Siamese Algae Eater (*Gyrinocheilus aymonieri*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, January 2016
Revised, March 2018
Web Version, 8/16/2018

Photo: Pseudogastromyzon. Public Domain (PD-Self). Available: https://commons.wikimedia.org/wiki/File:Chinese_algae_eater.jpg. (March 2018).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2016):

"Asia: Mekong, Chao Phraya and Meklong basins; northern Malay Peninsula."

From Vidthayanon (2012):

"The species is known from the middle/lower Mekong (Thailand, Cambodia, Lao PDR, Viet Nam (e.g., the Mekong delta (Electricity Viet Nam 2010) and the Srepok and Se San tributaries), and southern China (Yunnan; Kottelat 1998; however, identification of these records requires confirmation […], Chao Phraya and Mae Klong basins, from the Dong Nai basin in Viet Nam, and from the northern Malay Peninsula (southern Thailand, Peninsular Malaysia, and probably associated parts of the Mekong drainage in Myanmar (Mekong Myanmar (the Mae Kok, Mae Sai, and Kengtung))."

Status in the United States

From Fuller (2018):

"Chinese algae-eaters were first collected in Rio Canos, in eastern Puerto Rico, just upstream of Lago Loiza, in the spring of 2007 (Wayne Starnes, personal communication)."

"The species appears to be established. Several tuberculate males were collected."

Means of Introductions in the United States

From Fuller (2018):

"Aquarium release. These fish are very popular in the aquarium trade for controlling algae in the tank."

Remarks

Eschmeyer et al. (2018) list *Psilorhynchus aymonieri*, *Gyrinocheilus kaznakovi*, and *Gyrinocheilus monchadskii* as synonyms for *Gyrinocheilus aymonieri*. All names were used in searching for information on this species.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2018):

"Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Actinopterygii
Class Teleostei
Superorder Ostariophysi
Order Cypriniformes
Superfamily Cobitoidea

Family Gyrinocheilidae
Genus *Gyrinocheilus*
Species *Gyrinocheilus aymonieri* (Tirant, 1883)"

"Taxonomic status: valid"

Size, Weight, and Age Range

From Froese and Pauly (2018):

"Max length : 28.0 cm SL male/unsexed; [Kottelat 1998]"

Environment

From Froese and Pauly (2018):

"Freshwater; demersal; pH range: 6.0 - 8.0; dH range: 5 - 19; potamodromous [Riede 2004]."

"[…] 25°C - 28°C [Riehl and Baensch 1991; assumed to represent recommended aquarium water temperatures]"

Climate/Range

From Froese and Pauly (2018):

"Tropical […]"

Distribution Outside the United States

Native

From Froese and Pauly (2016):

"Asia: Mekong, Chao Phraya and Meklong basins; northern Malay Peninsula."

From Vidthayanon (2012):

"The species is known from the middle/lower Mekong (Thailand, Cambodia, Lao PDR, Viet Nam (e.g., the Mekong delta (Electricity Viet Nam 2010) and the Srepok and Se San tributaries), and southern China (Yunnan; Kottelat 1998; however, identification of these records requires confirmation (see Taxonomic Notes), Chao Phraya and Mae Klong basins, from the Dong Nai basin in Viet Nam, and from the northern Malay Peninsula (southern Thailand, Peninsular Malaysia, and probably associated parts of the Mekong drainage in Myanmar (Mekong Myanmar (the Mae Kok, Mae Sai, and Kengtung))."

Introduced

No introductions of this species have been reported outside the United States.

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

Short Description
From Froese and Pauly (2018):

"Has 9 branched dorsal rays; 36-40 lateral line scales; no dark spots on pelvic and anal fins [Kottelat 1998]; a small dark spot always present behind spiracle; sometimes tiny tubercles on side of head and large tubercles confined to snout [Rainboth 1996]."

Biology
From Froese and Pauly (2018):

"Occur in medium to large-sized rivers and enters flooded fields [Taki 1978]. Found on solid surfaces in flowing waters. Mostly herbivorous, feed largely on algae, periphyton and phytoplankton, but also take insect larvae or zooplankton. In current, they hold onto fixed objects with their sucker-like mouth. For breathing, water is pumped into the gill cavity through a small spiracle and across the gills for gas exchange."

