

Spotted Barb (*Barbodes binotatus*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, May 2011

Revised, June 2018

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Photo: W. Djatmiko. Licensed under CC BY-SA 3.0. Available:
https://commons.wikimedia.org/wiki/File:Punti_binot_090519-8585_kdBdk.jpg. (June 2018).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2018):

“Asia: Myanmar [Talwar and Jhingran 1991] and from Mekong of Thailand through Indonesia [Rainboth 1996].”

From Jenkins et al. (2015):

“Native:

Brunei Darussalam; Cambodia; Indonesia; Lao People's Democratic Republic; Malaysia; Myanmar; Philippines; Thailand; Viet Nam”

Status in the United States

This species has not been reported as introduced or established in the United States. No evidence was found for trade in this species in the United States.

Means of Introductions in the United States

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

Remarks

The synonym *Puntius binotatus* is also commonly used, so this name was also used when researching in preparation of 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 Ostariophysi
Order Cypriniformes
Superfamily Cyprinoidea
Family Cyprinidae
Genus *Puntius*
Species *Puntius binotatus* (Valenciennes in Cuvier and Valenciennes, 1842) – spotted barb”

From Eschmeyer et al. (2018):

“Current status: Valid as *Barbodes binotatus* (Valenciennes 1842). Cyprinidae: Cyprininae.”

Size, Weight, and Age Range

From Froese and Pauly (2018):

“Max length : 20.0 cm SL male/unsexed; [Baird et al. 1999]; common length : 10.0 cm SL male/unsexed; [Rainboth 1996]”

Environment

From Froese and Pauly (2018):

“Freshwater; benthopelagic; pH range: 6.0 - 6.5; dH range: ? - 12. [...] 24°C - 26°C [Baensch and Riehl 1985; assumed to represent recommended aquarium water temperature]”

Climate/Range

From Froese and Pauly (2018):

“Tropical; [...]”

Distribution Outside the United States

Native

From Froese and Pauly (2018):

“Asia: Myanmar [Talwar and Jhingran 1991] and from Mekong of Thailand through Indonesia [Rainboth 1996].”

From Jenkins et al. (2015):

“Native:

Brunei Darussalam; Cambodia; Indonesia; Lao People's Democratic Republic; Malaysia; Myanmar; Philippines; Thailand; Viet Nam”

Introduced

From Jenkins et al. (2015):

“Introduced:

Palau; Singapore”

Means of Introduction Outside the United States

From FAO (2018):

“*Puntius binotatus* introduced to Singapore [...]”

“Reasons of Introduction : 1) ornamental”

“*Puntius binotatus* introduced to Palau from unknown”

“Reasons of Introduction : 1) unknown”

Short Description

From Froese and Pauly (2018):

“Dorsal spines (total): 4; Dorsal soft rays (total): 8; Anal spines: 3; Anal soft rays: 5. Lateral line complete; 4 1/2 scales between lateral line and dorsal fin origin; four barbels; last simple dorsal ray bony and serrated behind; one large blotch at anterior base of dorsal fin and a round spot in the middle of caudal peduncle. Juveniles and sometimes adults possess 2-4 midlateral round to elongate spots [Kottelat et al. 1993]. Color in life varies from silvery gray to greenish gray; darker dorsally; paler or nearly white on throat and belly; a bar behind operculum on shoulder; body markings (spots or band) may be absent on large specimens, except spot on caudal base. 8-9 scales from nape to dorsal; 2.5 (rarely 3) scales between ventral and lateral line. 4th dorsal spine serrate. Round, broad-tipped snout equal or a seventh longer than eye [Herre 1924].”

Biology

From Froese and Pauly (2018):

“Occurs from sea level to at least 2000 m above sea level and is commonly found below waterfalls in isolated mountain streams and on small islands inhabited by few other freshwater fishes [Roberts 1989]. Inhabits medium to large rivers, stagnant water bodies including sluggish flowing canals and brooks of the middle Mekong [Taki 1978]. Found in middle to bottom depths in fairly shallow waters where it feeds on zooplankton, insect larvae and some vascular plants. Probably does not migrate [Rainboth 1996].”

Human Uses

From Froese and Pauly (2018):

“Fisheries: minor commercial; aquarium: commercial”

From Lim et al. (2013):

“In wild, it can be easily found in the mountain streams, rivers and lakes [Rainboth 1996]. Due to its common availability, *P. binotatus* has been utilized as an important bio-indicator to habitat degradation or health status of environments in these freshwater resources [Baumgartner 2005, Mat Isa et al. 2010, Zakeyudin et al. 2012]. Besides that, it is a common ornamental fish species. In Sabah [Malaysian state], *P. binotatus* is locally known as “Turongou” and popular to the indigenous people as a deep-fried delicacy.”

