

Red Discus (*Symphysodon discus*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, February 2011
Revised, April 2019
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Doronenko. 2009. Licensed under Creative Commons Attribution 3.0 Unported. Available: https://commons.wikimedia.org/wiki/File:Symphysodon_discus_02.jpg. (May 2019).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2019):

“South America: Amazon River basin in Brazil, near the mouth of the Negro River, in the lower Abacaxis River, and in the lower Trombetas River.”

Status in the United States

From Froese and Pauly (2019):

“Specimens were collected in geothermal waters on the Weisbart Swine Farm, in the Upper Rio Grande drainage in the San Luis Valley, Conejos County, Colorado, ca. 1983 [Zuckerman and Behnke 1986].”

“probably not established, no data”

From Aqua Imports (2019):

“Blue Heckel Discus (*Symphysodon discus*) – wild Japura
\$129.99 - \$149.99”

Chapman et al. (1997) report 12,948 individuals of *Symphysodon discus* imported to the United States in October 1992.

Means of Introductions in the United States

From Froese and Pauly (2019):

“aquaculture”

From Nico (2019):

“Probable escape from local fish farm (Zuckerman and Behnke 1986).”

Remarks

No additional remarks.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Fricke et al. (2019):

“**Current Status:** Valid as *Symphysodon discus* (Heckel 1840).”

From ITIS (2019):

“Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Actinopterygii

Class Teleostei
Superorder Acanthopterygii
Order Perciformes
Suborder Labroidei
Family Cichlidae
Genus *Symphysodon*
Species *Symphysodon discus* Heckel, 1840”

Size, Weight, and Age Range

From Froese and Pauly (2019):

“Max length : 12.3 cm SL male/unsexed; [Kullander 2003]”

Environment

From Froese and Pauly (2019):

“Freshwater; benthopelagic; pH range: 4.2 - 6.2; dH range: ? - 1. [...]; 26°C - 30°C [Riehl and Baensch 1991] [assumed to be the recommended aquarium temperature];”

Climate/Range

From Froese and Pauly (2019):

“Tropical; [...] 1°S - 3°S”

Distribution Outside the United States

Native

From Froese and Pauly (2019):

“South America: Amazon River basin in Brazil, near the mouth of the Negro River, in the lower Abacaxis River, and in the lower Trombetas River.”

Introduced

According to Froese and Pauly (2019) *Symphysodon discus* has been introduced to the Philippines; it is unknown whether it has established. The reference cited by Froese and Pauly (2019) for this record is a list of species present in the aquarium trade in the Philippines (ASAP 1996 in Froese and Pauly 2019). Since there are no other records of this species from the Philippines it seems unlikely that the species is established in the wild.

Means of Introduction Outside the United States

From Froese and Pauly (2019):

“ornamental”

Short Description

From Hildemann (1959):

“The skin and scales of non-breeding adults revealed nothing extraordinary -only the dense melanin pigmentation and scattered guanin crystals which make this species so colorful.”

“Wild fishes collected from various sources have shown some distinctive color variations.”

From Chellappa et al. (2005):

“This species is strikingly unlike the other cichlids due to its discoidal and laterally compressed body form (Câmara et al., 2002).”

Biology

From Froese and Pauly (2019):

“Feeds on worms, crustaceans, insects and plant matter. Maximum length 20 cm TL [Mills and Vevers 1989]”

“Deposit several hundred eggs on stones or plants; both parents defend eggs and larvae; larvae feed on a skin mucus during their first few days.”

From Chellappa et al. (2005):

“Its reproductive behavior is complex, involving competition for territory and mates, courtship and parental care. The males establish breeding territories utilizing aquatic plants with wide leaves, to which the females are attracted. Males defending territories are more aggressive and gain priority in courting females. Courtship provides an opportunity for mate choice and also fulfils several mutually compatible functions, such as orientation to the spawning site and synchronization of the spawning activities, so that gametes are released at the same time (Câmara & Chellappa, 2002).”

