

Cuban Limia (*Poecilia vittata*)

Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, February 2011
Revised, January 2018
Web Version, 8/29/2019



Photo: Cardet co6cs. Licensed under CC BY-SA 3.0. Available:
https://commons.wikimedia.org/wiki/File:Limia_vittata.jpg. (January 2018).

1 Native Range and Status in the United States

Native Range

From Nico et al. (2018):

“Streams, lakes, estuaries, coastal lagoons, and mangrove swamps throughout Cuba and Isle of Pines (Lee et al. 1980 et seq.).”

Status in the United States

From Nico et al. (2018):

“The only known occurrence of this species in the United States is in Hawaii on Oahu and on the Big Island (Hawaii) in the Kaloko-Honokohau National Historic Park (Brock 1960; Maciolek 1984; Devick [1991]; Tilmant 1999; Mundy 2005).”

“Established in Hawaii by 1950 (Devick [1991]).”

This species is in trade in the United States. For example, Oregon-based The Wet Spot Tropical Fish aquarium retailer lists *P. vittata* (as *Limia vittata*) on its stock list dated August 23, 2019.

From Coletti (2007):

“We know *Limia vittata* was displayed at American public aquariums and occasionally made available to the public during the late 1920s to 1930s. But the fabulous strain we enjoy as hobbyists today did not seem to enter the hobby until the 1970s.”

Means of Introductions in the United States

From Nico et al. (2018):

“According to Brock (1960), the origin and date of introduction into Hawaii are not known. Devick ([1991]) listed the species as an aquarium release some time between 1900 and 1940; although its presence in Hawaii was not known until about 1950.”

Remarks

There is uncertainty surrounding the taxonomy of this species.

From Rivas (1978):

“In the most recent revision of the family Poeciliidae, Rosen and Bailey (1963) synonymized *Mollienesia*, *Psychropoecilia*, *Curtipenis*, *Limia*, and other genera with *Poecilia*, but *Limia* was retained as a subgenus.”

“Other than introductory philosophical remarks on the taxonomic role of genera as indicators of relationships, Rosen and Bailey did not give specific reasons to justify their synonymizing *Limia* with *Poecilia* (see critique by Rivas, 1965).”

From Rivas (1980):

“Pending a revision of the genus *Limia*, eight new species are herein described to make the names available to other workers. In the last revision of the family Poeciliidae (Rosen and Bailey, 1963) *Limia* was synonymized with *Poecilia* but retained as a valid subgenus. Recently, however, I discussed the status of *Limia* and reinstated it as a valid genus (Rivas, 1978).”

From Coletti (2007):

“Some hobby and scientific texts still refer to it as *Poecilia vittata*, a re-naming from Rosen and Bailey’s 1960 taxonomical lumping frenzy. *Limia* [*sic*] is now firmly established as its own genus.”

From Nico et al. (2018):

“A commonly used name for this species is *Poecilia vittata* (Rosen and Bailey 1963; Rivas 1980).”

Eschmeyer et al. (2018) still consider *Poecilia vittata* the valid name for this species, so it is the name used in this ERSS. Both *Poecilia vittata* and *Limia vittata* were used when conducting literature searches because *Limia vittata* seems to be used more often in current publications.

From Coletti (2007):

“All *Limia* species hybridize readily.”

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 Cyprinodontiformes
Suborder Cyprinodontoidei
Family Poeciliidae
Subfamily Poeciliinae
Genus *Limia*
Species *Limia vittata* (Guichenot, 1853)”

From Eschmeyer et al. (2018):

“Current status: Valid as *Poecilia vittata* Guichenot 1853. Poeciliidae: Poeciliinae.”

Size, Weight, and Age Range

From Froese and Pauly (2017):

“Max length : 8.0 cm TL male/unsexed; [de Jong 1999]; 10.0 cm TL (female)”

Environment

From Froese and Pauly (2017):

“Freshwater; brackish; demersal; pH range: 7.5 - 8.2; dH range: 25 - 30; [...] 18°C - 24°C [Baensch and Riehl 1996; assumed to be recommended aquarium temperature range]”

Climate/Range

From Froese and Pauly (2017):

“Tropical”

Distribution Outside the United States

Native

From Nico et al. (2018):

“Streams, lakes, estuaries, coastal lagoons, and mangrove swamps throughout Cuba and Isle of Pines (Lee et al. 1980 et seq.)”

