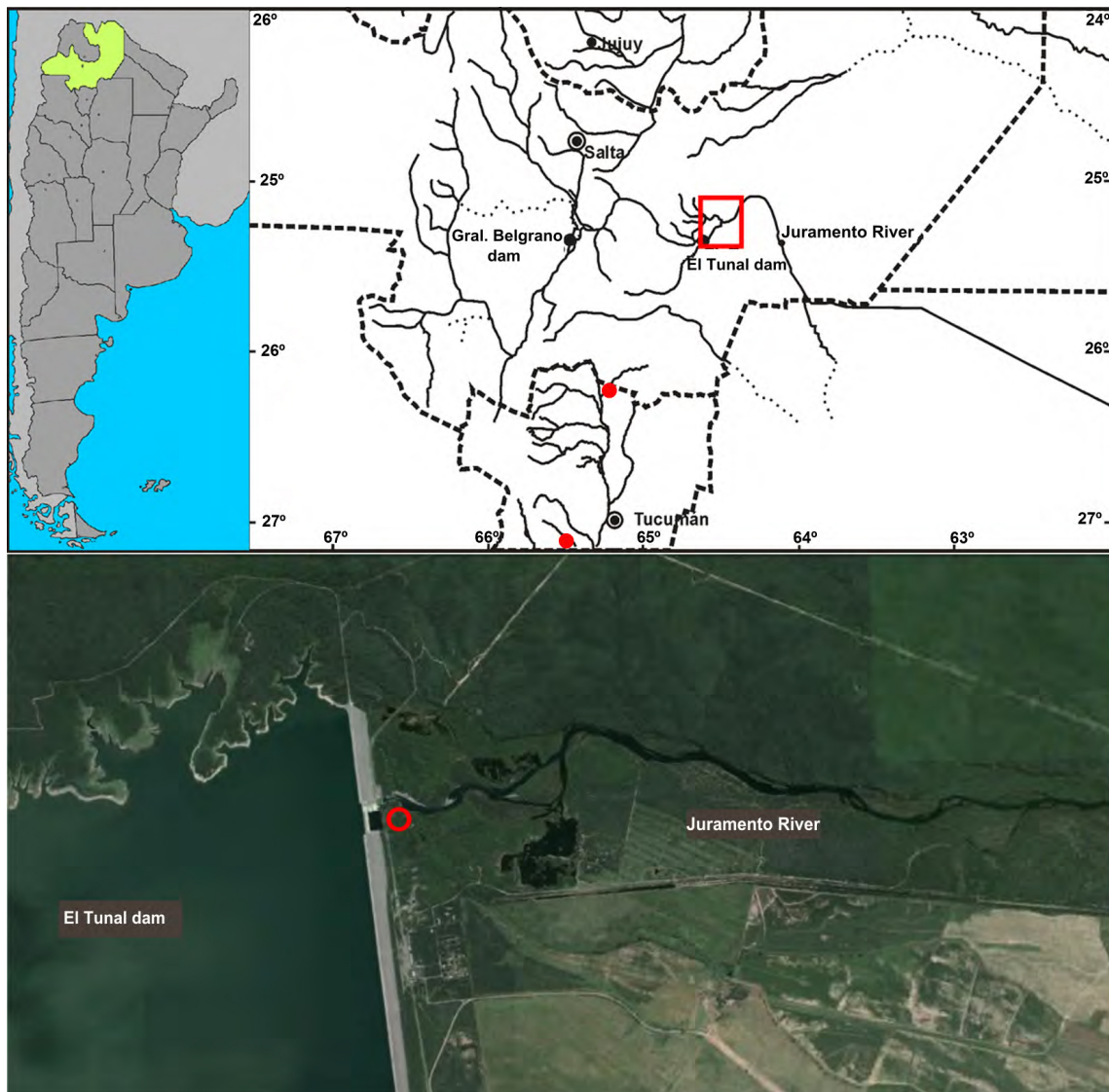
Morphometric measurements of 24 specimens of *A. puka* from the Río Juramento basin are presented in Table 1. Voucher specimens are deposited in Colección Ictiológica Fundación Miguel Lillo, Tucumán (CI-FML 5878) (see Appendix 1).

The presence of *Astyanax puka* in the Río Juramento basin is not surprising since, according to López *et al.* (2008), the Juramento and Salí-Dulce basins are included in the Ichthyological Pampean province due to the share of several fish species. The finding of *Astyanax puka* in the Río Juramento basin provides new evidence that reinforces the hypothesis of a close historical relationship of both basins.

The Río Juramento basin also shares elements with the Bermejo river basin, maybe because relatively malleable bedrock erosion, which potentially allows river captures on their heads. Therefore, although the populations are isolated at present, perhaps they had recent genetic exchanges (Mirande 2012).

