

Green Barb (*Puntius semifasciolatus*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, Web Version – 12/8/2017



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1 Native Range and Status in the United States

Native Range

From The Anh (2012):

“The species is known from the Red River basin (Viet Nam and southern China), southwestern China (Chen et al. 1991) and Hainan (Kottelat 2001), and extends northwards in China to at least Fujian (M. Kottelat pers. comm. 2011).”

Status in the United States

From Nico et al. (2016):

“This species was introduced to Nu'uuanu Reservoir in Oahu, Hawaii in 1940, but was extirpated during a drought of 1984 (Brock 1960; Maciolek 1984; Welcomme 1988; Devick 1991a, b; Yamamoto and Tagawa 2000; Mundy 2005).”

No information on trade of this species in the United States was found.

Means of Introductions in the United States

From Nico et al. (2016):

“According to Devick (1991b), this species was introduced from Asia for food and decoration.”

Remarks

No additional remarks.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Eschmeyer et al. (2017):

“*semifasciolatus*, *Barbus* Günther [A.] 1868:484 [Catalogue of the fishes in the British Museum v. 7 [...] China. Holotype (unique): BMNH 1851.12.27.185. Replacement name for *Barbus fasciolatus* Günther 1868 (same reference, p. 140). •Valid as *Capoeta semifasciolata* (Günther 1868) -- (Wu et al. 1977:259 [...], Chu & Cui in Chu & Chen 1989:164 [...], Zheng et al. 1989:171 [...], Zhu 1995:52 [...] as *semifasciolate*). •Valid as *Puntius semifasciolatus* (Günther 1868) -- (Mai 1978:108 [...], Jin in Kuang et al. 1986:113 [...], Chen et al. in Pan et al. 1991:138 [...], Doi 1997:11 [...], Fuller et al. 1999:144 [...], Shan et al. in Yue 2000:11 [...], Kottelat 2001:37 [...], Kottelat 2001:74 [...], Manilo & Pan'kov 2004:281 [...], Bogutskaya & Naseka 2004:50 [...], Kullander & Fang 2005:297 [...], Yang et al. 2015:99 [...] in Cyprininae, tribe Poropuntini, Zhang et al. 2016:97 [...]). •Valid as *Barbodes semifasciolatus* (Günther 1868) -- (Kottelat 2013:79) **Current status:** Valid as *Puntius semifasciolatus* (Günther 1868). Cyprinidae: Cyprininae.”

From ITIS (2016):

“Taxonomic Status:
Current Standing: valid”

“Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata

Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Osteichthyes
Class Actinopterygii
Subclass Neopterygii
Infraclass Teleostei
Superorder Ostariophysi
Order Cypriniformes
Superfamily Cyprinoidea
Family Cyprinidae
Genus *Puntius*
Species *Puntius semifasciolatus* (Günther, 1868)”

Size, Weight, and Age Range

From Nico et al. (2016):

“Size: 10 cm.”

From Froese and Pauly (2016):

“Max length : 7.0 cm TL male/unsexed; [Hwang et al. 1988]; common length: 3.5 cm SL male/unsexed; [Nichols 1943]”

Environment

From Froese and Pauly (2016):

“Freshwater; benthopelagic; pH range: 6.0 - 8.0; dH range: 5 - 19; depth range 0 - 5 m [Shao and Lim 1991].”

“18°C - 24°C [Riehl and Baensch 1988] [assumed to be recommended aquarium temperature range]”

Climate/Range

From Froese and Pauly (2016):

“Subtropical; [...]; 24°N - 20°N, 102°E - 108°E”

Distribution Outside the United States

Native

From The Anh (2012):

“The species is known from the Red River basin (Viet Nam and southern China), southwestern China (Chen et al. 1991) and Hainan (Kottelat 2001), and extends northwards in China to at least Fujian (M. Kottelat pers. comm. 2011).”

