

On some species of *Astyanax* reported erroneously from Argentina.

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Abstract

Several species of *Astyanax* have been reported from Argentina which currently are considered not to be distributed so far South or whose identity as *Astyanax* is doubtful. These records have been copied during decades based on historic accounts or erroneous determination. We conclude that *Astyanax bimaculatus*, *A. fasciatus*, *A. paranahybae*, *A. scabripinnis*, and *A. taeniatus* shall be excluded from the faunal lists of Argentina and, at least in the case of *A. fasciatus*, also of Uruguay.

Resumen

Varias especies de *Astyanax* han sido reportadas para Argentina, de las que actualmente no se considera que estén distribuidas tan al sur o cuya identidad en *Astyanax* es dudosa. Estos registros han sido repetidos durante décadas basándose en cuestiones históricas o identificaciones erróneas. Nosotros concluimos que *Astyanax bimaculatus*, *A. fasciatus*, *A. paranahybae*, *A. scabripinnis* y *A. taeniatus* deberían ser excluidas de las listas de fauna de Argentina y, al menos en el caso de *A. fasciatus*, también de Uruguay.

Introduction

Astyanax is the most diverse genus of freshwater fishes inhabiting Argentina. Most of its diversity in this country was described in the last 20 years, in which this genus was intensely studied across most basins and valuable information was produced on some problematic species complexes. Especially, advances on the resolution of the *A. eigenmanniorum* complex, with detailed comparisons with type material and topotypes, permitted the description of many species of the genus (e.g. *Astyanax chico*, *A. endy*, *A. hermosus*, *A. puka*, and *A. troya*). Also, some species not assignable to any complex were discovered and described recently (e.g. *A. latens*, *A. paris*).

However, this high and growing known diversity of the genus in Argentina is also positively biased by species that are cited but are not present in this country. Those wrong citations are either due to repeated mentions of originally misidentified specimens or to lack of nomenclatural updates after taxonomic changes proposed in literature.

The aim of this paper is to discuss the situation of species of *Astyanax* usually cited in Argentina but, according to our observations and/or recent literature, are not present in this country and should be removed from lists of species.

Astyanax bimaculatus (Linnaeus, 1758)

| | |
|---------------|--|
| original | <i>Salmo bimaculatus</i> |
| type locality | America Meridionali |
| synonyms | <i>Tetragonopterus maculatus</i> Müller & Troschel, 1845 Brasilia, Guiana et Surinam ? <i>Tetragonopterus gronovii</i> Valenciennes, 1850 Surinam; rivières de La Guyane ? <i>Tetragonopterus linnaei</i> Valenciennes, 1850 Cayenne [French Guiana] ? <i>Tetragonopterus wappi</i> Valenciennes, 1850 [Essequibo River, Guyana] ? <i>Tetragonopterus vittatus</i> Castelnau, 1855 Bahia [Brazil] ? <i>Poecilurichthys brevoortii</i> Gill, 1858 [Island of] Trinidad ? <i>Tetragonopterus bartlettii</i> Günther, 1866 Upper Amazon ? <i>Tetragonopterus orientalis</i> Cope, 1870 Pará [Brazil] |

?*Tetragonopterus bahiensis* Steindachner, 1877 | Bahia, Brazil
Astyanax bimaculatus borealis Eigenmann, 1908 | Rio Magdalena and Cauca
Astyanax bimaculatus novae Eigenmann, 1911 | Rio Sapon, Prazeres, Bahia [Brazil]
Astyanax rupununi Fowler, 1914 | Rupununi River, British Guiana
Astyanax bimaculatus incaicus Tortonese, 1942 | Rio Zamora, Ecuador

Ringuelet et al. (1967) and López et al. (2003) mentioned as first record for Argentina 'Cuvier & Valenciennes (1848) sub *Tetragonopterus orbygnianus*, in part'. *Astyanax orbignyianus* (Valenciennes, 1850) was described from La Plata and other localities in Argentina and is currently considered to be a valid species by Buckup (2003). The type material of *A. orbignyianus* is still available in Paris (Bertin 1948) and since the times of Eigenmann probably nobody has examined these specimens.