*Astyanax puka* lives in sympatry in the Juramento River with other species of the genus: *A. abramis*, *A. asuncionensis*, *A. eigenmanniorum*, and *A. lineatus*. Also, *Astyanax rutilus* was found in the middle Juramento-Salado basin, Figueroa dam, Figueroa department in Santiago del Estero (see Appendix 1).

**ACKNOWLEDGEMENTS:** We thank CONICET, Fundación Miguel Lillo, and FONCyT (PICT-2011-0992 to JMM) for support; two anonymous reviewers who improved the manuscript with their comments and suggestions; and Luis Lobo, Fabiana Cancino (FML) and Baltazar Bugeau (FML) for loan of specimens.



**FIGURE 1.** Map of Tucumán and Salta provinces, located at Northern Argentina. Salta province is colored in yellow. The square indicates the study site in the Río Juramento basin (25°13' S, 64° 28' W). Full red spots show sites where *Astyanax puka* was collected in Sali-Dulce basin (for detailed map see Mirande et al 2007) an empty red spot indicates the place where *Astyanax puka* was record in Juramento River.

#### LITERATURE CITED

- Almirón, A.E., M.M. Azpelicueta and J.R. Casciotta. 2002. *Astyanax ita* sp. n.—A new species from the Río Iguazú basin, in Argentina (Teleostei, Characiformes, Characidae). *Zoologische Abhandlungen (Dresden)* 52: 3–10.
- Azpelicueta, M.M. and J.O. García. 2000. A new species of *Astyanax* (Characiformes, Characidae) from Uruguay river basin in Argentina, with remarks on hook presence in Characidae. *Revue Suisse de Zoologie* 107(2): 245–257 (<http://biodiversitylibrary.org/page/41280393>).
- Azpelicueta, M.M., J.R. Casciotta and A.E. Almirón, 2002a. Two new species of the genus *Astyanax* (Characiformes, Characidae) from the Paraná river basin in Argentina. *Revue Suisse de Zoologie* 109(2): 243–259 (<http://biodiversitylibrary.org/page/41230123>).
- Azpelicueta, M.M., J.R. Casciotta and A.E. Almirón. 2002b. *Astyanax paris*: A new species from the río Uruguay basin of Argentina (Characiformes, Characidae). *Copeia* 2002(4): 1052–1056 (doi: 10.1643/0045-8511(2002)002[1052:APANSF]2.0.CO;2).
- Casciotta, J.R. and A.E. Almirón. 2004. *Astyanax chico* sp. n., a new species from the río San Francisco basin, northwest of Argentina (Teleostei: Characiformes: Characidae). *Zoologische Abhandlungen (Dresden)* 54: 11–17.
- Casciotta, J.R., A.E. Almirón, J.A. Bechara, J.P. Roux, and Ruiz Diaz, F. 2003. *Astyanax pynandi* sp. n. (Characiformes, Characidae) from the Esteros del Iberá wetland, Argentina. *Revue Suisse de Zoologie* 110(4): 807–816 (<http://biodiversitylibrary.org/page/41178156>).
- Eigenmann, C.H. 1917. The American Characidae. *Memoirs of the Museum of Comparative Zoology* 43(1): 1–102.
- Eschmeyer, W.N. and R. Fricke (eds.). 2014. *Catalog of Fishes Electronic Version*. Available from: <http://researcharchive.calacademy.org/>



**FIGURE 2** *Astyanax puka*, CI-FML 5878, 44.0 mm SL, male, from El Tunal dam, Río Juramento basin, Salta, Argentina.

- research/Ichthyology/catalog/fishcatmain.asp. Captured on September 2014.
- Gonzo, GM de. 2003. *Peces de los Ríos Bermejo, Juramento y Cuencas Endorreicas de la Provincia de Salta*. Museo de Ciencias Naturales y Consejo de Investigación Universidad Nacional de Salta. 243 pp.
- López, H.L, R.C. Menni, M. Donato and A.M. Miquelarena. 2008. Biogeographical revision of Argentina (Andean and Neotropical Regions): An analysis using freshwater fishes. *Journal of Biogeography* 35: 1564–1579 (doi: 10.1111/j.1365-2699.2008.01904.x).
- Miquelarena, A.M. and R.C. Menni, 2005. *Astyanax tumbayaensis*, a new species from northwestern Argentina highlands (Characiformes: Characidae) with a key to the Argentinean species of the genus and comments on their distribution. *Revue Suisse de Zoologie* 112(3):

