South European Toothcarp (*Aphanius fasciatus*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, March 2011
Revised, June 2019
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1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2019):

"Europe: France, Italy, Slovenia, Croatia, Albania, Greece and Montenegro. Mediterranean basin: North Africa from Egypt to eastern Algeria, sometimes in landlocked basins; through the Suez Canal into the Bitter Lakes, Egypt [Wildekamp et al. 1986]. In Appendix III of the Bern Convention (protected fauna). Asia: Turkey."

From Crivelli (2006):

"It is distributed in all countries of the Mediterranean region to the exception of the Iberic Peninsula. It is restricted to coastal waters including islands. It is found in several Mediterranean islands, except Crete (Bianco et al. 1996). The Species is also found in the Suez Canal (Lotan and Ben-Tuvia 1996)."

Status in the United States

No records were found of *Aphanius fasciatus* in the wild or in trade in the United States.

Means of Introductions in the United States

No records were found of *Aphanius fasciatus* in the wild in the United States.

Remarks

Aphanius fasciatus occurs in both marine and freshwater environments. The conclusions in this screening are valid for freshwater locations.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Fricke et al. (2019):

"**Current status:** Valid as *Aphanius fasciatus* (Valenciennes 1821)."

From ITIS (2019):

"Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Actinopterygii
Class Teleostei
Superorder Acanthopterygii
Order Cyprinodontiformes
Suborder Cyprinodontoidei
Family Cyprinodontidae
Subfamily Cyprinodontinae
Tribe Orestiini
Genus *Aphanius*
Species *Aphanius fasciatus* (Valenciennes in Humboldt and Valenciennes, 1821)"

Size, Weight, and Age Range

From Froese and Pauly (2019):

"Max length : 6.0 cm TL male/unsexed; [Huber 1996]"

Environment

From Froese and Pauly (2019):

"Marine; freshwater; brackish; demersal; pH range: 6.5 - 7.5; dH range: 8 - 10; non-migratory. […]; 10°C - 24°C [Riehl and Baensch 1991; assumed to be recommended aquarium temperature];"

Climate/Range

From Froese and Pauly (2019):

"Subtropical; […]; 46°N - 34°N, 2°E - 36°E"

Distribution Outside the United States

Native

From Froese and Pauly (2019):

"Europe: France, Italy, Slovenia, Croatia, Albania, Greece and Montenegro. Mediterranean basin: North Africa from Egypt to eastern Algeria, sometimes in landlocked basins; through the Suez Canal into the Bitter Lakes, Egypt [Wildekamp et al. 1986]. In Appendix III of the Bern Convention (protected fauna). Asia: Turkey."

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Introduced

Froese and Pauly (2019) lists *Aphanius fasciatus* as introduced and established in Morocco. *Aphanius fasciatus* was found in the Ebro delta (Spain).

Means of Introduction Outside the United States

From Froese and Pauly (2019):

"Recently appeared in Ebro delta [Spain], suspected to have been released by aquarists [Kottelat and Freyhof 2007]."

Short Description

From Froese and Pauly (2019):

"Anal soft rays: 9. Can be diagnosed from other species of *Aphanius*, Valenciidae and Fundulidae in Europe by having the following characters: males have pale yellow to yellow-orange caudal fin, in some populations with a wide dark submarginal bar, 8-15 dark blue to grey bars on a silvery background, bars usually regularly shaped and set; females possess 11-17 short dark brown bars on sides, over a faint greyish midlateral stripe, 24-29 scales in midlateral series on body, and pectoral fin with 14-15 rays [Kottelat and Freyhof 2007]."

Biology

From Froese and Pauly (2019):

"Occurs in coastal lagoons and in hypersaline to shallow still to slow-flowing fresh water, especially at river mouths [Kottelat and Freyhof 2007]. A short-lived species which inhabits ponds, ditches and swamps. Feeds on invertebrates and plants. Spawns from April to September [Crivelli 1996]. Spawning takes place on the bottom and in submerged vegetation [Kottelat and Freyhof 2007]. Threatened due to habitat destruction and the introduction of other species [Crivelli 1996]."

