

# Siamese Fighting Fish (*Betta splendens*)

## Ecological Risk Screening Summary

Matthew Curtis, July 2012  
Don MacLean, September 2012  
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Photo: Mandolesi, L. From EOL (2014)

## 1 Native Range, and Status in the United States

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### Native Range

From Nico (2012):

“Tropical Asia. Native to Southeast Asia including the northern Malay Peninsula, central and eastern Thailand, Kampuchea, and southern Vietnam (Witte and Schmidt 1992).”

## Status in the United States

From Nico (2012):

“Specimens ranging from 1-3 cm were taken from the Thames River drainage in [southeastern] Connecticut (Whitworth 1996). Specimens were collected from Lake Worth Drainage District canal L-15, adjacent to an aquarium fish farm west of Atlantis in Palm Beach County, Florida (Ogilvie 1969; Courtenay et al. 1974), but have not been found at that locality in subsequent years (Courtenay and Hensley 1979). A population became established in a canal south of Holmberg Road in Parkland, northern Broward County [Florida]. When first discovered in December 1975, it was a dominant fish; however, the population was killed by extremely cold weather in January 1977 (Courtenay and Hensley 1979a; Courtenay et al. 1984; Courtenay and Stauffer 1990).”

## Means of Introductions to the United States

From Nico (2012):

“Florida records are the result of probable escapes from local ornamental fish farms (Courtenay and Stauffer 1990). Connecticut records are probably aquarium releases.”

## Remarks

From Nico (2012):

“A supposed report of *Betta splendens* in Hiko Spring, Lincoln County, Nevada, was false (W. Courtenay, personal communication). Voucher specimens: Florida (UF 97046; UF 118475).”

“This species has been shown to be an alternative host to the glochidia of native unionid mussels *Lampsilis cardium* and *Utterbackia imbecillis* (Watters and O'Dee 1998).”

## 2 Biology and Ecology

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From ITIS (2011):

“Kingdom Animalia  
  Phylum Chordata  
    Subphylum Vertebrata  
      Superclass Osteichthyes  
        Class Actinopterygii  
          Subclass Neopterygii  
            Infraclass Teleostei  
              Superorder Acanthopterygii  
                Order Perciformes  
                  Suborder Anabantoidei  
                    Family Osphronemidae  
                      Subfamily Macropodinae

Genus *Betta*  
Species *Betta splendens* Regan, 1910”

Taxonomic Standing: “Valid”

### **Size, Weight, Age**

From Froese and Pauly (2012):

“Max length: 6.5 cm TL male/unsexed; (Rainboth 1996); max. reported age: 2 years (Hugg 1996).”

### **Environment**

From Froese and Pauly (2012):

“Benthopelagic; freshwater; pH range: 6.0 - 8.0; dH range: 5 – 19.”

### **Climate/Range**

From Froese and Pauly (2012):

“Tropical; 24°C - 30°C (Riehl and Baensch 1991); 22°N - 8°N, 99°E - 107°E.”

### **Distribution Outside the United States**

- Native - Asia: Mekong basin (Froese and Pauly 2012).
- Introduced and Established - Brazil, Colombia (Welcomme 1988), Singapore (Chou and Lam 1989), and the Dominican Republic (Lever 1996).
- Introduced and Probably Established – Indonesia (Tan and Ng 2005) and Malaysia (Mohsin and Ambak 1983)
- None of the above established and possibly established populations provided geo-referenced locations for use with climate matching.

### **Short Description**

From Froese and Pauly (2012):

“Dorsal spines (total): 1; Vertebrae: 29 - 34. Reddish bars on opercle (Rainboth 1996).”

### **Biology**

From Froese and Pauly (2012):

“Occur in standing waters of floodplains, canals, rice paddies (Rainboth 1996) and medium to large rivers (Taki 1978). Feeds on zooplankton, mosquito and other insect larvae (Rainboth 1996). Air breather and bubble nest builder. Used in behavioral studies (Robins et al. 1991). Males will fight each other. The many colorful varieties are popular aquarium fish, however, the holding of the males in very small containers should be discouraged (Riehl and Baensch 1991).

