U.S. Fish & Wildlife Service

Rainbow Krib (*Pelvicachromis pulcher*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, February 2011
Revised, April 2019
Web Version, 1/6/2021

Organism Type: Fish
Overall Risk Assessment Category: Uncertain

Photo: Tiino Strauss. Licensed under Creative Commons Attribution-Share Alike 3.0 Unported. Available: https://commons.wikimedia.org/wiki/File:Pelvicachromis_pulcher_(female)_02.jpg. (April 2019).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2019):

"Africa: eastern Benin, southern Nigeria and western Cameroon [Stiassny et al. 2008]."

From Lalèyè et al. (2010):

"**Central Africa:** In Lower Guinea, *Pelvicachromis pulcher* is known from the Cross River basin, and from western Cameroon (Ndonga).

Western Africa: In Western Africa, this species is known from Southwestern Nigeria to the River Cross. Also reported from Sierra Leone but this needs to be confirmed."

Status in the United States

From Froese and Pauly (2019):

"Established in reservoir or pond habitats on Oahu, Hawaii, First released or discovered in 1984."

Pelvicachromis pulcher falls within Group I of New Mexico's Department of Game and Fish Director's Species Importation List (New Mexico Department of Game and Fish 2010). Group I species "are designated semi-domesticated animals and do not require an importation permit."

P. pulcher is in trade within the United States (e.g. Live Aquaria 2021).

Means of Introductions in the United States

From Froese and Pauly (2019):

"ornamental"

Remarks

No additional remarks.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to Fricke et al. (2019), *Pelvicachromis pulcher* (Boulenger 1901) is the current valid name for this species. It was originally described as *Pelmatochromis pulcher* (Boulenger (1901).

From ITIS (2019):

Kingdom Animalia
  Subkingdom Bilateria
    Infrakingdom Deuterostomia
      Phylum Chordata
        Subphylum Vertebrata
          Infraphylum Gnathostomata
            Superclass Actinopterygii
              Class Teleostei
                Superorder Acanthopterygii

Order Perciformes
Suborder Labroidei
Family Cichlidae
Genus *Pelvicachromis*
Species *Pelvicachromis pulcher* (Boulenger, 1901)

Size, Weight, and Age Range

From Froese and Pauly (2019):

"Max length : 11.0 cm TL male/unsexed; [Daget 1991]"

From Martin and Taborsky (1997):

"Male *P. pulcher* grow up to 12 cm total length (TL) and females up to 7 cm TL."

Environment

From Froese and Pauly (2019):

"Freshwater; brackish; demersal; pH range: 5.0 - 8.0; dH range: 5 - 19. […] 24°C - 25°C [Riehl and Baensch 1991] [assumed to be the recommended aquarium temperature];"

Climate

From Froese and Pauly (2019):

"Tropical; […] 10°N - 4°N"

Distribution Outside the United States

Native

From Froese and Pauly (2019):

"Africa: eastern Benin, southern Nigeria and western Cameroon [Stiassny et al. 2008]."

From Lalèyè et al. (2010):

"**Central Africa:** In Lower Guinea, *Pelvicachromis pulcher* is known from the Cross River basin, and from western Cameroon (Ndonga).

Western Africa: In Western Africa, this species is known from Southwestern Nigeria to the River Cross. Also reported from Sierra Leone but this needs to be confirmed."

Introduced

According to Froese and Pauly (2019) *Pelvicachromis pulcher* has been introduced into Singapore and the Philippines but it did not become established or its statues is unknown.

Means of Introduction Outside the United States

From Froese and Pauly (2019):

"ornamental"

Short Description

From Froese and Pauly (2019):

"Dorsal spines (total): 14 - 17; Dorsal soft rays (total): 8-10; Anal spines: 3; Anal soft rays: 6 - 8. Diagnosis: body elongate, moderately compressed, its depth 28.4-36.8% of standard length; head length 27.8-34.5% of standard length; 4-5 rows of monocuspid teeth in jaws; dorsal fin usually with spots or bands, dark posteriorly; lower part of body often reddish in life [Teugels and Thys van den Audenaerde 2003]. Black mid-lateral band extends over caudal fin; base of dorsal fin heavily pigmented dark grey or black [Stiassny et al. 2008]."