Diseases

From Froese and Pauly (2018):

“Haplorchis Infestation 2, Parasitic infestations (protozoa, worms, etc.)
Haplorchis Infestation 3, Parasitic infestations (protozoa, worms, etc.)

Oceanicucullanus Infestation, Parasitic infestations (protozoa, worms, etc.) [Arthur and Lumanlan-Mayo 1997]”

No OIE-reportable diseases have been documented for this species.

Threat to Humans

From Froese and Pauly (2018):

“Harmless”

3 Impacts of Introductions

FAO (2018) reports this species is “Established” in Singapore and “Probably established” in Palau. No information is available on impacts of this species in either country.

4 Global Distribution



Figure 1. Known global distribution of *Barbodes binotatus*, reported from Southeast Asia. Map from GBIF Secretariat (2018). A point in Mumbai, India was excluded from the extent of this map and from subsequent climate match analysis because it occurred far outside the documented range of *P. binotatus*. Two points in the Indian Ocean off the coast of Indonesia were excluded because of imprecise coordinates. No georeferenced occurrences were available from GBIF Secretariat (2018) for parts of the species range located in Myanmar, Vietnam, Laos, or Cambodia.

5 Distribution Within the United States

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

6 Climate Matching

Summary of Climate Matching Analysis

The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the contiguous United States was 0.001, which is a low climate match. The range for a low climate match is from 0.0 to 0.005, inclusive. Texas was the only state with a medium climate match overall; all other states had a low climate match. In general, the southern United States had a medium to medium-low climate match, while the northern United States had a very low climate match.