From Leonardos (2008):

"The Mediterranean toothcarp *Aphanius fasciatus* (Valenciennes, 1821) is a small-sized omnivorous estuarine fish. Its diet is dominated by juveniles of shrimps (*Palaemon adspersus),* Isopods, Branchiopoda, Bivalvia, eggs of invertebrates, mosquitoes (adults and larvae) and diatoms. An ontogenetic diet shift with an increase in mean prey size with fish length was observed. Smaller fish feed on planktonic prey (e.g. copepods, ostracods, nauplii of *Artemia*), while larger fish prefer larger and more benthic preys (e.g. ampipods, Bivalvia). The diet of *A. fasciatus* shows a high degree of seasonal variation, with a reduction in the feeding activity during the periods of adverse environmental conditions (winter and autumn). It is a well-adapted estuarine fish, its feeding mode and preferences depending on the preys that are available. Its feeding strategy is characterised by specialisation in different resource types (aquatic invertebrates and mosquitoes) and a high between phenotype contribution (BPC) to niche width, with specialised individuals showing little or no overlap in resource use."

Human Uses

From Froese and Pauly (2019):

"Fisheries: of no interest; aquarium: commercial"

From Maltagliati (1999):

"Since *Aphanius fasciatus* is important neither as a source of food nor for aquariology purposes,"

Diseases

No records of OIE-reportable diseases (OIE 2019) were found for *Aphanius fasciatus.*

Poelen et al. (2019) lists *Gyrodactylus salinae* as a parasite of *Aphanius fasciatus.*

Threat to Humans

From Froese and Pauly (2019):

"Harmless"

3 Impacts of Introductions

No records of impacts of introductions were found for *Aphanius fasciatus*; therefore there is no information on impacts of introduction.

