

Zebra Loach (*Botia striata*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, November 2014
Revised, March 2016, October 2017, November 2017
Web Version, 8/30/2018



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1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2014):

“Known from Tunga [R]iver system and Kohapur Satara district, Western Ghats [Talwar and Jhingran 1991]. Also occurs in Thungabhadra [R]iver at Shimoga, Karnataka in Western Ghats;

and Krishna drainage of Satara and Kolhapur in Maharashtra [Menon 1999]. Also [Gopalakrishnan and Ponniah 2000; Kapoor et al. 2002].”

From Dahanukar (2013):

“*Botia striata* is endemic to the Western Ghats of India (Dahanukar et al. 2004). It has been recorded from Tunga and Bhadra rivers of Karnataka (Rao 1920, Shahanawaz and Venkateshwarlu 2009, Shahanawaz et al. 2010) and Panchaganga [R]iver and Koyna [R]iver of Maharashtra (Kalawar and Kelkar 1956, Jadhav et al. 2011). Record of this species from Vamanapuram [R]iver basin in Kerala by Johnson and Arunachalam (2009) could either be a different species or an introduced population as there are no other records from this and adjoining areas.”

“Further the species is known from only four fragmented locations.”

Status in the United States

No records of *Botia striata* in the wild in the United States were found.

Chapman et al. (1994) lists *Botia striata* as imported to the United States for the aquarium trade in October 1992.

From ThatPetPlace (2018):

“Zebra Loach – *Botia striata* [...] \$9.99”

Means of Introductions in the United States

No records of *Botia striata* in the United States were found.

Remarks

From Dahanukar (2013):

“Endangered B2ab(iii) ver 3.1”

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to Eschmeyer et al. (2017), *Botia striata* Narayan Rao 1920 is the valid name for this species. It is also the original name for the species.

From ITIS (2014):

“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 Cobitoidea
Family Cobitidae
Subfamily Botiinae
Genus *Botia*
Species *Botia striata* Narayan Rao, 1920”

Size, Weight, and Age Range

From Froese and Pauly (2014):

“Max length: 7.8 cm SL male/unsexed; [Menon 1999]”

From Anna Mercy et al. (2007:141):

“Attains a maximum size of 10cm.”

Environment

From Froese and Pauly (2014):

“Freshwater; demersal; pH range: 6.0 - 8.0; dH range: 5 - 12. [...]; 23°C - 26°C [assumed to be recommended aquarium temperature] [Baensch and Riehl 1985]”

Climate/Range

From Froese and Pauly (2014):

“Tropical; [...]”

Dahanukar (2013) lists the lower elevation limit as 500m and the upper elevation limit as 700m.

Distribution Outside the United States

Native

From Froese and Pauly (2014):

“Known from Tunga [R]iver system and Kohapur Satara district, Western Ghats [Talwar and Jhingran 1991]. Also occurs in Thungabhadra [R]iver at Shimoga, Karnataka in Western Ghats; and Krishna drainage of Satara and Kolhapur in Maharashtra [Menon 1999]. Also [Gopalakrishnan and Ponniah 2000; Kapoor et al. 2002].”

From Dahanukar (2013):

“*Botia striata* is endemic to the Western Ghats of India (Dahanukar et al. 2004). It has been recorded from Tunga and Bhadra rivers of Karnataka (Rao 1920, Shahanawaz and Venkateshwarlu 2009, Shahanawaz et al. 2010) and Panchaganga [R]iver and Koyna [R]iver of Maharashtra (Kalawar and Kelkar 1956, Jadhav et al. 2011). Record of this species from Vamanapuram [R]iver basin in Kerala by Johnson and Arunachalam (2009) could either be a different species or an introduced population as there are no other records from this and adjoining areas.”

Introduced

No records of *Botia striata* introductions to the wild were found.

Youguang (2014) lists *Botia striata* as present in the Singapore ornamental trade.

Means of Introduction Outside the United States

No records of *Botia striata* introductions were found.

Youguang (2014) lists *Botia striata* as present in the Singapore ornamental trade.