Aquarium keeping: several females for one male; minimum aquarium size 60 cm (BMELF 1999).”

## **Human Uses**

From Froese and Pauly (2012):

“Fisheries: of no interest; aquarium: highly commercial.”

Betta Fish Center (2009):

“King of Siam started licensing and collecting these fighting fish in 1840.”

“Betta Splendens were introduced into France and Germany and in 1910 they were first seen in the United States.”

“Today, Betta Splendens are the most popular fish with breeders in the U.S. and Japan.”

## **Diseases**

From Froese and Pauly (2012):

- Fin-rot Disease (late stage), Bacterial diseases
- White spot Disease, Parasitic infestations (protozoa, worms, etc.)
- Fin Rot (early stage), Bacterial diseases
- Bacterial Infections (general), Bacterial diseases
- Columnaris Disease (e.), Bacterial diseases
- Fish tuberculosis (FishMB), Bacterial diseases
- Velvet Disease 2 (*Piscinoodinium* sp.), Parasitic infestations (protozoa, worms, etc.)
- Edwardsiellosis, Bacterial diseases

## **Threat to humans**

None reported, listed as harmless (Froese and Pauly 2012).

## **3 Impacts of Introductions**

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No adverse impacts reported for this species.

## 4 Global Distribution



**Figure 1 (above).** Global distribution of *B. splendens*. Original map included points in Florida and Connecticut that indicated introduced but not established populations. There was also a point in Australia from a specimen in a Sydney pet shop. None of these points were included in the climate matching analysis. Map from GBIF (2011).

