

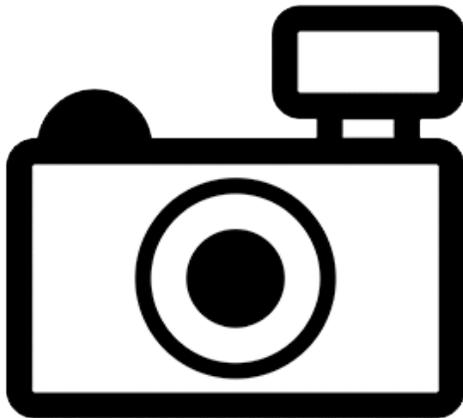
***Potamotrygon schuhmacheri* (a stingray, no common name)**

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, August 2012

Revised, September 2018

Web Version, 8/19/2019



No Photo Available

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2018):

“South America: Paraná-Paraguay River basin [Argentina, Brazil, Paraguay].”

“[In Argentina:] Type locality, Río Colastiné Sur, Santa Fe [Eschmeyer 1998]. Found in Parano Platense [López et al. 2003].”

Status in the United States

No records of *Potamotrygon schuhmacheri* in the wild or in trade in the United States were found.

The Florida Fish and Wildlife Conservation Commission has listed the freshwater stingray *Potamotrygon schuhmacheri* as a prohibited species. Prohibited nonnative species (FFWCC 2018), “are considered to be dangerous to the ecology and/or the health and welfare of the people of Florida. These species are not allowed to be personally possessed, although exceptions are

made by permit from the Executive Director for research, commercial use (with security measures to prevent escape or release) or public exhibition purposes.”

Means of Introductions in the United States

No records of *Potamotrygon schuhmacheri* in the wild in the United States were found.

Remarks

From Charvet-Almeida and de Almeida (2004):

“Misidentifications occur with other potamotrygonid species such as *P. brachyura* and *P. histrix* (Almeida and Charvet-Almeida, pers. obs.). Some authors suggest that this species could be a junior synonym of *P. histrix* (Carvalho et al. 2003). However, at present *P. schuemacheri* is considered a valid species. Further research and collections are needed.”

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Fricke et al. (2018):

“**Current status:** Valid as *Potamotrygon schuhmacheri* Castex 1964.”

From ITIS (2018):

“Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Chondrichthyes
Class Chondrichthyes
Subclass Elasmobranchii
Superorder Euselachii
Order Myliobatiformes
Family Potamotrygonidae
Genus *Potamotrygon*
Species *Potamotrygon schuhmacheri* Castex 1964”

Size, Weight, and Age Range

From Froese and Pauly (2018):

“Max length : 25.0 cm WD male/unsexed; [Carvalho et al. 2003]”

Environment

From Froese and Pauly (2018):

“Freshwater; benthopelagic.”

Climate/Range

From Froese and Pauly (2018):

“Temperate”

Distribution Outside the United States

Native

From Froese and Pauly (2018):

“South America: Paraná-Paraguay River basin [Argentina, Brazil, Paraguay].”

“[In Argentina:] Type locality, Río Colastiné Sur, Santa Fe [Eschmeyer 1998]. Found in Parano Platense [López et al. 2003].”

Introduced

From Haddad Jr. et al. (2013):

“In the Brazilian stretch of the Paraná River, stingray envenomations appeared over the past 20 years. An important natural barrier – the Seven Falls of Guaíra (Paraná state) – served as a natural barrier preventing species of the Upper Paraná River to colonize other regions. However, with the creation of Itaipu hydroelectric dam in 1982, these falls were submerged, allowing the movement of several fish species upstream, including rays that are taking advantage of locks installed at the dam to expand their distribution area [Garrone Neto and Haddad Jr. 2010; Garrone Neto et al. 2007].

Despite taxonomic uncertainties, studies in the region demonstrated that at least three species of potamotrygonids settled, to a greater or lesser extent, in invaded areas: *Potamotrygon falkneri*, *P. motoro* and *P. schuhmacheri* [Garrone Neto et al. 2005a, 2007; Haddad Jr. et al. 2005; Garrone Neto and Haddad Jr. 2007; Graça and Pavanelli 2007].”