Introduced

This species has not been reported outside of its native range and Hawaii.

Means of Introduction Outside the United States

This species has not been reported outside of its native range and Hawaii.

Short Description

From Froese and Pauly (2017):

“Blue-gray back, silvery sides and a white belly; scales edged with black producing a "fishnet" pattern on the sides; females with a yellow patch near the vent; male's dorsal fin and tail usually yellow-orange with blue black speckles; females with colorless fins and growing to more than double the size of males [Yamamoto and Tagawa 2000].”

Biology

From Froese and Pauly (2017):

“Inhabits streams, lakes, estuaries, coastal lagoons and mangrove swamps. Feeds on worms, crustaceans, insects and plant matter [Mills and Vevers 1989]. Often found in the company of sailfin molly and mosquitofish [Haedrich 1986].”

“Produces 20-50 young. Large females can produce >100 fry every 4-6 weeks [Yamamoto and Tagawa 2000].”

Human Uses

From Froese and Pauly (2017):

“Fisheries: of no interest; aquarium: commercial”

From Coletti (2007):

“There is some debate whether the aquarium form of *Limia vittata* is the result of selective breeding or hybridization. We know *Limia vittata* was displayed at American public aquariums and occasionally made available to the public during the late 1920s to 1930s. But the fabulous strain we enjoy as hobbyists today did not seem to enter the hobby until the 1970s.”

This species is in trade in the United States. For example, Oregon-based The Wet Spot Tropical Fish aquarium retailer lists *P. vittata* (as *Limia vittata*) on its stock list dated August 23, 2019.

Diseases

No OIE-listed diseases (OIE 2019) have been documented for this species.

From Mendoza-Franco et al. (2006):

“[*Salsuginus*] *cubensis* n. sp. is the first dactylogyrid described from a native host species, the poeciliid *L. vittata*, in Cuba.”

Threat to Humans

From Froese and Pauly (2017):

“Harmless”

3 Impacts of Introductions

From Nico et al. (2018):

“Cuban limia, and other introduced poeciliids, have been implicated in the decline of native damselflies on Oahu, Hawaii. Often the distributions of the damselflies and introduced fishes were found to be mutually exclusive, probably resulting from predation of the fish on the insects (Englund 1999).”

4 Global Distribution



Figure 1. Known global distribution of *Limia vittata*. Distribution map for *Poecilia vittata* was similar but had fewer reported occurrences and did not have any occurrences in Hawaii. Map from GBIF Secretariat (2018).