From Martin and Taborsky (1997):

"Females have intensely coloured purple patches on their bellies. In the males, there are red and yellow colour morphs. The former are red from the mouth edges to the belly region and have dark red opercula, while the latter have red bellies but yellow opercula and lips."

Biology

From Froese and Pauly (2019):

"Feeds on worms, crustaceans and insects [Mills and Vevers 1989]. In the river Sombreiro (Nigeria) observed to mainly feed on diatoms, algae, higher plants and detritus [Lamboj 2004]. Pair bonding [Lamboj 2004], cave-spawning [Lamboj 2004; Stiassny et al. 2008], substrate brooder [Stiassny et al. 2008]. Aquarium keeping: in pairs; minimum aquarium size 80 cm [BMELF 1999]."

"Spawns in caves."

From Lalèyè et al. (2010):

"*Pelvicachromis pulcher* is a demersal substrate spawner. It occurs in freshwater and in brackish water, and is able to survive in anoxic conditions. *Pelvicachromis pulcher* feeds on worms, crustaceans and insects (Mills and Vevers 1989)."

From Martin and Taborsky (1997):

"Red morph males are more aggressive and patrol their territories more intensively than males of the yellow morph (E. Martin, unpublished work)."

"Non-reproductive males and females live in common aggregations. Territorial males defend multi-purpose territories of about 0.25 m2 around shelters which are holes under leaves, stones

or pieces of wood (Sjölander 1972). After pair formation, territory defence and sand or debris removal by digging are performed by both partners. At spawning, the partners take turns with only one fish being in the cave at a time while the other one guards the cave entrance and wards off intruders (i.e. sequential spawning). Females stick lines of about 10 eggs each to the roofs and sides of their caves, producing a total clutch of approximately 40-80 eggs. Then they take care of the eggs and wrigglers while their partner guards the area around the shelter. Free-swimming fry are closely guarded by the female while the male defends the surrounding area. Intruding congeners are attacked by the same-sex guarders. Both parents chase predators, dig holes, collect and transport larvae and scattered fry in their mouths, and feed fry. For the latter purpose they carry pieces of plants or snails (and commercial dry food in the laboratory) to the shoal of fry, break the material up by chewing and spit it towards the young."

Human Uses

From Lalèyè et al. (2010):

"This species is part of the aquarium trade."

P. pulcher is in trade within the United States (e.g. Live Aquaria 2021).

Diseases

No records of OIE-reportable diseases (OIE 2021) were found for *Pelvicachromis pulcher*.

According to Froese and Pauly (2019) *Pelvicachromis pulcher* is prone to bacterial infections.

Threat to Humans

From Froese and Pauly (2019):

"Harmless"

3 Impacts of Introductions

According to Froese and Pauly (2019) *Pelvicachromis pulcher* has been introduced into Singapore and the Philippines but it did not become established or its status is unknown. It also has been introduced and became established in Hawaii but the impacts of its introduction are unknown.

4 History of Invasiveness

Pelvicachromis pulcher has been introduced into Singapore and the Philippines but establishment and status are unknown. It is established in Hawaii but the impacts of its introduction are unknown. *P. pulcher* is in trade but there is no information on duration or volume of trade. For these reasons the history of invasiveness is classified as "data deficient."

5 Global Distribution

Figure 1. Known global distribution of *Pelvicachromis pulcher*. Map from GBIF Secretariat (2019).