4 Global Distribution

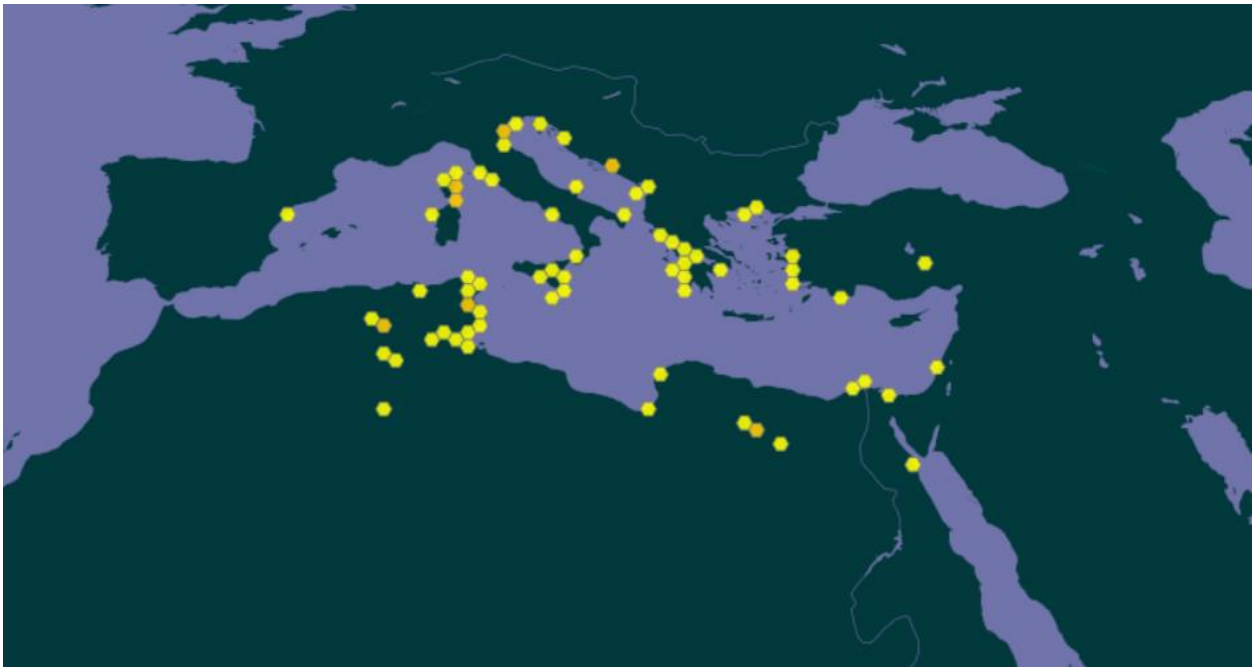

Figure 1. Known global distribution of *Aphanius fasciatus*. Locations are in Spain, Italy, Sardinia, Corsica, Slovenia, Croatia, Montenegro, Greece, Turkey, Cyprus, Israel, Egypt, Libya, Tunisia, and Algeria. Map from GBIF Secretariat (2019). The location in Spain was not used to select source points for the climate match as it is unknown if it represents an established population. Because the climate matching analysis (section 6) is not valid for marine waters, no marine occurrences were used in the climate matching analysis.

Froese and Pauly (2019) reported an established population in Morocco but georeferenced observations could not be found to use in selecting source points for the climate match.

5 Distribution Within the United States

No records of *Aphanius fasciatus* were found in the United States.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Aphanius fasciatus* was high to medium for the majority of the contiguous United States. Patches of low match were found in the upper West Coast, upper Midwest and Great Plains, northern New England, Florida, and the Gulf Coast. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.299, high. (Scores of 0.103 or greater are classified as high.) The majority of the States had high individual Climate 6 scores except for Alabama, Colorado, Kansas, Montana, Oklahoma, and South Carolina, which had medium individual scores, and Florida, Iowa, Louisiana, Maine, Minnesota, Mississippi, Nebraska, New Hampshire, North Dakota, South Dakota, Texas, Vermont, Wisconsin, and Wyoming, which had low individual scores.

