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Morphometric and Meristic Studies of Ornamental Banded Gourami *Colisa fasciata* (Bloch and Schneider, 1801); A Freshwater Osphronemidae of Ramgarh Lake, Gorakhpur, Uttar Pradesh, India

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Abstract: This study describes the morphometric and meristic characters of *Colisa fasciata*, from Ramgarh lake, Gorakhpur, Uttar Pradesh, India. Total 32 specimens of *Colisa fasciata* were occasionally collected from the Ramgarh lake, Gorakhpur, India during the period from July 2023 to January 2024 with the help of local fishermen. Fish fin rays are counted with the use of a magnifying glass. Different lengths (e.g., TL, SL, PrDL etc.) are measured using slide calipers and the total body weight (BW) was weighed by an electronic balance with a 0.01 g accuracy for each individual. Minimum and maximum size were 62.7 – 81.1 mm in total length (TL) and 7.1- 8.2 g in body weight. The fin formula of *Colisa fasciata* is: dorsal, D.10-17; pectoral, Pc. 1-10; pelvic, Pv.1; anal, A.15-17 and caudal, C.16. This study is helpful for species identification of *Colisa fasciata* from Ramgarh Lake, Gorakhpur.

Keywords: Morphometric, Meristic study, *Colisa fasciata*, Fin rays, Ramgarh lake

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Introduction

Colisa fasciata, commonly known as giant or banded gourami is a popular ornamental fish due to its brilliant colour pattern, small size and peaceful nature (Rahman *et al*., 2019). It is a tropical labyrinth fish that belongs to the Osphronemidae family and is found in freshwater and estuaries (Romero, 2002; Froese and Pauly, 2018). According to Menon (1999) and Craig *et al.* (2004), this fish was mostly found in lowlands and sub-montane regions, where it could be found in rivers, streams, ponds, beels, floodplains, baors and haors. It mainly preferred grassy environments. According to Huang *et al*. (2011), it is an extremely resilient and erect species. Because they are omnivores by nature, fish can eat live, frozen or slivered food (Goodwin, 2003).

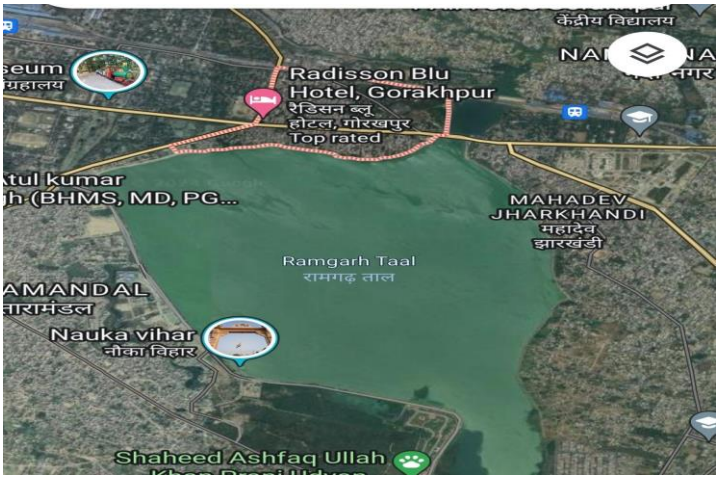


Fig. 1: Study area --Ramgarh lake, Gorakhpur, India (Source: Google Map).

According to Talwar and Jhingran (2001), this particular species of fish is traditionally valued for its delicious flavor and is kept as a peaceful and lovely aquarium fish. Though this species is considered a minor in terms of marketable catches due to its small size it is substantially captured as a bycatch (Rahman *et al*., 2019; Hossain *et al*., 2019). It is regarded as a largely marketable fish species for the aquaria (Froese and Pauly, 2018).

Colisa fasciata has ecological value as it controls malaria, chikungunya etc. as it feeds on mosquito larvae. This fish plays an important role in meeting the nutritional requirements of poor fishermen in India and its neighbouring countries like Bangladesh, Myanmar and Sri Lanka (Mitra *et al*., 2007). This fish species has also gained importance for its ornamental value as an indigenous aquarium fish. This species is rapidly declining from our natural habitat, as human intervention and alteration of its habitat has resulted in a great reduction in natural food and breeding grounds (Hossen *et al*., 2014). Overexploitation and use of pesticides and insecticides in the surrounding agricultural areas are the main causes of threat to ornamental fish (Behera *et al*., 2015). *Colisa fasciata* is in the 'least concern' category in the IUCN Bangladesh (2015).

