International Journal of Ecology and Environmental Sciences 48: 515-518, 2022
ISSN: 2320-5199 (Online); https://doi.org/10.55863/ijees.2022.0515

Short communication

First Report of Carnatic Rice Fish *Oryzias carnaticus* (Jerdon 1849) (Order: Beloniformes) from Sunderban Biosphere Reserve, West Bengal

ARYA SEN AND SREERAJ C.R.*
Zoological Survey of India, Ministry of Environment, Forest and Climate Change, Government of India, Sunderban Regional Centre, Canning – 743329, West Bengal, India.
E-mail: arya.sen2@gmail.com, crsreeraj@gmail.com
***Author for Correspondence**

ABSTRACT
Oryzias is a genus of rice fish belonging to the family Adrianichthyidae (Class Actinopterygii, Order: Beloniformes), usually found in estuarine and freshwater areas. So far, only two species are recorded from West Bengal under this genus *viz*., *Oryzias dancena* (Hamilton 1822) and *Oryzias melastigma* (McClelland 1839). Present work reports the first record of *Oryzias carnaticus* (Jerdon 1849), from West Bengal. The species was collected from the mangrove ecosystem of Sunderban Biosphere Reserve. Details of the morphological data, live coloration and wild habitat are provided for the new record.

Key words: Mangrove, Oryzias, Rice Fish, Sunderban, West Bengal

INTRODUCTION

Oryzias is a genus under the fish family Adrianichthyidae, which is commonly referred as "Rice Fish", has a wide distribution along the southeast and eastern Asia (Roberts 1989). Their physical body shape is similar with a rice grain and hence commonly called as 'rice fish'. This group of fishes are normally euryhaline in nature but can be found even in fresh water areas (Park 2021). So far, 34 valid species have been recorded from the world under this genus (Fricke et al. 2022). In the Indian context, four species have been recorded so far, among which two species *i.e., Oryzias carnaticus* (Jerdon 1849), *O. dancena* (Hamilton 1822), *O. setnai* (Kulkarni 1940) and *O.s javanicus* (Bleeker 1854) from the Indian mainland and one from Indian Islands (Lakshadweep and Andaman and Nicobar Islands) *i.e., O. melastigma* (Mc Clelland 1839) (Angel et al. 2019, Chandra et al. 2018, 2020, Menon 1990). Only *O. dancena* (Hamilton 1822) and *O. melastigma* (McClelland 1839) has been reported from West Bengal previously (Alfred et al. 2012, Dutta et al. 2013, Mishra and Gopi 2017). This work reports the presence of *O. carnaticus* (Jerdon 1849) in West Bengal from Sunderban Biosphere Reserve.

MATERIALS AND METHODS

During a routine faunal exploration survey in the mangroves of Pakhir Dweep, Sunderban Biosphere Reserve, India (22° 8'49.55" N; 88°51'11.47" E) (Fig. 1) on 07.11.2020, three specimens (TL 22 mm, 19.7 mm, 21 mm) of *Oryzias* were collected from a tiny tide pool in the mangrove forest. Live specimens were transferred to laboratory in wide mouth collection container. The species was placed in small sized (15 x 5 x 10 cm) aquarium in live condition and photographed using Nikon 5200, 40 mm macro lens. The species was identified based on Parenti (2008). The animals were preserved in 70% ethanol and deposited in the National Zoological Collections of Zoological Survey of India, Sunderban Regional Centre, Canning.

