

Penang Betta (*Betta pugnax*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, April 2011
Revised, July 2018
Web Version, 8/20/2018

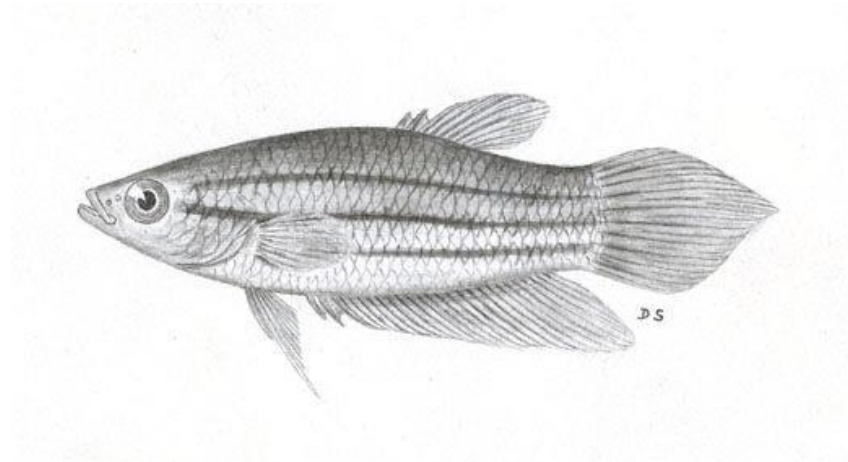


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Available: <http://eol.org/pages/205813/overview>. (July 2018).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2018):

“Asia: Malaysia, Singapore and Indonesia.”

Froese and Pauly (2018) also report that *B. pugnax* is native to Thailand, Cambodia, and Vietnam.

Status in the United States

This species has not been reported as introduced or established in the United States.

This species is in trade in the United States, for example:

From Wet Spot Tropical Fish (2012):

“Green Mask Betta *Betta pugnax* Medium (1.5”+ to 2”) WILD \$8.00”

Means of Introductions in the United States

No known introductions.

Remarks

Eschmeyer et al. (2018) report the following synonyms for this species: *Betta bleekeri*, *Betta brederi*, *Betta macrophthalma*, and *Macropodus pugnax*. The accepted scientific name and all synonyms were used as search terms in finding information for this report.

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 Acanthopterygii
Order Perciformes
Suborder Anabantoidei
Family Osphronemidae
Subfamily Macropodinae
Genus *Betta*
Species *Betta pugnax* (Cantor, 1849)”

“Taxonomic status:

Current Standing: valid”

Size, Weight, and Age Range

From Froese and Pauly (2018):

“Max length : 6.7 cm SL male/unsexed; [Tan and Ng 2005]”

Environment

From Froese and Pauly (2018):

“Freshwater; benthopelagic; pH range: 7.1 - 7.6; dH range: 5 - 12. [...] 24°C - 28°C [Riehl and Baensch 1991; presumed to be recommended aquarium water temperatures]”

Climate/Range

From Froese and Pauly (2018):

“Tropical [...]”

Distribution Outside the United States

Native

From Froese and Pauly (2018):

“Asia: Malaysia, Singapore and Indonesia.”

Froese and Pauly (2018) also report that [species] is native to Thailand, Cambodia, and Vietnam.

Introduced

From Froese and Pauly (2018):

“Guam”

“Philippines”

Means of Introduction Outside the United States

From Froese and Pauly (2018):

“Assumed to be introduced [in Guam] as an ornamental fish. Species became established.”

“ornamental [in Philippines]”

Short Description

From Froese and Pauly (2018):

“Dorsal spines (total): 0 - 2; Dorsal soft rays (total): 7-10; Anal spines: 1-2; Anal soft rays: 24 - 26; Vertebrae: 28 - 31. A member of the *Betta pugnax* species group that can be differentiated from other members by the following combination of characters: presence of chin-bar; absence of dark marks below postorbital stripe on opercle; presence of dorsal transverse bars; caudal transverse bars present only in male; greenish to bluish iridescent scales on opercle and body; red subdistal band and black edge on anal fin; absence of dark edge on caudal fin; anal fin rays 25-28 (mode 26); lateral scales 28-31 (mode 29); postdorsal scales 11-12 (mode 11); pelvic fin length

26.6-43.8% SL; head length 27.5-35.2% SL; inter-orbital width 32.4-53.0% HL [Tan and Ng 2005].”

