Trichomycterus areolatus (a catfish, no common name)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, December 2016
Revised, April 2017
Web Version, 4/26/2018

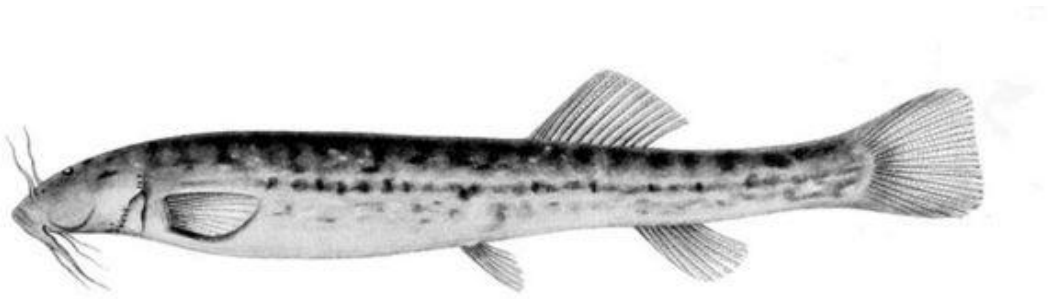

Image: J.H. Richard, Contributions to the fauna of Chile Charles Girard. Public domain. Available: https://commons.wikimedia.org/w/index.php?curid=15559926.

1 Native Range and Status in the United States

Native Range

From Reis and Lima (2009):

"This species occurs on the western versant in central Chile, from Limari to Puerto Varas. In the Andalien River, it occurs from the mouth of the Nonguen to its headwaters."

Status in the United States

This species has not been reported in the U.S. No evidence was found of trade in this species occurring in the United States.

From FFWCC (2016):

"Prohibited nonnative species 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 or used for commercial activities. Very limited exceptions may be made by permit from the Executive Director […] [The list of prohibited nonnative species includes] *Trichomycterus areolatus*"

Means of Introductions in the United States

This species has not been reported in the U.S.

Remarks

From Reis and Lima (2009):

"This species is undergoing population decline but its causes or its extent of threats is unclear."

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2016):

"Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Osteichthyes
Class Actinopterygii
Subclass Neopterygii
Infraclass Teleostei
Superorder Ostariophysi
Order Siluriformes
Family Trichomycteridae
Subfamily Trichomycterinae
Genus *Trichomycterus*
Species *Trichomycterus areolatus* Valenciennes in Cuvier and Valenciennes, 1846"

"Taxonomic Status: valid"

Size, Weight, and Age Range

From Froese and Pauly (2016):

"Max length : 11.6 cm TL male/unsexed; [de Pinna and Wosiacki 2003]"

Environment

From Froese and Pauly (2016):

"Freshwater; benthopelagic."

Climate/Range
From Froese and Pauly (2016):

"Temperate, preferred ?"

Distribution Outside the United States
Native
From Reis and Lima (2009):

"This species occurs on the western versant in central Chile, from Limari to Puerto Varas. In the Andalien River, it occurs from the mouth of the Nonguen to its headwaters."

Introduced
No introductions of this species have been reported.

Means of Introduction Outside the United States
No introductions of this species have been reported.

Short Description
From Günther (1864):

"The length of the head is more than the height of the body, and nearly one-seventh of the total. The origin of the dorsal fin is in the middle between the occiput and the end of the caudal fin. None of the pectoral rays are prolonged. Brownish olive, with blackish spots."

Biology
From Scott et al. (2007):

"*Trichomycterus areolatus* and *Trichomycterus chiltoni* […] are the only Chilean species of this genus that live in sympatry and coexist in the Biobío basin."

"Trophic composition of *T. chiltoni* and *T. areolatus* consisted mainly of chironomids in all seasons […] Ephemeroptera was almost absent in both species during winter, but represented almost 20 % of prey items the rest of the year."

"According to previous works (Habit et al. 2005) and to our results, *Trichomycterus areolatus* and *T. chiltoni* are mainly benthic feeders, preying mostly on insect larval stages."

"Feeding results of *T. areolatus* and *T. chiltoni* suggest these two species may coexist mainly due to differences in their observed diet patterns. *Trichomycterus areolatus* correlates its diet with seasonal changes, and this would be related to the well described yearly changes shown by insect abundance and diversity (Fernández et al. 2001, Sabando 2004). We speculate that this implies generalist behaviour, associated to seasonal resource changes. On the other hand *T. chiltoni* shows a differential diet at different body sizes as intraspecific habitat partitioning (Arratia

1983). The prey items captured by *T. chiltoni* showed a greater taxa richness, what could be explained by the larger size that this fish reaches, allowing consumption of all preys eaten by *T. areolatus* plus bigger items such as decapods and dragonfly larvae that are absent in the stomach contents of *T. areolatus*."

