Uttar Pradesh Journal of Zoology

Volume 45, Issue 18, Page 546-552, 2024; Article no.UPJOZ.4010
ISSN: 0256-971X (P)

New Record of Threatened Fish Species of *Clupisoma naziri* from River Gomati of Tripura, India

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Authors' contributions

This work was carried out in collaboration between both authors. Author PB project investigator performed field surveys collected samples validated curated draft. Author DRT performed taxonomical studies and validated species and curated final draft. Both authors read and approved the final manuscript.

Article Information

DOI: https://doi.org/10.56557/upjoz/2024/v45i184471

Open Peer Review History:
This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: https://prh.mbimph.com/review-history/4010

Original Research Article

Received: 04/07/2024
Accepted: 11/09/2024
Published: 17/09/2024

ABSTRACT

Morphometric and meristic characteristics of *Clupisoma naziri* was explored in Gomati River Tripura and the poorly known *C. naziri*, was newly recorded from the river at 23°33.144'N, 91°36.732' E, elevation 39 m and 23°31.676'N, 91°39.184' E, elevation 30m. Morphometric measurements (8 Male and 4 female) show the mean length and weight of the fish is 29.3±3.4cm and 246 ±7.1g respectively. Meristic counts show 40–45 anal-fin rays which is one of the important distinguishing characters of the species. The average water pH of the sampling site observed 6.7–7.2. Dissolved oxygen observed 5.6–6.4 mg/l, Total alkalinity 55–56 mg/l and Transparency observed 15–25 cm.

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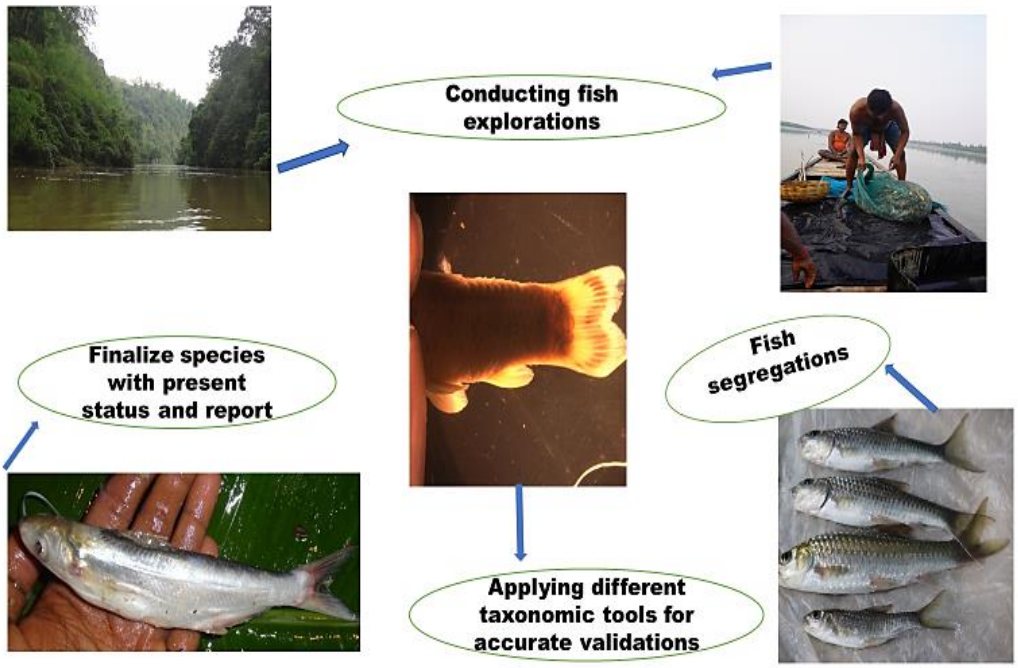
Cite as: *Bhattacharjee, Pampa, and Diamond Rajakumar Tenali. 2024. "New Record of Threatened Fish Species of Clupisoma Naziri from River Gomati of Tripura, India". UTTAR PRADESH JOURNAL OF ZOOLOGY 45 (18):546-52. https://doi.org/10.56557/upjoz/2024/v45i184471.*

Graphical Abstract

Clupisoma naziri is currently considered near threatened by IUCN criteria, and therefore, it is urgent to take conservation measures and to study biological parameters of the fish to protect the fish in nature as well as in culture.