Introduced

From The Anh (2012):

“Presence in Mekong basin in northern Lao PDR and southern China (Yunnan) probably results from introductions, and it has been introduced elsewhere (Welcomme 1988).”

From Nico et al. (2016):

“*Puntius semifasciolatus* is established on Singapore where it was introduced sometime before 1912 (Alfred 1966; Ng et al. 1993), was reported from a swamp in Papua New Guinea in 1966 (Glucksman et al. 1976), and is introduced in Lake Khanka, Russia (Svirsky and Barbanshchikov 2010)”

According to Froese and Pauly (2016) *Puntius semifasciolatus* has been introduced to India from Japan but that introductions mostly likely did not establish a population. The species was also introduced to Papua New Guinea without establishing. An introduction from China to Singapore resulted in an established population.

Means of Introduction Outside the United States

From FAO (2016):

“Reasons of Introduction: 1) accidental”

“Reasons of Introduction: 1) ornamental”

From Fuller (2015):

“Ng et al. (1993) reported that the Chinese Barb (*Puntius semifasciolatus*) and *Rasbora lineatus*, now *Metzia lineata*, probably entered Singapore as contaminants in food and sport fish stockings.”

Short Description

From Froese and Pauly (2016):

“Body with 4-7 narrow bars, more or less complete or dissociated into series of spots; complete lateral line; last simple dorsal ray serrated posteriorly; yellowish in color [Kottelat 2001].”

Biology

From The Anh (2012):

“Found in flowing streams and tributaries, as well as small lakes.”

“Feeds on aquatic invertebrates and plant matter.”

From Froese and Pauly (2016):

“Adults feed on worms, crustaceans, insects, plant matter [Mills and Vevers 1989] and detritus [Man and Hodgkiss 1981].”

“Spawns during early morning hours.”

Human Uses

From The Anh (2012):

“Species is common in the aquarium trade however probably from cultivated sources (M. Kottelat pers. comm. 2011). Probably eaten at a subsistence scale.”

From Nico et al. (2016):

“This species is common in the ornamental fish trade.”

Diseases

White spot disease is an OIE reportable disease.

From Nico et al. (2016):

“White spot Disease, Parasitic infestations (protozoa, worms, etc.)
Bacterial Infections (general), Bacterial diseases”

Threat to Humans

From Froese and Pauly (2016):

“Harmless”

3 Impacts of Introductions

From Nico et al. (2016):

“Impact of Introduction: Unknown.”

4 Global Distribution



Figure 1. Known global distribution of *Puntius semifasciolatus*. Map from GBIF Secretariat (2017).