Means of Introduction Outside the United States

From Haddad Jr. et al. (2013):

“An important natural barrier – the Seven Falls of Guaíra (Paraná state) – served as a natural barrier preventing species of the Upper Paraná River to colonize other regions. However, with the creation of Itaipu hydroelectric dam in 1982, these falls were submerged, allowing the movement of several fish species upstream, including rays that are taking advantage of locks installed at the dam to expand their distribution area [Garrone Neto and Haddad Jr. 2010; Garrone Neto et al. 2007].”

Short Description

From Ramos (2017):

“Rosa (1985) describes it as a species with subcircular disc, dorsal surface with reticulate pattern of dark pigment, delimiting irregular yellowish-brown spaces with dark center, which decrease in size towards disc margins.”

Biology

Information on the biology of *Potamotrygon schuhmacheri* was not found.

Human Uses

From Charvet-Almeida and de Almeida (2004):

“It does not seem to be taken for the ornamental trade, or as a food source.”

The Florida Fish and Wildlife Conservation Commission has listed the freshwater stingray *Potamotrygon schuhmacheri* as a prohibited species. Prohibited nonnative species (FFWCC 2018), “are considered to be dangerous to the ecology and/or the health and welfare of the people of Florida. These species are not allowed to be personally possessed, although exceptions are made by permit from the Executive Director for research, commercial use (with security measures to prevent escape or release) or public exhibition purposes.”

Diseases

No records of OIR-reportable diseases (OIE 2019) were found for *Potamotrygon schuhmacheri*.

Reyda (2008) lists *P. schuhmacheri* as a potential host of *Rhinebothrium paratrygoni*.

Threat to Humans

From Haddad Jr. et al. (2013):

“In the upper course of the Paraná River, injuries are reported by inhabitants and also tourists, who are often unaware of the presence of these animals [*Potamotrygon falkneri*, *P. motoro*, and *P. schuhmacheri*] in the area.”

3 Impacts of Introductions

According to Haddad Jr. et al. (2013), the building of a dam and subsequent submergence of a falls that was previously a natural barrier to *P. schuhmacheri* and two other *Potamotrygon* spp. has led to envenomations from stingray attacks on humans.

From Haddad Jr. et al. (2013):

“In the upper course of the Paraná River [above the falls that were flooded out], injuries are reported by inhabitants and also tourists, who are often unaware of the presence of these animals in the area. Epidemiological surveys and ethno-ecological studies involving fishermen and inhabitants of Guaíra town (Paraná state), Presidente Epitácio town (São Paulo state), Novo Porto XV (Mato Grosso do Sul state), Castilho town (São Paulo state), Três Lagoas town (Mato Grosso do Sul state) and Itapura town (São Paulo state) revealed that freshwater stingray migration to that was more evident in the past decade and that envenomations were a sign of its presence [Haddad Jr. et al. 2004; Garrone Neto et al. 2005, 2007; Haddad Jr. 2005; Garrone Neto and Haddad Jr. 2010].”

4 Global Distribution

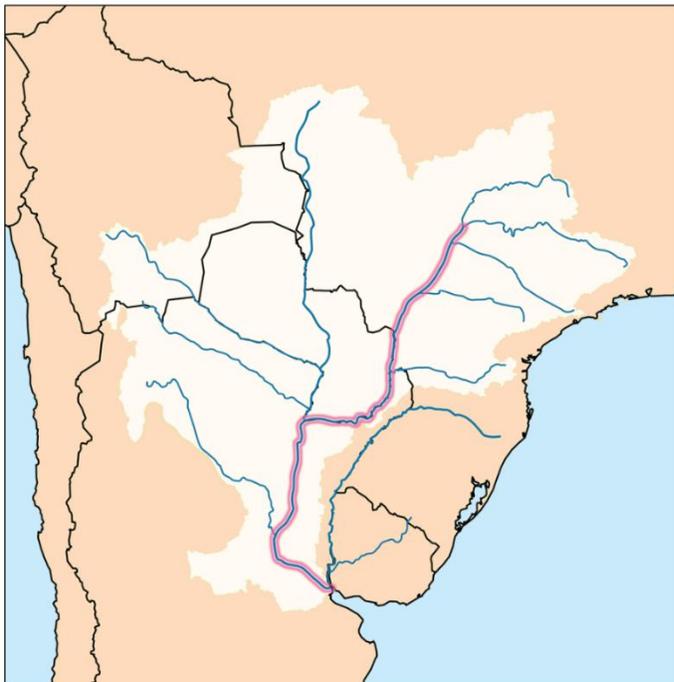


Figure 1. The Paraná-Paraguay River basin in South America (which spans southern Brazil, Bolivia, Paraguay, and northern Argentina). According to Haddad Jr. et al. (2013) and Froese and Pauly (2018), *Potamotrygon schuhmacheri* is native to and potentially found throughout the river basin. Map from Chocofrito/Wikimedia; licensed under Creative Commons BY-SA 4.0 International.