Eigenmann (1921) treated *A. orbignyianus* as a synonym of two different congeners and assigned part of the type material to *Astyanax abramis* and part to *A. bimaculatus* [the nominal subspecies]. Pozzi (1945), Ringuelet & Arámburu (1962), Ringuelet et al. (1967), López et al. (1987) and López et al. (2003) followed Eigenmann (1921) or copied from each other and thus initiated the ongoing erroneous listings of *Astyanax bimaculatus* as a species from Argentina. In the same paper Eigenmann (1921) described the new subspecies *Astyanax bimaculatus paraguayensis*, raising automatically *A. bimaculatus* to the rank of the subspecies *A. b. bimaculatus*. This new subspecies was listed by Pozzi (1945), Ringuelet et al. (1967), and López et al. (1987). As *Astyanax bimaculatus paraguayensis* was preoccupied in *Astyanax* by *Bertoniolus paraguayensis* Fowler, 1918 a replacement name was proposed by Géry (1972): *Astyanax bimaculatus asuncionensis*.

López et al. (2003) did not mention *Astyanax bimaculatus paraguayensis*, *Astyanax bimaculatus asuncionensis* or *Astyanax asuncionensis*. Since then, *Astyanax asuncionensis* Géry, 1972 was treated as a valid species from Argentina by Azpelicueta et al. (2003), Casciotta et al. (2003), Mirande et al. (2004), Miquelarena & Menni (2005), Miquelarena et al. (2005), Mirande et al. (2006), Mirande et al. (2007), Almirón et al. (2010), Mirande (2010), and Soneira et al. (2010). Miquelarena & Menni (2005) did not include *A. bimaculatus* in their key to the *Astyanax* from Argentina. The first record for Uruguay was done by Messner (1962) sub *A. b. bimaculatus*. Nion et al. (2002) listed *A. bimaculatus*. Serra (2012) has excluded *A. bimaculatus* from the faunal list of Uruguay. Also, Buckup (2003) mentioned the distribution of *A. bimaculatus* as "Panama to Amazon basin". *Astyanax asuncionensis* is readily distinguished from *A. bimaculatus* by the absence of maxillary teeth (vs. presence). We assume that most of the Argentinean records of *Astyanax bimaculatus* can be assigned to *Astyanax asuncionensis* Géry, 1972.

***Astyanax fasciatus* (Cuvier, 1819)**

| | |
|---------------|---|
| original | <i>Chalceus fasciatus</i> |
| type locality | Brazil |
| synonyms | <i>Tetragonopterus viejita</i> Valenciennes, 1850 Laguna de Maracaibo, Venezuela <i>Salmo lambari</i> Natterer, 1859 Irisanga, Brazil <i>Tetragonopterus aeneus</i> Günther, 1860 freshwaters of Oaxaca, Mexico <i>Tetragonopterus humilis</i> Günther, 1864 Lake Amatitlan, Guatemala ? <i>Tetragonopterus microphthalmus</i> Günther, 1864 Pacific coast of Guatemala <i>Tetragonopterus panamensis</i> Günther, 1864 Pacific coast of Panama <i>Tetragonopterus belizianus</i> Bocourt, 1868 environments de Belize <i>Tetragonopterus cobanensis</i> Bocourt, 1868 <i>Tetragonopterus finitimus</i> Bocourt, 1868 <i>Tetragonopterus oaxacanensis</i> Bocourt, 1868 <i>Astyanax carolinae</i> Gill, 1870 <i>Tetragonopterus cuvieri</i> Lütken, 1875 <i>Tetragonopterus oerstedii</i> Lütken, 1875 <i>Tetragonopterus rutilus</i> var. <i>jequitinhonhae</i> Steind., 1877 <i>Astyanax albeolus</i> Eigenmann, 1908 ? <i>Tetragonopterus macrophthalmus</i> Regan, 1908 <i>Astyanax regani</i> Meek, 1909 <i>Astyanax grandis</i> Meek & Hildebrand, 1912 <i>Astyanax heterurus</i> Eigenmann & Wilson, 1914 <i>Astyanax aeneus</i> var. <i>costaricensis</i> Meek, 1914 |