5 Distribution Within the United States

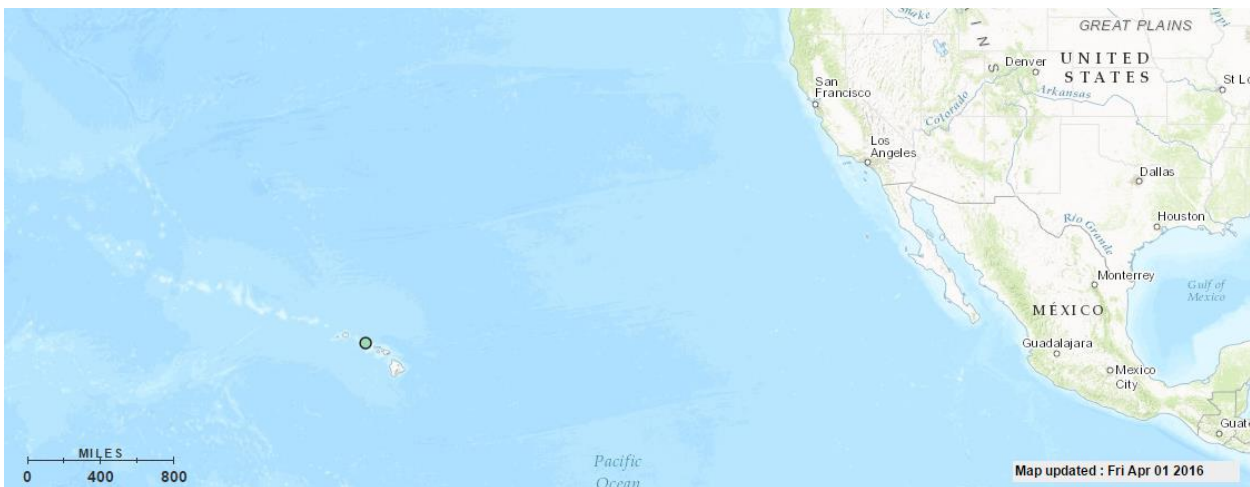


Figure 2. Known distribution of *Puntius semifasciolatus* in the United States. Map from Nico et al. (2016). This population was extirpated (Nico et al. 2016) and was not used as a source point in the climate match.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Puntius semifasciolatus* was high in parts of Florida. There was a medium match for the Gulf and southern Atlantic coasts; it was low everywhere else. The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the contiguous U.S. was 0.23, medium. Florida, Georgia, and South Carolina had individually high climate matches.