The Greek terms "morph," which means shape or form and "metron," which means measurement, are the earliest forms of the word "morphometrics". Parsons *et al.* (2003) defined morphometrics as a measurement tool for morphology or shape of fish. Morphometric and meristic characteristics are salutary for species recognition and classification (Bagenal and Tesch, 1978; Jayaram, 1999; Hossen *et al*., 2018). In order to compare the life history and morphological trends of fish populations, morphometric features are an essential part of fisheries research (Hossain *et al*., 2014; Elahi *et al*., 2017). The present study was intended to describe the morphometric and meristic characters of *Colisa fasciata* in the Ramgarh lake, Gorakhpur, Uttar Pradesh, India via a number of specimens with various size over a study period from July 2023 to January 2024.

Materials and Methods

Study area and sampling

Ramgarh is located in Gorakhpur, Uttar Pradesh, India (Fig. 1). The lake is present northeast of Gorakhpur city with the coordinates 26°13'-27°29' and 26°44'N 83°25'E. A total of 32 individuals of *Colisa fasciata* were intermittently collected from the month of July 2023 to January 2024. This fish was collected from the site, with the help of local fishermen by using various fishing gears, such as cast net (mesh size: 1.0-2.0 cm), gill net (mesh size: 1.5-2.5 cm) and square lift net (about 1.0 cm). After collection the fish specimens were preserved in 10% buffered formalin and brought to the

Fig. 2: *Colisa fasciata* collected from Ramgarh lake, Gorakhpur, India.

laboratory situated in Department of Zoology, St. Andrew's College, Gorakhpur.

Measuring tools

A magnifying glass was used to count the total number of fin rays. Total body weight (BW) was measured for each fish specimen with an electronic balance, while digital slide calipers were used to measure diverse and distinct linear dimensions (lengths) to the nearest 0.01 g and 0.01 cm, respectively.

Results and Discussion

To classify and identify species, morphometric and meristic characteristics are helpful. The body of *Colisa fasciata* is compressed laterally and has an egg shape. Both the ventral and dorsal profiles are nearly equally convex. Large eyes, broad lips and an intercepted lateral line are characteristics. Scales are present on head, body and base of dorsal and anal fin. There are modifications, such as the long pectoral fin reaching the tenth spine of the anal fin. Body colour is greenish and bluish above, pelvic with yellow white base and brilliant greenish. Dorsal and caudal fins spotted with orange coloured. Typically, caudal cuts square. Across the body, there are roughly nine to eleven greenish bands. In the longitudinal lateral line series, the scale numbers are 29–31 (Fig. 2).

Meristic Counts

For the meristic counts of fin of *Colisa fasciata* the dorsal, pectoral, pelvic, anal and caudal fins were observed by a magnifying glass.

Fish measurement

Total length (TL), Standard length (SL), Pre-dorsal length (PrDL), Post-dorsal length (PoDL), Pre-pectoral length (PrPcL), Pre-pelvic length (PrPvL) and Pre-Anal length (PrAnL) were measured using a slide calipers and illustrated in Table 1. Each individual's body weight (BW) was measured with an accuracy of 0.01 g. The meristic measurements of *Colisa fasciata* are shown in Table 2. The various fins of *Colisa fasciata* are depicted in Figure 3.