Human Uses

From Froese and Pauly (2019):

“Aquarium: commercial”

From Aqua Imports (2019):

“Blue Heckel Discus (*Symphysodon discus*) – wild Japura
\$129.99 - \$149.99”

Chapman et al. (1997) report 12,948 individuals of *Symphysodon discus* imported to the United States in October 1992.

Diseases

No records of OIE-reportable diseases (OIE 2019) were found for *Symphysodon discus*.

According to Froese and Pauly (2019) *Symphysodon discus* can have Dactylogyrus Gill Flukes Disease, Nematode Infestation, Livoneca Infestation, Hole-in-the-Head Disease, Protopalina Symphysodonis infection, Turbidity of the Skin (Freshwater fish), Tetrahymena Disease, Bacterial Infections (general), Bacterial diseases, Hexamitosis, Capillaria Infestation 4, and Ichthyouris Infestation 2.

According to Poelen et al. (2014) *Symphysodon discus* is host to *Ancyrocephalus* sp., *Sciadicleithrum variabilum*, *Sciadicleithrum variabilis*, *Urocleidoides* sp., *Ichthyouris bursata*, *Neocapillaria pterophylli*, *Proteocephalus microcephalus*, and *Symphysodon discus* adomavirus 1.

Threat to Humans

From Froese and Pauly (2019):

“Harmless”

3 Impacts of Introductions

From Nico (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 *Symphysodon discus*. Locations are in Brazil and India. Map from GBIF Secretariat (2019). The point located in India was actually from a market and not from a wild or established population and therefore was not used to select source points for the climate match. The two southern points in Brazil were not used to select source points for the climate match. There is no indication of the species' presence in those locations.