RESULTS

The collected specimens were identified as *Oryzias carnaticus* (Jerdon 1849) and the details are given below:

Systematic account
Class: Actinopterygii
Order: Beloniformes

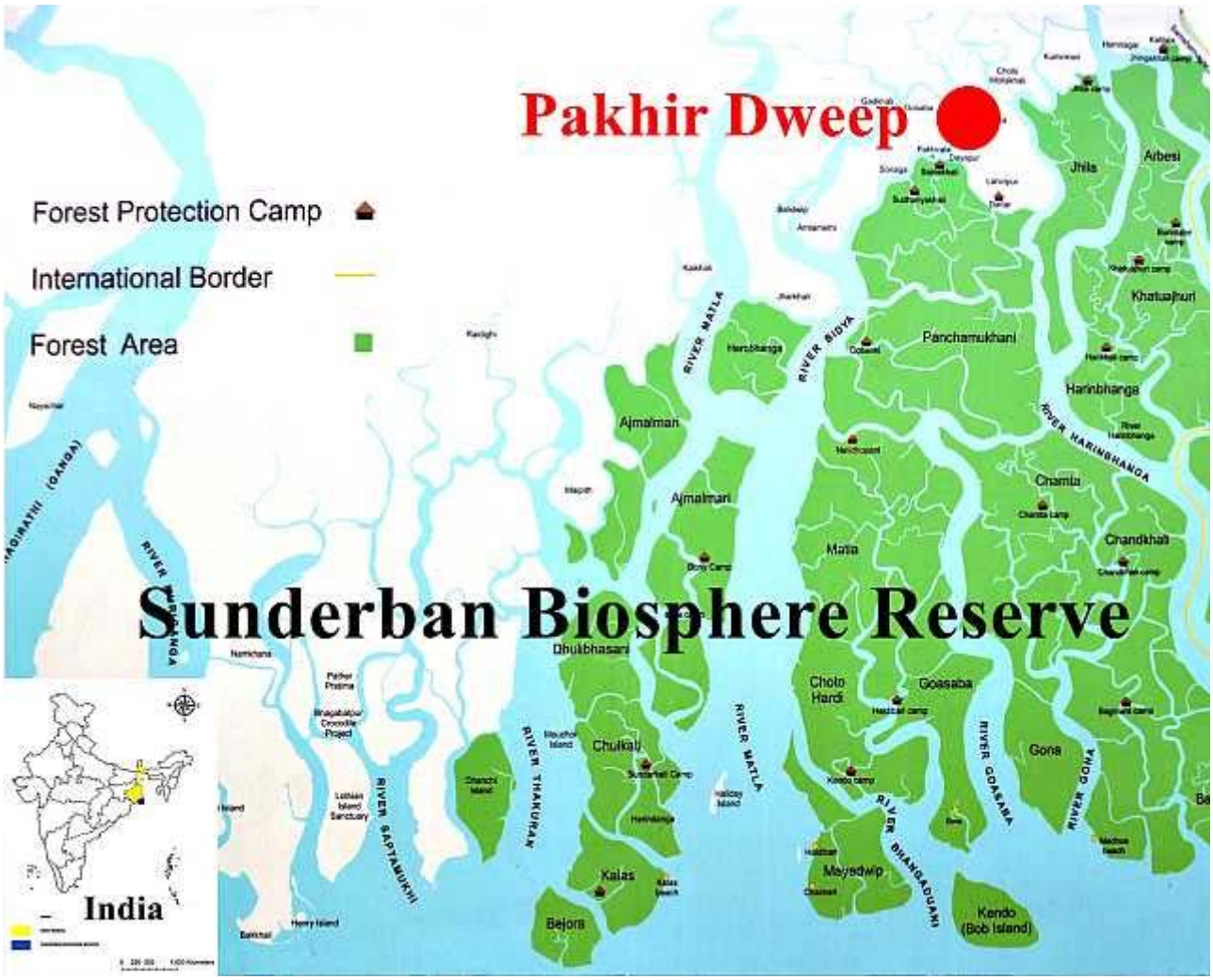

Figure 1. Map of showing the collection sites from Sunderban Biosphere Reserve

Family: Adrianichthyidae Weber 1913
***Oryzias carnaticus* (Jerdon 1849)**

Carnatic rice fish

1849. *Aplocheilus carnaticus* Jerdon [T.C.], Madras Journal of Literature and Science, 15(2), 331 (River that passes by Waniambaddy [= Vaniyambadi], Carnatic, southern India) – No known types or drawing of the specimen

1898. *Oryzias carnaticus* (Jerdon 1849) Roberts [T.R], Systematic observations on tropical Asian medakas or ricefishes of the genus *Oryzias*, with descriptions of four new species, Ichthyological Research, 45(3), 213 – 224.