"potamodromous [migratory in freshwater]"

From Vidthayanon (2012):

"Inhabits flowing streams and tributaries with substrates of boulders, pebbles, gravel and sand, often in areas with submerged driftwood or tree roots (Rainboth 1996). It is thought to undergo seasonal migrations during which it can be found in deeper, more turbid water and is known to enter temporarily-inundated zones. Occurs in medium to large-sized rivers and enters flooded fields (Taki 1978)."

Human Uses
From Froese and Pauly (2016):

"Fisheries: commercial; aquarium: highly commercial"

Diseases
From Froese and Pauly (2018):

"Bacterial Infections (general), Bacterial diseases"

No OIE listed diseases were reported for this species.

Threat to Humans

From Froese and Pauly (2018):

"Harmless"

3 Impacts of Introductions

From Fuller (2018):

"Unknown."

4 Global Distribution

Figure 1. Known global distribution of *Gyrinocheilus aymonieri*, reported from Southeast Asia and Puerto Rico. Map by GBIF Secretariat (2018).

5 Distribution Within the United States

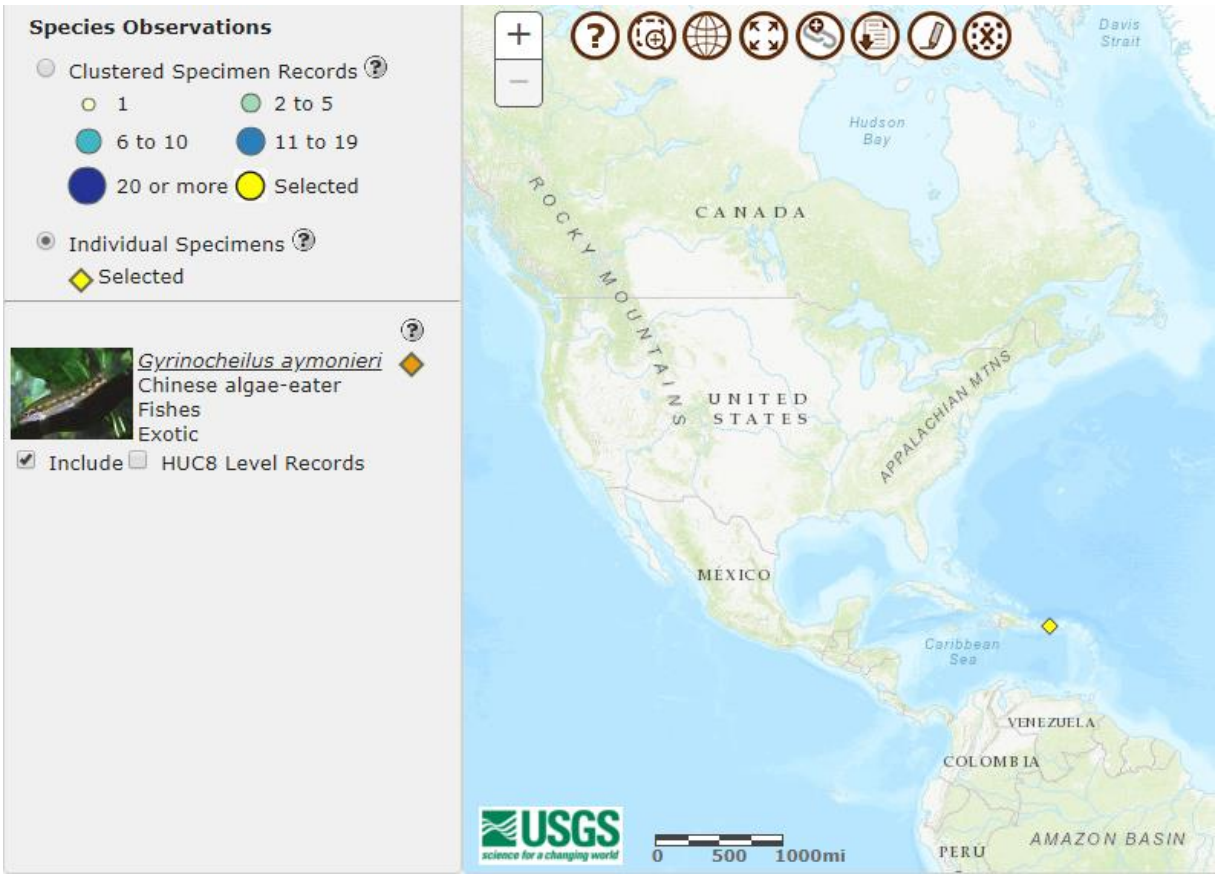

Figure 2. Known distribution of *G. aymonieri* in the United States, reported from Puerto Rico. Map from Fuller (2018).