Keywords: Cat fish; exploration; first report; morphometric measures; Northeast India.

1. INTRODUCTION

Clupisoma naziri (Figs. 1 and 2) Mirza and Awan [1] belongs to the order Siluriformes, family Schilbeidae and subfamily Schilbeinae. Family Schilbeidae consists of six genera: *Ailia, Clupisoma, Eutropiichthys, Neotropius, Silonia* and *Horabagrus* Jayaram (2010). *Clupisoma* is easily distinguishable from other genera by the cleft of mouth which is not oblique, abdominal edge rounded, abdominal edge keeled throughout Viswanath [2], Jayaram [3]. *Clupisoma* comes from Latin, *clupea* meaning sardine which itself is derived from *clupeus* meaning shield in Greek and soma means body, so named because of its similar shape to sardines and herrings. Genus *Clupisoma* includes eight species, *Clupisoma bastari* Datta and Karmakar [4], *C. garua* Hamilton-Buchanan [5], *C. marcrophthalmus* Blyth [6], *C. montana* Hora [7], *C. naziri* Mirza and Awan [1], *C. prateri* Hora [7], *C. roosae* Ferraris [8], and *C. taakree* Sykes [9]. Important characters of *Clupisoma* are dorsal fin short with one spine and 6–8 rays, a very small adipose dorsal that may be absorbed in the adult, pectoral fin with serrated spine and 11–12 rays. The anal fin is long with 29–44 rays terminating at some distance from a forked caudal fin. Four pairs of barbels are present, nasal barbels are short and not extending even to the anterior margin of eye. Palate teeth present and air or reduced, thick walled and flattened Day [10], Datta Munshi and Srivastava [11]. Among all species of *Clupisoma*, *C. garua,* and *C. montana* are previously recorded in the Tripura Goswami et al. [12]. While conducting fish exploratory surveys in Gomati river for fish diversity analysis, we collected 12 unknown specimens *clupisoma* which analysis led us to report range extension of *Clupisoma naziri* for first-time from Northeastern Indian state of Tripura.

Fig. 1. *Clupisoma naziri* (300 mm) specimen plate

Fig. 2. *Clupisoma naziri* (220 mm) specimen

2. MATERIALS AND METHODS

Twelve specimens of *Clupisoma naziri* were collected from the river Gomati during the month of Jan- May 2021. The specimens were collected from the middle stretches of the river, while randomly sampling and the GPS recorded of the sample site, N- 23°33.144' E- 91°36.732' Elevation was 39 m and N- 23°31.676' E- 91°39.184' Elevation was 30 (Figs. 3 and 4). Fish specimens collected from the sampling sites with the help of local fishermen and preserved in 10% formalin solution at the sampling site itself. Later preserved specimens were transformed and stored in the glass/ plastic jars after processing in the laboratory. Body measurements of the specimens was taken using Mitutoyo Vernier Caliper before permanent preservation. Different water quality parameters of the habitat *viz*., Temperature, pH, DO, and alkalinity were measured by following the standard method APHA [13]. Identification was mainly done based on various morphometric and meristic characters on both fresh and preserved specimens. In fresh specimens, color had been taken for consideration during identification, where as it was not possible for preserved specimens. The sampled fish specimens were identified with the help of standard literature viz, Talwar and Jhingran [14], Viswanath [2], Barman [15], Jayaram [3].

Fig. 3. Sampling sites (Chabimura) of *Clupisoma naziri* (Anwar and Mirza)

Fig. 4. Sampling site (Amphicherra) of *Clupisoma naziri* (Anwar and Mirza)

3. RESULTS

The male 8 and female 12 fish specimens of *C. naziri* were separated for further study. It was observed that the male fishes are comparatively larger than female fish specimens. The body colour showed that the fish was silvery in colour with smooth and shiny skin; dorsal region of the body was darker than the abdomen. Elongated body, dorsal profile slightly convex, and the posterior dorsal fin was nearly horizontal. The head region greenish in colour. The lateral line is straight and complete. Snout almost rounded but in anterior most regions observed sharp elevation in front. Eye placed ventro-laterally and clearly visible from dorsal view. Mouth subterminal. Caudal fin deeply forked, pelvic fin moderate in size, anal fin base larger in size, and pectoral fins appeared triangular. There is a keel between the pelvic fin and the vent is present in the specimens of *C. naziri*.