5 Distribution Within the United States

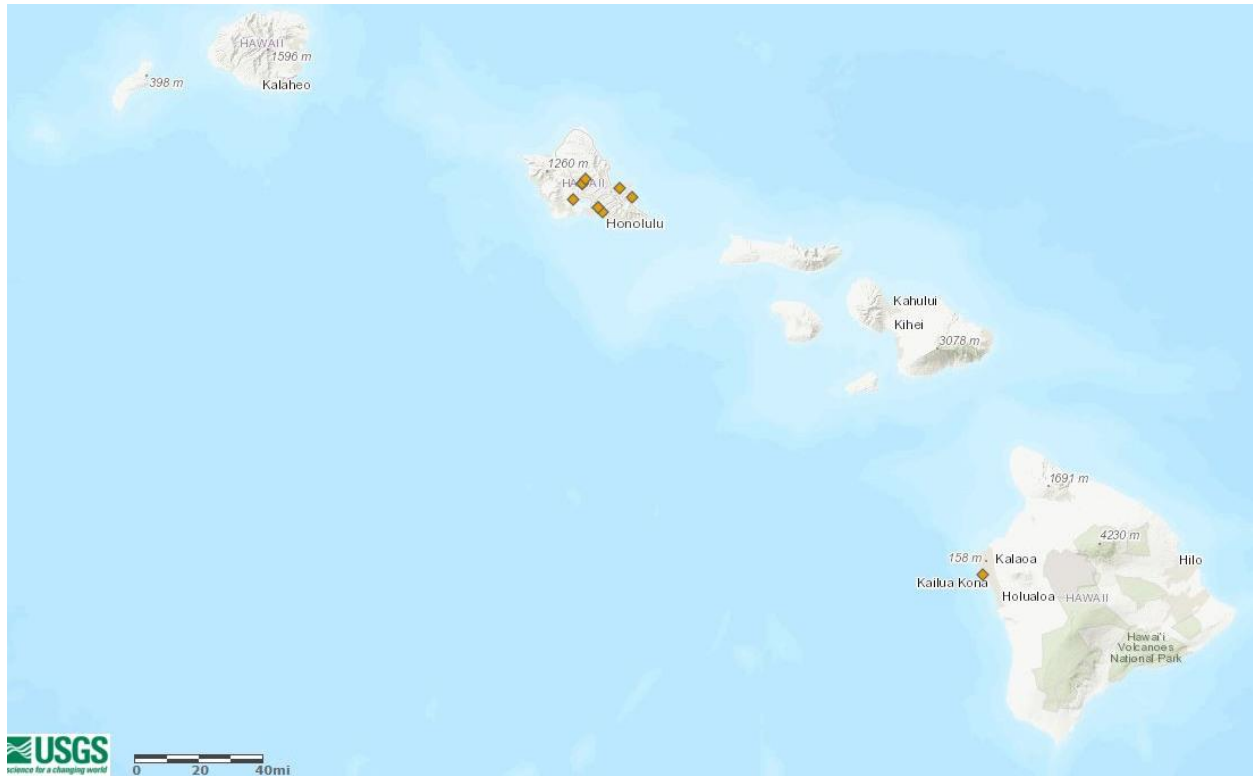


Figure 2. Known distribution of *Poecilia vittata* (as *L. vittata*) in the United States. Map from Nico et al. (2018).

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 0.011, which is a medium climate match. (Scores between 0.005 and 0.103 are classified as medium.) The climate score was high in Florida, medium in Texas, and low elsewhere in the contiguous United States. Locally, the climate match was high in southern peninsular Florida, medium in northern Florida and along the Gulf Coast, southern Atlantic Coast (as far north as South Carolina), and southern coastal California. The remainder of the contiguous United States had low climate match.