From Quezada-Romegialli et al. (2010):

"For *T. areolatus* we found no evidence of gene flow among populations of rivers (except for the Limarí and Choapa rivers), but high levels of historical migrants within each basin, with the exception of some localities in the Aconcagua and Maipo Rivers. These findings coupled with a pattern of isolation by distance suggest that catfish are effectively being isolated by terrestrial barriers and coastal routes probably were not used."

Human Uses

From Froese and Pauly (2016):

"Fisheries: of no interest"

Diseases

From Olmos et al. (2003):

"The parasites from three species of native freshwater fishes, *Trichomycterus areolatus*, *Diplomystes nahuelbutaensis* and *Percilia irwini*, common from Central Chile were studied. These parasites are interesting because they could infect farmed salmon. […] The prevalence and intensity of seven parasites taxa were recorded: *Mixobolus sp*., *Henneguya sp*., Ancrynocephalidae (Monogenea), Zoogonidae (Digenea), *Steganodermata sp* (Zoogonidae), Nematoda and *Pomphorhynchus sp.* (Acanthocephala). *P. irwini* harbours the most diverse and rich parasite assemblage with 4 species, followed by *T. areolatus* with 3 taxa."

Threat to Humans

From Froese and Pauly (2016):

"Harmless"

3 Impacts of Introductions

No introductions of this species have been reported. The Florida Fish and Wildlife Conservation Commission (FFWCC 2018) has listed the parasitic catfish *T. areolatus* as a prohibited species.

4 Global Distribution

Figure 1. Global distribution of *T. areolatus*, as reported by GBIF (2016). Points falling outside of Chile, north of Limari, or south of Puerto Varas were not included in climate matching because these locations were outside the known established distribution of *T. areolatus* (see Distribution Outside the United States, above).

5 Distribution Within the United States

This species has not been reported in the United States.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match (Sanders et al. 2014; 16 climate variables; Euclidean Distance) was high along the length of the Pacific Coast and medium for 200-300 km inland from that coastline. The remainder of the contiguous U.S. showed a low climate match. Climate 6 proportion suggested a

medium climate match overall for the contiguous U.S. Proportions between 0.005 and 0.103 indicate a medium match; the Climate 6 proportion for *T. areolatus* was 0.035.

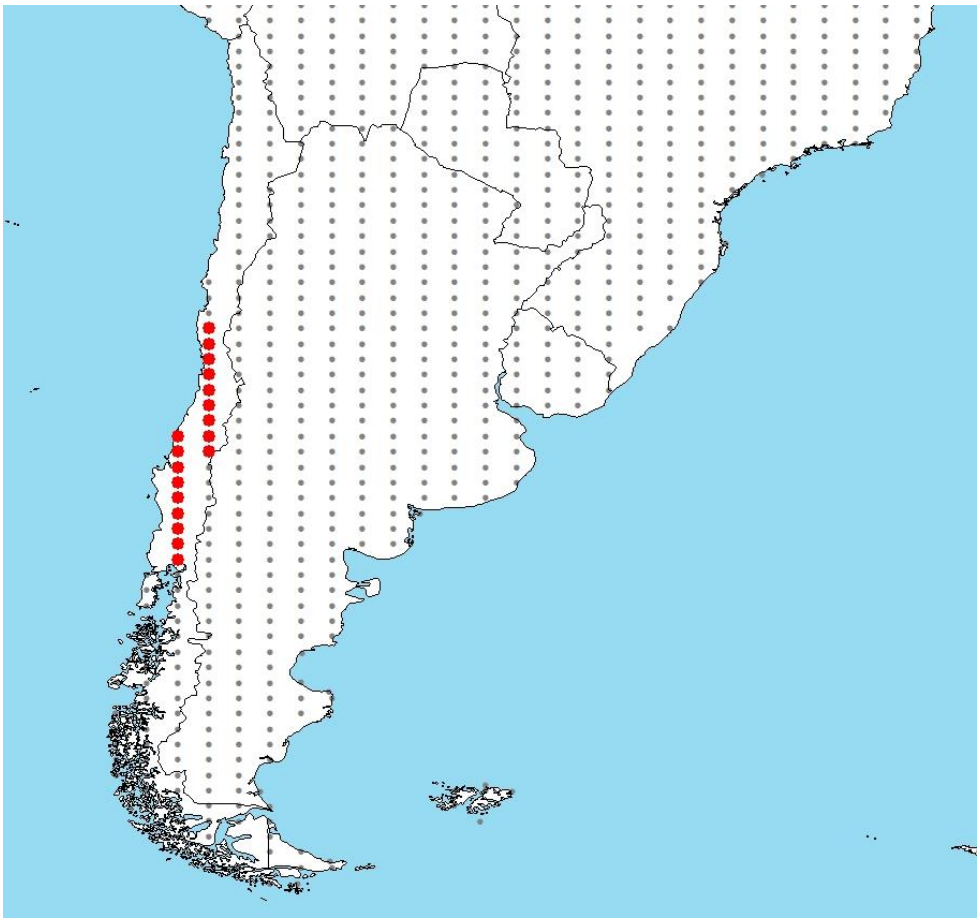

Figure 2. RAMP (Sanders et al. 2014) source map showing weather stations in Chile and surrounding countries selected as source locations (red) and non-source locations (gray) for *T. areolatus* climate matching. All source locations are within Chile. Source locations from GBIF (2016).