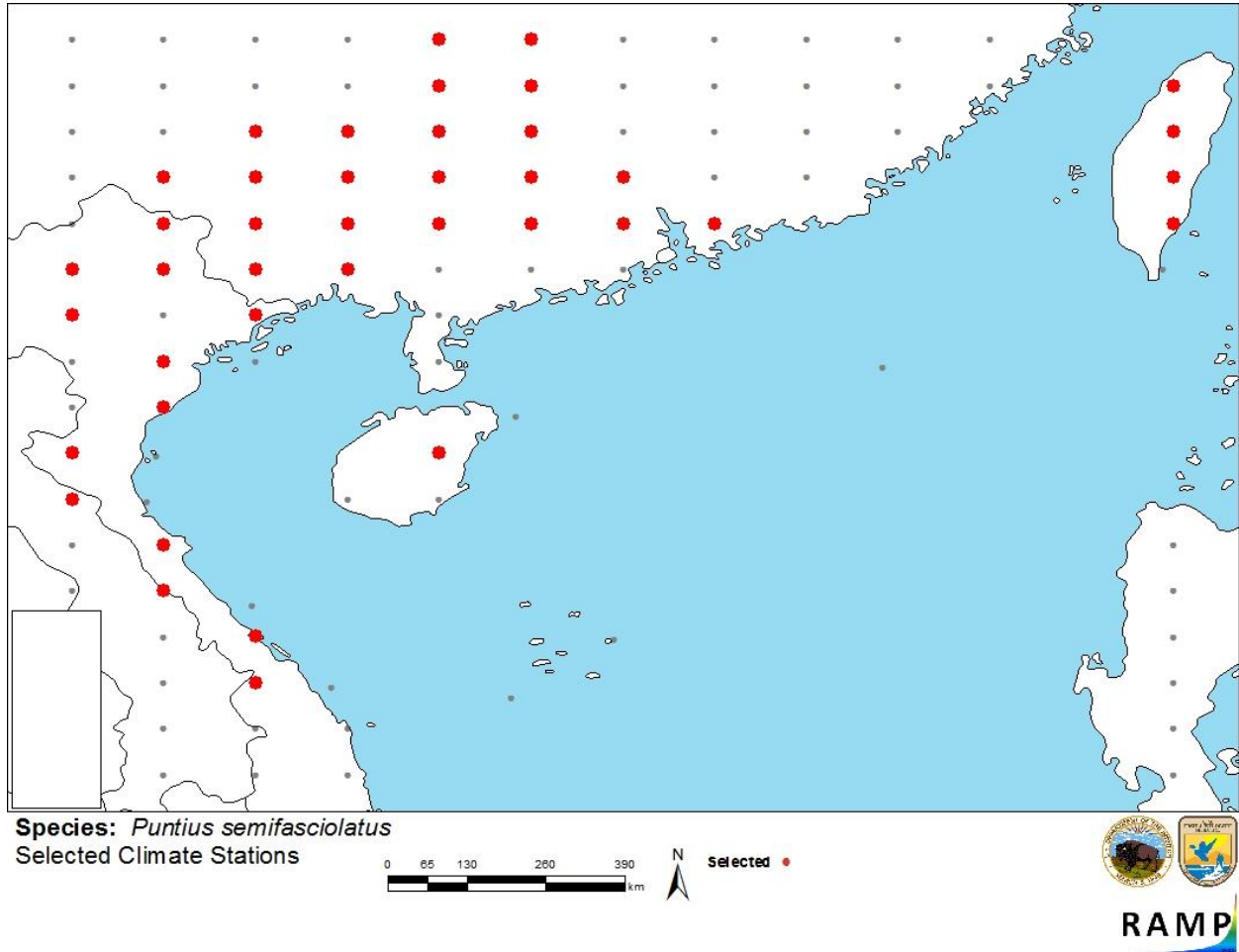


Figure 3. RAMP (Sanders et al. 2014) source map showing weather stations in Southeast Asia that were selected as source locations (red) and non-source locations (grey) for *Puntius semifasciolatus* climate matching. Source locations from GBIF Secretariat (2017).