6 Climate Matching

Summary of Climate Matching Analysis

The climate match (Sanders et al. 2014; 16 climate variables; Euclidean Distance) for *Gyrinocheilus aymonieri* within the contiguous United States is low overall. The Climate6 proportion for this species is 0.08. The range of proportions classified as low match is 0.005 to <0.103. Locally, Florida demonstrated a high match, while Texas represented a medium match. All other states showed a low match.

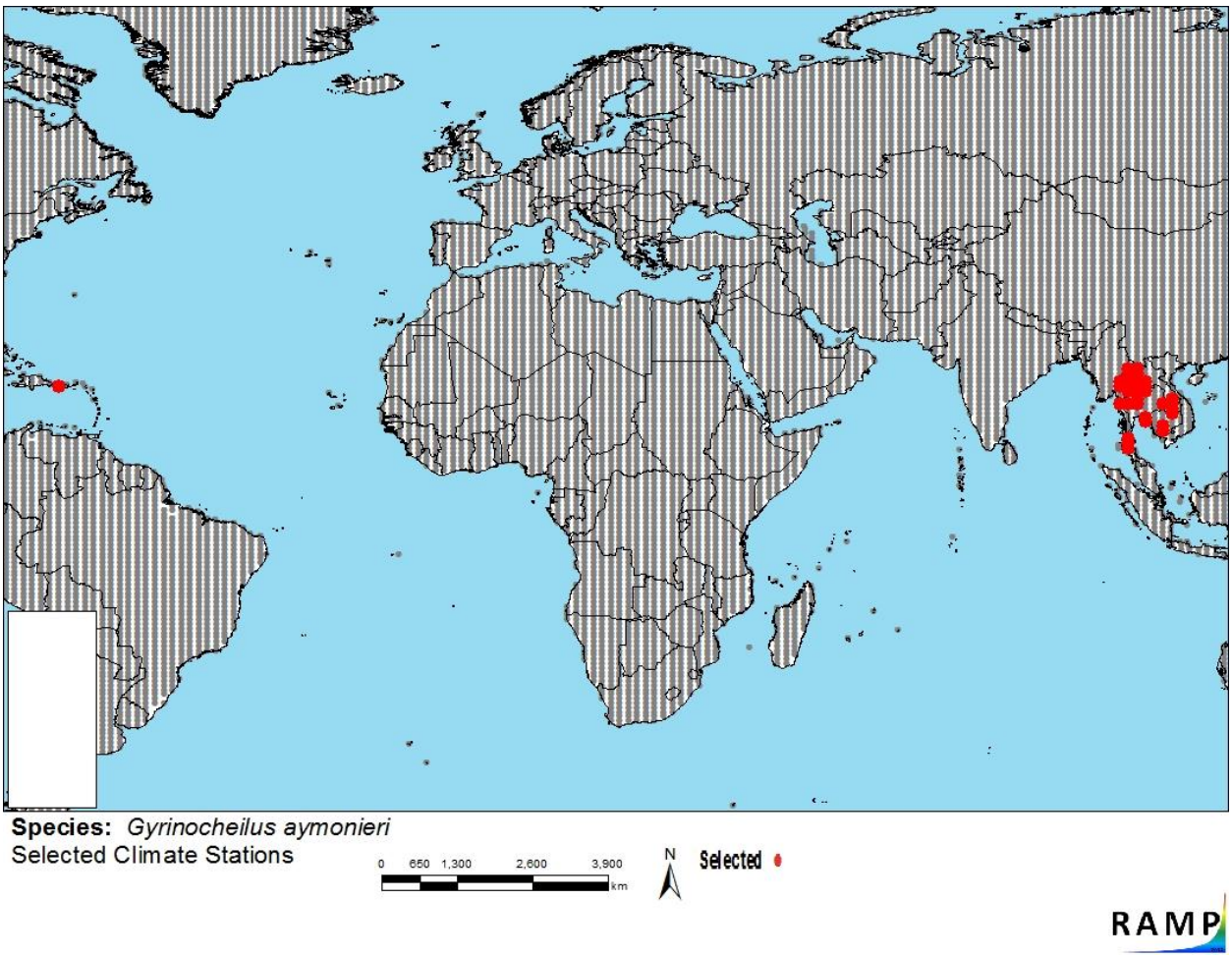

Figure 3. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red; Puerto Rico, Myanmar, Thailand, Laos, Vietnam, Cambodia) and non-source locations (gray) for *Gyrinocheilus aymonieri* climate matching. Source locations from GBIF Secretariat (2018).