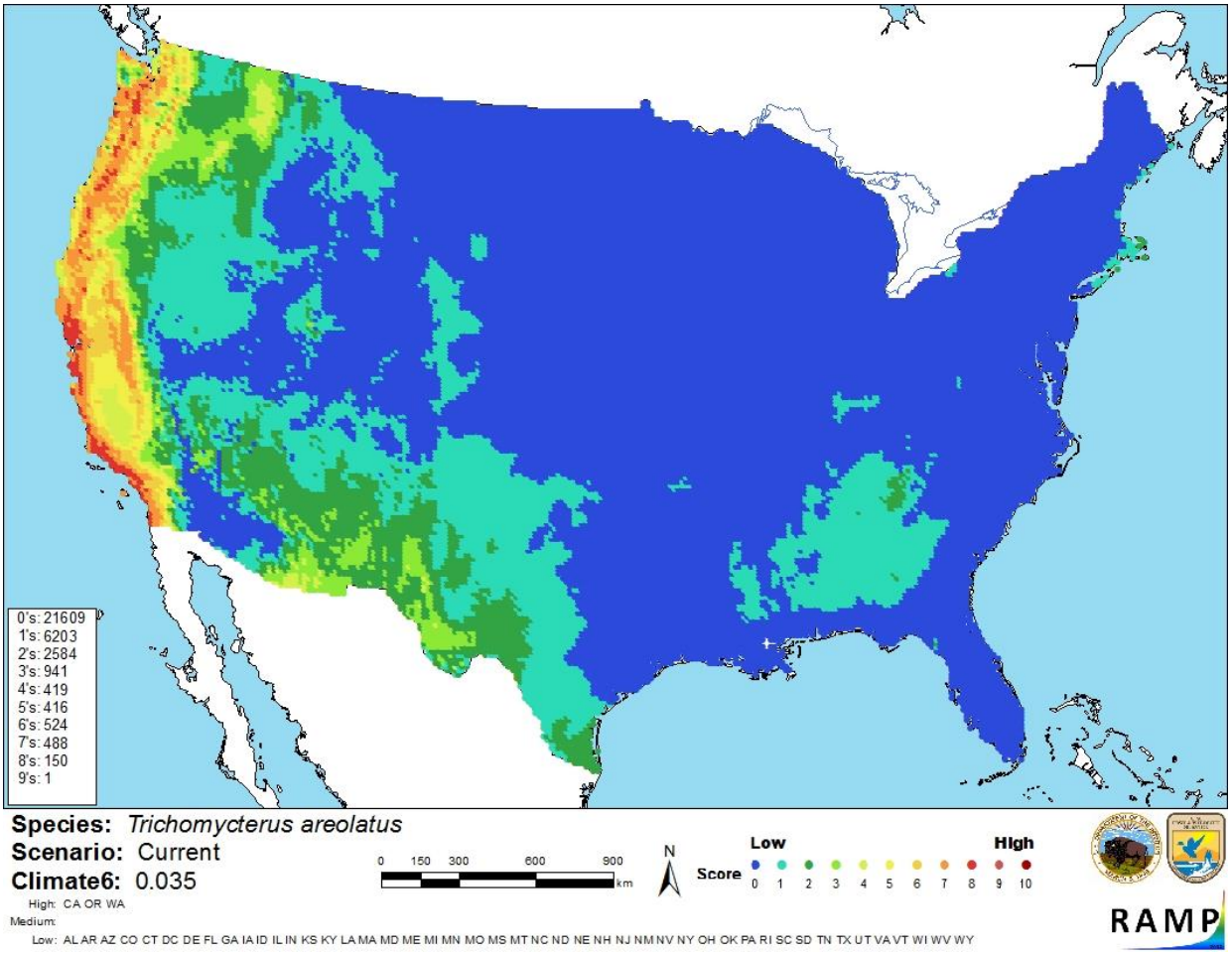

Figure 3. Map of RAMP (Sanders et al. 2014) climate matches for *T. areolatus* in the contiguous United States based on source locations reported by GBIF (2016). 0=Lowest match, 10=Highest match. Counts of climate match scores are tabulated on the left.

