



Record of zipper loach *Paracanthocobitis mackenziei* (Chaudhuri, 1910), an indigenous ornamental fish from West Bengal, India

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Manuscript history

Received 22 July 2022 | Accepted 28 July 2023 | Published online 31 August 2023

Citation

Sit G, Jana A, Chanda A, Sahu SK (2023) Record of zipper loach *Paracanthocobitis mackenziei* (Chaudhuri, 1910), an indigenous ornamental fish from West Bengal, India. *Journal of Fisheries* 11(2): 112402. DOI: 10.17017/j.fish.477

Abstract

Paracanthocobitis mackenziei (Chaudhuri, 1910) is an ornamental fish belonging to the family Nemachilidae, mainly reported from several localities in the Ganges River basin of Uttar Pradesh and Bihar in Northern India. During a study on indigenous ornamental fish diversity in Paschim Medinipur district, *P. mackenziei* has been recorded for the first-time from Kangsabati River basin. The specimens have been identified based on morphometric and meristematic characteristics. This report is the extension of the distribution of the species up to the South-Western part of West Bengal.

Keywords: loach; Nemachilidae; ornamental fish; *Paracanthocobitis mackenziei*; first record; West Bengal

1 | INTRODUCTION

The zipper loach under the genus of *Paracanthocobitis*, is a worldwide distributed species rich group of family Nemachilidae found throughout the South East Asia (Arunkumar *et al.* 2019). This genus is extended from Indus basin of Pakistan to the Salween drainages, the Malay Peninsula, Cambodia and Laos in the Mekong basin (Kottelat 1990; Pethiyagoda 1991; Arunkumar *et al.* 2019). The genus *Paracanthocobitis* was created by Grant (2007) as a sub-genus of *Acanthocobitis* and after that Singer and Page (2015) recognised *Paracanthocobitis* as a distinct genus which includes 14 valid species. *Paracanthocobitis* has differentiated from *Acanthocobitis* by the characteristic features such as emarginate or truncate (vs. pointed) caudal fin, 9 ½–15 ½ (vs. 17 ½–19 ½) branched dorsal-fin rays, rounded (vs. triangular-shaped) head in lateral view, horizontally (vs. vertically) aligned suborbital flap or groove, papillated pad on either

side of narrow (vs. wide) with medial interruption of lower lip and anus closer to pelvic-fin insertion than to anal-fin insertion (vs. nearer to anal-fin insertion) as mentioned by Singer and Page (2015). The genus is distinct from all other genera of the family Nemachilidae by the combination of characters like, lower lip with a large papillated pad on either side of a median barrier, upper lip with 2–5 rows of papillae and continuous with lower lip, conspicuous black spot with ocellus on upper half of caudal-fin base (Kottelat 2012; Singer and Page 2015). Present literature survey reveals the existence of 20 valid species of the genus and among which eight species are reported from India (Shangningam *et al.* 2019).

Paracanthocobitis mackenziei is the most abundant species of the genus *Paracanthocobitis* and is reported from the Ganges River basin of Nepal and Northern India, the Meghna River basin in eastern Bangladesh, the Mahanadi River basin in eastern India, Narmada River

basin in central India, the upper Indus River basin of Northern India and eastern Pakistan (Singer and Page 2015). The species survive in areas with open sand or mixed cobbles, pebbles, boulders, streams and small rivers (Singer and Page 2015). Dey et al. (2021) reported *P. mackenziei* from Kameng River system, Arunachal Pradesh. Barman (2007) has reviewed on the freshwater fish fauna of West Bengal and not enlisted this species. Mogalekar (2017) noted a list of freshwater fishes of West Bengal based on published literature in the form of different research articles, monographs and species checklists from 2003 to 2015 but did not record *P. mackenziei*. Acharjee and Barat (2014) have reported the loaches of Darjeeling Himalaya and adjoining areas of West Bengal but the study species was not recorded. Various other researchers (e.g. Das 2018; Paul and Chanda 2014, 2017; Jana et al. 2015, 2020, 2021; Pahari et al. 2017; Kisku et al. 2017; Kar et al. 2017; Sit et al. 2020, 2022; Chanda and Jana 2021) studied fish diversity of different rivers and other water bodies of the study area but did not report presence of *P. mackenziei*. Therefore, the present study reveals the first record of *P. mackenziei* in the Kangsabati River basin of Midnapore which has contributed to the macro-faunal diversity of the Paschim Medinipur as well as West Bengal, India.