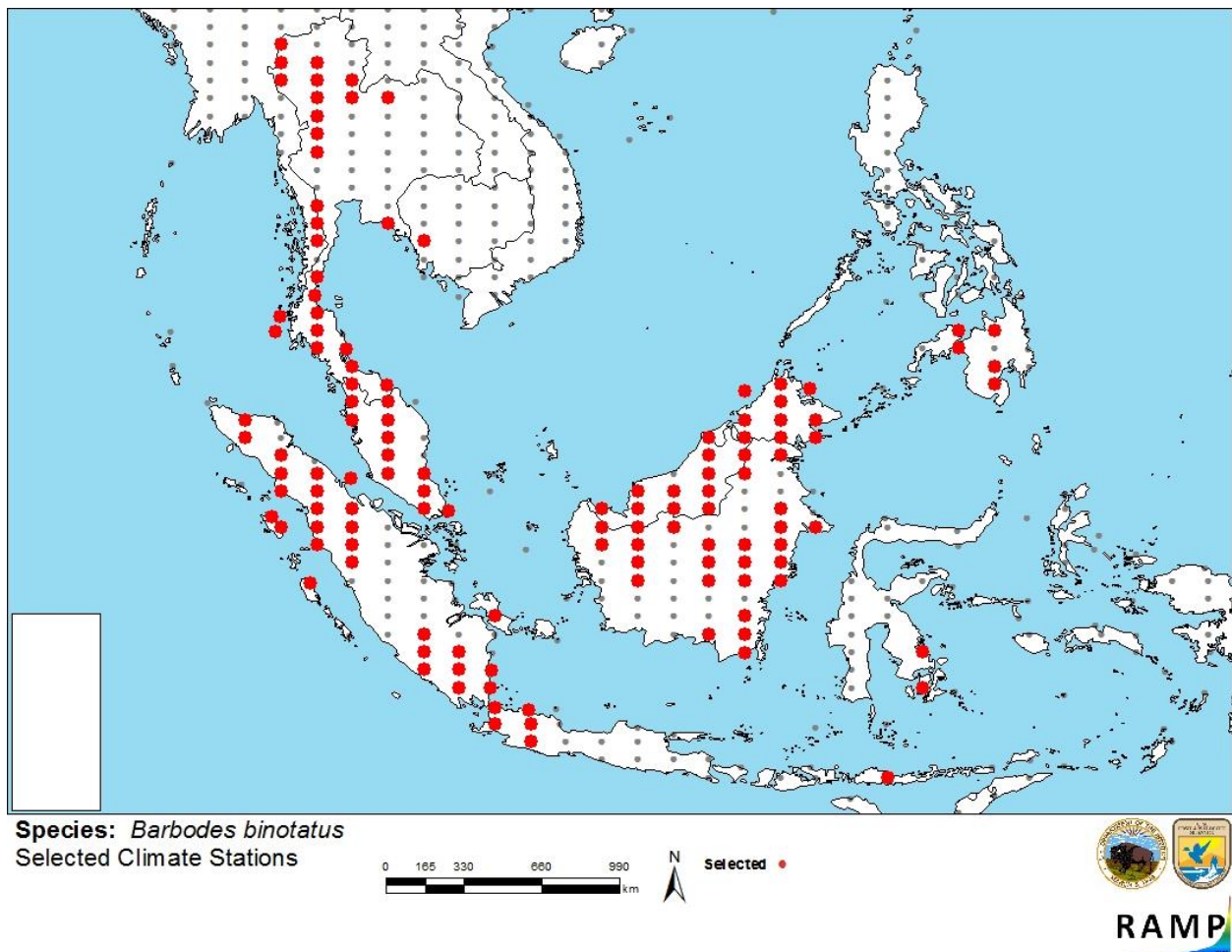


Figure 2. RAMP (Sanders et al. 2014) source map showing weather stations in Southeast Asia selected as source locations (red) and non-source locations (gray) for *Barbodes binotatus* climate matching. Source locations from GBIF Secretariat (2018).

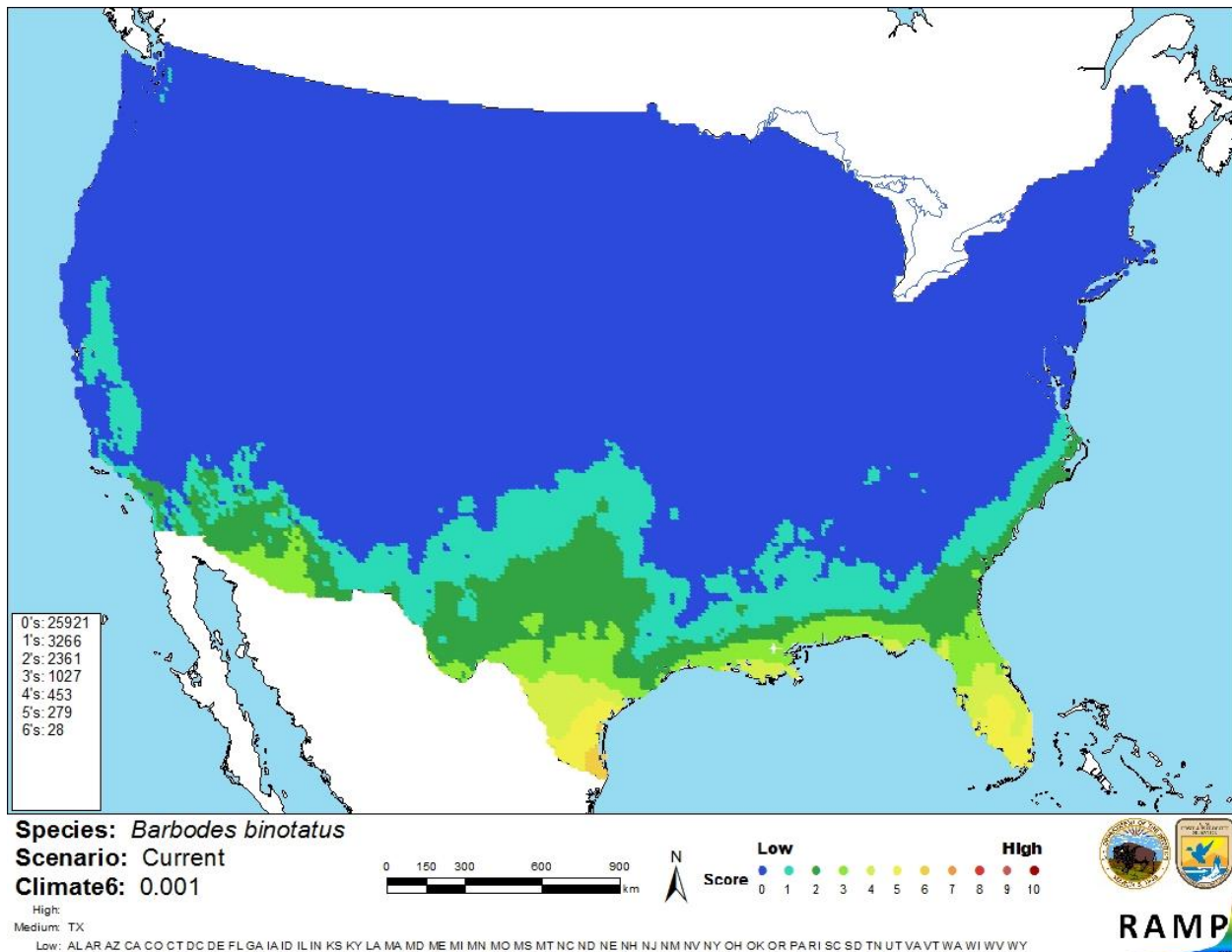


Figure 3. Map of RAMP (Sanders et al. 2014) climate matches for *Barbodes binotatus* in the contiguous United States based on source locations reported by GBIF Secretariat (2018). 0=Lowest match, 10=Highest match.

