Redeye Tetra (*Moenkhausia sanctaefilomenae*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, February 2011
Revised, July 2019
Web Version, 11/6/2019

Photo: Loury Cédric. Licensed under Creative Commons Attribution-Share Alike 4.0 International. Available: https://commons.wikimedia.org/wiki/File:Moenkhausia_sanctaefilomenae_-_T%C3%A9tra_yeux_rouge_-_Aqua_Porte_Dor%C3%A9e_08.JPG. (July 10, 2019).

1 Native Range and Status in the United States

Native Range

From Nico and Loftus (2019):

"Tropical America, in Paranaíba, São Francisco, upper Parana, Paraguay and Uruguay River basins [Brazil, Bolivia, Argentina, Paraguay, Uruguay] (Géry 1977, Lima et al. 2003)."

From Froese and Pauly (2019):

"Known from upper Paraná [López et al. 2005] and Corrientes [López et al. 2003] [Argentina]."

"Recorded from Caracu and Sao Pedro streams, tributaries of the Paraná river [*sic*] [Pavanelli and Caramaschi 1997]; lagoon near rio Cuiabá, Mato Grosso, LIRP 717 [Benine 2002] [Brazil]."

Status in the United States

From Froese and Pauly (2019):

"A popular aquarium fish, found in 65% of pet shops near Lakes Erie and Ontario [Rixon et al. 2005]. Two specimens were taken from a ditch in Florida adjacent to Tampa Bypass Canal, near a fish farm east of Tampa in Hillsborough County, on 10 November 1993. These fish were probably released or escaped from a fish farm, or were aquarium releases."

From Nico and Loftus (2019):

"Status: Failed in Florida."

Rixon et al. (2005) evaluated *M. sanctaefilomenae* as a commercial aquarium fish with potential to become established in the Great Lakes. It was not identified as a priority species for the Great Lakes due to its temperature requirements (cannot survive in waters <5°C).

Means of Introductions in the United States

From Froese and Pauly (2019):

"These fish were probably released or escaped from a fish farm, or were aquarium releases."

Remarks

This species is also commonly referred to as yellow-banded moenkhausia (Froese and Pauly 2019).

From Nico and Loftus (2019):

"The genus [*Moenkhausia*] is in need of systematic revision."

From Benine et al. (2009):

"Nonetheless, misidentifications between *Moenkhausia oligolepis* and *M. sanctaefilomenae* are common."

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Fricke et al. (2019):

"**Current status:** Valid as *Moenkhausia sanctaefilomenae* (Steindachner 1907)."

From ITIS (2019):

"Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Actinopterygii
Class Teleostei
Superorder Ostariophysi
Order Characiformes
Family Characidae
Genus Moenkhausia Eigenmann, 1903
Species Moenkhausia sanctaefilomenae (Steindachner, 1907)"

Size, Weight, and Age Range

From Froese and Pauly (2019):

"Max length: 7.0 cm SL male/unsexed; [Lima et al. 2003]"

Environment

From Froese and Pauly (2019):

"Freshwater; benthopelagic; pH range: 6.0 - 8.0; dH range: 5 - 19. […]; 22°C - 26°C [assumed to be recommended aquarium temperature] [Riehl and Baensch 1991]."

Climate/Range

From Froese and Pauly (2019):

"[…] Tropical;"

Distribution Outside the United States

Native

From Nico and Loftus (2019):

"Tropical America, in Paranaíba, São Francisco, upper Parana, Paraguay and Uruguay River basins [Brazil, Bolivia, Argentina, Paraguay, Uruguay] (Géry 1977, Lima et al. 2003)."

From Froese and Pauly (2019):

"Known from upper Paraná [López et al. 2005] and Corrientes [López et al. 2003] [Argentina]."

"Recorded from Caracu and Sao Pedro streams, tributaries of the Paraná river [sic] [Pavanelli and Caramaschi 1997]; lagoon near rio Cuiabá, Mato Grosso, LIRP 717 [Benine 2002] [Brazil]."