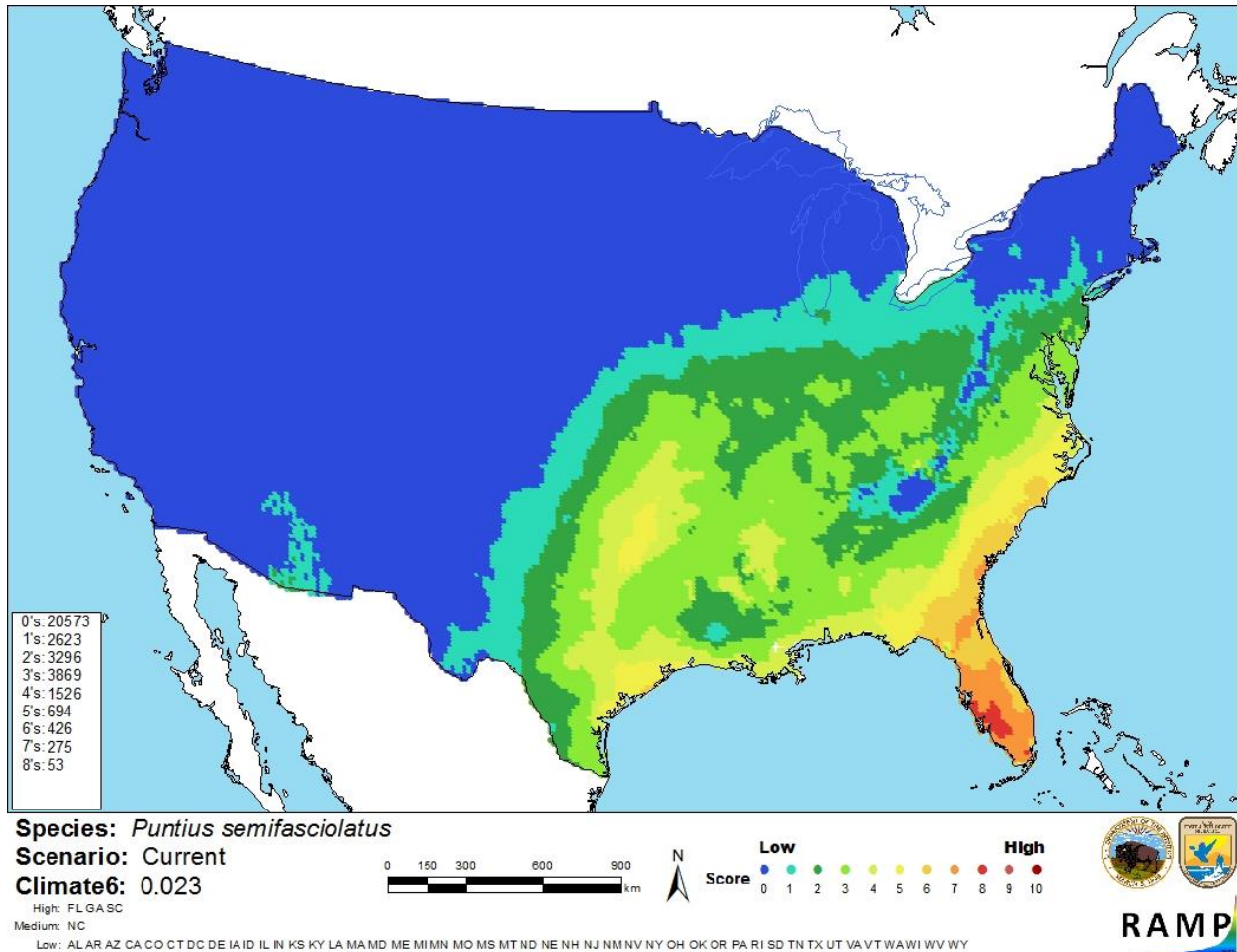


Figure 4. Map of RAMP (Sanders et al. 2014) climate matches for *Puntius semifasciolatus* in the contiguous United States based on source locations reported by GBIF (2013). 0 = Lowest match, 10 = Highest match.

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

7 Certainty of Assessment

The certainty of assessment for *Puntius semifasciolatus* is medium. There was adequate, quality ecological and biological information available. Records of introductions were found but no impacts were recorded.

8 Risk Assessment

Summary of Risk to the Contiguous United States

The history of invasiveness of *Puntius semifasciolatus* is not documented. There were a few records of introduction; some sources were unclear on if the introductions in the Mekong River were the result of a natural range expansion. There was no information found regarding impacts of introductions. The climate match was medium with areas of high match in Florida. There is suitable climate to sustain a population of *Puntius semifasciolatus* within the contiguous United States. The certainty of assessment is medium. The overall risk assessment category is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): None Documented**
- **Climate Match (Sec. 6): Medium**
- **Certainty of Assessment (Sec. 7): Medium**
- **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.

Eschmeyer, W. N., R. Fricke, and R. van der Laan, editors. 2017. Catalog of fishes: genera, species, references. Available: <http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp>. (June 2017).

FAO (Fisheries and Agriculture Organization of the United Nations). 2016. Database on introductions of aquatic species. FAO, Rome. Available: <http://www.fao.org/fishery/introsp/3577/en>. (April 2016).

Froese, R., and D. Pauly, editors. 2016. *Puntius semifasciolatus* (Günther, 1868) Chinese barb. FishBase. Available: <http://www.fishbase.org/summary/Puntius-semifasciolatus.html>. (April 2016).

Fuller, P. 2015. Vectors of invasions in freshwaters invertebrates and fishes.

GBIF Secretariat. 2017. GBIF backbone taxonomy: *Puntius semifasciolatus* (Günther, 1868). Global Biodiversity Information Facility, Copenhagen. Available: <https://www.gbif.org/species/2364170>. (December 2017).

ITIS (Integrated Taxonomic Information System). 2016. *Puntius semifasciolatus* (Günther, 1868). Integrated Taxonomic Information System, Reston, Virginia. Available: http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=163709. (April 2016).

Nico, L., P. M. Schofield, and M. Neilson. 2016. *Puntius semifasciolatus*. U.S. Geological Survey, Nonindigenous Aquatic Species Database, Gainesville, Florida. Available: <http://nas.er.usgs.gov/queries/FactSheet.aspx?SpeciesID=634>. (April 2016).

Sanders, S., C. Castiglione, and M. Hoff. 2014. Risk assessment mapping program: RAMP. U.S. Fish and Wildlife Service.

The Anh, B. 2012. *Barbodes semifasciolatus*. The IUCN Red List of Threatened Species 2012: e.T166936A1154475. Available: <http://www.iucnredlist.org/details/full/166936/0>. (April 2016).