2 | METHODOLOGY

Specimens (Figure 1) were collected from the Kangsabati River basin (22°23'55.0"N 87°20'33.9"E and 22°24'31.3"N 87°17'54.3"E) of Midnapore, West Bengal, India. Fish specimens were collected by the use of cast net with a mesh size of 2 – 3 mm. After collection, the specimens were immediately preserved in 4% formaldehyde and brought to laboratory of the department of Zoology (PG) of Raja N. L. Khan Women's College (Autonomous) for further studies. Finally, specimens were washed and preserved in 6% formaldehyde in a labelled container (ID. RNLK/ZOO/ORN/FISH/50) and kept in the museum of Zoology, Raja N. L. Khan Women's College (Autonomous). The specimens have been identified based on the morphometric and meristic characteristics such as body length, depth, colour, colour band, shape, size, fin number, fin shape, fin ray's number and number of lateral line pore etc. (Singer and Page 2015).

3 | RESULTS

3.1 History of the species

Paracanthocobitis mackenziei was originally described as *Nemachilus mackenziei* Chaudhuri, 1910 from Northern India (Cheriyadhang near Kathgodam). A brief history of the species has been given below.

1910 *Nemachilus mackenziei* Chaudhuri, Records of the Indian Museum (Calcutta) 5(pt 3); Northern India (several localities): 183.

1978 *Nemacheilus botia* Shrestha, Fish fauna of

Nepal. Journal of Natural History Museum Tribhuvan University 5(1–4): 33–43.

2007 *Acanthocobitis* (*Paracanthocobitis*) *botia* Grant, A new subgenus of *Acanthocobitis* Peters, 1861 (Teleostei: Nemacheilidae). Ichthyofile No. 2: 1–9.

2015 *Paracanthocobitis mackenziei* Singer and Page, Revision of the zipper loaches, *Acanthocobitis* and *Paracanthocobitis* (Teleostei: Nemacheilidae), with descriptions of five new species; missing journal name / publication title 103(20): 386–389.

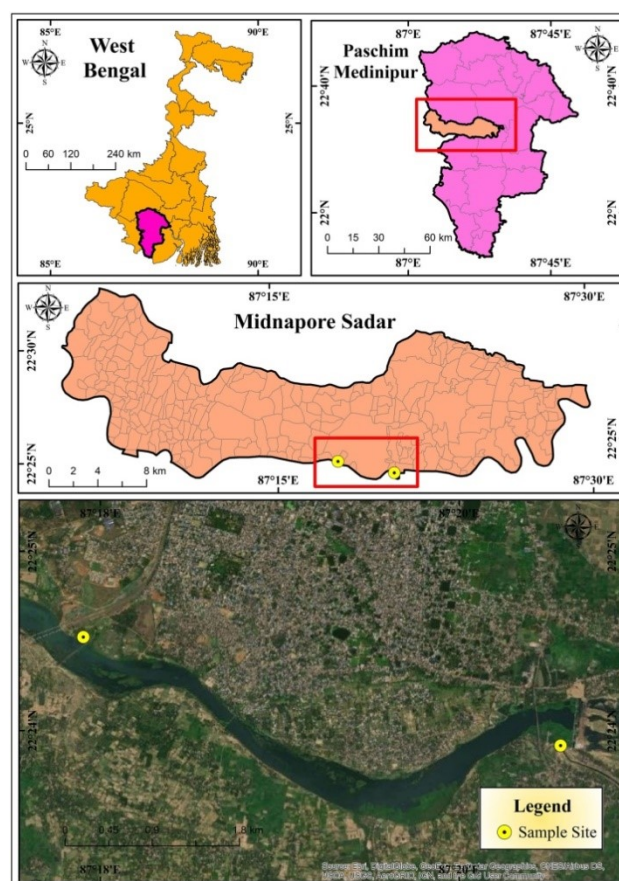


FIGURE 1 Map of the study area showing sampling.