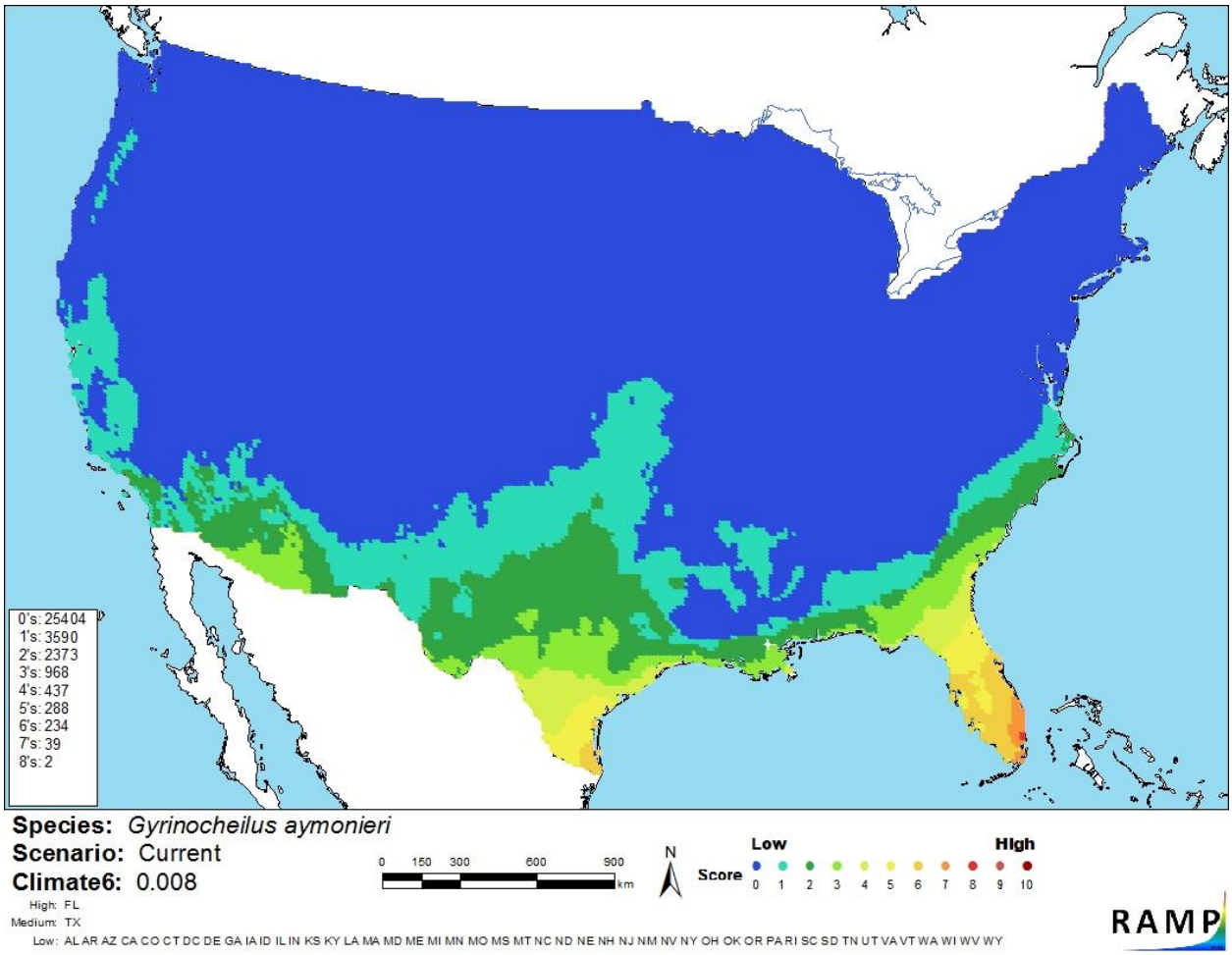

Figure 4. Map of RAMP (Sanders et al. 2014) climate matches for *Gyrinocheilus aymonieri* in the contiguous United States based on source locations reported by GBIF Secretariat (2018). 0=Lowest match, 10=Highest match. Counts of climate match scores are tabulated on the left.

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 for *G. aymonieri* are well documented. Limited information on the species' introduction beyond its native range currently exists and no studies addressing potential impacts of introduction were found as part of this review. Therefore, the certainty of assessment for *G. aymonieri* is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Gyrinocheilus aymonieri is a fish species native to the Asian Mekong, Chao Phraya and Meklong river basins, and, northern Malay Peninsula. A potamodromous species, cyclically migrating long distances in larger rivers and also occurring in flooded fields. *G. aymonieri* is herbivorous, feeding primarily on algae, periphyton, and phytoplankton. This food preference has contributed to it being a very popular in the aquarium trade as a biological control for algae. The species is believed to be established within Puerto Rico, where it was likely introduced by aquarium release. No scientific studies have addressed the potential impacts of introduction there and is needed to better inform the species' invasiveness risk. Climate match within the United States is medium overall, with the highest match areas occurring locally within southern Florida and Texas. Given all factors, the overall risk assessment for *Gyrinocheilus aymonieri* is uncertain.

Assessment Elements

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

Eschmeyer, W. N., R. Fricke, and R. van der Laan, editors. 2018 Catalog of fishes: genera, species, references. Available: http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp. (March 2018).