6 Distribution Within the United States

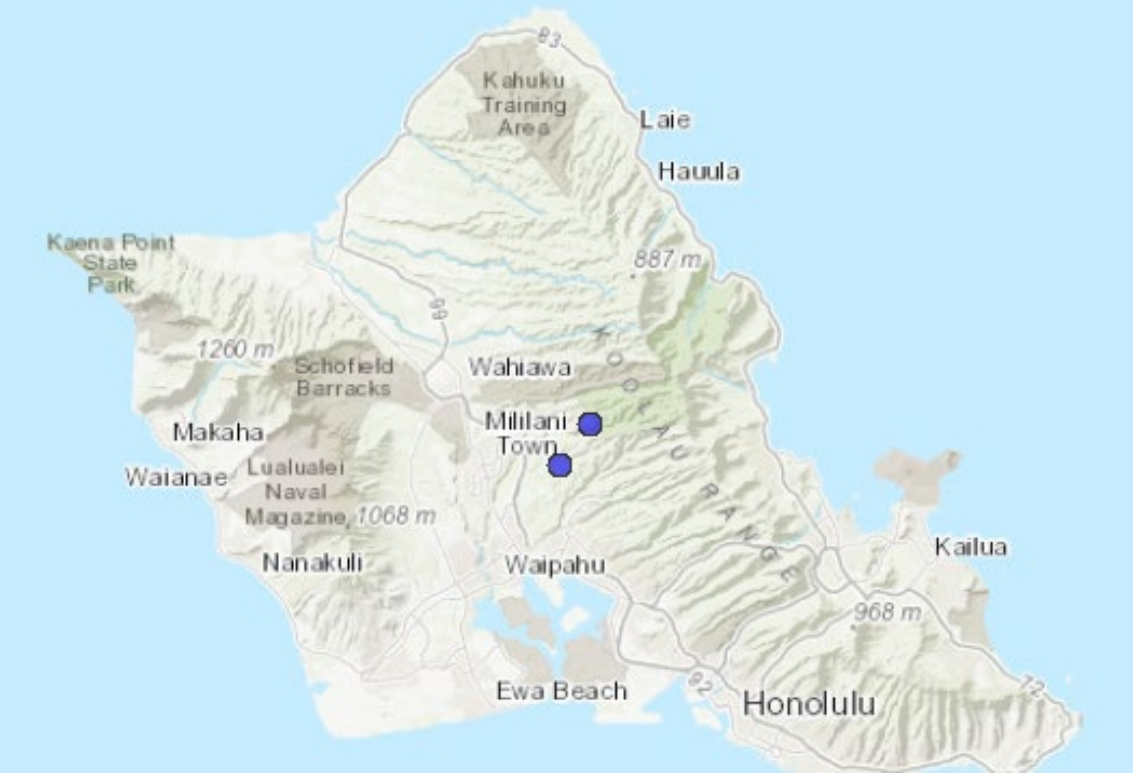

Figure 2. Known distribution of *Pelvicachromis pulcher* in the United States (Hawaii). Map from BISON (2019).

7 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Pelvicachromis pulcher* was low for the majority of contiguous United States with some patches of medium match in the very southern parts of California, Florida, and Texas. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.000, low (scores between 0.000 and 0.005, inclusive, are classified as low). All States had a low individual climate 6 score.