Short Description

From India Biodiversity Portal (2014):

“A species of *Botia* having head and body marked with several narrow oblique vertical bands; caudal fin with two complete and 2 or 3 interrupted stripes; eye placed almost in posterior half of head; snout length almost equal to remaining parts of head; four pairs of barbels; dorsal fin inserted nearer to caudal fin base than to snout-tip.”

From Anna Mercy et al. (2007:141):

“Body elongate and greatly compressed. Head moderate, its length about 2.5 times in standard length; snout length about equal to remaining part of head. Eyes placed almost in posterior half of head. Mouth small; barbels four pairs. Dorsal fin inserted nearer to caudal fin base than to snout-tip. Pectoral fins longer than snout length. Caudal peduncle almost squarish, slightly deeper than long. Scales small and non-deciduous.”

“Body pale pink or deep yellow, diversified by broad dark and narrow yellow bands which from behind nape form oblique hoops or stripes directed backwards, these bands completely surround body; broad dark bands often with light streaks of variable number forming complete or incomplete hoops, on upper surface of head the dark and yellow streaks form a trident mark. Fins white and barred; caudal fin with two complete and 2 or 3 interrupted stripes.”

Anna Mercy et al. (2007:141) lists the following for ray counts: dorsal ii 9-10, anal ii 5-6, pectoral ii 11-12, ventral (pelvic) i 7.

Biology

From Dahanukar (2013):

“*Botia striata* prefers clear mountain streams (Menon 1999). It is a bottom feeder and prefers sandy and gravel bottom. The habitat of this species is getting severely altered because of recreational activities on the mountain tops, deforestation leading to siltation and pollution of the hill streams, especially in the Western Ghats of Maharashtra (Neelesh Dahanukar pers. obs.).”

From Anna Mercy et al. (2007:141):

“Bottom feeder, eats algae, detritus, worms, and pellet feed.”

Human Uses

From Dahanukar (2013):

“*Botia striata* is in aquarium trade and it is caught from the wild. In Koyna [India] the species is also sold in the fish markets by tribal people called Katkari.”

From Keskar et al. (2014):

“Loaches such as *Botia striata* and *Nemachilichthys ruppelli* are regularly caught from the wild in large numbers from Satara, Kolhapur and Sangali districts and are sold to aquarium fish exporters.”

Raghavan et al. (2013) report that 382,575 wild caught individuals of *Botia striata* were exported from India between 2005 and 2012.

From TheSprucePets (2018):

“Zebra loaches were first introduced to the aquarium trade in 1952, and have continued to remain popular among aquarium hobbyists.”

“There have been no reports of successful cases of zebra loach breeding in home aquariums. Commercial breeders have been successful only through the use of hormones, a practice that is controversial.”

Diseases

No records of OIE reportable diseases were found.

From Froese and Pauly (2014):

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

Threat to Humans

From Froese and Pauly (2014):

“Harmless”

3 Impacts of Introductions

No records of *Botia striata* introductions were found, therefore there is no information on impacts.