? *Astyanax hanstroemi* Dahl, 1943 |
Astyanax fasciatus ortegasae Fowler, 1943 |

Astyanax fasciatus is actually a complex of species whose diversity is far to be completely discovered yet. Apparently this species has been cited from Argentina since Cuvier & Valenciennes (1849) have published their doubts about the identities of *Astyanax rutilus* and *A. fasciatus*.

The type locality of *A. rutilus* is in the Río Paraná, whereas *Astyanax fasciatus* was primarily described from the Rio São Francisco basin in Brazil, but subsequently cited for most basins from Mexico to central Argentina.

Melo & Buckup (2006) restricted *Astyanax fasciatus* to the Rio São Francisco basin, leaving most other populations as *A. aff. fasciatus*. They said that *A. rutilus* is probably a valid species and mentioned some differences in the number of vertebrae, supporting that idea. Also, Melo & Buckup (2006: fig. 5) showed a male specimen of *A. fasciatus* having an elongation of the dorsal fin that was neither observed by us nor mentioned in any population of *Astyanax* living in Argentina. Therefore, since that paper, specimens from Argentina once identified as *A. fasciatus* are named *A. rutilus* by most authors. Protopino et al. (2006) described *Astyanax aramburui*, which distinguishes from *A. rutilus* mainly by the presence of bony hooks in all fins of males. At least until a revision of the *A. fasciatus* complex might be conducted, we assume that the specimens from Argentina and Uruguay once identified as *A. fasciatus* are either *A. aramburui* or *A. rutilus*.

***Astyanax paranahybae* Eigenmann, 1911**

type locality Rio Paranahyba, Brazil
distribution Paraná River basin, Brazil

This species was cited by Ringuélet et al. (1967) based on a single examined specimen from Santa Fe city, with no collection number. Their citation was subsequently repeated by several other authors (e.g. Liotta, 2005) but no additional material of *A. paranahybae* was cited for Argentina. According to Ringuélet et al. (1967), meristic counts of the specimen they examined are similar to *A. eigenmanniorum*, but it has 3-4 maxillary teeth (instead of 1).

Astyanax paranahybae is known by a single specimen, which was examined by Garutti & Britski (2000). They mentioned that the posterior premaxillary row has 4 teeth in the left premaxilla and 5 in the right one and that it has only 7 branched dorsal-fin rays (vs. 9 in other species of *Astyanax*). Vari & Castro (2007) discussed the validity of *A. paranahybae* and suggested that it could be actually a member of *Bryconamericus* or *Piabina*, according to these data and the overall form of body.

There are just a few species of *Astyanax* in Argentina having 3 maxillary teeth, but no one has the combination of characters mentioned by Ringuélet et al. (1967). However, is not clear if the characters mentioned by Ringuélet et al. (1967) were observed by them or if they just copied the diagnosis by Eigenmann (1921). Ringuélet et al. (1967) did not mention how many premaxillary teeth and dorsal-fin rays had the specimen they examined, but the combination of characters provided by them is compatible with the discussion by Vari & Castro (2007) about this species. Therefore, and considering that no other specimen of this species was consequently cited, we consider *Astyanax paranahybae*, if valid, to be absent in Argentina. Even it is possible that the material examined by Ringuélet et al. (1967) was actually a specimen of *Bryconamericus*.