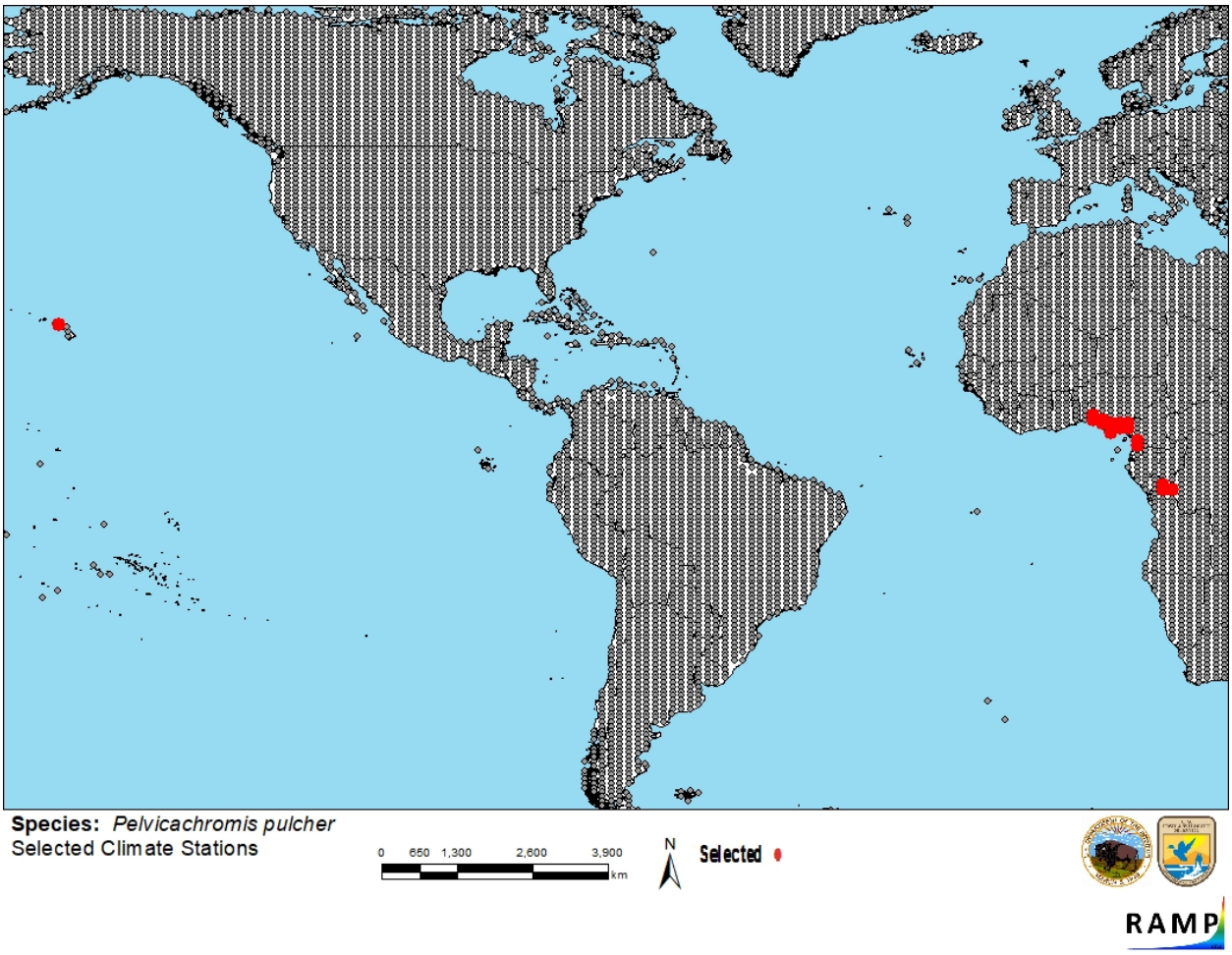

Figure 3. RAMP (Sanders et al. 2018) source map showing weather stations in western Africa and Hawaii selected as source locations (red) and non-source locations (gray) for *Pelvicachromis pulcher* climate matching. Source locations from GBIF Secretariat (2019). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