4 Global Distribution

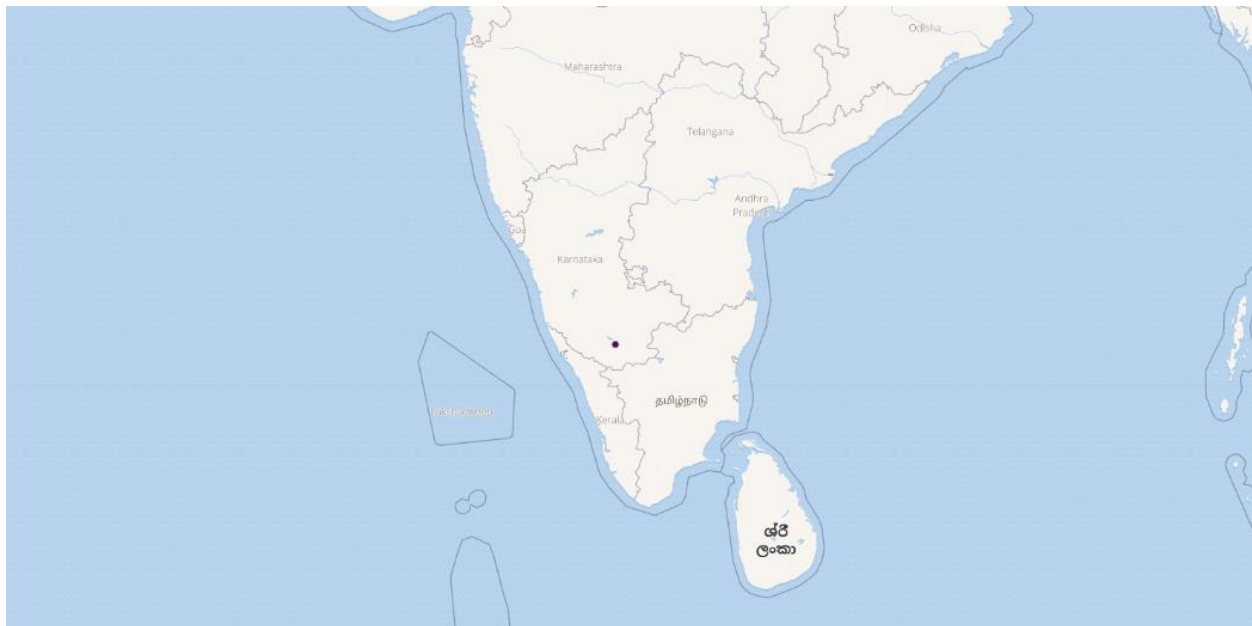


Figure 1. Known global distribution of *Botia striata*. Location is in southern India. Map from GBIF Secretariat (2017).

Additional locations in western India are given in Menon (1992: Map 10).

5 Distribution Within the United States

No records of *Botia striata* in the United States were found.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Botia striata* was medium in small patches along the Mexican border. The match was low everywhere else. The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for the contiguous United States was 0.000, and no states had an individually high climate match.