No georeferenced observations of *Potamotrygon schuhmacheri* were available. Source points for the climate match were chosen to represent the entire Paraná-Paraguay River basin, the best available description of the species’ range.

5 Distribution Within the United States

No records of *Potamotrygon schuhmacheri* in the wild in the United States were found.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Potamotrygon schuhmacheri* was high in Florida, along the Gulf Coast, the southern half of Texas and in small areas of the southwest. The Northeast, upper Midwest, and most of the West had low climate matches. The Pacific coast of California and everywhere else had medium matches. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for contiguous United States was 0.154, high (scores 0.103 and greater are classified as high). Alabama, Arizona, Florida, Georgia, Louisiana, Maryland, Mississippi, New Mexico, North Carolina, Oklahoma, South Carolina, Texas, and Virginia had high individual Climate 6 scores. Arkansas, Delaware, New Jersey, and Tennessee had medium individual Climate 6 scores; all other States had low individual scores.

The climate match for *P. schuhmacheri* was based climate source points representing a generalized description of the species' range. The results may change if actual georeferenced observations were available to use as source points.

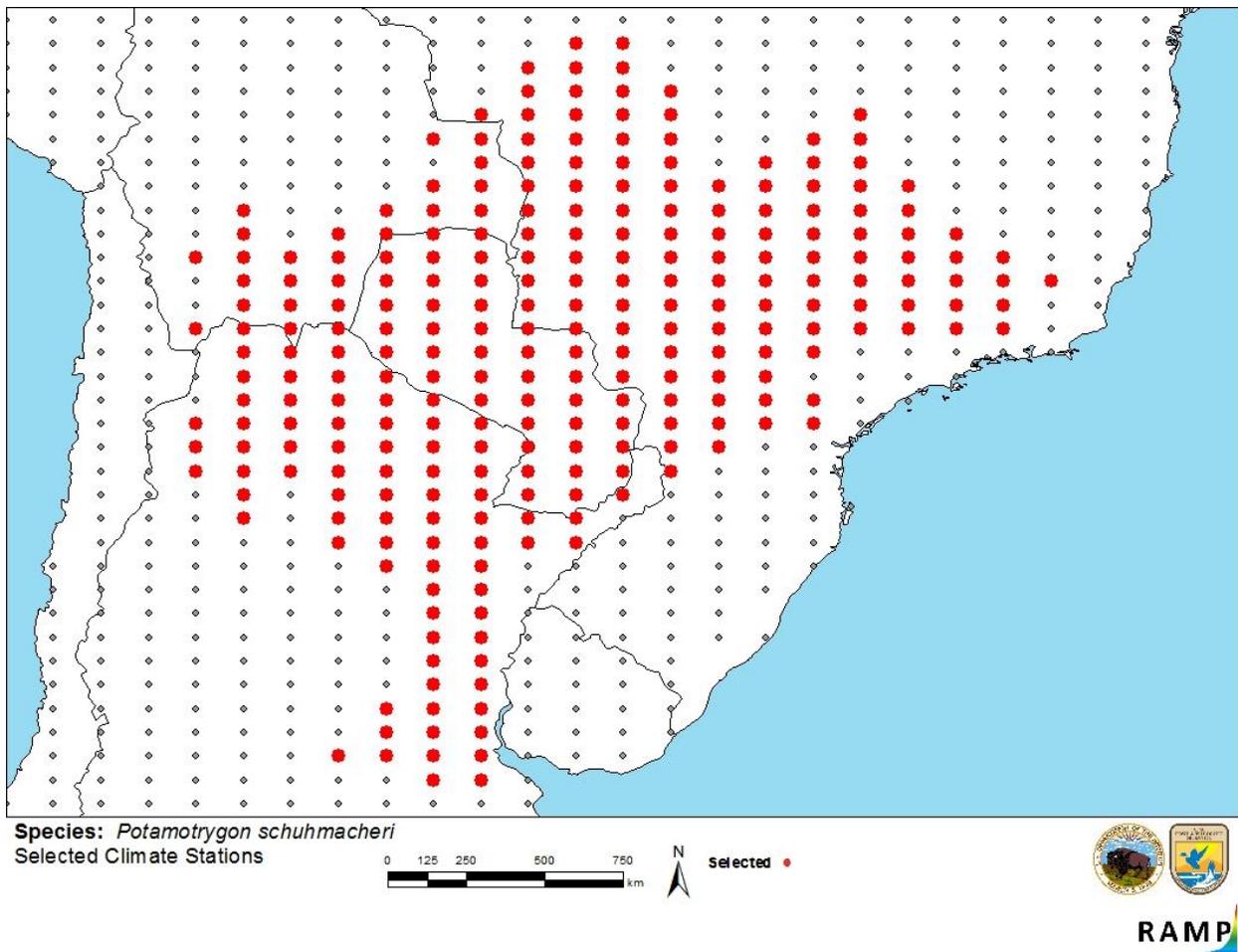


Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations in South America selected as source locations (red; Brazil, Bolivia, Paraguay, Argentina) and non-source locations

(gray) for *Potamotrygon schumacheri* climate matching. Source locations from Froese and Pauly (2018).