Morphometric measurements (Table 1) showed that mean total wet body weight of *C. naziri* was recorded as 246 ±7.1g. While mean total length of the sampled specimens of *C. naziri* was measured as 29.3 ±3.4cm, whereas standard length of sampled fish specimens ranged from 23.3-28.5cm with mean value of 26.13±1.1cm. The mean length of dorsal, caudal, pectoral, pelvic and anal fin were measured as 4.1±0.34cm, 4.47±1.1cm, 3.91±0.98 cm, 2.21±1.56cm and 2.31±0.88cm respectively. The mean body depth was measured 5.47±0.34cm. (Table 2).

Among meristic counts (Table 1), dorsal fin rays were 8 in number. Pectoral fin rays ranged from 11-12, whereas 6-7 and 24-25 pelvic and caudal fin rays, respectively were recorded in the specimens. The number of anal fin rays observed 40-45 in the specimens of *C. naziri.*

The average water temperature of sampling sites of Gomati River was observed 28.5^0C. The pH of Gomati River is in between 6. 7 to 7.2 which is neutral to slightly alkaline. Whereas the average Dissolved Oxygen was found 6.18mgL^{-1} and the range of alkalinity was observed in between 36.28 to 62.33 mgL^{-1}.

Table 1. Meristic count of *Clupisoma naziri* [1] collected from river Gomati of Tripura, India

Sl. No.	Name of the parameters	Number
1	Dorsal fin ray (DFR)	8
2	Pectoral fin ray (PcFR)	11-12
3	Pelvic fin ray (PeFR)	6-7
4	Anal fin ray (AFR)	40-45
5	Caudal fin ray (CFR)	24-25

Table 2. Morphometric measurement of *Clupisoma naziri* collected [1] from River Gomati of Tripura, India

Sl no.	Name of the parameters	Specimen I (Male)	Specimen II (Female)	Range	Mean
1	Total weight (in g)	254 ± 10.11	239 ± 5.77	232-259	246 ±7.1
2	Total length (in cm)	30.2 ± 2.1	29.6 ±5.3	26.6-36.2	29.3 ±3.4
3	Fork length (in cm)	28.3 ±1.1	27.1 ±4.3	24.1-29.4	27.13 ±2.6
4	Standard length (in cm)	27.5 ±2.3	26.3 ±3.2	23.3-28.5	26.13 ±1.1
5	Post dorsal length (in cm)	9.2 ±0.02	7.7 ±2.1	7.6-9.5	8.5 ±0.6
6	Pre dorsal length (in cm)	7.8 ±0.5	6.5 ±0.44	6.1-7.9	6.93 ±1.2
7	Pre pelvic distance (in cm)	10.9 ±0.44	10.1 ±0.74	9.81-11.4	10.53 ±1.8
8	Head length (in cm)	5.2 ±0.66	4.2 ±0.89	3.9-5.5	4.67 ±0.99
9	Caudal fin length (in cm)	5.0 ±0.11	4.1 ±2.34	3.8-5.3	4.47 ±1.1
10	Dorsal fin length (in cm)	4.2±0.45	3.9±0.78	3.6-4.4	4.1 ±0.34
11	Adipose fin length (in cm)	0.9±0.05	0.7±0.98	0.6-0.9	0.7 ±0.19
12	Pectoral fin length (in cm)	4.1±0.33	3.7±1.45	3.5-4.4	3.91 ±0.98
13	Pelvic fin length (in cm)	2.2±0.12	2.2±0.78	2.0-2.4	2.21 ±1.56
14	Anal fin length (in cm)	2.5±0.45	2.3±0.68	2.1-2.6	2.31 ±0.88
15	Caudal fin height (in cm)	6.7 ±0.12	6.3 ± 0.6	6.1-6.7	6.43 ±0.56
16	Body depth (in cm)	5.8 ±0.43	5.5 ±0.78	5.2-5.8	5.47 ±0.34
17	Eye diameter (in cm)	0.6 ±0.45	0.5 ±0.2	0.6-0.5	0.53 ±0.40