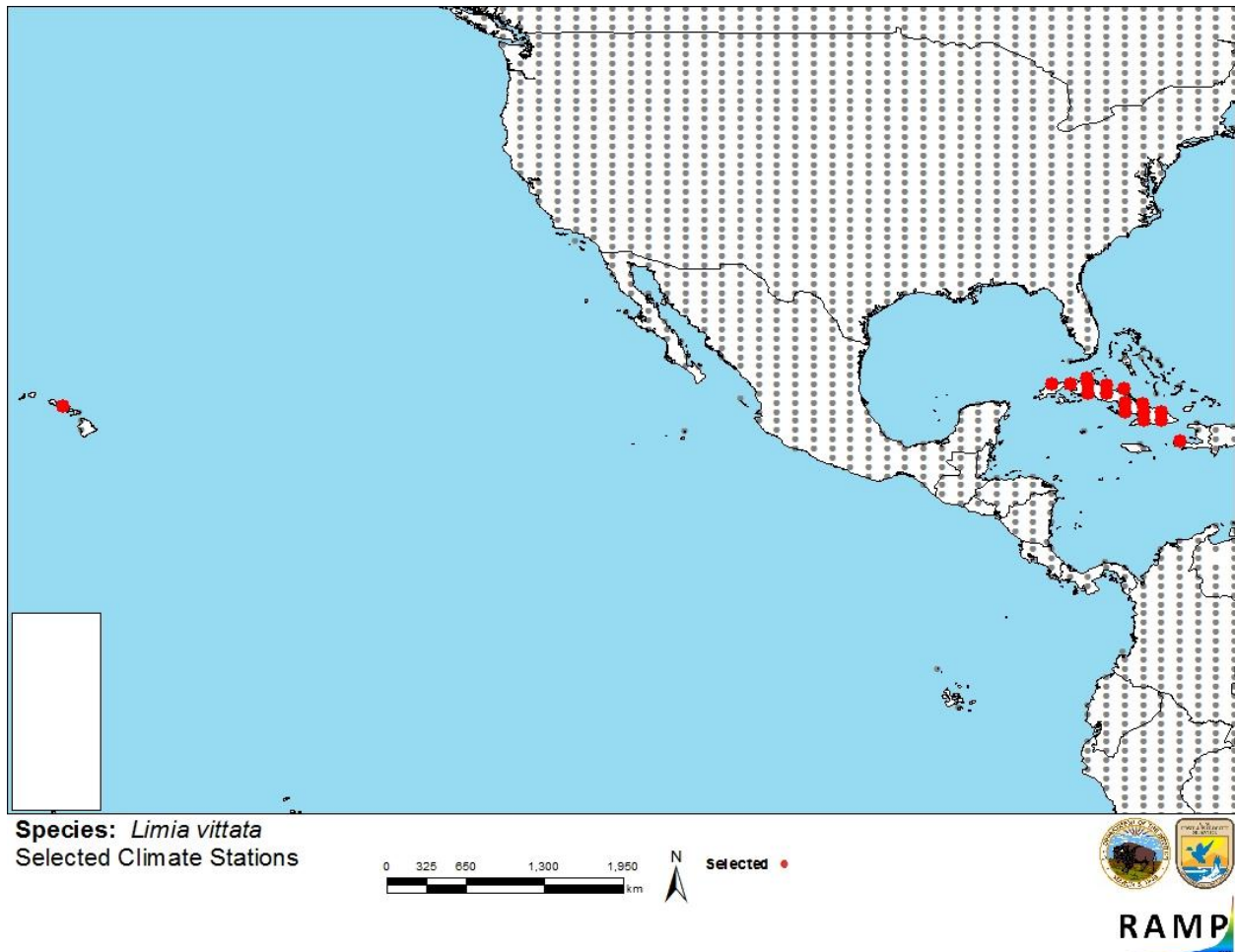


Figure 3. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red; Cuba, Hawaii) and non-source locations (gray) for *Poecillia vittata* (synonym of *Limia vittata*) climate matching. Source locations from GBIF Secretariat (2018).