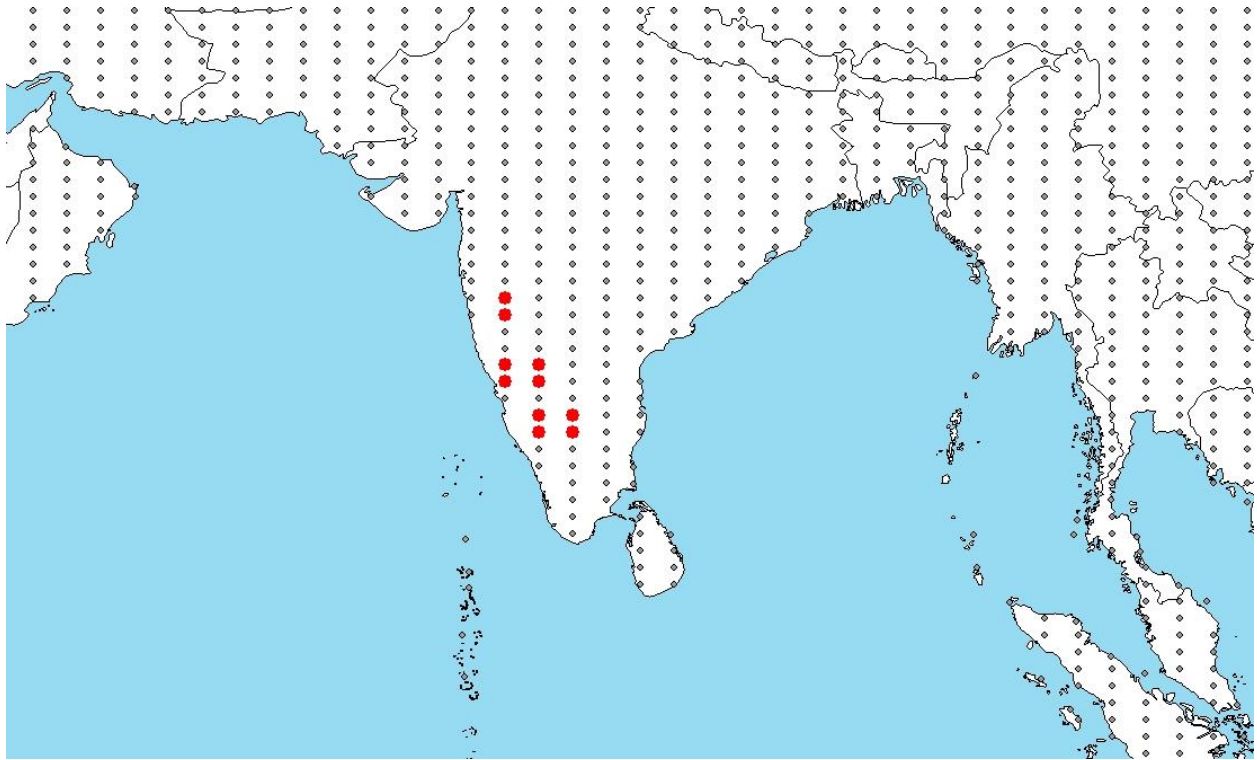


Figure 2. RAMP (Sanders et al. 2014) source map showing weather stations in India selected as source locations (red) and non-source locations (gray) for *Botia striata* climate matching. Source locations from Menon (1992) and GBIF Secretariat (2017).