Introduced

According to Froese and Pauly (2019), an introduction of *M. sanctaefilomenae* occurred in inland waters of Asia between 1970-1974 from the Philippines. It is unknown whether the population established in inland Asian waters.

Means of Introduction Outside the United States

Froese and Pauly (2019) list the reason for introduction to Canada and Asia as ornamental.

Short Description

From Nico and Loftus (2019):

"Géry (1977) provided a key and photographs. Color photographs appeared in Axelrod et al. (1985) and Sakurai et al. (1993). This species closely resembles the glass tetra *Moenkhausia oligolepis* in body form and coloration but has fewer lateral line scales."

From Best et al. (no date):

"This species has a distinct red band across the top of the pupil. Relatively deep bodied and has a plain silver/tan color. The base of the caudal fin has a prominent black band along with yellow on the caudal fin. The maximum size of this species is 2-3 inches (Lima et al., 2003)."

Biology

From EOL (2019):

"Females are larger and have a more rounded abdomen than the males. […] The Red-eye tetra is free spawning but will also lay eggs among the roots of floating plants. […] One day after they are laid, the eggs will hatch. The fry can initially be fed infusoria, rotifers, or commercially prepared fry foods, then freshly hatched brine shrimp, and eventually finely crushed flake foods [Riehl and Baensch 1987]."

From Padial et al. (2009):

"This species is zooplankti-benthivorous, feeding mainly on microcrustaceans and insect larvae such as ostracodes and chironomids (Loureiro-Crippa, unpublished data)."

"Additionally, the capture of prey in similar proportions (even with different initial densities) may suggest that *M. sanctaefilomenae* has an opportunist feeding strategy, consuming the prey that is most available at a given moment."

From Best et al. (no date):

"This species is known to spawn in schools. They are also known to exhibit cannibalistic, reproductive traits by consuming their own eggs. This species is omnivorous and its prominent forage base consists of small invertebrates and plant matter (Mills and Vevers, 1989; Riehl and Baensch, 1991)."

Human Uses

From Froese and Pauly (2019):

"Aquarium: highly commercial"

From Nico and Loftus (2019):

"This is species is common in the aquarium trade."

M. sanctaefilomenae was found in 65% of pet shops near Lakes Erie and Ontario (Rixon et al. 2005).

From Ribas (2016):

"Accordingly, several indications suggest that biotic resistance helps suppress hydrilla in lakes of the Upper Paraná River floodplain. For example, hydrilla is frequently consumed by native fish species of the genus *Moenkhausia* (N. Carniato, R. R. Braga and L. G. S. Ribas, personal observation)."

"[…] *M. aff. sanctaefilomenae* do not represent a potential control of growth and development of hydrillain [*sic*] the short term but can potentially decrease hydrilla's performance in the long-term by damaging the total photosynthetic tissues due to leaf consumption from rooted plants."

Diseases

No records of OIE-reportable diseases (OIE 2019) were found for *Moenkhausia sanctaefilomenae*.

From Shamsudin et al. (1990):

"The occurrence of fish mycobacteriosis in two goldfish, *Carassius auratus* and a red eyed tetra, *Moenkhausia sanctaefilomenae* was reported in Malaysia (Anderson *et al.*, 1987). The disease was diagnosed based on typical morphology of fish tubercles, the presence of acid-fast bacteria in smears and granulomas, and the isolation of *Mycobacterium* sp.. [*sic*]"

"Moreover, it is concluded that the isolate closely related to the subspecies of [*Myobacterium*]*chelonei* documented in Bergey's Manual of Systematic Bacteriology, but the isolate could not be definitively placed in either of three reference subspecies of *M. chelonei,* and this probably could warrant a new subspecies."

From Fujimoto (2013):

"*Moenkhausia sanctaefilomenae* showed the highest values for prevalence and mean intensity of infection by monogeneans (17.3% and 5.0 ± 2.2, respectively)."

"Larvae of *Contracaecum* sp. and *Capillaria* sp. were only found parasitizing the intestine and liver of *M. sanctaefilomenae*."