***Astyanax scabripinnis* (Jenyns, 1842)**

original *Tetragonopterus scabripinnis*
type locality Rio de Janeiro, Brazil

The subspecies *Astyanax scabripinnis paranae* was treated as an 'especie limítrofe', meaning 'from neighbouring countries', by Ringuélet et al. (1967) despite the fact that they cited Pozzi (1945) as the first record from Argentina. López et al. (2003) mention as first record Fernández Santos et al. (1987) who reported *Astyanax scabripinnis paranae* from the El Palmar National Park in Entre Ríos (fig. 1). Additionally they referred to more specimens reported by Miquelarena et al. (1997) from the Urugua-í stream in the Paraná basin of Misiones (fig. 2). Actually in both, the mentioned paper of Miquelarena

et al. (1997) and in Miquelarena et al. (2009) these specimens were addressed as the nominal species *Astyanax scabripinnis* and not as the subspecies *A. s. paranae* as indicated by López et al. (2003). *Astyanax paranae* Eigenmann, 1914 was treated as a valid species by Buckup (2003) and the record by Fernández Santos et al. (1987) would thus be the first one from Argentina for this species. These specimens should be existing yet at the MACN and deserve an examination. Anyhow, if treated as the subspecies as listed by López et al. (2003) and considered currently as a valid species this record cannot refer to *Astyanax scabripinnis*.

The only remaining record for *Astyanax scabripinnis* is based on the specimens reported from the Urugua-í subbasin in Misiones. The Urugua-í stream was separated from the Río Paraná by a waterfall until the construction of a hydroelectric dam and has developed its own ichthyofauna, different at least in part from the ones found in the ríos Paraná and Iguazú.

For the specimens from the Urugua-í we consider that these might have been confused with a later described species from the *Astyanax scabripinnis* complex sensu Ingenito & Duboc (2014). Considering that the arroyo Urugua-í shows an extremely diverse composition of species, possessing species endemic to this subbasin, sharing some with the río Paraná and others with the río Iguazú basin above the falls, the two species which might be candidates for such a confusion are *Astyanax leonidas* from the Urugua-í itself and *A. troya* from the río Paraná. Either would more probably be found in the Urugua-í than the real *A. scabripinnis* or *A. paranae*. Until an examination of the above mentioned specimens proves us wrong, *A. scabripinnis* should not be listed in faunal lists for Argentina.

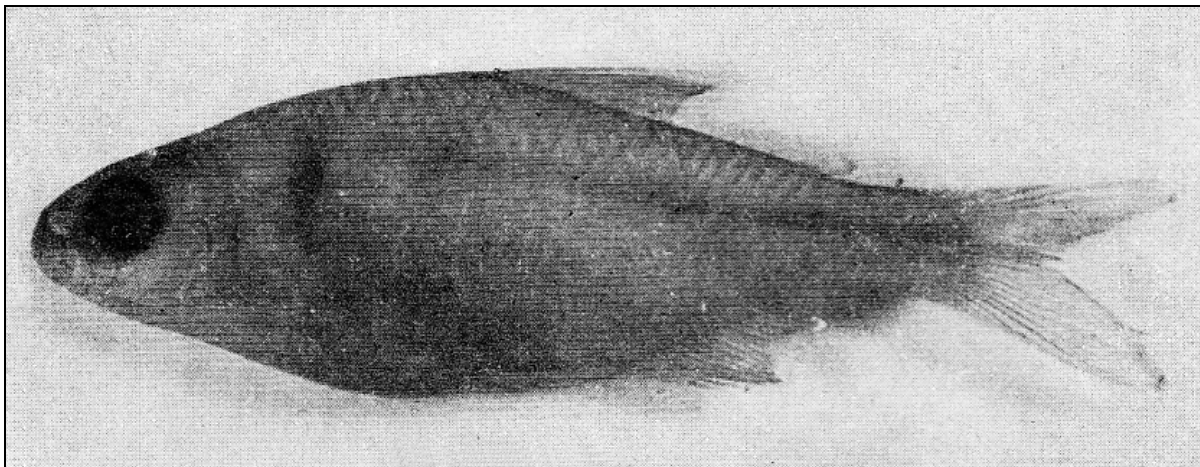


fig. 1. *Astyanax scabripinnis paranae* from Fernández Santos et al. (1987)



fig. 2. *Astyanax scabripinnis* from Miquelarena et al. (1997)