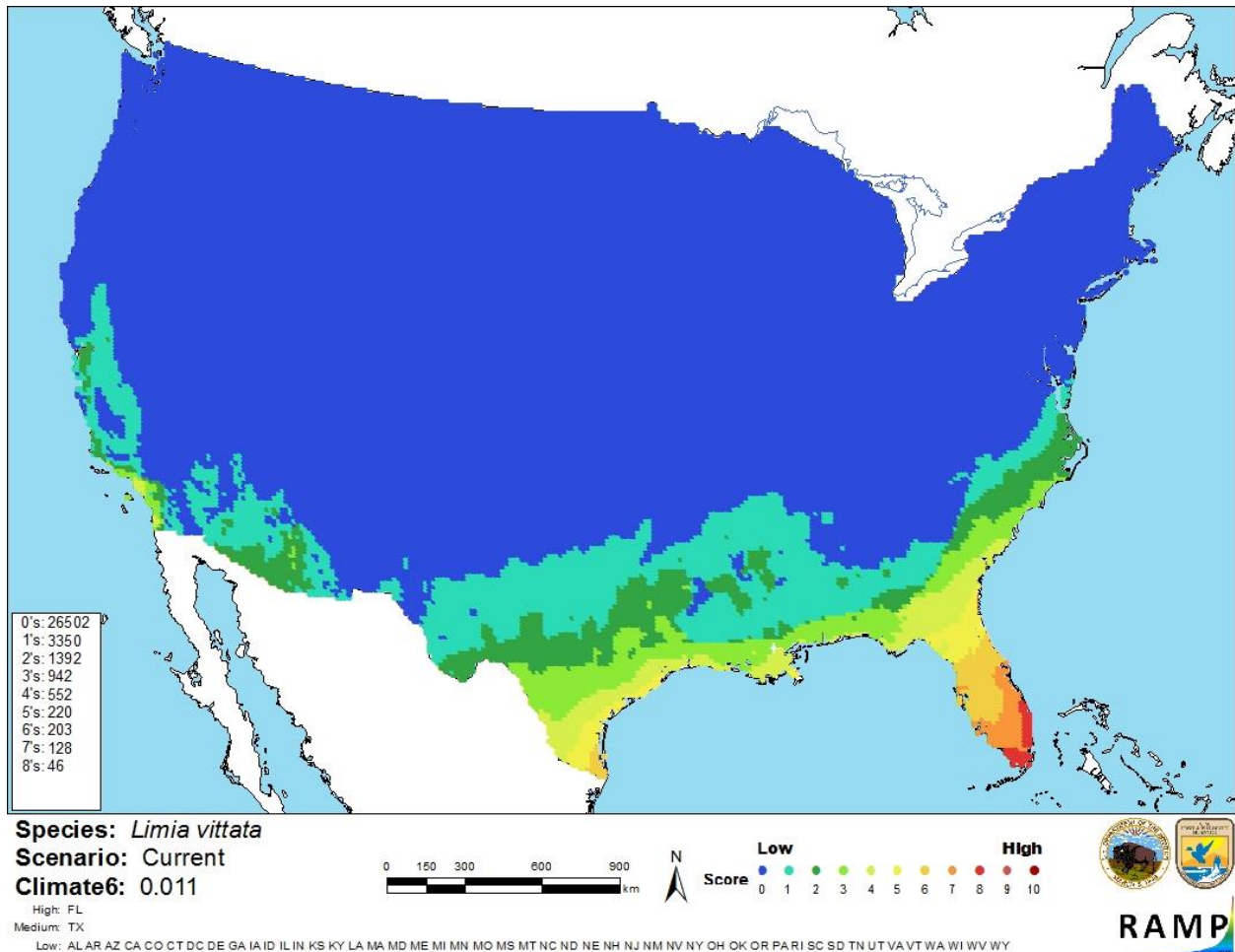


Figure 4. Map of RAMP (Sanders et al. 2014) climate matches for *Poecilia vittata* (synonym of *Limia vittata*) in the contiguous United States based on source locations reported by GBIF Secretariat (2018). 0 = Lowest match, 10 = Highest match.

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

7 Certainty of Assessment

There is little information available on the biology of *Poecilia vittata*. This species has been introduced to Hawaii, but there is no definitive information available on impacts of its introduction. Taxonomy of this species is unclear. Further information is necessary to adequately assess the risk this species poses to the United States. Certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Poecilia vittata, Cuban limia, is a small livebearing fish native to Cuba. It has been present in the aquarium trade for decades, including in the United States. *P. vittata* was introduced and has become established in Hawaii, possibly as a result of an aquarium release. It has been suggested that exotic poeciliids including *P. vittata* have had a negative impact on native damselflies in Hawaii, but the impacts of *P. vittata* specifically are not known. History of invasiveness is classified as “none documented.” *P. vittata* has a medium climate match with the contiguous United States, with a high climate score in Florida and a medium climate score in Texas. Certainty of this assessment is low because of a lack of clear, credible research into the negative impacts of introductions of this species outside of its native range. The overall risk assessment category is therefore uncertain.

Assessment Elements

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

Coletti, T. 2007. My Big Dogs from Cuba: *Limia vittata*. Tropical Fish Hobbyist. Available: <http://www.tfhmagazine.com/details/articles/my-big-dogs-from-cuba-limia-vittata.htm>. (January 2018).

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>. (January 2018).

Froese, R., and D. Pauly, editors. 2017. *Limia vittata* (Guichenot, 1853). FishBase. Available: <http://www.fishbase.org/summary/4665>. (January 2018).

GBIF Secretariat. 2018. GBIF backbone taxonomy: *Limia vittata*, Guichenot, 1853. Global Biodiversity Information Facility, Copenhagen. Available: <https://www.gbif.org/species/5203831>. (January 2018).