Biology

From Froese and Pauly (2018):

“Occurs in small fast flowing forest streams [Lim and Ng 1990]. Inhabits mainly overhanging bank vegetation, submerged leaf litter and exposed roots of bank vegetation [Tan and Tan 1996, Tan and Ng 2005]. Mouth brooder [Lim and Ng 1990].”

“Spawns in a depression on the substrate. Male broods the eggs in his mouth until hatching [Lim and Ng 1990]. Produces a minimum of 100 eggs [Riehl and Baensch 1991].”

Human Uses

From Froese and Pauly (2018):

“Aquarium: commercial”

Diseases

No OIE reportable diseases have been documented for this species. No additional information found.

Threat to Humans

From Froese and Pauly (2018):

“Harmless”

3 Impacts of Introductions

No information found.

4 Global Distribution



Figure 1. Known global distribution of *Betta pugnax*, reported from Malaysia, Thailand, Indonesia, Singapore, and Australia. Map from GBIF Secretariat (2017). The location in Australia was not included in the climate matching analysis because the location represents a pet shop and not an established population in the wild. Georeferenced locations were not available for established populations described from Cambodia, Vietnam, or Guam.

5 Distribution Within the United States

No known occurrences.

6 Climate Matching

Summary of Climate Matching Analysis

The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for *Betta pugnax* in the contiguous United States was 0.000, which is a low score. The range of scores for a low climate match is from 0.0 to 0.005, inclusive. No state recorded a medium or high score. The entire contiguous United States had a low match locally, too, except for small areas of medium match in southeastern Florida, western Florida, and southern Louisiana.