4. DISCUSSION AND CONCLUSION

The schilbid catfishes (Schilbeidae) family of catfishes native to Africa and southern Asia. These fish tend to swim in open water. Schilbid catfishes usually have dorsal fins with a short base and a spine, but *Ailia* and *Parailia* lack a dorsal fin altogether. Most species also possess an adipose fin. The base of the anal fin is very long. There are usually four pairs of barbels. The family name is sometimes spelled Schilbidae in scientific literature. *Clupisoma naziri* was described by Mirza and Awan [1] from the river Indus near Jinnah Barrage and the river Khiale (Swat River system) near Khatki village. Its range was subsequently extended upto Tarbela Dam in the Indus, up to Muzaffarabad in the Jhelum and some other tributaries of river Indus in Pakistan and Azad Kashmir. *C' garua* described by Hamilton, 1822 from the gangetic region of India and Bangladesh and *C. roosae by* Ferraris [8] *C. montana* described from the Teesta River of India by Hora [7]. *C. montana*, *C. naziri* distinguished by the presence of midventral keel in the abdomen. This character separated them from all other species of South Asian *Clupisoma.* The Abdominal keel character was used in the keys of genus *Clupisoma* Talwar and Jhingran [14], Jayaram [16]. This species is very similar to *C. garua* Mirza (2004). It is found that the abdominal keel characters are not included the key characters of the fishes Jayaram [3]. The abdominal keel in *Clupisoma naziri* is highly variable. It was not mentioned in the original description by Mirza and Awan [1]. In case of *C. bastari* it extends up to vent anteriorly onto the thorax. However, it has been observed that in present study a keel between the pelvic fins and the vent is present in *C. naziri,* like that in *C. garua* Hamilton (1822) from the gangetic region of India and Bangladesh can be distinguished from *C. roosae* Ferraris [8] is having substantially fewer branched anal fin rays (less than 33 in *C. garua* and more than 43 in *C. roosae* as well as adipose dorsal fin which is present in *C. roosae*. *C. naziri* Mirza and Awan [1]) is distinguished by presence of maxillary barbells extending up to or beyond base of pelvic fins, anal fin with 40 to 47 rays whereas in *C. garua* it is 29 to 36 Jayaram [3]. However, anal fin rays' number 41-43 in *C. montana,* 52-54 in *C. bastari,* 40-44 in *C. prateri* and 47-50 in *C. roosae* Jayaram [3]. In the present study also anal fin rays in *C. naziri* counted 40-45 numbers. *C. garua* grows up to 60 cm in total length whereas *C. naziri* grows up to 36 cm in total length Arshad et al. [17]. In the present study also the range of total length of all sampled specimens observed 28.6-30.2 cm.

C. garua is mainly distributed in the plains but *C. naziri* is found in the hilly region Arshad et al. [17]. The specimens of *C. naziri* were also collected from a hilly region of Tripura. It is a fresh water demersal fish species. Water pH near neutral to slightly alkaline (6.5 - 8) is harmless for fish health Saha [18]. The pH of Gomati River is in between 6.7 to 7.2 which is neutral to slightly acidic and is good for fish culture [19].

The species first time recorded from Tripura, India. Generally, the species of *Clupisoma* are of consumer preferred fish. Therefore, the knowledge of the biology and breeding of the species will help the farmers to produce the seed for culture practices [20,21].

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are completely incorporated in this manuscript.

FUNDING

ICAR-National Bureau of Fish Genetic Resources, Lucknow "Exploration and Characterization of Fish germplasm and Indigenous fisheries Knowledge of major rivers of Tripura.

ACKNOWLEDGEMENTS

We express our sincere thanks to the NBFGR, Lucknow for funding the project entitled "Exploration and Characterization of Fish germplasm and Indigenous fisheries Knowledge of major rivers of Tripura, and Mitra Debnath, Debtanu Barman and Anjan Das for their help in field investigations.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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