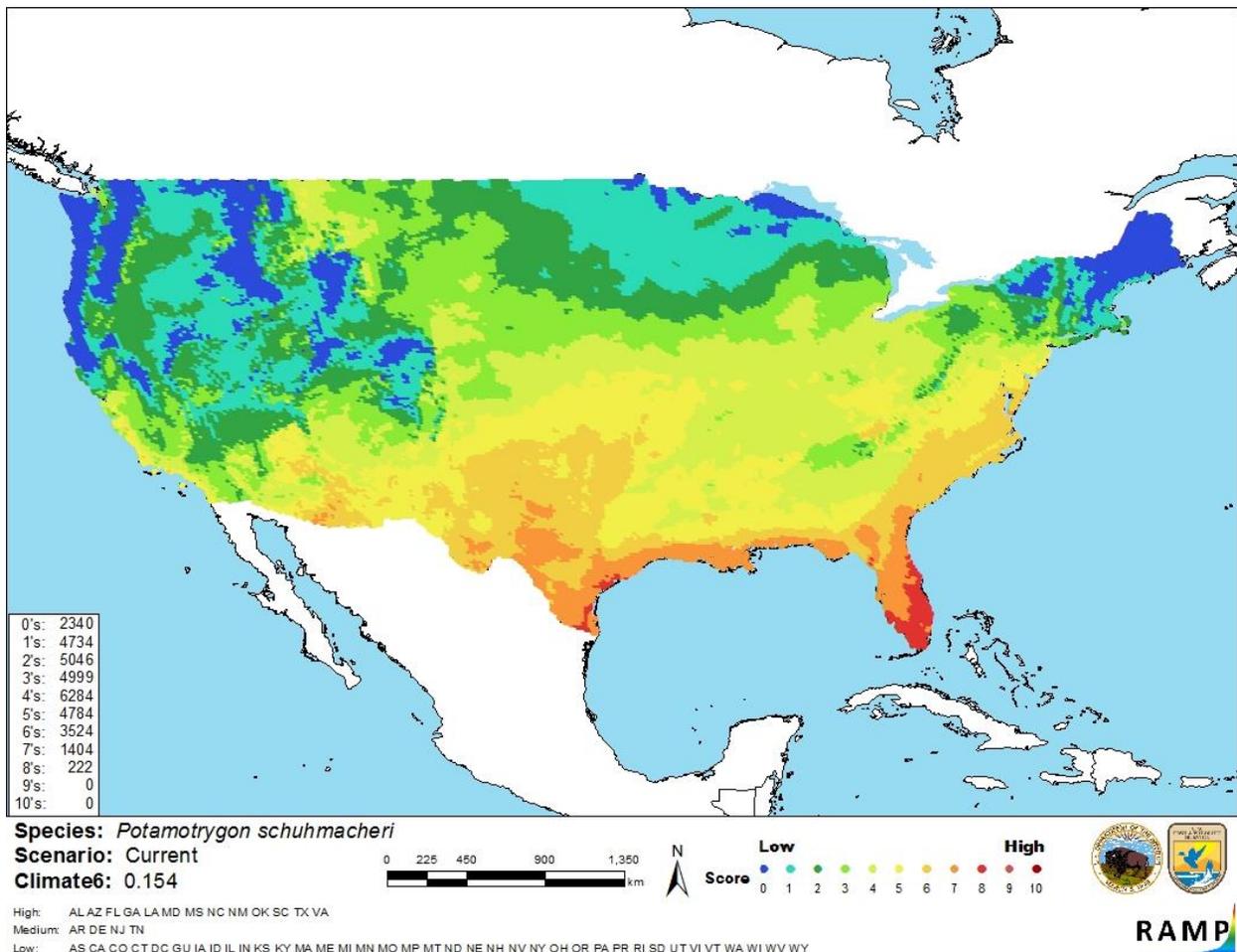


Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Potamotrygon schumacheri* in the contiguous United States based on source locations reported by Froese and Pauly (2018). Counts of climate match scores are tabulated on the left. 0 = Lowest match, 10 = Highest match.

The High, Medium, and Low Climate match Categories are based on the following table:

Climate 6: Proportion of (Sum of Climate Scores 6-10) / (Sum of total Climate Scores)	Climate Match Category
$0.000 \leq X \leq 0.005$	Low
$0.005 < X < 0.103$	Medium
≥ 0.103	High

7 Certainty of Assessment

The certainty of assessment for *Potamotrygon schumacheri* is medium. There is peer reviewed, scientifically defensible information on an introduction of *P. schumacheri* and the negative impacts of that introduction. However, the climate match is based on a generalized description of

the species' range and not georeferenced observations of the species or even a finer scale description of the range. The range of the species as described in the literature is a very large river basin in South America and the selected source locations represent that entire basin.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Potamotrygon schuhmacheri is a species of freshwater stingray native to the Paraná-Paraguay River basin in South America. There is no information indicating that this species is used for food or in the aquarium industry. The history of invasiveness is high. *P. schuhmacheri* invaded upper reaches of the Paraná-Paraguay River basin when a dam was built and submerged a falls that had been a natural barrier to *Potamotrygon* species. After the dam was built stingray attacks on humans and the resulting wounds were reported from the upper reaches where previously there had been no reports. Florida