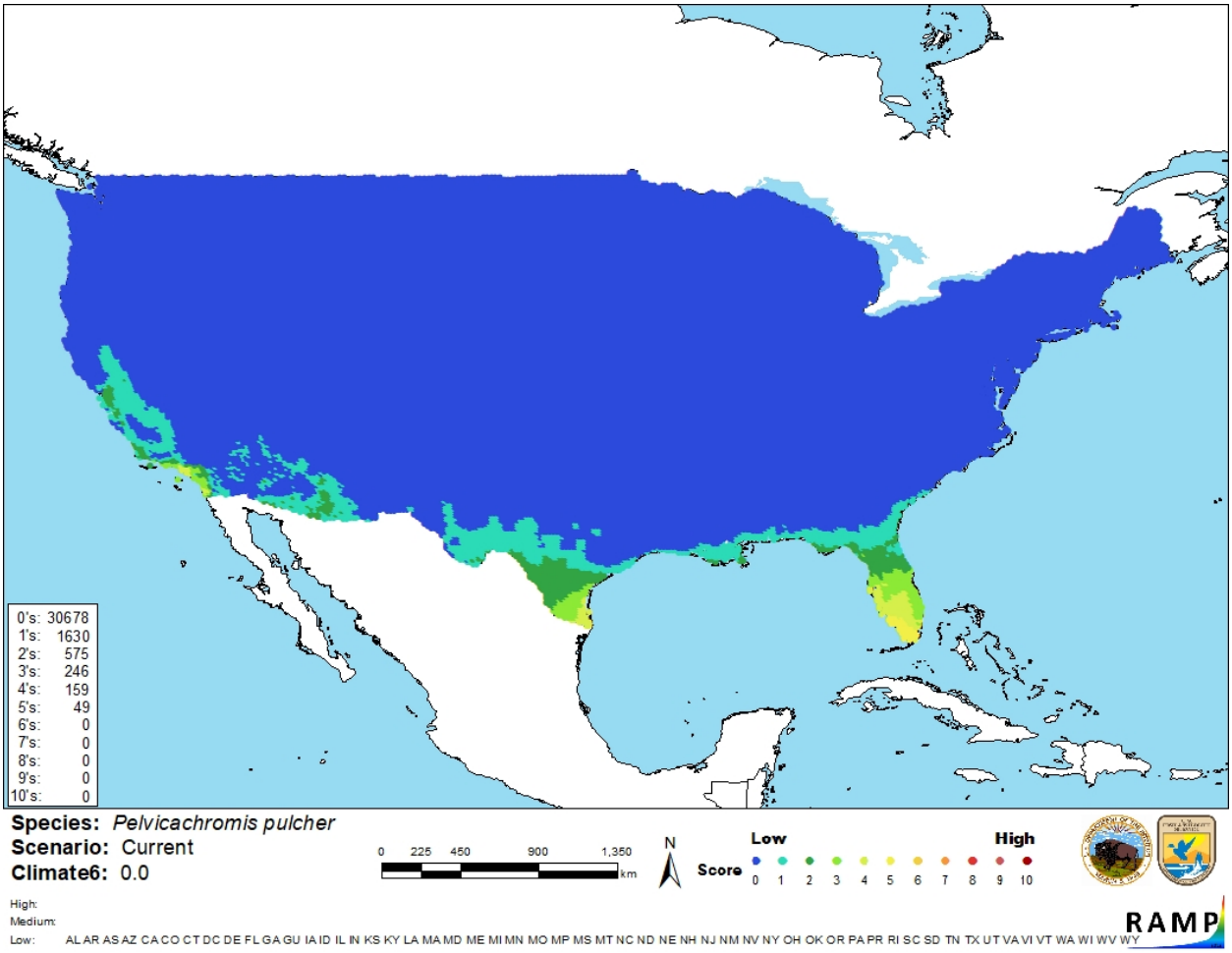

Figure 4. Map of RAMP (Sanders et al. 2018) climate matches for *Pelvicachromis pulcher* in the contiguous United States based on source locations reported by GBIF Secretariat (2019). Counts of climate match scores are tabulated on the left. 0/Blue = Lowest match, 10/Red = Highest match.

The High, Medium, and Low Climate match Categories are based on the following table:

Climate 6: (Count of target points with climate scores 6-10)/ (Count of all target points)	Overall Climate Match Category
0.000≤X≤0.005	Low
0.005<X<0.103	Medium
≥0.103	High

8 Certainty of Assessment

The certainty of assessment for *Pelvicachromis pulcher* is low. There is information available on the description of the species and its biology but it is very general information with few specifics. *Pelvicachromis pulcher* has been recorded as introduced in Singapore and the Philippines but it is unknown if it became established or if it had any impacts. It has also been

recorded as introduced and established in Hawaii, but the last recorded fish was back in 1999, it is uncertain if they are still there according to Froese and Pauly (2019).

9 Risk Assessment

Summary of Risk to the Contiguous United States

Pelvicachromis pulcher is a fish endemic to eastern Benin, southern Nigeria, and western Cameroon. This fish is found in the aquarium trade but it is not certain to what extent. *Pelvicachromis pulcher* has been recorded as introduced to Singapore and the Philippines but there is no information available stating if it became established, if it had any impact, or how it got there. It also has been recorded as established in Hawaii. The history of invasiveness is classified as "data deficient." The climate match for the contiguous United States is low. Small areas of medium match were found in California, Florida, and Texas; everywhere else had a low match. The certainty of assessment is low. The overall risk assessment category for *Pelvicachromis pulcher* is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 4): Data Deficient**
- **Overall Climate Match Category (Sec. 7): Low**
- **Certainty of Assessment (Sec. 8): Low**
- **Remarks/Important additional information: No additional remarks**
- **Overall Risk Assessment Category: Uncertain**

10 Literature Cited

Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 11.

BISON. 2019. Biodiversity Information Serving Our Nation. U.S. Geological Survey. Available: https://bison.usgs.gov (April 2019).

Fricke R, Eschmeyer WN, van der Laan R, editors. 2019. Eschmeyer's catalog of fishes: genera, species, references. California Academy of Science. Available: http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp (April 2019).