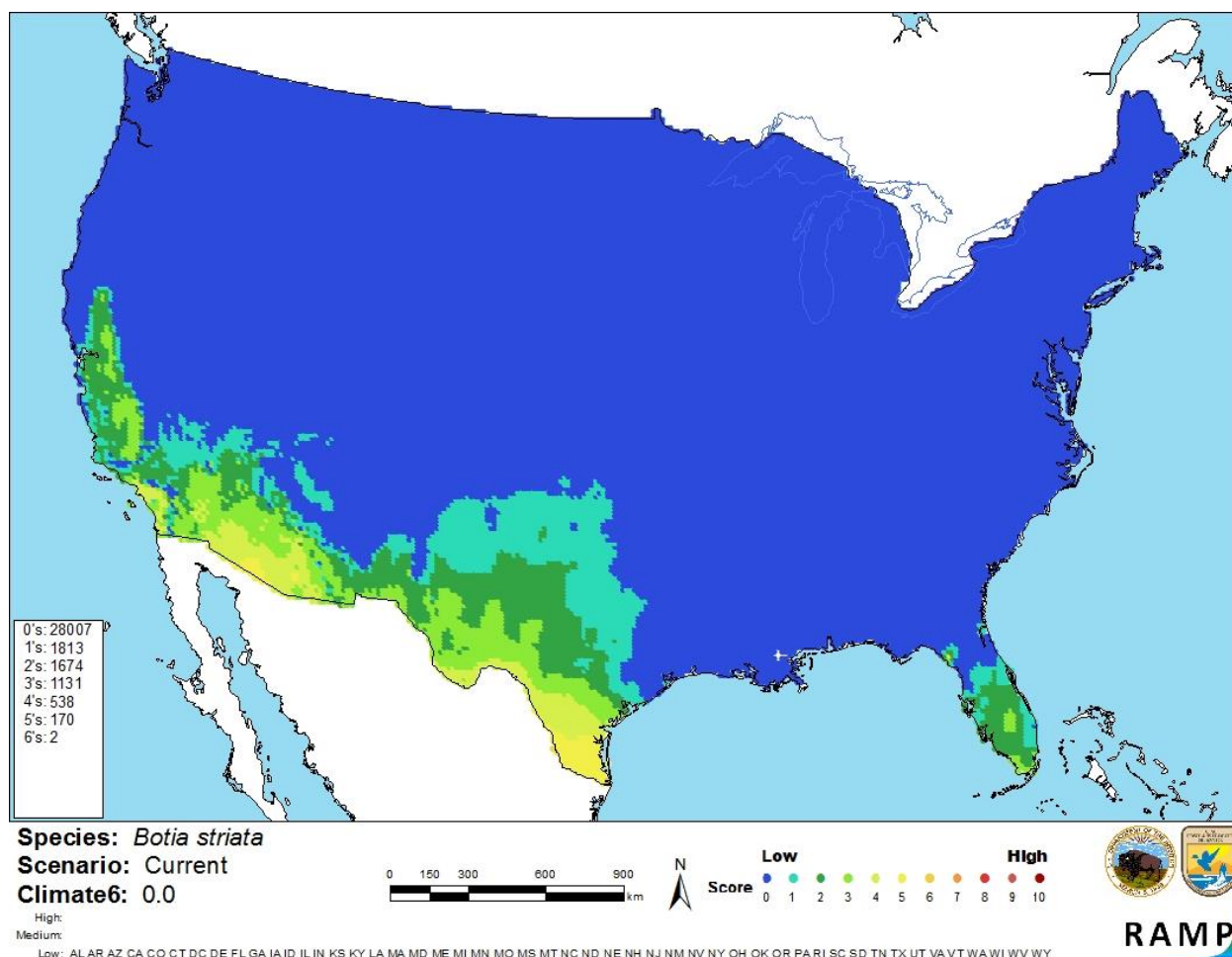


Figure 3. Map of RAMP (Sanders et al. 2014) climate matches for *Botia striata* in the contiguous United States based on source locations reported by Menon (1992) and GBIF Secretariat (2017). 0 = Lowest match, 10 = Highest match. Counts of climate match scores are tabulated on the left.

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

The certainty of this assessment is high. There was adequate, quality ecological and biological information available about *Botia striata*. There were no records of introductions found for *Botia striata*. Information regarding the duration and volume of this species' presence in the international ornamental trade was available from a peer reviewed paper. This allowed for the determination of a history of invasiveness in the absence of introduction and impact records.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Zebra Loach (*Botia striata*) is a species of loach native to river drainages in India. It is a bottom feeder found in clear water streams. *B. striata* is wild caught by local tribes and sold to the aquarium industry. The history of invasiveness for *Botia striata* is low. There were no introduction records found. The species has been in international trade since 1952. In a period of 7 years, 382,575 individuals were exported from India for the aquarium trade. If extrapolated for the entire 66 years *B. striata* has been in trade that would be over 3.5 million individuals exported. The climate match was low; the Climate 6 score was 0.000. There were a few small pockets of medium match along the Mexican border; the match was low everywhere else. The certainty of assessment is high. The overall risk assessment category is low.

Assessment Elements

- **History of Invasiveness (Sec. 3): Low**
- **Climate Match (Sec. 6): Low**
- **Certainty of Assessment (Sec. 7): High**
- **Remarks/Important additional information** No additional information
- **Overall Risk Assessment Category: Low**

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.

- Anna Mercy, T. V., A. Gopalakrishnan, D. Kapoor, and W. S. Lakra. 2007. Ornamental fishes of the Western Ghats of India. National Bureau of Fish Genetic Resources, Lucknow, India.
- Chapman, F. A., S. Fitz-Coy, E. Thunberg, J. T. Rodrick, C. M. Adams, and M. Andre. 1994. An analysis of the United States of America international trade in ornamental fish. Final Report. University of Florida.
- Dahanukar, N. 2013. *Botia striata*. The IUCN Red List of Threatened Species 2011: e.T168591A6521075. Available: <http://www.iucnredlist.org/details/full/168591/0>. (November 2014).
- 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>. (October 2017).
- Froese, R., and D. Pauly, editors. 2014. *Botia striata* Narayan Rao, 1920. FishBase. Available: <http://fishbase.de/summary/Botia-striata.html>. (November 2014).