Description

Meristic: Dorsal soft ray 7; Anal fin Rays 22; Pectoral fin rays 12; Pelvic fin rays 6; Principal caudal fin rays 6, Forked caudal fin rays 4; Pre caudal vertebrae 10; Caudal vertebrae 18; Total vertebrae 28; Dorsal fin origin vertebrae 22; Lateral series scales 28; Total length 20.9 mm, Standard length 16.5 mm, Head Length 4.6 mm, Eye diameter 1.35 mm; Inter orbital length 1.9 mm; Snout length 1.1 mm; Pectoral fin length 3.9 mm; Pelvic fin length 2 mm; Anal fin length 0.6 mm; Pre dorsal length 13.5 mm; Pre anal length 8.9 mm; Pre pectoral length 4.6 mm, Pre pelvic length 4.7 mm; Body depth 3.4 mm; Upper jaw length 0.8 mm; Caudal peduncle length 1.5 mm; Caudal peduncle depth 0.7 mm, Caudal fin length 4.5 mm.

Body shape and color: Lateral profile of the body is semi compressed. Body depth is medium ranged. Rounded upper jaw margin and upper lip is slightly smaller than lower lip. Caudal fins truncated with upper half larger than lower. Lips are pinkish with

Figure 2. Live specimen of *Oryzias carnaticus* (Jerdon, 1849) in aquarium

deep black pigmentation and not blotch. Snout is covered with deep black pigmentation. Operculum and belly are bluish silvery in nature. Dorsal part of the body is light greenish yellow. Nape region is covered with deep black dots. Upper portion of the lateral part is covered with minute small pigments. Dorsally body is covered with deep black dots and minute black pigments. Anal margin of the body up to caudal is pigmented in a single line highlighting the margin. Base of caudal is demarcated by the presence of black pigments in a single line. All the adjoining fin membrane are having black irregular pigmentation but fin rays are transparent (Fig. 2).

Material examined

Three medium sized, Pakhir Dweep near Pakhiralaya, Sunderban Biosphere Reserve (22°82 49.55"N; 88°512 11.47"E), 19.07.2021, Collector: Sreeraj C.R, Accession Number: NZC/ZSI/SbRC/KN3815 (Deposited in the National Zoological Collections of ZSI-Sunderban Regional Centre).

DISCUSSION AND CONCLUSIONS

O. carnaticus has been previously reported from three states (Karnataka, Tamil Nadu and Odisha) of India, and globally it has been reported from Bangladesh and Sri Lanka (Angel 2019, Froese 2022). This species generally inhabits small intertidal pools of Sunderban along with *Oryzias dancena*, *Stigmatogobius sadanundio* and *Boleophthalmus boddarti*. This species is generally confused with much similar *O. dancena* but can be easily differentiated by having more body depth, presence of black pigmentation on the lateral part of the body and having large black circles over the nape region. The character similarities between these two species might have made overlooking the species by researchers.

Oryzias is a genus of interest and so much work is done on this genus as these are good model species for studying the effects of several chemical compounds and is very popular worldwide and commonly known as “Medaka” or “Rice fish” (Ravindran et al. 2012). Four species of *Oryzias* that are available in India are also described from India. *O. dancena* was described from lower Ganges; *O. carnaticus* from Karnataka, *O. setnai* from Mumbai and *O. melastigma* from lower Bengal – Kolkata (Fricke 2022). Most of the description of this species are lacking many information such as live colour data and genetic data. Also, some of the type specimens are lost, hence the present status for the species *O. setnai* is unknown (Angel et al. 2019, Roberts 1989). More thrust should be given on this genus from Indian region and those species which were discovered from India shall be revised with recent

collection for proper taxonomic validation and to understand the present diversity status of this genus. Present finding of *O. carnaticus* from West Bengal for the first time provides the evidence and reason for future studies on this group.