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

There is limited information available on the biology and ecology of *Barbodes binotatus*, but its native range has been well-documented. It has been introduced outside of its native range, but no information is available on impacts of these introductions. Further information is needed to adequately assess the risk this species poses to the contiguous United States, so the certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Barbodes binotatus, the Spotted Barb, is a small fish species native to Southeast Asia. *B. binotatus* is used in the aquarium trade and for human consumption. It is susceptible to a number of parasitic infections. *B. binotatus* has no documented history of invasiveness. It is documented outside of its native range, but there are no reports of impacts, if any, it is having where introduced. *B. binotatus* has a low climate match with the contiguous United States. Further information is needed to assess the risk this species poses with any certainty, so the certainty of this assessment is low. The overall risk assessment category 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>. (June 2018).

FAO (Fisheries and Agriculture Organization of the United Nations). 2018. Database on introductions of aquatic species. FAO, Rome. Available: <http://www.fao.org/fishery/introsp/search/en>. (June 2018).

Froese, R., and D. Pauly, editors. 2018. *Barbodes binotatus* (Valenciennes, 1842). FishBase. Available: <https://www.fishbase.de/summary/Barbodes-binotatus.html>. (June 2018).

GBIF Secretariat. 2018. GBIF backbone taxonomy: *Barbodes binotatus* (Valenciennes, 1842). Global Biodiversity Information Facility, Copenhagen. Available: <https://www.gbif.org/species/2363847>. (June 2018).

ITIS (Integrated Taxonomic Information System). 2018. *Puntius binotatus* (Valenciennes in Cuvier and Valenciennes, 1842). Integrated Taxonomic Information System, Reston, Virginia. Available: https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=553285#null. (June 2018).

- Jenkins, A., F. F. Kullander, and H. H. Tan. 2015. *Barbodes binotatus*. The IUCN Red List of Threatened Species 2015: e.T169538A70031333. Available: <http://www.iucnredlist.org/details/169538/0>. (June 2018).
- Lim, L.-S., W.-K. Chor, A. D. Tuzan, L. Malitam, R. Gondipon, and J. Ransangan. 2013. Length-weight relationships of the pond-cultured spotted barb (*Puntius binotatus*). International Research Journal of Biological Sciences 2(7):61-63.
- Sanders, S., C. Castiglione, and M. H. Hoff. 2014. Risk Assessment Mapping Program: RAMP. 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.

- Arthur, J. R., and S. Lumanlan-Mayo. 1997. Checklist of the parasites of fishes of the Philippines. FAO Fisheries Technical Paper 369. FAO, Rome.
- Baensch, H. A., and R. Riehl. 1985. Aquarien atlas, volume 2. Mergus, Verlag für Natur-und Heimtierkunde GmbH, Melle, Germany.
- Baird, I. G., V. Inthaphaisy, P. Kisouvannalath, B. Phylavanh, and B. Mounsouphom. 1999. The fishes of southern Lao. Lao Community Fisheries and Dolphin Protection Project. Ministry of Agriculture and Forestry, Lao People's Democratic Republic.
- Baumgartner, L. 2005. Fish in irrigation supply offtakes: A literature review. NSW Department of Primary Industries – Fisheries Research Report Series: 11. Department of Primary Industries, New South Wales, Australia.
- Herre, A. W. C. T. 1924. Distribution of the true freshwater fishes in the Philippines. I. The Philippine Cyprinidae. Philippine Journal of Science 24(3):249-307.
- Kottelat, M., A. J. Whitten, S. N. Kartikasari, and S. Wirjoatmodjo. 1993. Freshwater fishes of Western Indonesia and Sulawesi. Periplus Editions, Hong Kong.
- Mat Isa, M., C. S. Md Rawi, R. Rosla, S. A. Mohd Shah, and A. S. R. Md Shah. Length-weight relationships of freshwater fish species in Kerian River Basin and Pedu Lake. Research Journal of Fisheries and Hydrobiology 5(1):1-8.
- Rainboth, W. J. 1996. Fishes of the Cambodian Mekong. FAO species identification field guide for fishery purposes. FAO, Rome.
- Roberts, T. R. 1989. The freshwater fishes of Western Borneo (Kalimantan Barat, Indonesia). Memoirs of the California Academy of Sciences 14.

- 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 1. Tokyo.
- Talwar, P. K., and A. G. Jhingran. 1991. Inland fishes of India and adjacent countries, volume 1. A. A. Balkema, Rotterdam, The Netherlands.
- Zakeyudin, M. S., M. M. Isa, C. S. Md Rawi, and A. S. Md Shah. 2012. Assessment of suitability of Kerian River tributaries using length-weight relationship and relative condition factor of six freshwater fish species. *Journal of Environmental and Earth Science* 2:52-60.