

First record of an anophthalmic unicorn cod, *Bregmaceros mccllellandi* Thompson, 1840 in dol net landings from Versova, Mumbai, Maharashtra

Manmeet Kaur Nalwa^{1*}, Ashok Kumar Jaiswar¹, Subal Kumar Roul¹, G.B.Sreekanth² & Sushanta Kumar Chakraborty¹

¹Central Institute of Fisheries Education (Deemed University), Panch Marg, Off Yari Road, Andheri (West), Versova, Mumbai - 400 061, Maharashtra, India

²ICAR Research Complex for Goa, Ela, Old Goa - 403 402, Goa, India

* [E-mail: simranmeet@rediffmail.com]

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Present study reports the first documented record of an anophthalmic specimen of unicorn cod, *Bregmaceros mccllellandi* without left eye caught by a dol net unit operated in the Arabian Sea, west coast of India and landed at Versova (Mumbai), northwest coast of India. The specimen was a mature female having 60 mm total length and 0.94 g total weight. Comparison of the morphometric and meristic characters of the anophthalmic specimen with a normal one does not show any considerable change in its size, shape or other morphological characters and meristic counts. This anomaly may be considered as congenital which has not affected the growth of the fish.

[Key words: Unicorn cod, *Bregmaceros mccllellandi*, left eye, phenotypic abnormalities]

Introduction

The fishes of the family Bregmacerotidae are represented by a single genus '*Bregmaceros*' with 14 valid species distributed in tropical and subtropical Seas^{1,2}. Spotted codlet, McClelland's unicorn-cod, or simply known as unicorn cod, *Bregmaceros mccllellandi* Thompson, 1840 is a small codlet fish which was fairly abundant along the northwest coast of India within the depth zone of 200 m and it reaches up to a maximum total length of 12 cm, common to 7 cm³. Presently this species is commercially exploited by dol net units along the coastal waters of Maharashtra and Gujarat, south-west coast of India⁴. The fish having elongated and silvery-brownish body. Two dorsal fins, the first one originated above the head and modified into a single ray. The second dorsal and anal fin are widely notched and extended towards the tail. Jugular ventral fin is composed of 5-6 long rays of which one or two are larger than the rest of the rays. This species is of commercial importance in the domestic market. Landings of unicorn cod in India have declined from 6,880 tonnes in 1950 to 1081 tonnes in 2012⁵. It is the only pelagic fishery resource

which has declined consistently.

Phenotypic abnormalities have been reported in several fish species. Some abnormalities are due to natural causes and some by anthropogenic activity. Dawson and Heal (1976) and Dawson (1964, 1966, and 1971) have compiled a bibliography of 1,499 papers that described abnormalities in fish; 63 of these papers (4.2%) described eye abnormalities⁶⁻⁹. Anophthalmia (the congenital absence of one or both eyes) can be observed in many fish populations^{10,11}. Anophthalmia either can be heritable or can be caused by environmental disturbances. Gross abnormalities can be problematic because they can affect marketability of the fish¹²⁻¹⁵. Consequently it is important to describe deformities, determine their frequencies and causative factors. The present communication describes a specimen of *B. mccllellandi* with anophthalmia i.e. absence of left eye collected in a dol net unit from the waters of Versova in the north-west coast of India and is a new record for the species in the Arabian Sea.



Fig. 1 Capture location of *B. mcclellandi* Thompson, 1840 (red spot), Versova landing centre

Table 1 Comparative morphometric and meristic characters of anophthalmic *B. mcclellandi* Thompson, 1840 with normal specimen captured from Versova, Mumbai waters.

Morphometric measurements/ meristic counts	Anophthalmic specimen	Normal specimen
Total length (mm)	60.00	60.00
Standard length	55.00	55.00
Pre-first dorsal fin length	7.00	6.70
Pre-pectoral fin length	10.00	10.0
Pre-pelvic fin length	6.00	6.10
Max. Body depth	7.00	7.20
Head length	9.00	8.70
Pelvic fin length	30.00	30.00
Pectoral fin length	6.00	6.20
First Dorsal fin length	14.00	13.80
Eye diameter (left)	-	3.00
First dorsal fin rays	1	1
Second dorsal fin rays	54	54
Pectoral fin rays	18	18
Pelvic fin rays	6	6
Anal fin rays	56	56
Branchiostegal rays	7	7
Lateral line scales	60	60
Caudal fin rays	19	19
Weight (g)	0.94	0.95
Sex	Female	Female