"[…] [*Quadrigyrus*] *brasiliensis*, *Q. torquatus* and *Q. nickoli* were observed in *M. sanctaefilomenae*; […]"

Froese and Pauly (2019) list Fin-rot Disease as a disease of *M. sanctaefilomenae*.

Threat to Humans

From Froese and Pauly (2019):

"Harmless"

3 Impacts of Introductions

The following information pertains to potential impacts, not documented impacts.

From Nico and Loftus (2019):

"The impacts of this species are currently unknown, as no studies have been done to determine how it has affected ecosystems in the invaded range. The absence of data does not equate to lack of effects. It does, however, mean that research is required to evaluate effects before conclusions can be made."

4 Global Distribution

Figure 1. Known global distribution of *Moenkhausia sanctaefilomenae*. Map from GBIF Secretariat (2019). The location in Florida was not used to select source points in the climate match as it does not represent an established population (Nico and Loftus 2019). The location in Uruguay (the southernmost location) was not used to select source points from the climate match. The recorded collection coordinates and country of collection (Brazil) do not match. Locations in northern Brazil, Colombia, and Venezuela were not used to select source points for the climate match. Those locations are outside the stated range of the species and are likely to be misidentifications of a congener (Benine et al. 2009; see quote below).

From Benine et al. (2009):

"Nonetheless, misidentifications between *Moenkhausia oligolepis* and *M. sanctaefilomenae* are common. According to Lima et al. (2003), *M. oligolepis* occurs in the Guianas and in the Amazon River basin, whereas *M. sanctaefilomenae* is distributed in the Parnaíba, São Francisco, upper Paraná, Paraguay and Uruguay River systems."

5 Distribution Within the United States

Figure 2. Known distribution of *Moenkhausia sanctaefilomenae* in the United States. Map from Nico and Loftus (2019). The observation in Florida was not used to select source points for the climate match as it does not represent an established population (Nico and Loftus 2019).

6 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Moenkhausia sanctaefilomenae* was low for most of the contiguous United States. However, there were patches of medium and high climate match in the southeastern United States and along the Gulf Coast. There were scattered small patches of medium match elsewhere. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for contiguous United States was 0.048, indicating a medium overall climate match (scores greater than 0.005, but less than 0.103 are considered medium). Most States had a low individual Climate 6 score. The following states had medium individual climate scores: Mississippi, North Carolina, and Texas. The following states had high individual climate scores: Alabama, Florida, Georgia, Louisiana, and South Carolina.