3.2 Materials examined

One female (6.4 cm) and one male (7.3 cm) specimens, Midnapore (22°23'55.0"N 87°20'33.9"E), Paschim Medinipur, West Bengal, India, 22 Mar 2021, G. Sit; one female (7.5 cm), one male (7.1 cm) Midnapore (22°24'31.3"N 87°17'54.3"E), Paschim Medinipur, West Bengal, India, 24 Apr 2021, G. Sit.

3.3 Diagnosis

3.3.1 Morphological view

Body is robust, large size, deeper pre-dorsally than post-dorsally. Head slightly depressed, snout rounded, eyes large, near top of head, slightly nearer to tip of snout than the end of operculum. Presence of transverse bands in caudal fin, suborbital flap in male; axillary pelvic lobe

present; lateral line complete with 80 – 100 pores (Figures 2 – 3; Table 1).

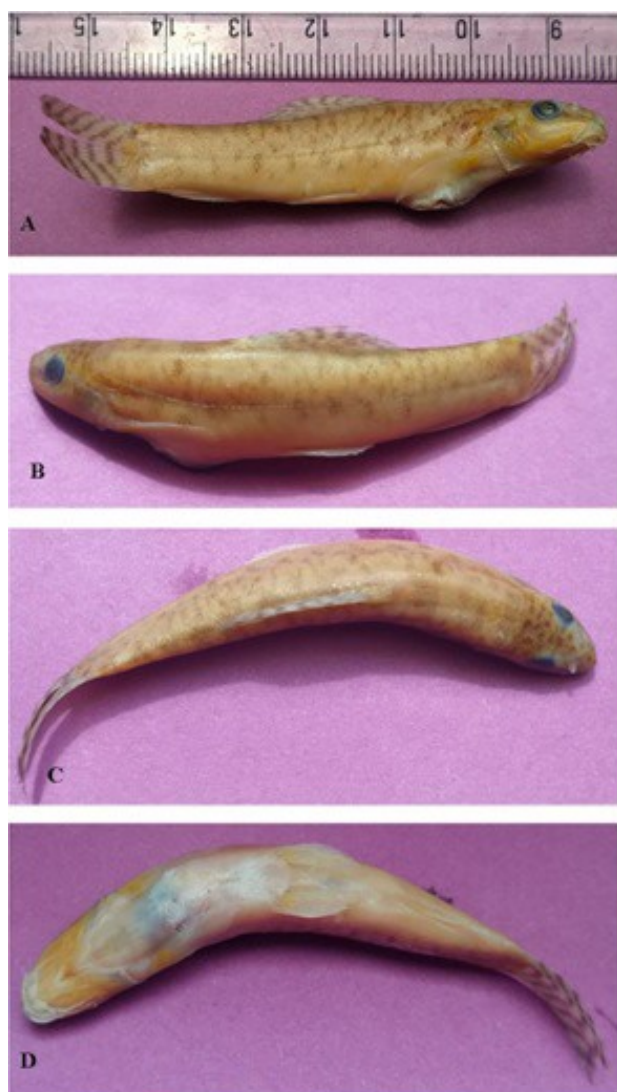


FIGURE 2 *Paracanthocobitis mackenziei* (Chaudhuri 1910). A and B, lateral views; C, dorsal view; D, ventral view.

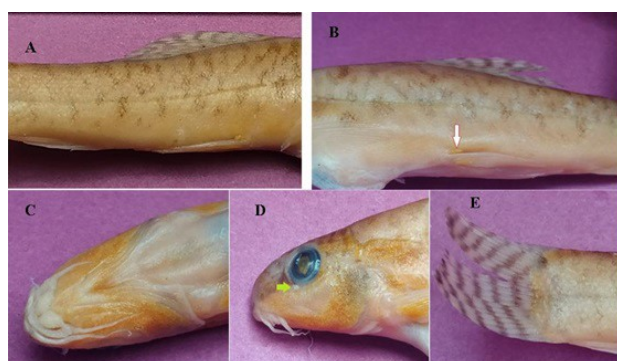


FIGURE 3 Parts of *Paracanthocobitis mackenziei* (Chaudhuri 1910). A, colour pattern on body; B, axillary pelvic lobe; C, ventral view of head showing papillated lips; D, preorbital flap; E, tail with dark band and round black spotted ocellus.

TABLE 1 Morphometric data of *Paracanthocobitis mackenziei* between studies.