Species of *Astyanax* reported from Argentina in the chronological order of their formal descriptions.

| | Ringuélet et al. (1967) | López et al. (2003) | Miquelarena & Menni (2005) | valid for Argentina |
|---|----------------------------|------------------------|-------------------------------|------------------------|
| <i>A. bimaculatus</i> (Linnaeus, 1758) | X | X | - | - |
| <i>A. fasciatus</i> (Cuvier, 1819) | X | X | X | - |
| <i>A. abramis</i> (Jenyns, 1842) | X | X | X | X |
| <i>A. rutilus</i> (Jenyns, 1842) | - | - | - | X |
| <i>A. scabripinnis</i> (Jenyns, 1842) | - | X | X | - |
| <i>A. taeniatus</i> (Jenyns, 1842) | - | X | - | - |
| <i>A. orbignyana</i> Cuvier & Valenciennes, 1850 | - | - | ? | X |
| <i>A. cordovae</i> (Günther, 1880) | X | X | X | X |
| <i>A. correntinus</i> (Holmberg, 1891) | X | X | X | X |
| <i>A. lineatus</i> (Perugia, 1891) | X | X | X | X |
| <i>A. erythropterus</i> (Holmberg, 1891) | X | X | X | X |
| <i>A. eigenmanniorum</i> (Cope, 1894) | X | X | X | X |
| <i>A. jacuhiensis</i> (Cope, 1894) | - | - | ? | ? |
| <i>A. alleni</i> (Eigenmann & Mc Atee, 1907) | X | - | X | X |
| <i>A. pelegri</i> Eigenmann, 1907 | X | X | X | X |
| <i>A. gymnogonys</i> Eigenmann, 1911 | X | X | X | X |
| <i>A. paranahybae</i> Eigenmann, 1911 | X | X | - | - |
| <i>A. paranae</i> Eigenmann, 1914 | X | - | - | - |
| <i>A. stenohalinus</i> Messner, 1962 | - | - | - | X |
| <i>A. asuncionensis</i> Gery, 1972 (incl. <i>A. bim. parag.</i>) | X | - | X | X |
| <i>A. ojara</i> Azpelicueta & García, 2000 | | X | X | X |
| <i>A. ita</i> Almirón, Azpelicueta & Casciotta, 2002 | | X | X | X |
| <i>A. leonidas</i> Azpelicueta, Casciotta & Almirón, 2002 | | X | X | X |
| <i>A. paris</i> Azpelicueta, Almirón & Casciotta, 2002 | | X | X | X |
| <i>A. troya</i> Azpelicueta, Casciotta & Almirón, 2002 | | X | X | X |
| <i>A. pynandi</i> Casciotta, Almirón et al. 2003 | | | X | X |
| <i>A. saguazu</i> Casciotta, Almirón & Azpelicueta, 2003 | | | X | X |
| <i>A. tupi</i> Azpelicueta et al., 2003 | | | X | X |
| <i>A. latens</i> Mirande, Aguilera & Azpelicueta, 2004 | | | X | X |
| <i>A. chico</i> Casciotta & Almirón, 2004 | | | - | X |
| <i>A. hermosus</i> Miquelarena, Protogino & López, 2005 | | | X | X |
| <i>A. tumbayaensis</i> Miquelarena & Menni, 2005 | | | X | X |
| <i>A. pampa</i> Casciotta, Almirón & Azpelicueta, 2005 | | | | X |
| <i>A. endy</i> Mirande, Aguilera & Azpelicueta, 2006 | | | | X |
| <i>A. aramburui</i> Protogino, Miquelarena & López, 2006 | | | | X |
| <i>A. puka</i> Mirande, Aguilera & Azpelicueta, 2007 | | | | X |