**TABLE 1.** Morphometrics of 24 specimens of *Astyanax puka*, CI-FML 5878.

	RANGE	MEAN	SD
Standard length	33.0–47.5	41.4	3.8
% of standard length			
Predorsal distance	17.2–25.3	21.6	2.1
Preanal distance	21.7–30.8	26.4	2.4
Preventral distance	15.7–26.2	20.3	2.3
Body depth	12.2–18.2	15.3	1.6
Dorsal-fin base	4.3–7.1	5.7	0.7
Anal-fin base	9.9–15.4	12.9	1.3
Pectoral-fin length	7.3–11.2	9.1	1.0
Pelvic-fin length	5.4–9.0	7.2	0.8
Pectoral to pelvic-fin distance	7.0–9.8	8.4	1.0
Pelvic to anal-fin distance	5.9–9.0	7.6	0.9
Head length	9.5–13.8	11.5	1.0
Peduncle depth	3.8–5.8	4.9	0.5
Peduncle length	3.2–4.9	4.1	0.5
% head length			
Eye diameter	3.5–4.8	4.3	0.3
Interorbital width	3.2–4.1	3.6	0.3
Postorbital distance	4.1–6.6	5.0	0.6
Snout length	2.0–2.9	2.6	0.2
Maxillary length	1.9–3.0	2.5	0.2
Upper-jaw length	3.0–4.5	3.8	0.4

661–676 (<http://biodiversitylibrary.org/page/41226545>).

- Miquelarena, A.M., L.C. Protogino and H.L. López. 2005. *Astyanax hermosus*, a new species from the Primero River basin, Córdoba, Argentina (Characiformes, Characidae). *Revue Suisse de Zoologie* 112(1): 13–20 (<http://www.biodiversitylibrary.org/page/41187829>).
- Mirande, J.M., G. Aguilera and M.M. Azpelicueta. 2006. *Astyanax endy* (Characiformes: Characidae), a new fish species from the upper Río Bermejo basin, northwestern Argentina. *Zootaxa* 1286: 57–68 (<http://www.mapress.com/zootaxa/2006f/z01286p068f.pdf>).
- Mirande, J.M., G. Aguilera and M.M. Azpelicueta. 2007. A new species of *Astyanax* (Characiformes: Characidae) from the endorheic río Salí

- basin, Tucumán, northwestern Argentina. *Zootaxa* 1646: 31–39 (<http://www.mapress.com/zootaxa/2007f/z01646p039f.pdf>).
- Mirande, J.M. 2012. Primer registro de *Nantis indefessus* (Characidae: Stevardinae) en la cuenca del Juramento, Salta, Argentina. *Acta Zoológica Lilloana* 56(1–2): 153–158.
- Ringuelet, R.A. 1975. Zoogeografía y ecología de los peces de aguas continentales de la Argentina y consideraciones sobre las áreas ictiológicas de América del Sur. *Ecosur* 2(3): 1–122.

RECEIVED: May 2014

ACCEPTED: September 2014

PUBLISHED ONLINE: October 2014

EDITORIAL RESPONSIBILITY: Rubens Pazza

#### APPENDIX 1

##### Examined material

*Astyanax puka*. CI FML 5878, 27 ex. (3 C & S), 33.0–47.5 mm. Argentina, Salta, El Tunal. Río Juramento, Río Juramento basin. Río de La Plata system. 25°13'38" S, 64°28'28" W. 460 m above sea level.

##### Comparative material

*Astyanax abramis* CI-FML 5040, 17 ex., 72.8–97.0 mm SL. Argentina, Salta, Río Juramento basin, Río Juramento. *Astyanax asuncionensis* CI-FML 6116, 6 ex, 32.5–40.3 mm SL. Argentina, Salta, Metán, Río Juramento basin, Río Juramento. CI-FML 5041, 1 ex., 58.7 mm SL. Argentina, Salta, Río Juramento basin, Río Juramento. *Astyanax eigenmanniorum* CI-FML 5043, 11 ex., 29.3–42.8 mm SL. Argentina, Salta, Río Juramento basin, Río Juramento. *Astyanax eigenmanniorum*. CI-FML 5468, 20 ex. (2 C & S), 37.9–55.5 mm. Brazil, Rio Grande do Sul, município de Mostardas, Lagoa Bacupari. *Astyanax lineatus*. CI-FML 5469, 22 ex., 46.8–74.4 mm SL. Argentina, Salta, Río Juramento basin, Río Arenales. *Astyanax puka*. Holotype. CI-FML 3844 male, 50.3 mm SL, Argentina, Tucumán, Monteros, Río Salí basin, Río Mandolo, under the bridge of Ruta Provincial 344. Paratypes: CI-FML 3849, 19 ex., 44.8–59.5 mm SL, collected with the holotype. CI-FML 3851, 2 ex., 53.4–60.1 mm SL, Argentina, Tucumán, Trancas, Río Salí basin, Río Salí at Balneario El Boyero. CI-FML 5371, 2 ex., 39.7–45.1 mm SL. Argentina, Tucumán, Simoca, Río Sali-Dulce basin, arroyo Pampa-Mayo. CI-FML 5804, 16 ex., 24.4–53.3 mm SL. Argentina, Tucumán, Simoca, Río Sali-Dulce basin, arroyo Los Perez. *A. rutilus*. CI-FML 5251, 313 ex. (4 C & S), 38.8–68.5 mm SL, Argentina, Santiago del Estero, Embalse Figueroa, Río Salado, Río Juramento-Salado basin, Río de La Plata system.