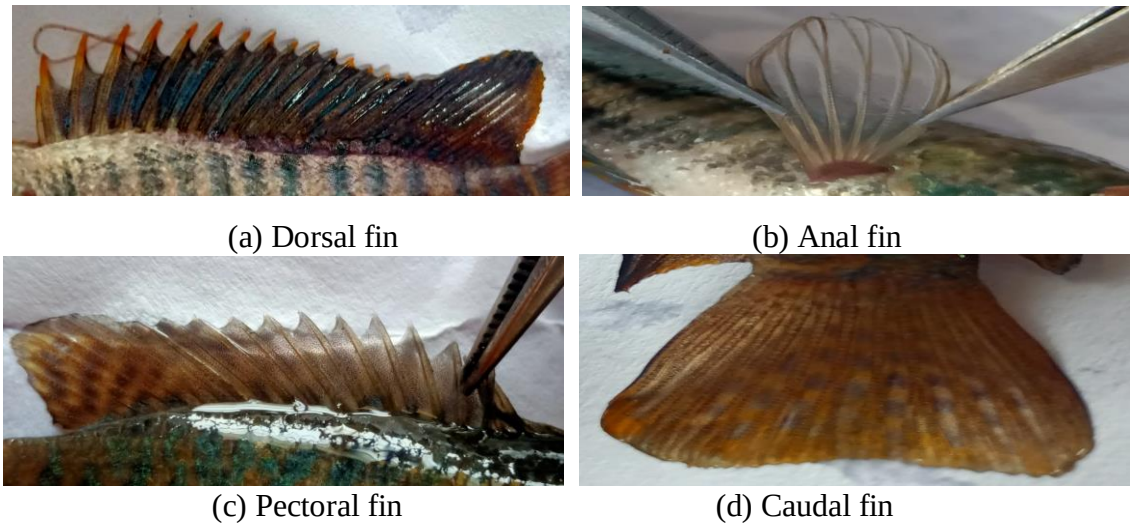
Very little information is available on *Colisa fasciata's* morphometric and meristic features. The present study describes the morphometric features and meristic counts of *Colisa fasciata.* Considering the populations in various locations, the length-weight relationship (LWR) is helpful in distinguishing between them (Le Cren, 1951; Chonder, 1972). 32 specimens ranging in body size from small to large were sampled in this study; however, in the collected sample, all the species were bigger than 62.7 mm and smaller than 81.1 mm of TL. In the present study the maximum length of *Colisa fasciata* observed was 81.1 mm. Earlier maximum length has been reported as 8.14 cm (Kalita *et al*., 2016); 8.10 cm (Borah *et al.*, 2017) 8.8 cm (Rahman *et al.*, 2019). However, Menon (1999) and Sarkar *et al.* (2013) have reported the total length as12.5 and 9.6 cm, respectively. Therefore, the total length of *Colisa fasciata* measured in the present study is the least.

Table 1: Morphometric measurements of the *Colisa fasciata* (Bloch and Schneider 1801) (n=32) captured from the Ramgarh lake, Gorakhpur, India

S. No.	Measurement	Minimum (mm)	Maximum (mm)	Mean	Standard deviation
1.	Total length	62.7	81.1	73.33	6.07
2.	Standard length	53.2	63.2	59.3	3.32
3.	Pre-dorsal length	21.4	25.1	23.38	1.13
4.	Pre-pectoral length	21.5	23.4	22.38	0.54
5.	Pre-pelvic length	28.5	30.3	29.32	0.54
6.	Pre-anal length	23.1	24.2	23.58	0.29
7.	Post-dorsal length	56.1	57.4	56.64	0.33
8.	Body weight(g)	7.1	8.2	7.6	0.33

Table 2: Meristic measurements of the *Colisa fasciata* (Bloch and Schneider 1801) (n=32) captured from the Ramgarh lake, Gorakhpur, India

S. No.	Meristic count	Minimum	Maximum
1	Unbranched dorsal fin rays	XVII	XVII
2	Branched dorsal fin rays	X	X
3	Unbranched anal fin rays	XVII	XVII
4	Branched anal fin rays	XV	XV
5	Unbranched pelvic fin rays	I	I
6	Unbranched pectoral fin rays	I	I
7	Branched pectoral fin rays	X	X
8	Caudal fin rays	XVI	XVI
9	Latral line scales	XXIX	XXXI
10	Circumferential scales	XVI	XVIII



(a) Dorsal fin (b) Anal fin

(c) Pectoral fin (d) Caudal fin

Fig. 3: Different fins (a) Dorsal, (b) Anal, (c) Pectoral And (d) Caudal fin of the *Colisa fasciata*

In this study, the total number of dorsal fin rays was observed to be 10-17, pectoral fin 1-10, pelvic fin 1, anal fin 15-17 and caudal fin 16. This is in agreement with the observations of Rahman (2005), Talwar and Jhingran (2001) and Shafi and Quddus (1982).

Sexual dimorphism

Males and females were distinguished by their external morphology (Swarup *et al*., 1972). Males had a more prominent upper lip and more pointed dorsal ventral fins at the posterior region, while females have more rounded fins. On the other hand, males are longer and more colourful than females. Females have a silvery or pale grey colour.

Conclusion

The present study is useful for the diversity and conservation of the species *Colisa fasciata,* which has become more important due to its ornamental and decorative properties, therefore the use of morphometrics and meristics for this purpose appears to be very promising. The results of the study may prove useful to fisheries management authorities for further investigation and to develop new strategies for conservation.

Ethical Statement

The authors confirm that all ethical issues have been dealt with the research ethics guidelines provided by the organization.

Author Contributions

Km. Ranjana conducted the data collection and primary investigation for the study, and writing manuscript; Vijayakumar C. supervised the research, provided guidance throughout the study, and reviewed the final draft; Kumari Vandana and Singh Akhand Pratap assisted in manuscript writing and formatting. All authors have read and agreed to the published version of the manuscript.

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Conflict of Interest

The authors declare no conflicts of interest.

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