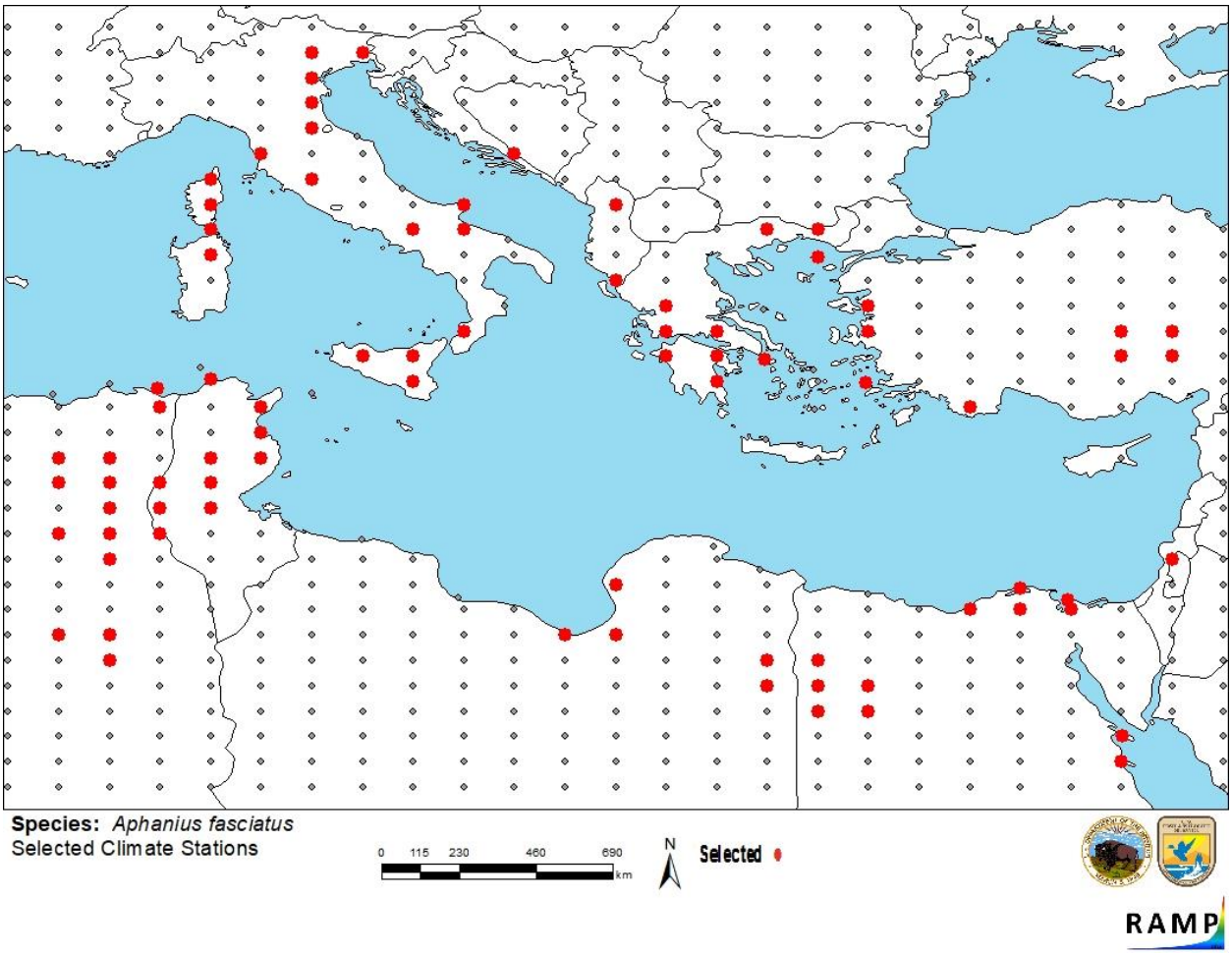

Figure 3. RAMP (Sanders et al. 2018) source map showing weather stations in the Mediterranean region selected as source locations (red; Algeria, Egypt, Libya, Tunisia, Israel, Turkey, Albania, Bosnia Herzegov, Croatia, Greece, Italy, and Montenegro) and non-source

locations (gray) for *Aphanius fasciatus* 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.