5 Distribution Within the United States

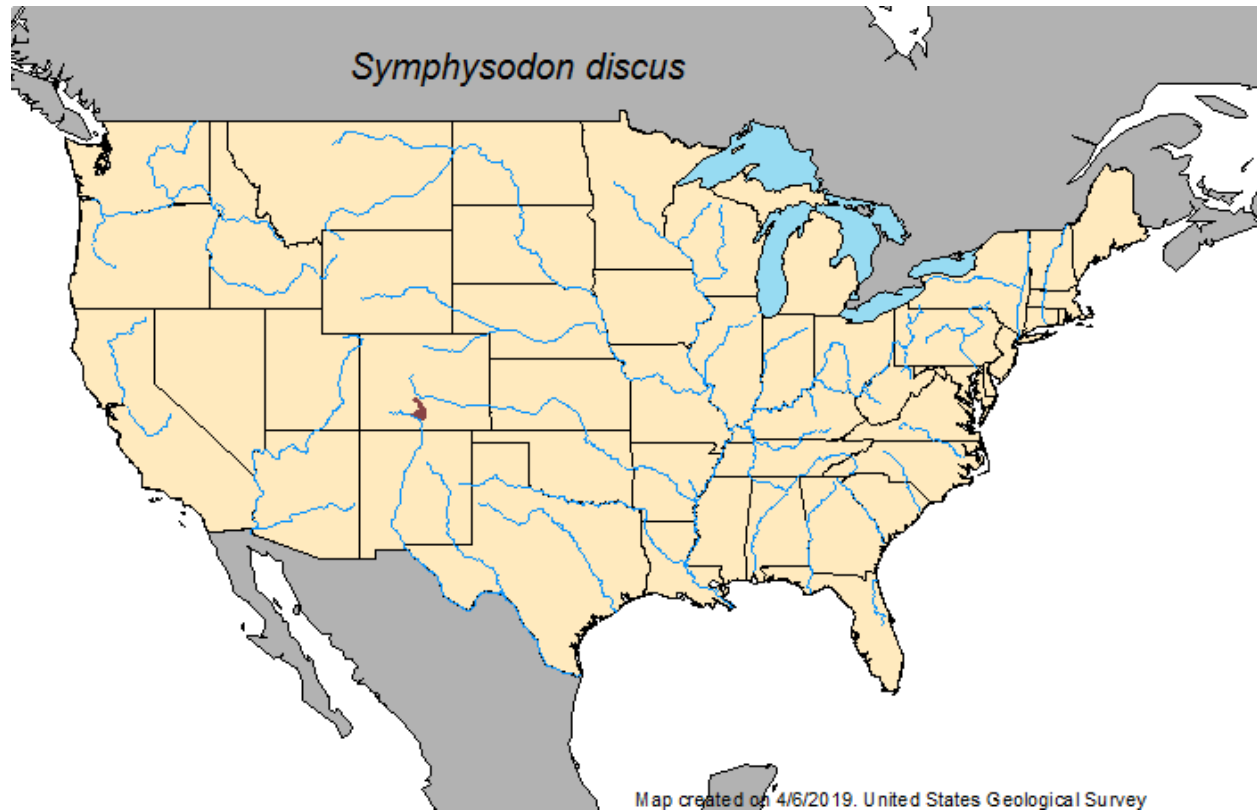


Figure 2. Known distribution of *Symphysodon discus* in the United States. Map from Nico (2019). The point located in Colorado was not used to select source points for the climate match because there is no evidence to suggest that this species became established; the sighting was from 1986 and no more recent sightings have been recorded.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Symphysodon discus* was low for the contiguous United States. There were no areas of high or medium match. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.000, low (scores between 0.000 and 0.005, inclusive, are classified as low). All States had a low individual Climate 6 score.