ITIS (Integrated Taxonomic Information System). 2018. *Limia vittata* (Guichenot, 1853). Integrated Taxonomic Information System, Reston, Virginia. Available: https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=165946#null. (January 2018).

- Mendoza-Franco, E. F., V. M. Vidal-Martínez, Y. Cruz-Quintana, and F. L. Prats León. 2006. Monogeneans on native and introduced freshwater fishes from Cuba with the description of a new species of *Salsuginus* Beverley-Burton, 1984 from *Limia vittata* (Poeciliidae). *Systematic Parasitology* 64(3):181-190.
- Nico, L., P. Fuller, and P. J. Schofield. 2018. *Limia vittata* (Guichenot, 1853). U.S. Geological Survey, Nonindigenous Aquatic Species Database, Gainesville, Florida. Available: <https://nas.er.usgs.gov/queries/factsheet.aspx?SpeciesID=853>. (January 2018).
- OIE (World Organisation for Animal Health). 2019. OIE-listed diseases, infections and infestations in force in 2019. World Organisation for Animal Health, Paris. Available: www.oie.int/animal-health-in-the-world/oie-listed-diseases-2019/. (August 2019).
- Rivas, L. R. 1978. A new species of poeciliid fish of the genus *Poecilia* from Hispaniola, with reinstatement and redescription of *P. dominicensis* (Evermann and Clark). *Northeast Gulf Science* 2(2):98-112.
- Rivas, L. R. 1980. Eight new species of poeciliid fishes of the genus *Limia* from Hispaniola. *Northeast Gulf Science* 4(1):28-38.
- Sanders, S., C. Castiglione, and M. H. Hoff. 2014. Risk Assessment Mapping Program: RAMP. U.S. Fish and Wildlife Service.
- The Wet Spot Tropical Fish. 2019. Tropical fish – current stock. The Wet Spot Tropical Fish, Portland, Oregon. Available: <https://www.wetspottropicalfish.com/current-stock/>. (August 2019).

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.

- Brock, V. E. 1960. The introduction of aquatic animals into Hawaiian waters. *Internationale Revue der gesamten Hydrobiologie* 45(4):463-480.
- Devick, W. S. 1991. 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.
- Englund, R.A. 1999. The impacts of introduced poeciliid fish and Odonata on the endemic *Megalagrion* (Odonata) damselflies of Oahu Island, Hawaii. *Journal of Insect Conservation* 3:225-243.

- Haedrich, R. L. 1986. Amarsipidae. Page 842 *in* M. M. Smith and P. C. Heemstra, editors. Smiths' sea fishes. Springer-Verlag, Berlin.
- de Jong, K. M. 1999. Zwei große Limia-Arten. Deutsche Aquarien- und Terrarien-Zeitschrift 52(10):26-29.
- Lee, D. S., C. R. Gilbert, C. H. Hocutt, R. E. Jenkins, D. E. McAllister, and J. R. Stauffer, Jr. 1980 et seq. Atlas of North American freshwater fishes. North Carolina State Museum of Natural History, Raleigh.
- 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. The Johns Hopkins University Press, Baltimore, Maryland.
- Mills, D. and G. Vevers, 1989. The Tetra encyclopedia of freshwater tropical aquarium fishes. Tetra Press, New Jersey.
- Mundy, B. C. 2005. Checklist of the Fishes of the Hawaiian Archipelago. Bishop Museum Bulletins in Zoology 6.
- Riehl, R., and H. A. Baensch, 1996. Aquarien Atlas, Band 1. 10th edition. Mergus Verlag GmbH, Melle, Germany.
- Rosen, D. E., and R. M. Bailey. 1963. The poeciliid fishes (Cyprinodontiformes): their structure, zoogeography, and systematics. Bulletin of the American Museum of Natural History 126(1):1-176.
- Tilmant, J. T. 1999. Management of nonindigenous aquatic fish in the U.S. National Park System. National Park Service.
- Yamamoto, M. N. and A. W. Tagawa. 2000. Hawai'i's native and exotic freshwater animals. Mutual Publishing, Honolulu, Hawaii.