***Astyanax taeniatus* (Jenyns, 1842)**

original *Tetragonopterus taeniatus*
type locality Socego, Rio de Janeiro state, Brazil

López et al. (2003) assigned the first record of this species to Géry (1978) from the South of Buenos Aires province. Géry actually only informed about the fact that Lueling had found *A. taeniatus* in a laguna near Guaminí. In 1981 Lueling himself published a report about the collection he had conducted in late 1975 in the lakes of Guaminí, known as the Lagunas Encadenas del Oeste.

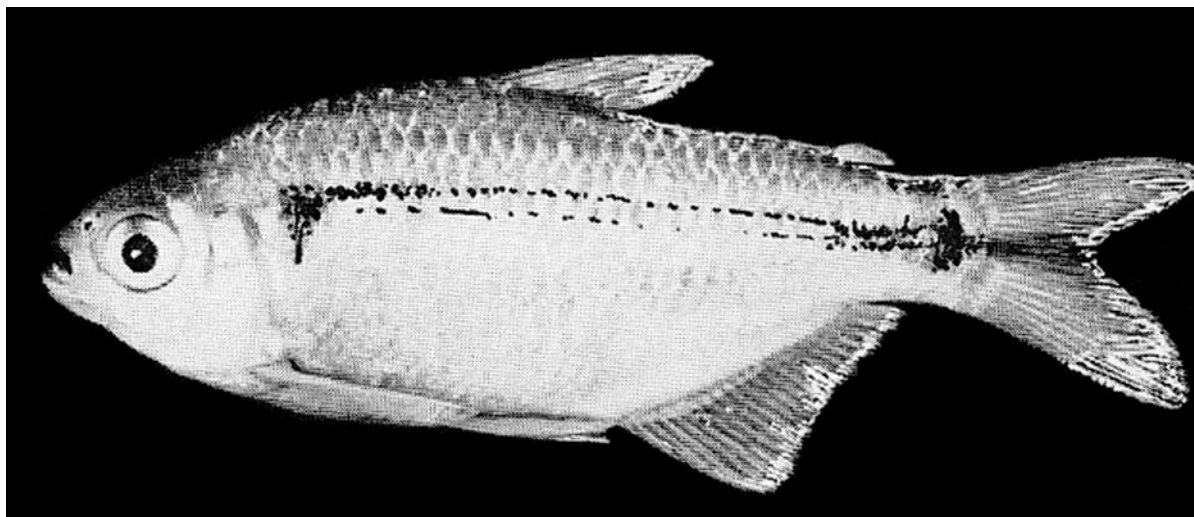


fig. 3. *Astyanax taeniatus* from Lueling (1981)

He provided a photo (fig. 3) of a specimen he had determined as *A. taeniatus*, but no further details or data. The only members of the genus subsequently reported on from localities South of the río Salado basin are *Astyanax eigenmanniorum* (e.g. Almirón et al. 1997, Casciotta et al. 1999) and *A. pampa* (Casciotta et al. 2005, Fulvio Pérez 2008). Miquelarena & López (1995) conducted another ichthyological inventory of the Lagunas Encadenadas del Oeste and recorded *A. cf. eigenmanniorum*, but explicitly stated that they could not confirm the presence of *A. taeniatus*. Buckup (2003) restricted the distribution of *A. taeniatus* to the "Paraíba do Sul River drainage and coastal rivers of Rio de Janeiro and Espírito Santo States" in Brazil.

Combining the above given information and despite the fact that so far we had no opportunity to examine Lueling's voucher material, if still available, we tentatively remove *Astyanax taeniatus* from the faunal list of freshwater fishes found in Argentina.

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