Fish and Wildlife Conservation Commission list *P. schuhmacheri* as a conditional species. The climate match is high. The areas of high match stretched from southern Texas in the west to Florida in the east. Many others areas in the south had medium matches. The certainty of assessment is low. While there is scientifically defensible information supporting the categorization of history of invasiveness there were no georeferenced observations of the species available to use as source points in the climate match. The source points selected represented the entire Paraná-Paraguay River basin; the results of the climate match could change if actual observations of the species could be used as source points. The combination of a high history of invasiveness and high climate match result in an overall risk assessment category of high.

Assessment Elements

- **History of Invasiveness (Sec. 3): High**
- **Climate Match (Sec. 6): High**
- **Certainty of Assessment (Sec. 7): Medium**
- **Remarks/Important additional information:** *Potamotrygon schuhmacheri* is capable of inflicting wounds on humans and is listed as a conditional species by the Florida Fish and Wildlife Conservation Commission.
- **Overall Risk Assessment Category: High**

9 References

Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 10.

Charvet-Almeida, P., and M. P. de Almeida. 2004. *Potamotrygon schuhmacheri*. The IUCN Red List of Threatened Species 2004: e.T44593A10911457. Available: <http://www.iucnredlist.org/details/full/44593/0>. (September 2018).

FFWCC (Florida Fish and Wildlife Conservation Commission). 2018. Conditional species list. Florida Fish and Wildlife Conservation Commission, Tallahassee, Florida. Available: <http://myfwc.com/wildlifehabitats/nonnatives/regulations/conditional/>. (September 2018).