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.

Alfred, E. R. 1966. The fresh-water fishes of Singapore. *Zoologische Verhandelingen* 78:1–68.

Bogutskaya, N. G., and A. M. Naseka. 2004. Catalogue of agnathans and fishes of fresh and brackish waters of Russia with comments on nomenclature and taxonomy. Russian Academy of Sciences, Moscow. (In Russian.)

Brock, V. E. 1960. The introduction of aquatic animals into Hawaiian waters. *International Revue der Gesamten Hydrobiologie* 45:463–480.

Chen, X., J.-H. Pan, Z. Liu, and D. Liang. 1991. Barbinae. Pages 136–167 in J.-H. Pan, L. Zhong, C.-Y. Zheng, H.-L. Wu, and J.-H. Liu, editors. *The freshwater fishes of Guangdong Province*. Guangdong Science and Technology Press, Guangzhou, China.

Chu, X.-L., Y.-R. Chen, et al., editors. 1989. *The fishes of Yunnan, China. Part 1 Cyprinidae*. Science Press, Beijing.

Devick, W. S. 1991a. Disturbances and fluctuations in the Wahiawa Reservoir ecosystem. Project F-14-R-15, Job 4, Study I. Division of Aquatic Resources, Hawaii Department of Land and Natural Resources.

Devick, W. S. 1991b. Patterns of introductions of aquatic organisms to Hawaiian freshwater habitats. Pages 189–213 in *New directions in research, management and conservation of Hawaiian freshwater stream ecosystems. Proceedings of the 1990 symposium on freshwater stream biology and fisheries management*, Division of Aquatic Resources, Hawaii Department of Land and Natural Resources.

Doi, A. 1997. A review of taxonomic studies of cypriniform fishes in Southeast Asia. *Japanese Journal of Ichthyology* 44(1):1–33. (In Japanese.)

- Fuller, P. L., L. G. Nico, and J. D. Williams. 1999. Nonindigenous fishes introduced into inland waters of the United States. American Fisheries Society, Special Publication 27, Bethesda, Maryland.
- Glucksman, J., G. West, and T. M. Berra. 1976. The introduced fishes of Papua New Guinea with special reference to *Tilapia mossambica*. Biological Conservation 9:37–44.
- Günther, A. 1868. Catalogue of the fishes in the British Museum. Catalogue of the Physostomi, containing the families Heteropygii, Cyprinidae, Gonorrhynchidae, Hyodontidae, Osteoglossidae, Clupeidae,... [thru]... Halosauridae, in the collection of the British Museum.
- Hwang, H. C., I. Y. Chen, and P. C. Yueh. 1988. The freshwater fishes of China in colored illustrations, volume 2. Shanghai Sciences and Technology Press, Shanghai, China.
- Kottelat, M. 2001. Freshwater fishes of northern Vietnam. A preliminary check-list of the fishes known or expected to occur in northern Vietnam with comments on systematics and nomenclature. Environment and Social Development Unit, East Asia and Pacific Region. The World Bank.
- Kottelat, M. 2001. Fishes of Laos. WHT Publications, Colombo 5, Sri Lanka.
- Kottelat, M. 2013. The fishes of the inland waters of Southeast Asia: a catalogue and core bibliography of the fishes known to occur in freshwaters, mangroves and estuaries. Raffles Bulletin of Zoology Supplement 27:1–663.
- Kuang, Y.-D., and et al. 1986. The freshwater and estuaries fishes of Hainan Island. 1986:1–13, 1–372
- Kullander, S. O., and F. Fang. 2005. Two new species of *Puntius* from northern Myanmar (Teleostei: Cyprinidae). Copeia 2005(2):290–302.
- Maciolek, J. A. 1984. Exotic fishes in Hawaii and other islands of Oceania. Pages 131–161 in W. R. Courtenay, Jr., and J. R. Stauffer, Jr., editors. Distribution, biology, and management of exotic fishes. John Hopkins University Press, Baltimore, Maryland.
- Mai, D. Y. 1978. Identification of the fresh-water fishes of North Viet Nam. Scientific & Technology, Ha Noi, Vietnam. (In Vietnamese.)
- Man, S. H., and I. J. Hodgkiss. 1981. Hong Kong freshwater fishes. Urban Council, Wishing Printing, Hong Kong.
- Manilo, L. G., and A. V. Pan'kov. 2004. First capture of green barb *Puntius semifasciolatus* (Cyprinidae) in inland waters of Russia. Voprosy Ikhtiologii 44(2):281–282. (In Russian.)