ACKNOWLEDGEMENTS

Authors would like to thank the Director, ZSI as well as the Officer-In-Charge, Sunderban Regional Centre of ZSI for the support and encouragement for undertaking the work.

Authors' contribution: AS assisted during survey and manuscript preparation, SCR confirmed the identification and finalized the manuscript.

Competing Interests: Authors declare that they do not have any competing interest.

REFERENCES

Alfred, J.R.B., Sanyal, A.K., Tiwari, S. and Mitra, S. 2012. Status of Biodiversity of West Bengal. Final Technical Report, (Department of Environment. Kolkata, West Bengal, India).

Angel, J.R., Vinay, T.N., Raghavan, R., Thomas, D., Avunje, S., Aravind, R. and Vijayan, K. K. 2019. First record of the Javanese ricefish, *Oryzias javanicus* (Bleeker 1854) (Beloniformes: Adrianichthyidae) in the natural waters of India. Journal of Applied Echthyology, 35, 1034 – 1038.

Chandra, K. and Raghunathan, C. 2018. Faunal Diversity of Biogeographic Zones: Islands of India. Zoological Survey of India, Kolkata, 523 pp.

Chandra, K., Raghunathan, C. and Mondal, T. 2020. Faunal Diversity of Biogeographic Zones: Coasts of India. Zoological Survey of India, Kolkata, 807 pp.

Dutta, A.L., Dey, S.K., Chakraborty, D., Manna, A.K. and Manna, P.K. 2013. *Oryzias melastigma*–an effective substitute for exotic larvicidal fishes: enhancement of its reproductive potential by supplementary feeding. Springer Plus, 2(1), 1-5.

Fricke, R., Eschmeyer, W.N. and Van Der Laan, R. (Eds.) 2022. Eschmeyer's Catalog of Fishes: Genera, Species, References, world wide web electronic publication. http://researcharchive.calacademy.org Accessed on 28 February 2022.

Froese R. FishBase. 2022. world wide web electronic publication. http://www. fishbase. org. 2009. Accessed on 08 February 2022.

Roberts, T.R. 1989. The freshwater fishes of western Borneo (Kalimantan Barat, Indonesia). Memoirs of the California Academy of Sciences, 14, 1-210.

Menon, A.G.K. 1999. Check list – fresh water fishes of India. Records of the Zoological Survey of India, Miscellaneous Publications Occasional Paper, 175, I–xxviii + 366 pages.

Mishra, S.S. and Gopi, K.C. 2017. Fish diversity of Indian Sundarban, pp. 107-127. In: Chandra, K., Alfred, J.R.B., Mitra, B. and Roy Chowdhury, B. (Eds.) Fauna of Sundarban Biosphare Reserve, Zoological Survey of India, Kolkata.

Parenti, L.R. 2008. A phylogenetic analysis and taxonomic revision of ricefishes, Oryzias and relatives (Beloniformes, Adrianichthyidae). Zoological Journal of the Linnean Society, 154(3), 494-610.

Park, I.S. 2021. A review of studies on *Oryzias dancena*. Laboratory Animal Research, 37(1), 1-10.

Ravindran, K.J., Daniel, R., Kumari, S., George, S. and Eapen, A. 2012. Effect of agricultural pesticides, Hostathion and Kitazin on the larvivorsity of the Carnatic rice fish, *Oryzias carnaticus* (Jerdon 1849). American-Eurasian Journal of Toxicological Science, 4(2), 56-59.

Received:2nd March 2022
Accepted: 4th June 2022