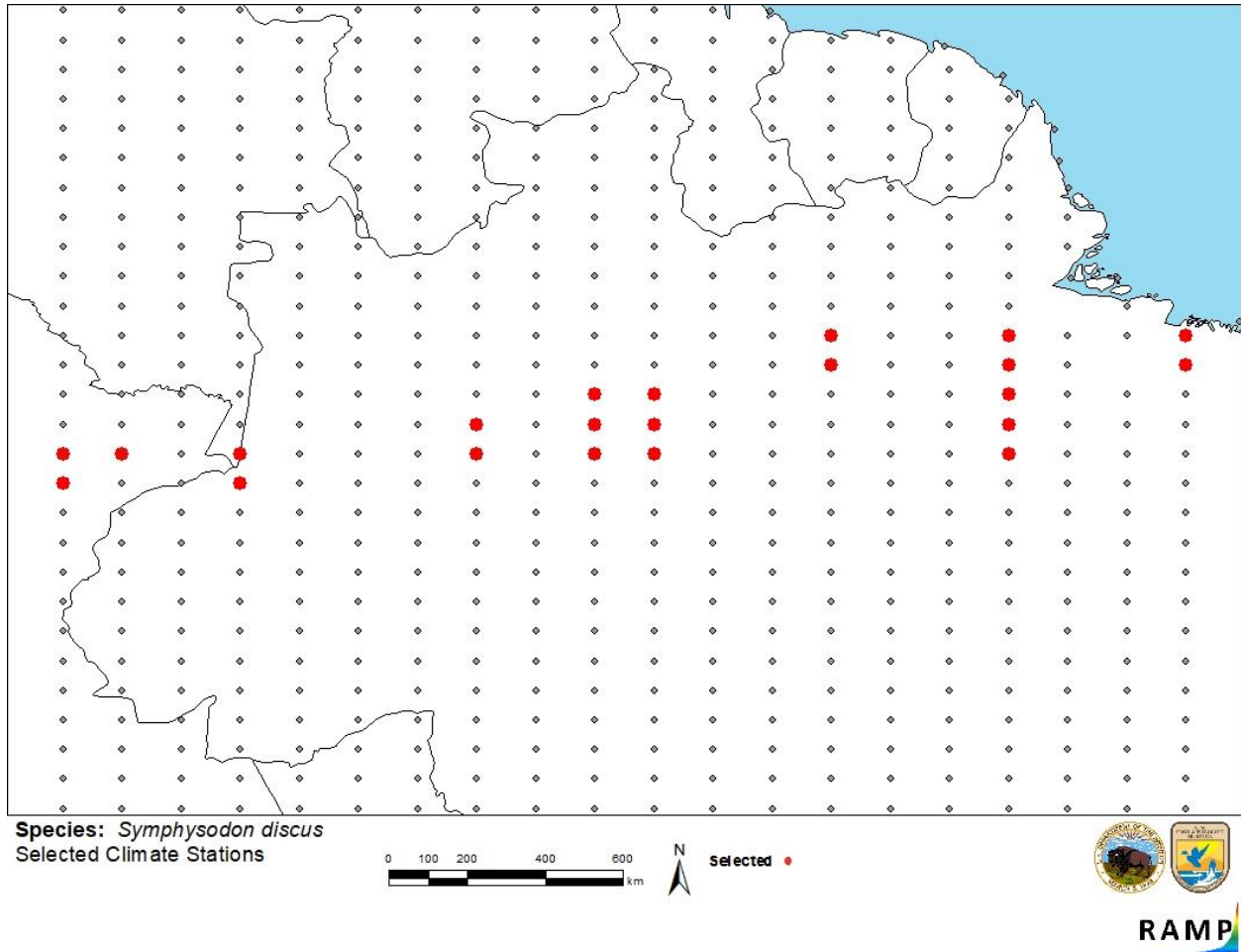


Figure 3. RAMP (Sanders et al. 2018) source map showing weather stations in South America selected as source locations (red; Brazil, Peru) and non-source locations (gray) for *Symphysodon discus* climate matching. Source locations from GBIF Secretariat (2019). Selected source locations are within 100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