## 5 Distribution within the United States

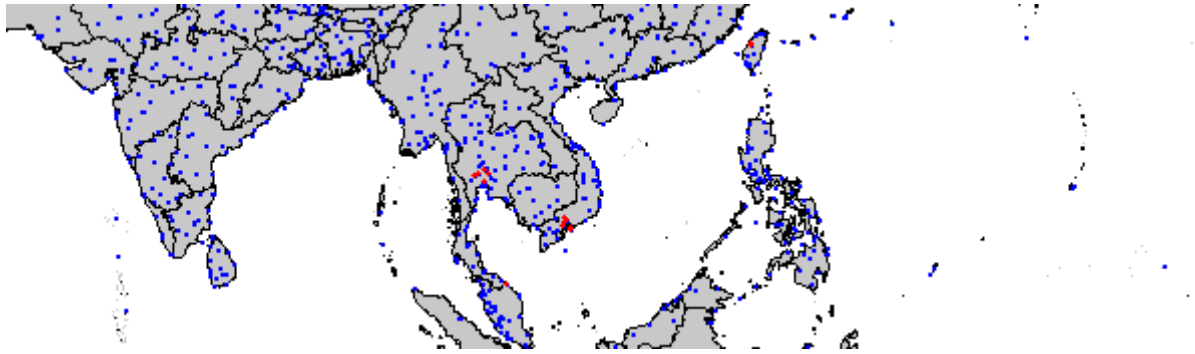


**Figure 2 (above).** Distribution of *B. splendens* in the United States. Map from Nico (2012).

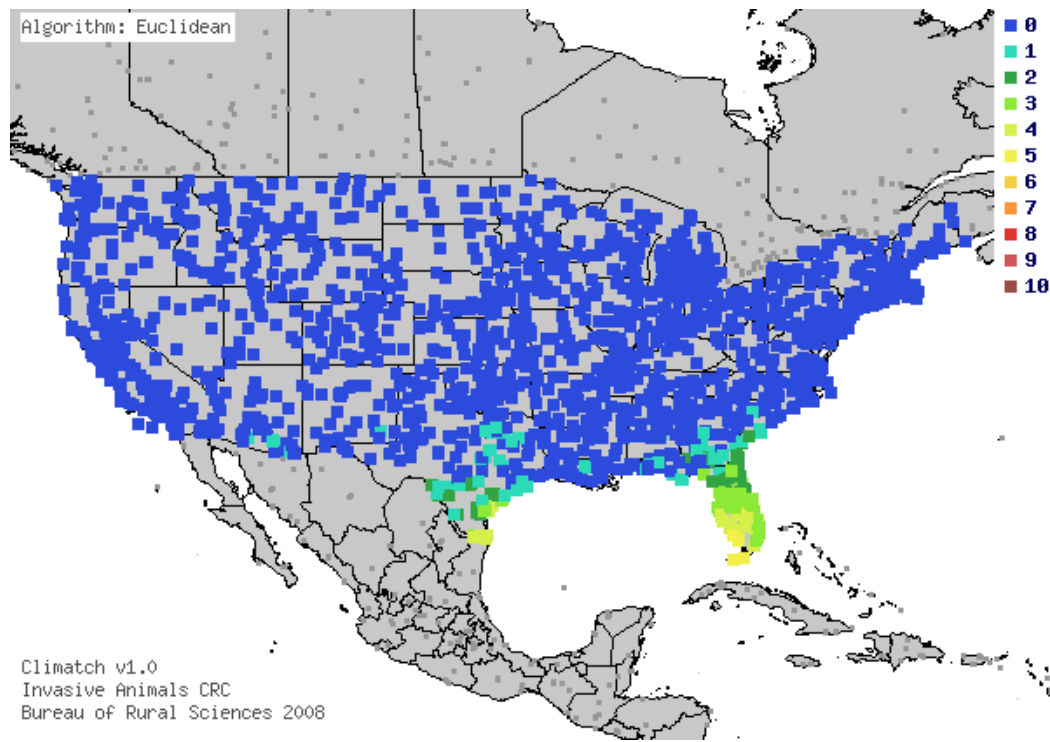
## 6 CLIMATCH

### Summary of Climate Matching Analysis

The climate match (Australian Bureau of Rural Sciences 2011; 16 climate variables; Euclidean Distance) was medium in Florida and extreme South Texas. It was low elsewhere. The range for a low climate match is 0 - 0.005, climate match of *B. splendens* is 0.0.



**Figure 3 (above).** CLIMATCH (Australian Bureau of Rural Sciences 2011) source map showing weather stations selected as source locations (red) and non-source locations (blue) for *B. splendens* climate matching. Source locations were from GBIF (2011). Only established populations were used.



**Figure 4 (above).** Map of CLIMATCH (Australian Bureau of Rural Sciences 2011) climate matches for *B. splendens* in the continental United States based on source locations reported by GBIF (2011). 0= Lowest match, 10=Highest match.

**Table 1 (below).** CLIMATCH (Australian Bureau of Rural Sciences 2011) climate match scores

CLIMATCH Score	0	1	2	3	4	5	6	7	8	9	10
Count	1770	75	45	51	25	8	0	0	0	0	0
Climate 6 Proportion =	0										



## 7 Certainty of Assessment

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Information on the biology, impacts, and history of this species is abundant and easily accessed. Certainty of this assessment is high.

## 8 Risk Assessment

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### Summary of Risk to the Continental United States

*B. splendens* may have become established in some nonnative tropical locations outside of the United States, however no adverse impacts have been reported. Within the United States, *B. splendens* was reported from Florida and Connecticut. According to the USGS (Nico 2012), the population in Florida had been established, but was wiped out by lower than normal temperatures in 1977. Impacts of this introduction are unknown. It is improbable that this species would survive winters in most of the continental United States. *B. splendens* has been in trade since the 19<sup>th</sup> century, and continues to be one of the most popular aquarium fishes in the United States. Many introductions in the United States have occurred throughout the 100 years this species has been raised in captivity here. Thus, the species has had opportunity to become established and invasive, but has not done so. Analysis and synthesis of available information on *B. splendens* is interpreted to mean that *B. splendens* is low risk within at least the continental United States.

### Assessment Elements

- **History of Invasiveness:** Low
- **Climate Match:** Low
- **Certainty of Assessment:** High
- **Overall Risk Assessment Category:** Low

## Sec. 9 References

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**Note: References cited within quoted text but not accessed for this ERSS are included in Section 10 below.**

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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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