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 biology and ecology of *T. areolatus* are poorly known. It has never been introduced outside of its native range, so no conclusions are possible on impacts of its introduction. The certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Trichomycterus areolatus is a catfish native only to Chile, where it has a widespread distribution in the central region of the country. *T. areolatus* is a benthic insectivore that can carry parasites harmful to farmed salmon. The species has a medium climate match in the continental United States. *T. areolatus* has not been introduced outside of its native range. Without being able to observe introductions in other parts of the world, it is impossible to know the potential impacts of introduction of *T. areolatus* to the U.S. The Florida Fish and Wildlife Conservation Commission has listed the parasitic catfish *T. areolatus* as a prohibited species. The overall risk posed by this species is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): Uncertain**
- **Climate Match (Sec. 6): Medium**
- **Certainty of Assessment (Sec. 7): Low**
- **Overall Risk Assessment Category: Uncertain**

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.

FFWCC (Florida Fish and Wildlife Conservation Commission). 2016. Prohibited species list. Florida Fish and Wildlife Conservation Commission, Tallahassee, Florida. Available: http://myfwc.com/wildlifehabitats/nonnatives/regulations/prohibited/. (December 2016).

Froese, R., and D. Pauly, editors. 2016. *Trichomycterus areolatus* Valenciennes, 1846. FishBase. Available http:// http://www.fishbase.org/summary/10412. (December 2016).

GBIF (Global Biodiversity Information Facility). 2016. GBIF backbone taxonomy: *Trichomycterus areolatus* Valenciennes, 1846. Global Biodiversity Information Facility, Copenhagen. Available: http:// http://www.gbif.org/species/2342975. (December 2016).

Günther, A. 1864. Catalogue of the Physostomi, containing the families Siluridae, Characinidae, Haplochitonidae, Sternoptychidae, Scopelidae, Stomiatidae, in the collection of the British Museum. Taylor and Francis, London.

ITIS (Integrated Taxonomic Information System). 2016. *Trichomycterus areolatus* Valenciennes in Cuvier and Valenciennes, 1846. Integrated Taxonomic Information System, Reston, Virginia. Available: https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=682175#null. (December 2016).

Olmos, V. L., P. Victoriano, E. Habit, and C. Valdovinos. 2003. Parásitos de peces nativos de la cuenca del Río Laja (Chile Central) y alcances sobre sus ciclos de vida. [Parasitism of native fishes from Laja river basin (Región del Bío-Bío, Chile) and approaches about life cycles]. Archivos de Medicina Veterinaria 35(2):195-203. (In Spanish with English abstract.)

Quezada-Romegialli, C., M. Fuentes, and D. Véliz. 2010. Comparative population genetics of *Basilicthys microlepidotus* (Atheriniformes: Atherinopsidae) and *Trichomycterus areolatus* (Siluriformes: Trichomycteridae) in north central Chile. Environmental Biology of Fishes 89:173-186.

Reis, R., and F. Lima. 2009. *Trichomycterus areolatus*. The IUCN Red List of Threatened Species 2009: e.T22120A9361027. Available: http://www.iucnredlist.org/details/22120/0. (April 2017).

Sanders, S., C. Castiglione, and M. H. Hoff. 2014. Risk Assessment Mapping Program: RAMP. US Fish and Wildlife Service.

Scott, S., R. Pardo, and I. Vila. 2007. Trophic niche overlap between two Chilean endemic species of *Trichomycterus* (Teleostei: Siluriformes). Revista Chilena de Historia Natural 80:431-437.

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.

Arratia, G. 1983. Preferencias de hábitat de peces siluriformes de aguas continentales de Chile (Fam. Diplomystidae y Trichomycteridae). Studies of Neotropical Fauna and Environment 18:217-237.

de Pínna, M. C. C., and W. Wosiacki, 2003. Trichomycteridae (pencil or parasitic catfishes). Pages 270-290 *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.

Fernández, H. R., F. Romero, M. Peralta, and L. Grosso. 2001. La diversidad de zoobentos en ríos de montañas del noroeste de Argentina: comparación entre seis ríos. Ecología Austral (Argentina) 11:9-16.

Habit, E., P. Victoriano, and H. Campos. 2005. Ecología trófica y aspectos reproductivos de *Trichomycterus areolatus* (Pisces, Trichomycteridae) en ambientes lóticos artificiales. Revista de Biología Tropical 53:195-210.

Sabando, M. C. 2004. Análisis funcional de las comunidades bentónicas en un tramo altitudinal de Río Clarillo (Pirque). Memoria para optar al título de Licenciado en Educación en

Biología y Pedagogía en Biología y Ciencias Naturales. Universidad de Ciencias de la Educación, Santiago, Chile.