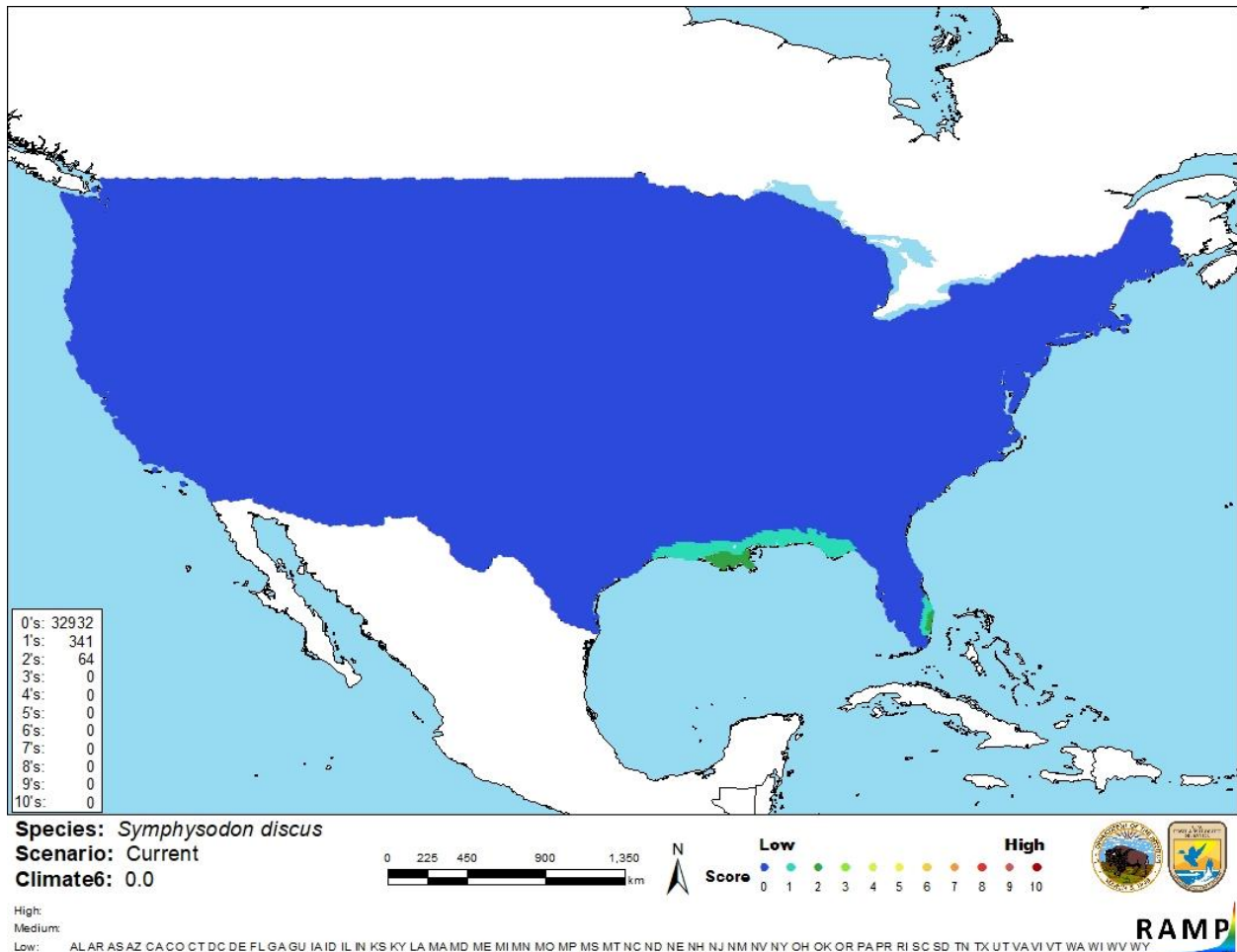


Figure 4. Map of RAMP (Sanders et al. 2018) climate matches for *Symphysodon discus* in the contiguous United States based on source locations reported by GBIF Secretariat (2019). 0 = Lowest match, 10 = Highest match.

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

7 Certainty of Assessment

The certainty of assessment for *Symphysodon discus* is medium. *Symphysodon discus* has been introduced in the Philippines and the United States, but it is unknown if it became established or if it had any impacts. There is trade data available but it is limited and the numbers had to be extrapolated to determine if a significant history of trade existed.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Symphysodon discus, the Red Discus, is a fish native to the Amazon River basin in Brazil. The history of invasiveness is low. *S. discus* has been introduced to the Philippines and the United States (geothermal waters in Colorado). It is unlikely that this species is established in the Philippines and the report from Colorado was from the early 1980s and there have been no further reports. This fish is found in the aquarium trade and has a significant trade history. Chapman et al. (1997) reported a monthly import of just under 13,000 individuals of *S. discus* in 1992. If that number is extrapolated, there has been importation of over 4 million individuals to the United States since 1992. The climate match for the contiguous United States is low. There were no areas of high or medium match. The certainty of assessment is medium due to lack of information on introductions and the limited nature of the trade information. The overall risk assessment category for *Symphysodon discus* is low.

Assessment Elements

- **History of Invasiveness (Sec. 3): Low**
- **Climate Match (Sec. 6): Low**
- **Certainty of Assessment (Sec. 7): Medium**
- **Remarks/Important additional information:** No additional remarks.
- **Overall Risk Assessment Category: Low**

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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Chellappa, S., M. R. Câmara, and J. R. Verani. 2005. Ovarian development in the Amazonian red discus, *Symphysodon discus* Heckel (Osteichthyes: Cichlidae). *Brazilian Journal of Biology* 65(4):609–616.

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- 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.

- Câmara, M. R., and S. Chellappa. 2002. Territorialidade em acará disco, *Symphysodon discus*. In *Anais do XX Encontro Anual de Etologia*. São Paulo: Associação Brasileira de Etologia 1:445.
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