Parameters	Length (mm)	
	Present study	Singer and Page (2015)
Morphometric characteristics		
Standard Length	55.0 – 65.0	28.8 – 72.7
Predorsal length/SL%	35.0 – 42.7	40.2 – 49.1
Head length/SL%	19.1 – 21.8	18.2 – 23.3
Snout length/SL%	6.0 – 8.6	7.1 – 11.1
Pre-pelvic length/SL%	43.5 – 51.0	45.1 – 54.3
Pre-anal length/SL%	66.5 – 77.5	66.7 – 80.3
Body depth/SL%	14.5 – 16.7	11.9 – 21.5
Caudal peduncle depth/SL%	9.0 – 11.0	8.5 – 13.9
Pectoral-fin length/SL%	14.0 – 18.2	18.0 – 24.9
Pelvic-fin length/SL%	11.1 – 15.5	13.3 – 18.7
Eye diameter/HL%	21.0 – 24.1	21.4 – 31.8
Interorbital width/HL%	20.0 – 26.5	21.4 – 33.9
Meristic characteristics		
Dorsal fin	12	10 ^{1/2} -12 ^{1/2}
Anal fin	6	–
Pelvic fin	8	8
Pectoral fin	11	11-14

3.3.2 Colour

Body olivaceous yellow and colour pattern with 11 – 13 thin dorsal saddles that connect to blotches along lateral line forming a zigzag pattern dipping below the lateral line (Figure 3). Pattern variable in this species with some having larger zigzag pattern, disconnected saddles or long s-shaped saddles that extend below lateral line. Ocellus with small round black spot well below upper margin of caudal peduncle and 5 – 7 transverse dark bands on caudal fin.

3.3.3 Others

Habitat: The species inhabit in streams and small rivers, areas of open sand or mixed cobbles, rocks and boulders (Singer and Page 2015).

Sexual dimorphism: Suborbital flap present in males but absent in females (Singer and Page 2015).

IUCN Conservation status: Least Concern (Devi and Boguskaya 2009).

Local Status: Very low abundance in the study area.

4 | DISCUSSIONS AND CONCLUSIONS

Paracanthocobitis mackenziei is distinguished from all other *Paracanthocobitis* by having complete lateral line, presence of axillary pelvic lobe and thin dark dorsal saddles connected to small dark blotches on side just below lateral line, small round black spot well below the upper margin of caudal peduncle, suborbital flap present in males (Singer and Page 2015). After comparison of morphometric and meristic data with Singer and Page (2015) it is confirmed that the present specimen is the *P.*

mackenziei. Present work is the first-time record of the species *P. mackenziei* (Chaudhuri, 1910) from the Kangsabati River basin, Paschim Medinipur district of West Bengal. Present report is the extension of distributional range for the species up to South-Western part of Bengal as well as addition to the indigenous ornamental fish faunal richness of West Bengal, India. This species is an attractive ornamental fish due to its olivaceous yellow body colour, with zigzag pattern blotches, eye spot on caudal peduncle and peaceful in nature which attract a wide range of aquarists. However, it is found in very low number in the study area. If it is possible to develop its aquaculture and captive breeding technique of this species, it will be possible to conserve the fish species as well as can bring economic prosperity to the local people.

Acknowledgements

Our deep sense of gratitude to the Department of Science & Technology and Biotechnology, Government of West Bengal for sanctioning research grant in the form of a major research Project (Grant ID: 0149/RND/ANI-FISH/Nil/Jan-2021/1/1) to A. Chanda, under which the present work has been conducted. Authors are indebted to the Principal of Raja Narendra Lal Khan Women's College (Autonomous) and departmental faculty and staff members of PG Zoology for their constant inspiration and help to conduct sustainable research work for the benefit of science and society. Corresponding author is deeply grateful to the Head of the Department of Environmental Science, Sambalpur University for allowing facilities to him as a Post-Doctoral Research Scholar of the department.

CONFLICT OF INTEREST

Authors have declared no conflict of interest for the present work.

AUTHORS' CONTRIBUTION

AC designing, monitoring, coordination; GS specimen collection, data analysis, draft manuscript writing; AJ data analysis, draft manuscript writing; SKS, critical review of the manuscript.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author.

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