- Fricke, R., W. N. Eschmeyer, and R. van der Laan, editors. 2018. Catalog of fishes: genera, species, references. Available: <http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp>. (September 2018).
- Froese, R., and D. Pauly, editors. 2018. *Potamotrygon schuhmacheri* Castex, 1964. FishBase. Available: <http://www.fishbase.org/summary/Potamotrygon-schuhmacheri.html>. (September 2018).
- Haddad Jr., V., J. L. Costa Cardoso, and D. Garrone Neto. 2013. Injuries by marine and freshwater stingrays: history, clinical aspects of the envenomations and current status of a neglected problem in Brazil. *Journal of Venomous Animals and Toxins including Tropical Diseases* 19:16.
- ITIS (Integrated Taxonomic Information System). 2018. *Potamotrygon schuhmacheri* Castex, 1964. Integrated Taxonomic Information System, Reston, Virginia. Available: https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=943768#null. (September 2018).
- OIE (World Organisation for Animal Health). 2019. OIE-listed diseases, infections and infestations in force in 2019. Available: <http://www.oie.int/animal-health-in-the-world/oie-listed-diseases-2019/>. (August 2019).
- Ramos, H. A. C. 2017. Commercial species of freshwater stingrays in Brazil. Ministry of Environment, Brazilian Institute of Environment and Renewable Resources, Department of Sustainable Use of Biodiversity and Forests, Brasília, Brazil.
- Reyda, F. B. 2008. Intestinal helminths of freshwater stingrays in southeastern Peru, and a new genus and two new species of Cestode. *The Journal of Parasitology* 94(3):684–699.
- Sanders, S., C. Castiglione, and M. Hoff. 2018. Risk assessment mapping program: RAMP, version 3.1. U.S. Fish and Wildlife Service.

10 References Quoted But Not Accessed

Note: The following references are cited within quoted text within this ERSS, but were not accessed for its preparation. They are included here to provide the reader with more information.

- Carvalho, M. R. de, N. Lovejoy, and R. S. Rosa. 2003. Potamotrygonidae (river stingrays). Pages 22–28 in R. E. Reis, S. O. Kullander, and C. J. Ferraris, Jr., editors. Checklist of the freshwater fishes of South and Central America. EDIPUCRS, Porto Alegre, Brazil.
- Eschmeyer, W. N., editor. 1998. Catalog of fishes. 3 volumes. California Academy of Sciences, Special Publication, San Francisco.

- Garrone Neto, D., R. C. Cordeiro, and V. Haddad Jr. 2005. Acidentes do trabalho em pescadores artesanais da região do Médio Rio Araguaia, TO, Brasil. *Cad Saúde Pública* 21(3):795–803.
- Garrone Neto, D., and V. Haddad Jr. 2007. Ocorrência de arraias fluviais (Myliobatiformes, Potamotrygonidae) na região do baixo Paranapanema, Sudeste do Brasil. *Bol Soc Bras Ictiol* 88:10–11.
- Garrone Neto, D., and V. Haddad Jr. 2010. Arraias em rios da região Sudeste do Brasil: locais de ocorrência e impactos sobre a população. (Stingrays in rivers in southeastern Brazil: occurrence localities and impact on the population). *Revista da Sociedade Brasileira de Medicina Tropical* 43(1):82–88.
- Garrone Neto, D., V. Haddad Jr., M. J. A. Vilela, and V. S. Uieda. 2007. Registro de ocorrência de duas espécies de potamotrigonídeos na região do Alto Rio Paraná e algumas considerações sobre sua biologia. *Biota Neotropica* 7(1):1–4.
- Garrone Neto, D., V. S. Uieda, M. J. A. Vilela, and V. Haddad Jr. 2005a. Comunicações Orais do I Simpósio Brasileiro Sobre Espécies Exóticas Invasoras. *In* As raias de água doce e seu papel enquanto espécies invasoras na região do Alto Rio Paraná, Brasil. Ministério do Meio Ambiente, Brasília, Brazil.
- Graça, W. J., and C. S. Pavanelli. 2007. Peixes da planície de inundação do alto rio Paraná e áreas adjacentes. EDUEM, Maringá, Brazil.
- Haddad, V., Jr. 2005. Ocorrência de arraias da família Potamotrygonidae no Rio Paraná e relato da presença no Rio Tietê: resultados preliminares. *Bol Soc Bras Ictiol* 78:3.
- Haddad, V., Jr., D. Garrone Neto, J. B. Paula Neto, F. P. L. Marques, and K. C. Barbaro. 2004. Freshwater stingrays: study of epidemiologic, clinic and therapeutic aspects based on 84 envenomings in humans and some enzymatic activities of the venom. *Toxicon* 48:287–294.
- López, H. L., A. M. Miquelarena, and R. C. Menni. 2003. Lista comentada de los peces continentales de la Argentina. *ProBiota Serie Técnica y Didáctica* 5.