Froese R, Pauly D, editors. 2019. *Pelvicachromis pulcher* (Boulenger, 1901). FishBase. Available: https://www.fishbase.de/summary/Pelvicachromis-pulcher.html (April 2019).

GBIF Secretariat. 2019. GBIF backbone taxonomy: *Pelvicachromis pulcher* (Boulenger, 1901). Copenhagen: Global Biodiversity Information Facility. Available: https://www.gbif.org/species/2372929 (April 2019).

[ITIS] Integrated Taxonomic Information System. 2019. *Pelvicachromis pulcher* (Boulenger, 1901). Reston, Virginia: Integrated Taxonomic Information System. Available: https://www.itis.gov/servlet/SingleRpt/SingleRpt?search_topic=TSN&search_value=169993#null (April 2019).

Lalèyè P, Moelants T, Olaosebikan BD. 2010. *Pelvicachromis pulcher*. The IUCN Red List of Threatened Species 2010: e.T182905A7999355. Available: https://www.iucnredlist.org/species/182905/7999355 (April 2019).

LiveAquaria. 2021. Kirbensis cichlid (*Pelvicachromis pulcher*). Rhinelander, Wisconsin: LiveAquaria. Available: https://www.liveaquaria.com/product/1575/?pcatid=1575 (January 2021).

Martin E, Taborsky M. 1997. Alternative male mating tactics in a cichlid, *Pelvicachromis pulcher*: a comparison of reproductive effort and success. Behavioral Ecology and Sociobiology 41:311–319.

New Mexico Department of Game and Fish. 2010. Director's species importation list. Santa Fe, New Mexico: New Mexico Department of Game and Fish. Available: http://www.wildlife.state.nm.us/download/enforcement/importation/information/Directors-Species-Importation-List-08_03_2010.pdf (November 2020).

[OIE] World Organisation for Animal Health. 2021. OIE-listed diseases, infections and infestations in force in 2020. Available: http://www.oie.int/animal-health-in-the-world/oie-listed-diseases-2020/ (January 2021).

Sanders S, Castiglione C, Hoff M. 2018. Risk Assessment Mapping Program: RAMP. Version 3.1. U.S. Fish and Wildlife Service.

11 Literature Cited in Quoted Material

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.

[BMELF] Bundesministerium für Ernährung, Landwirtschaft und Forsten. 1999. Gutachten über Mindestanforderungen an die Haltung von Zierfischen (Süßwasser). Bonn: Bundesministerium für Ernährung, Landwirtschaft und Forsten.

Daget J. 1991. *Pelvicachromis*. Pages 363–366 in Daget J, Gosse J-P, Teugels GG, Thys van den Audenaerde DFE, editors. Check-list of the freshwater fishes of Africa. Brussels: ISNB; Tervuren, Belgium: MRAC; Paris: ORSTOM.

Lamboj A. 2004. The cichlid fishes of Western Africa. Bornheim, Germany: Birgit Schmettkamp Verlag.

Mills D, Vevers G. 1989. The Tetra encyclopedia of freshwater tropical aquarium fishes. New Jersey: Tetra Press.

Riehl R, Baensch HA. 1991. Aquarien atlas. Band. 1. Melle, Germany: Mergus, Verlag für Natur-und Heimtierkunde.

Sjolander S. 1972. Feldbeobachtungen an einigen westafrikani-schen Cichliden. Monatsschr ornithol Vivarienkd Ausg B Aqu Terr 19:42–45, 86–88.

Stiassny MLJ, Lamboj A, De Weirdt D, Teugels GG. 2008. Cichlidae. Pages 269–403 in Stiassny MLJ, Teugels GG, Hopkins CD, editors. The fresh and brackish water fishes of Lower Guinea, West-Central Africa, volume 2. Coll. faune et flore tropicales 42. Paris: Institut de recherche de développement, Muséum national d'histoire naturelle; Tervuren, Belgium: Musée royal de l'Afrique Central.

Teugels GG, Thys van den Audenaerde DFE. 2003. Cichlidae. Pages 521–600 in Paugy D, Lévêque C, Teugels GG, editors. The fresh and brackish water fishes of West Africa, volume 2. Coll. faune et flore tropicales 40. Paris: Institut de recherche de développement, Muséum national d'histoire naturelle; Tervuren, Belgium: Musée royal de l'Afrique Central.