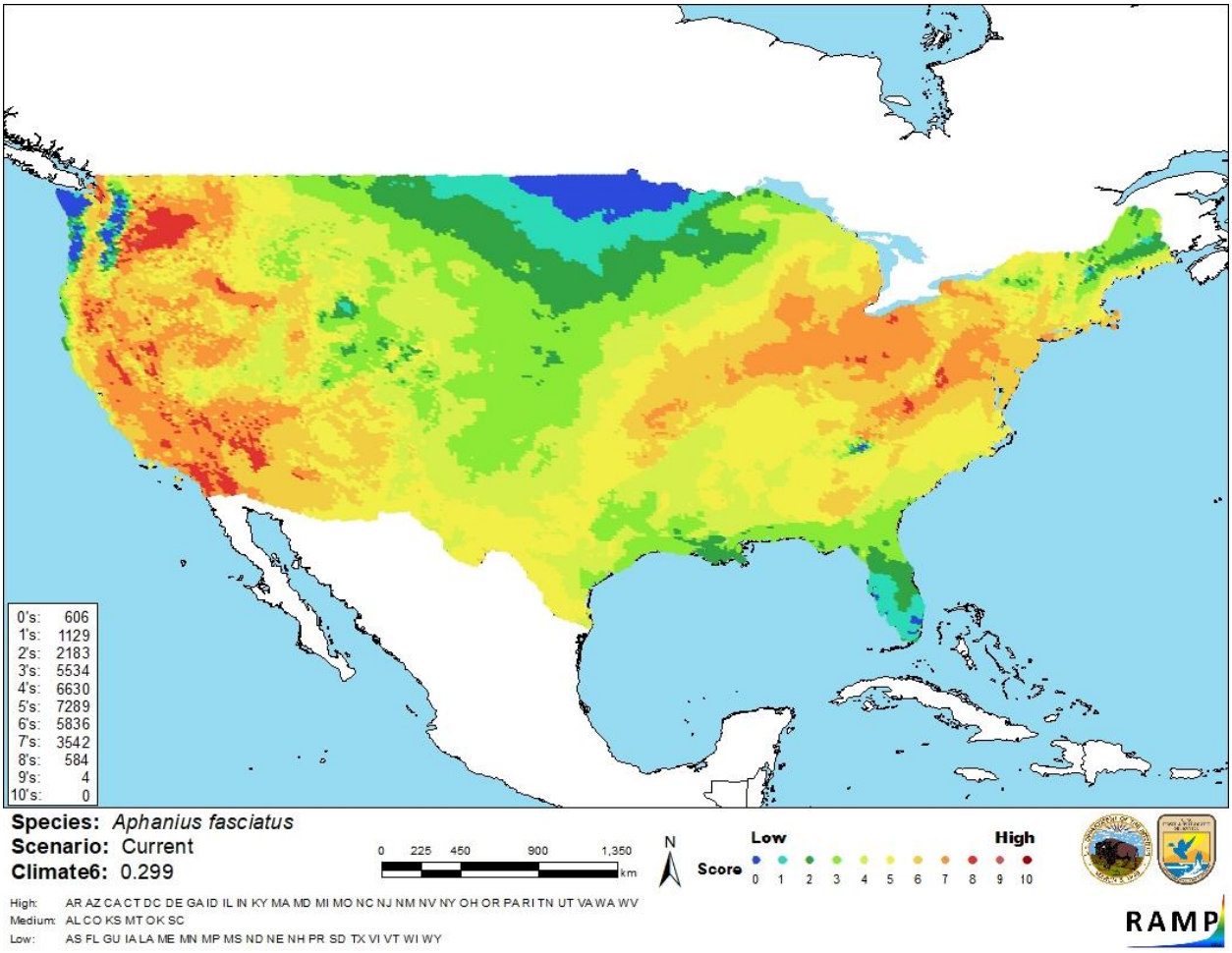

Figure 4. Map of RAMP (Sanders et al. 2018) climate matches for *Aphanius fasciatus* in the contiguous United States [or appropriate region] based on source locations reported by GBIF Secretariat (2019). 0 = Lowest match, 10 = Highest match.

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
$0.000 \leq X \leq 0.005$	Low
$0.005 < X < 0.103$	Medium
≥ 0.103	High

7 Certainty of Assessment

The certainty of assessment for *Aphanius fasciatus* is low. There is minimal information available for this species. Information on introductions was found for *Aphanius fasciatus*; however, no information was found on the impacts of introductions.

8 Risk Assessment

Summary of Risk to the Contiguous United States

South European Toothcarp (*Aphanius fasciatus*) is a fish native to the Mediterranean region. The species is present in the aquarium trade. The history of invasiveness for *A. faciatus* is none documented. *A. fasciatus* has been established outside of its' native range; however, no information has been found on impacts from the introductions. The climate match for the contiguous United States was high. There were multiple areas of low to medium match, with the largest ones found in the southeast and central portions of the country. The certainty of assessment is low. The overall risk assessment category for *Aphanius fasciatus* is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): None Documented**
- **Climate Match (Sec. 6): High**
- **Certainty of Assessment (Sec. 7): Low**
- **Remarks/Important additional information:** No additional remarks.
- **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.

Bianco, P. G., A. Ahnelt, and P. Ecomomidis. 1996. The freshwater fish from eastern and large Mediterranean islands with comments on their safety status. Acta Universitatis Carolinae 40:45–60.

Crivelli, A. J. 1996. The freshwater fish endemic to the Mediterranean region. An action plan for their conservation. Tour du Valat Publication.

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