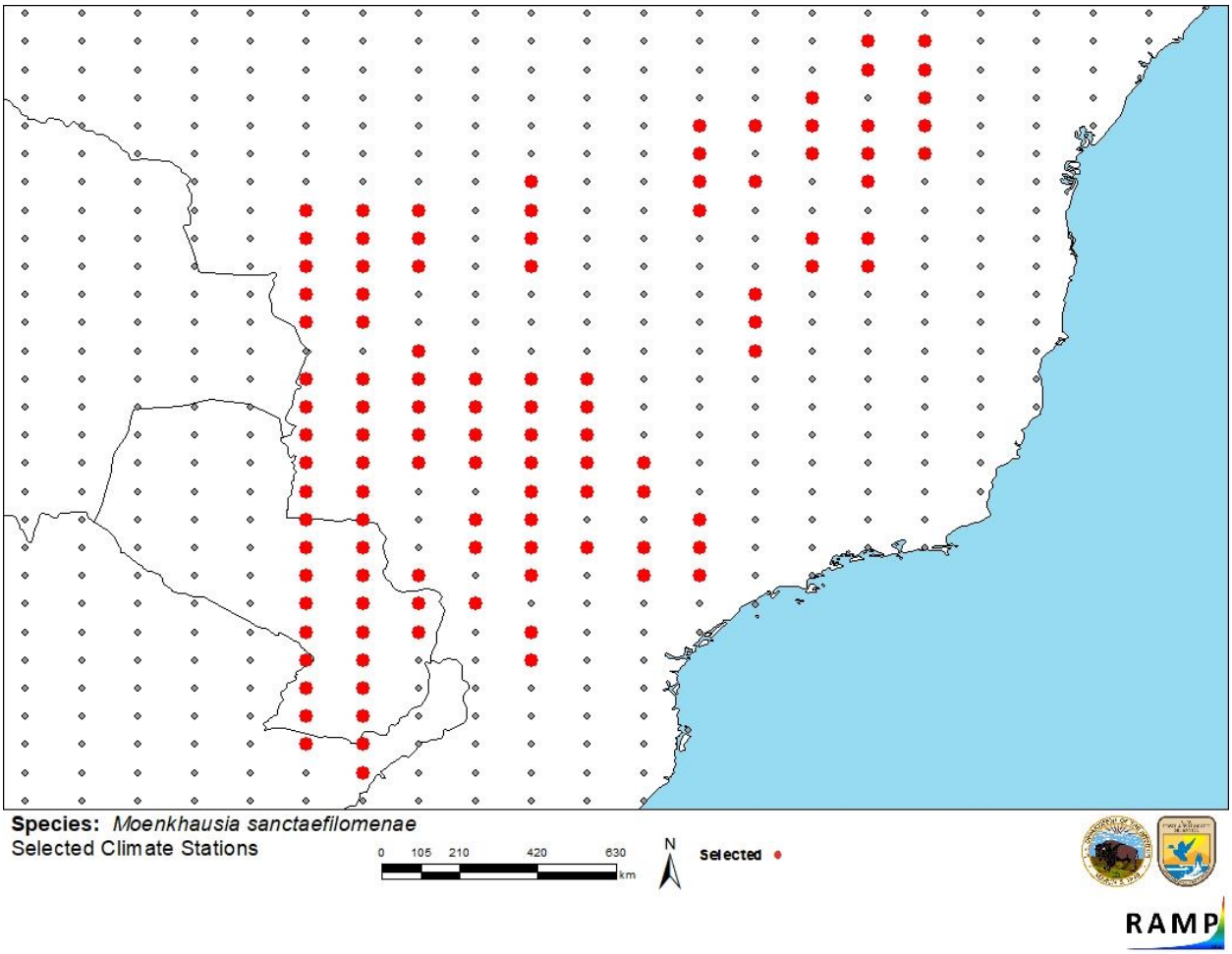

Figure 3. RAMP (Sanders et al. 2018) source map showing weather stations in South America selected as source locations (red; Argentina, Brazil, Paraguay) and non-source locations (gray) for *Moenkhausia sanctaefilomenae* climate matching. Source locations from GBIF Secretariat (2019). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