- GBIF Secretariat. 2017. GBIF backbone taxonomy: *Botia striata* Narayan Rao, 1920. Global Biodiversity Information Facility, Copenhagen. Available: <https://www.gbif.org/species/2368019>. (October 2017).
- India Biodiversity Portal. 2014. *Botia striata* Narayan Rao, 1920. India Biodiversity Portal, species page. Available: <http://indiabiodiversity.org/species/show/231839>. (November 2014).
- ITIS (Integrated Taxonomic Information System). 2014. *Botia striata* Narayan Rao, 1920. Integrated Taxonomic Information System, Reston, Virginia. Available: http://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=640127. (November 2014).
- Keskar, A., A. Padhye, and N. Dahanukar. 2014. Fighting against all odds: the struggle for existence among hill stream loaches of norther Western Ghats. Min-Newsletter of FFSG 2:25–29.
- Menon, A. G. K. 1992. The fauna of India and the adjacent countries. Pisces. Volume IV. Teleostei - Cobitoidea. Part 2. Cobitidae. Zoological Survey of India, Madras, India.
- Raghavan, R., N. Dahanukar, M. F. Tlusty, A. L. Rhyne, K. K. Kumar, S. Molur, and A. M. Rosser. 2013. Uncovering an obscure trade: threatened freshwater fishes and the aquarium pet markets. Biological Conservation 164:158–169
- Sanders, S., C. Castiglione, and M. Hoff. 2014. Risk assessment mapping program: RAMP. U.S. Fish and Wildlife Service.
- ThatPetPlace. 2018. Zebra Loach – *Botia striata*. ThatFishPlace. Available: <https://www.thatpetplace.com/Botia-striata-zebra-loach-216129>. (August 2018).
- TheSprucePets. 2018. Freshwater fish breeds: Zebra Loach (Candystripe Loach). Available: <https://www.thesprucepets.com/zebra-loach-1381072>. (August 2018).
- Youguang, Y. 2014. Developing monitoring tools for tomorrow’s invasives: species lists, DNA barcodes, and images for ornamental fish. Doctoral dissertation. National University of Singapore.

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.

- Baensch, H. A., and R. Riehl. 1985. Aquarien atlas. Band 2. Mergus, Verlag für Natur-und Heimtierkunde GmbH, Melle, Germany.

- Dahanukar, N., R. Raut, and A. Bhat. 2004. Distribution, endemism and threat status of freshwater fishes in the Western Ghats of India. *Journal of Biogeography* 31:123–136.
- Gopalakrishnan, A., and A. G. Ponniah. 2000. Cultivable, ornamental, sport and food fishes endemic to peninsular India with special reference to Western Ghats. Pages 13–32 *in* A. G. Ponniah, and A. Gopalakrishnan, editors. *Endemic fish diversity of Western Ghats*. NBFGR-NATP Publication. National Bureau of Fish Genetic Resources, Lucknow, India.
- Jadhav, B. V., S. S. Kharat, R. N. Raut, M. Paingankar, and N. Dahanukar. 2011. Freshwater fish fauna of Koyna River, northern Western Ghats, India. *Journal of Threatened Taxa* 3(1):1449–145.
- Johnson, J. A., and M. Arunachalam. 2009. Diversity, distribution and assemblage structure of fishes in streams of southern Western Ghats, India. *Journal of Threatened Taxa* 1(10):507–513.
- Kalawar, A. G., and C. N. Kelkar. 1956. Fishes of Kolhapur. *Journal of Bombay Natural History Society* 53(4):669–679.
- Kapoor, D., R. Dayal, and A. G. Ponniah. 2002. Fish biodiversity of India. National Bureau of Fish Genetic Resources Lucknow, India.
- Menon, A. G. K. 1999. Check list - fresh water fishes of India. *Records of the Zoological Survey of India, Occasional Paper* 175.
- Narayan Rao, C. R. 1920. Some new species of cyprinoid fish from Mysore. *Annals and Magazine of Natural History (Series 9)* 6(31):45–64.
- Rao, C. R. N. 1920a. Some new species of cyprinoid fish from Mysore. *Annals and Magazine of Natural History Series* 6(31):45–64.
- Rao, C. R. N. 1920b. Some south Indian batrachians. *Journal of the Bombay Natural History Society* 119–127.
- Talwar, P. K., and A. G. Jhingran. 1991. *Inland fishes of India and adjacent countries, volume 1*. A.A. Balkema, Rotterdam, the Netherlands.