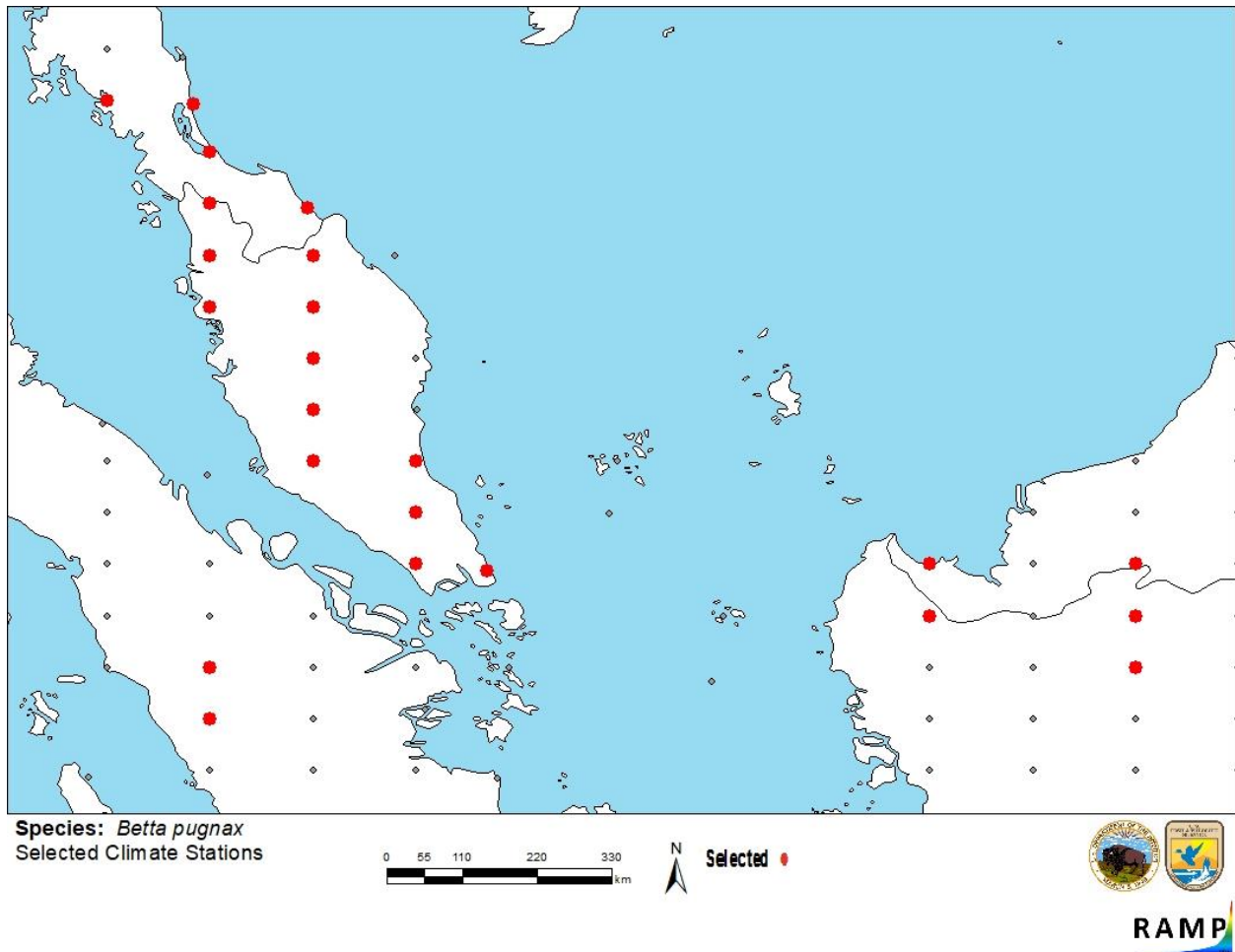


Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations in Southeast Asia selected as source locations (red; Malaysia, Thailand, Singapore, and Indonesia) and non-source locations (gray) for *Betta pugnax* climate matching. Source locations from GBIF Secretariat (2017).