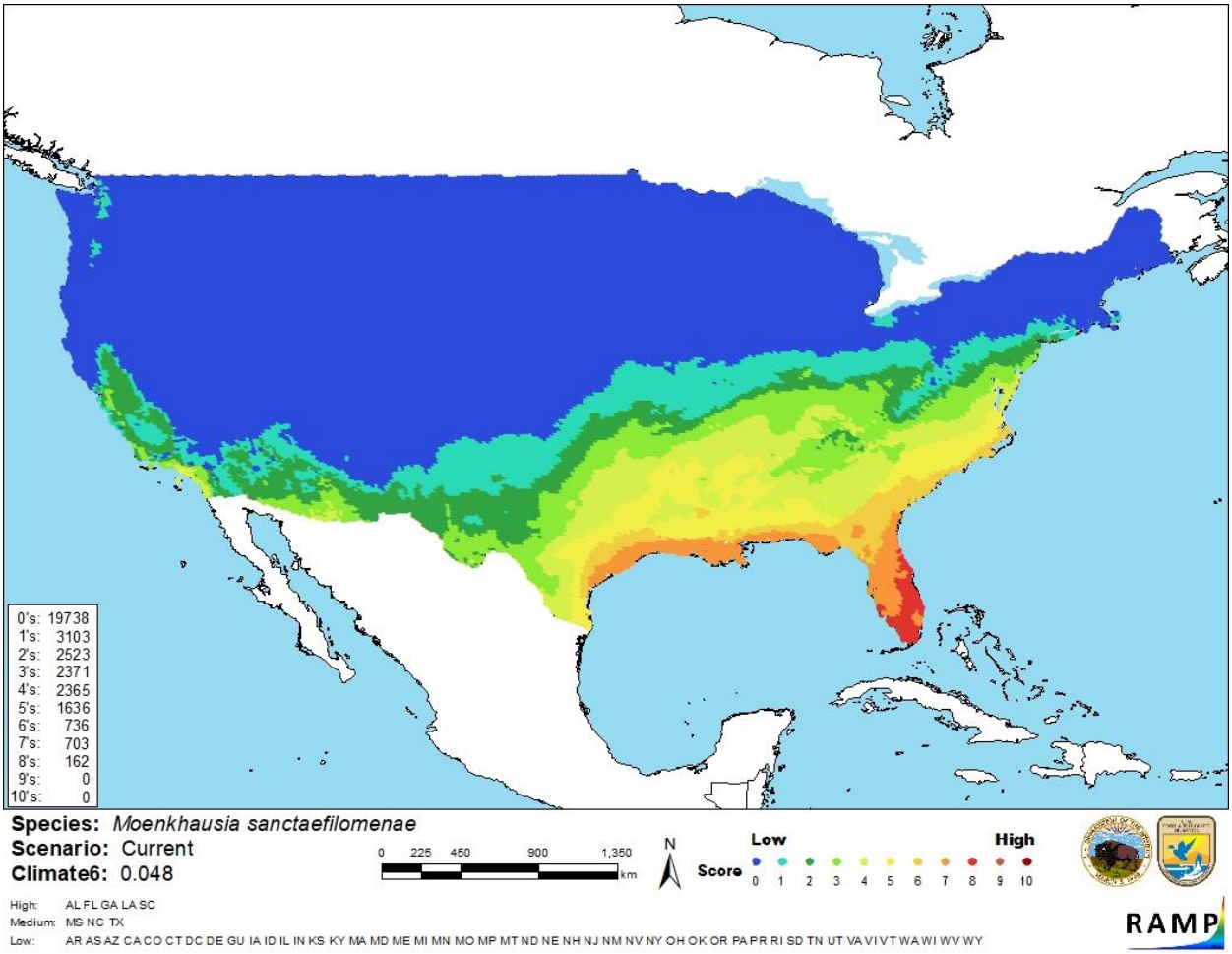

Figure 4. Map of RAMP (Sanders et al. 2018) climate matches for *Moenkhausia sanctaefilomenae* in the contiguous United States based on source locations reported by GBIF Secretariat (2019). 0 = Lowest match, 10 = Highest match.

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≤X≤0.005	Low
0.005<X<0.103	Medium
≥0.103	High

7 Certainty of Assessment

The certainty of assessment for *Moenkhausia sanctaefilomenae* is low. There is information on the biology and range of this species, including an introduction in Florida. The introduction did not result in an established population, so there is no information about impacts of introduction.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Redeye tetra (*Moenkhausia sanctaefilomenae*) is a South American fish that is native to river basins in Argentina, Brazil, Bolivia, Paraguay, and Uruguay. They are a freshwater schooling fish and are highly commercial in aquarium trade. *M. sanctaefilomenae* are commonly sold in hobby aquarium shops. The history of invasiveness is uncertain; *M. sanctaefilomenae* has only been reported twice outside of its historical range. The introduction in Florida failed to establish, and information on the introductions reported in inland waters of Asia is lacking. The overall climate match for the contiguous United States was medium. Most of the contiguous United States had a low climate match, but the southern Atlantic Coast and the Gulf coast had areas of high match. The certainty of assessment is low due to a general lack of information. The overall risk assessment category is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): Uncertain**
- **Climate Match (Sec. 6): Medium**
- **Certainty of Assessment (Sec. 7): Low**
- **Remarks/Important additional information: None**
- **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.

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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.

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