- Mills, D., and G. Vevers. 1989. *The Tetra encyclopedia of freshwater tropical aquarium fishes*. Tetra Press, New Jersey.
- Mundy, B. C. 2005. *Fishes of the Hawaiian Archipelago*. Bishop Museum Bulletins in Zoology, Number 6.
- Ng, P. K. L., L. M. Chou, and T. J. Lam. 1993. The status and impact of introduced freshwater animals in Singapore. *Biological Conservation* 64:19–24.
- Nichols, J. T. 1943. *The freshwater fishes of China*. Natural history of Central Asia, volume IX. The American Museum of Natural History, New York.
- Pan, J.-H., L. Zhong, C.-Y. Zheng, H.-L. Wu, and J.-H. Liu, editors. 1991. *The freshwater fishes of Guangdong Province*. Guangdong Science and Technology Press.
- Riehl, R., and H. A. Baensch. 1991. *Aquarien Atlas*. Band. 1. Melle: Mergus, Verlag für Natur- und Heimtierkunde, Germany.
- Shao, K.-T., and P. L. Lim. 1991. *Fishes of freshwater and estuary*. Encyclopedia of field guide in Taiwan. Recreation Press, Taipei. (In Chinese.)
- Svirsky, V. G., and E. I. Barbanshchikov. 2010. Biological invasions as an element of anthropogenic pressure upon the aquatic biotic communities in Lake Khanka. *Russian Journal of Biological Invasions* 1:21–25.
- Welcomme, R. L. 1988. *International introductions of inland aquatic species*. Food and Agriculture Organization of the United Nations (FAO), FAO Fisheries Technical Paper 294, Rome.
- Wu, H.-W., R.-D. Lin, Q.-X. Chen, X.-L. Chen, and M.-Q. He. 1977. Barbinae. Pages 229–394 in H.-W. Wu, editor. *Zhongguo like yulei zhi*. [The cyprinid fishes of China] Volume 2. People's Press, Shanghai, China. (In Chinese.)
- Yamamoto, M. N., and A. W. Tagawa. 2000. *Hawaii's native and exotic freshwater animals*. Mutual Publishing, Honolulu, Hawai'i.
- Yang, L., T. Sado, M. V. Hirt, E. Pasco-Viel, M. Arunachalam, J. Li, X. Wang, J. Freyhof, K. Saitoh, A. M. Simons, M. Miya, S. He, and R. L. Mayden. 2015. Phylogeny and polyploidy: resolving the classification of cyprinine fishes (Teleostei: Cypriniformes). *Molecular Phylogenetics and Evolution* 85:97–116.
- Yue, P.-Q., editor. 2000. *Fauna Sinica. Osteichthyes. Cypriniformes III*. Science Press. Beijing. (In Chinese, with English abstract.)
- Zhang, C.-G., Y.-H. Zhao, et al. 2016. *Species diversity and distribution of inland fishes in China*. Science Press, Beijing. (In Chinese with some sections in English.)

Zheng, C.-Y., and et al. 1989. Fishes of the Zhujiang River. Science Press, Beijing. (In Chinese, English summary.)

Zhu, S.-Q. 1995. Synopsis of freshwater fishes of China. Jiangsu Science and Technology Publishing House, Nanjing, China. (In Chinese, English summary.)