Table 2 Morphometric comparison (% of standard length in mm) of anophthalmic *B. mcclellandi* Thompson, 1840 with normal specimen captured from Versova, Mumbai waters

Morphometric characters	Anophthalmic	Normal specimen
Standard length	—	—
Pre-first dorsal fin length	12.73	12.18
Pre-pectoral fin length	18.18	18.18
Pre-pelvic fin length	10.91	11.09
Max. Body depth	12.73	13.09
Head length	16.36	15.81
Pelvic fin length	54.55	54.54
Pectoral fin length	10.91	11.27
First Dorsal fin length	25.46	25.09
Eye diameter (left)	—	5.45

Materials and Methods

While on observation for regular collection of this species, a specimen of *B. mcclellandi* with anophthalmia (absence of left eye) was collected on 10th October, 2013 from the landings of a dol net unit (fixed conical bag net) operated in fishing grounds of Versova waters (Mumbai) in Maharashtra at a depth of 10 m (Fig. 1). All the morphometric measurements were measured with a digital Vernier calliper with an accuracy of 0.1 mm and the specimen was deposited in the museum at the Central Institute of Fisheries Education, Mumbai (Fig. 2). Morphometric and meristic data of anophthalmic specimen was compared with a normal one (Fig. 3) of the same size and the detailed morphometric measurements and meristic counts are given in Table 1.

Results and Discussion

Meristic counts of the anophthalmic specimen was found to be as follows: 1 first dorsal fin rays, 54 second dorsal fin rays, 18 pectoral fin rays, 6 pelvic fin rays, 56 anal fin rays, 7 branchiostegal rays, 60 lateral line scales and 19 caudal fin rays. Similarly the morphometric measurements of anophthalmic specimen were found to be as follows: total length-60 mm, standard length-55 mm, pre-first dorsal fin length-7 mm, pre-pectoral fin length-10 mm, pre-pelvic fin length-6 mm, maximum body depth-7 mm, head length-9 mm, pelvic fin length-30 mm, pectoral fin length-6 mm and first dorsal fin length-14 mm. Comparative statements of morphometric and meristic characters of anophthalmic specimen with normal one were given in Table 1.



Fig. 2 Anophthalmic *B. mcclellandi* Thompson, 1840 (TL 60 mm and SL 55 mm) without left eye

In percentages of standard length of anophthalmic specimen, body depth was found to be 12.73%, head length 16.3%, pre-first dorsal fin length 12.7%, pre-pectoral fin length 18.1%, pre-pelvic fin length 10.9%, pelvic fin length 54.5%, pectoral fin length 10.9% and first dorsal fin length 25.4% (Table. 2). Detail of morphometric comparison (% of standard length in mm) of anophthalmic specimen with normal specimen was given in Table 2. No significant differences were found in their morphometric characters and meristic counts in the present study.



Fig. 3 Normal *B. maclellandi* Thompson, 1840 (TL 60 mm and SL 55 mm) with left eye

Vision is an important sensory requirement for most species of fish, which helps them to find food, shelter, mate and avoid predator. Non-heritable congenital eye defects including anophthalmia have been described in *Ictalurus punctatus*, *Oreochromis mossambicus*, *O. niloticus* and *O. aureus*¹⁶⁻¹⁹. Information on external anomalies is recorded because many are either caused or exacerbated by environmental factors and often indicate the presence of multiple, sub-lethal stresses. Morphological abnormalities are uncommon in wild fish populations²⁰. Temperature, salinity, dissolved oxygen, diet, chemicals, and organic wastes may causes different types of anomalies especially during the ontogeny and larval stages of fishes²¹. Several others had also recorded abnormalities in fish and prawn from Indian Waters²²⁻²⁴. In the present case, since the origin of left eye and eye socket is covered with normal skin (Fig. 2) and

without any external marks of injury, it has to be assumed that the abnormality is not the result of any physical injury but may be a congenital. However this defect has neither resulted in any other external abnormality in the specimen nor any change in its body shape.

Conclusions

From the comparison, it was clearly revealed that there were no marked differences in the morphometric features and meristic counts of the normal specimen with that of anophthalmic specimen. Therefore, it may be concluded that the absence of left eye has not affected the growth of the fish in case of present specimen.

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