Froese, R., and D. Pauly, editors. 2018. *Gyrinocheilus aymonieri* Tirant, 1883. FishBase. Available: http://www.fishbase.us/summary/SpeciesSummary.php?ID=12298&genusname=Gyrinocheilus&speciesname=aymonieri&AT=Gyrinocheilus+aymonieri&lang=English. (March 2018).

Fuller, P. 2018. *Gyrinocheilus aymonieri* Tirant, 1883. U.S. Geological Survey, Nonindigenous Aquatic Species Database, Gainesville, Florida. Available: https://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=2640. (March 2018, August 2018).

GBIF Secretariat. 2018. GBIF backbone taxonomy *Gyrinocheilus aymonieri* Tirant, 1883. Global Biodiversity Information Facility, Copenhagen. Available: https://www.gbif.org/species/2368346. (March 2018).

ITIS (Integrated Taxonomic Information System). 2018. *Gyrinocheilus aymonieri* Tirant, 1883. Integrated Taxonomic Information System, Reston, Virginia. Available: https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=163888#null. (March 2018).

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

Vidthayanon, C. 2012. *Gyrinocheilus aymonieri*. The IUCN Red List of Threatened Species. Available: http://www.iucnredlist.org/details/full/180997/0. (March 2018, August 2018).

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.

Kottelat, M. 1998. Fishes of the Nam Theun and Xe Bangfai basins, Laos, with diagnoses of twenty-two new species (Teleostei: Cyprinidae, Balitoridae, Cobitidae, Coiidae and Odontobutidae). Ichthyological Exploration of Freshwaters 9(1):1-128.

Rainboth, W. J. 1996. Fishes of the Cambodian Mekong. FAO species identification field guide for fishery purposes. FAO, Rome.

Riede, K. 2004. Global register of migratory species - from global to regional scales. Final Report of the R&D-Projekt 808 05 081. Federal Agency for Nature Conservation, Bonn, Germany.

Riehl, R., and H. A. Baensch, 1991. Aquarien Atlas, volume 1. Mergus, Verlag für Natur- und Heimtierkunde, Melle, Germany.

Taki, Y. 1978. An analytical study of the fish fauna of the Mekong basin as a biological production system in nature. Research Institute of Evolutionary Biology Special Publications, Tokyo, Japan.