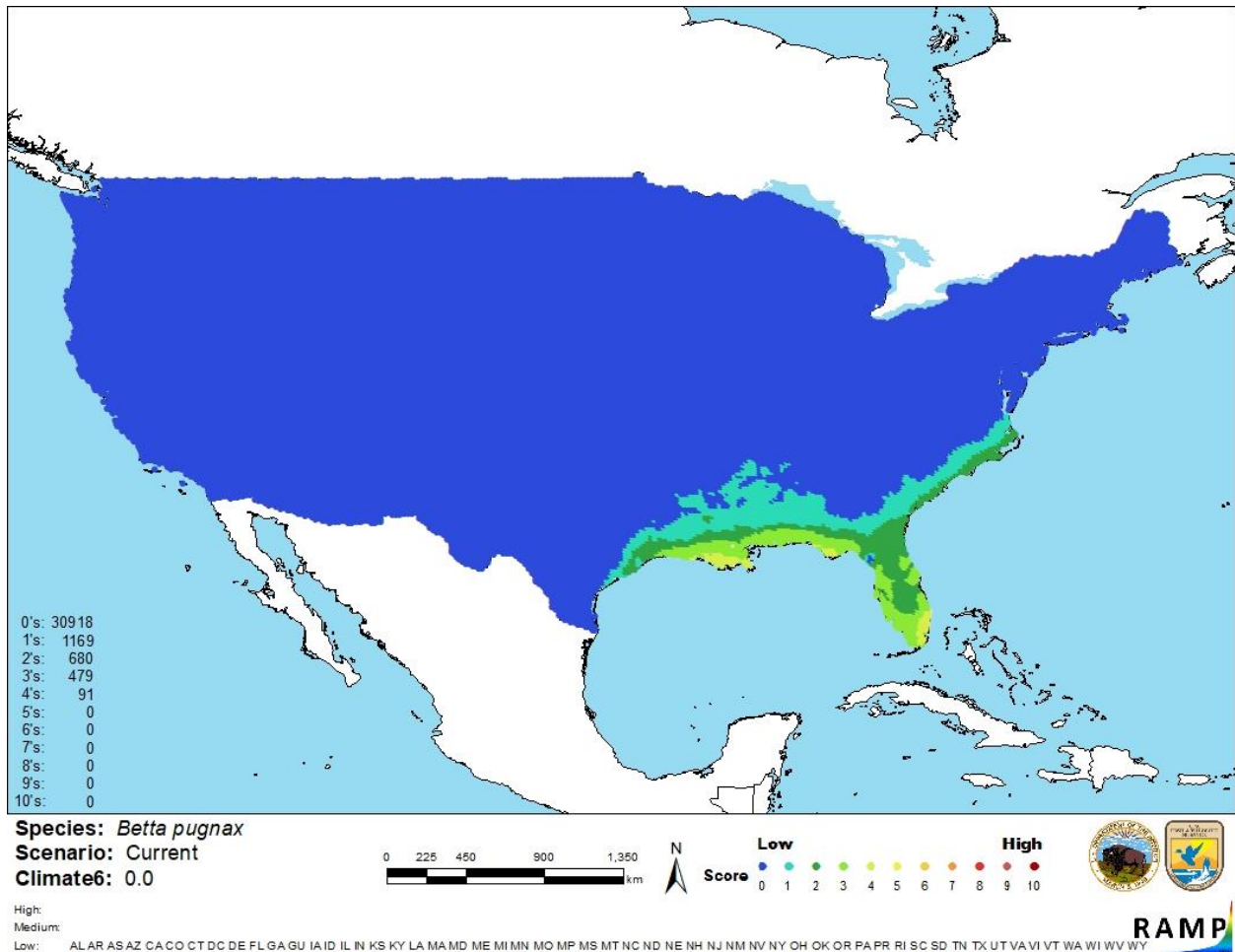


Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Betta pugnax* in the contiguous United States based on source locations reported by GBIF Secretariat (2017). 0=Lowest match, 10=Highest match.

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

7 Certainty of Assessment

Some information is available about the biology and ecology of *Betta pugnax*. It has been introduced outside of its native range to Guam and the Philippines. It has become established in Guam; the status is unknown in the Philippines. No impacts from these introductions have been reported. No studies of impacts were available. Due to lack of information, the certainty of assessment is low. More information is needed to increase the certainty of assessment.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Penang betta (*Betta pugnax*) is a fish native to Thailand, Malaysia, Indonesia, Singapore, Cambodia and Vietnam. It is sold in the aquarium trade, including in the United States. *B. pugnax* has been introduced to two locations outside of its native range. One population is established in Guam, while the status of the population in the Philippines is unknown. No information about impacts, or lack thereof, of its introduction has been reported. The climate match with the contiguous United States is low with small areas of medium match in southeastern Florida, western Florida, and southern Louisiana. Due to lack of information about the impacts of introduction, the risk for *B. pugnax* is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): None Documented**
- **Climate Match (Sec. 6): Low**
- **Certainty of Assessment (Sec. 7): Low**
- **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>. (August 2018).

Froese, R., and D. Pauly, editors. 2018. *Betta pugnax* (Cantor, 1849). FishBase. Available: <https://www.fishbase.de/summary/Betta-imbellis.html>. (July 2018).

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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.

Lim, K. K. P., and P. K. L. Ng. 1990. The freshwater fishes of Singapore. Singapore Science Centre, Singapore.

Riehl, R., and H. A. Baensch. 1991. Aquarien atlas, volume 3. Mergus, Verlag für Natur- und Heimtierkunde, Melle, Germany.

Tan, H. H., and P. K. L. Ng. 2005. The fighting fishes (Teleostei: Osphronemidae: Genus *Betta*) of Singapore, Malayasia and Brunei. Raffles Bulletin of Zoology Supplement (13):43-99.

Tan, H. H., and S. H. Tan. 1996. Redescription of the Malaysian fighting fish *Betta pugnax* (Teleostei: Belontiidae), and description of *Betta pulchra*, new species from Peninsular Malaysia. Raffles Bulletin of Zoology 44(2):419-434.