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First record of the band fish *Acanthocepola indica* (Perciformes: Cepolidae) from the Bay of Bengal, Bangladesh

Tonmoy Saha[1], Sujan Kumar Datta[1], Ayesha Akhter Zhilik[2], Nishat Zahan Chowdhury[2] Sumaiya Ahmed[1] and Md. Sagir Ahmed[2*]

[1]Department of Zoology, Jagannath University, Dhaka 1100, Bangladesh

[2]Department of Zoology, University of Dhaka, Dhaka 1000, Bangladesh.

Abstract: We report the new record of the band fish *Acanthocepola indica* (Perciformes:Cepolidae) from the South eastern part of Bay of Bengal, Bangladesh. A single specimen of *A. indica* was collected on 31 March 2018 from BFDC fish landing center of Cox's Bazar. Morphometric and molecular approaches were applied for taxonomic identification. Body was relatively deep and gradually tapering to caudal fin. Total length (TL) and standard length (SL) of the specimen was 31.50cm and 29.30cm respectively. Number of fin rays was 75 in dorsal; 84 anal; 17 pectoral; 6 pelvic among which the outermost rays was the longest and 6 spine on pre-operculum. A dark blotch on anterior portion of dorsal fin was the most distinguishing characteristics from closely related species. The morphometric, meristic and DNA barcoding data thus confirmed the presence of *A. indica* in Bangladesh. This report updates the geographical distribution for this species confirming its presence in the coastal region of Bangladesh, and extends the number of marine fish known from the area.

Key words: *Acanthocepola indica,* band fish, Bay of Bengal, new record, COI gene.

Introduction

Cepolidae, the family of band fishes has five genera and 66 species, distributed in the tropical and subtropical seas throughout the world (Day, 1889; Smith, 1949; Shen, 1993; Heemstra, 1995). Members of this family are associated with a variety of marine habitats such as sandy or muddy bottoms, and reefs at depths ranging between 40 and 300m (Nakabo, 2002); usually found in 180 to 200m depth. It is widely distributed in Indo-west pacific: Natal in South Africa, India, Taiwan and Japan (Heemstra, 1995; Pradhan & Mahapatra, 2017; Shen, 1993; Nakabo, 2002). Recently band fish, *A. indica* was reported from Maemul Island,Korea (Park et al. 2008).

On 31 March 2018, a single species of *A. indica* was captured from Cox's Bazar. The present study reports the occurrence of the band fish *A. indica* from the coastal area of the Bay of Bengal, Bangladesh. The presence of *A. indica* was confirmed based on morphometric and molecular (DNA barcoding) approaches.

Material and Methods

Sampling and Morphological analysis

A single specimen of *A. indica* was collected on 31 March 2018 from BFDC fish landing center of Cox's Bazar, (20°16'54.5"N 90°39'57.3"E) Bangladesh (Fig. 1). It was caught by fishermen during bottom trawl fishing in the off coast of Cox's Bazar, as by catch. Immediately after collection the specimen was preserved in ice and transported to the DNA Barcoding lab, Department of Zoology, University of Dhaka. The specimenwas kept frozen (-18 ˚C) until further use. Taxonomic identification of the specimen was performed based on morphometric and meristic characteristics following the guideline of Fischer and Bianchi (1984) and Nakabo (2002). The total length (TL) and standard length (SL) were measured as 31.50 and 29.30cm, respectively. A portion of tissue was taken from the specimen for genomic DNA extraction. The specimen was tagged as T-11177, Voucher ID DUZM_MF_363 Band kept in Dhaka University Zoology Museum.

Genomic DNA extraction and amplification by PCR

DNA was extracted from tissue samples and was followed the Phenol Isoamyl alcohol extraction protocol (Sambrook, 2001) with minor modification. The extracted DNA was checked by agarose (1%) gel electrophoresis at 100V for 45 minutes and visualized under UV light. The mitochondrial Cytochrome Oxidase Subunit I (COI) gene was amplified using primers FishF2 -5' - TCGACTAATCATAAAGATATCGGCAC-3'

Corresponding author: sagir@du.ac.bd

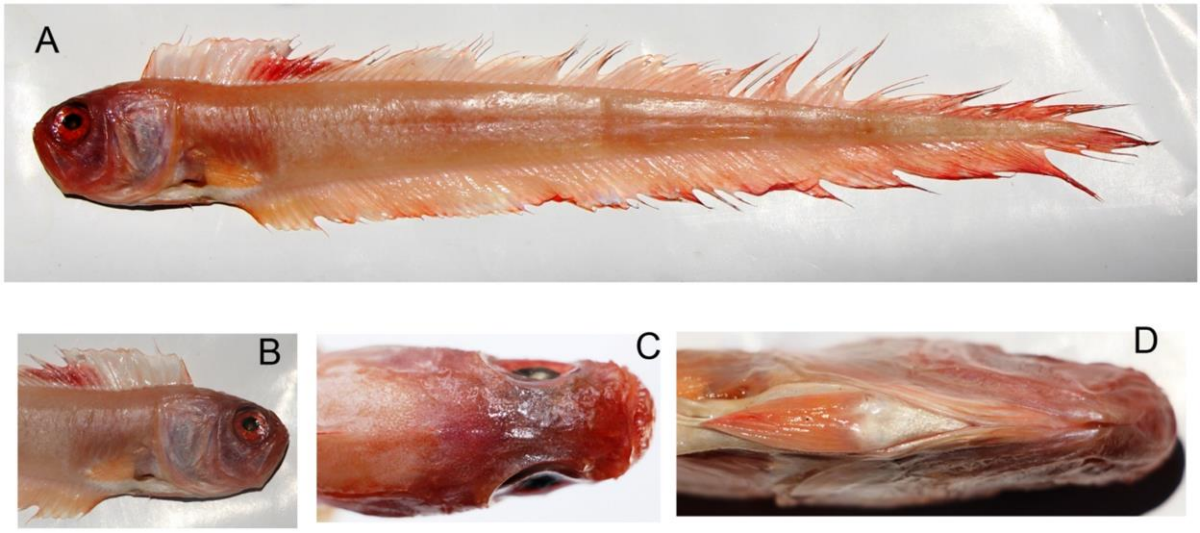

Figure 1. *Acanthocepola indica*, Tag 11177, Voucher ID DUZM_MF_363B and kept in Dhaka University Zoology Museum.

and FishR2-5' ACTTCAGGGTGACCGAAGAA TCAGAA-3' (Wards et al. 2005). Samples were amplified in a Thermal cycler (Applied Biosystem, Veriti 96 well thermal cycler). An initial denaturation at 95°C was carried out for 5 mins, followed by 41 cycles of denaturation at 95°C (30 s), annealing at 54°C (30 s), and extension at 72°C (1 min); a final extension at 72°C (7 min) was then used. The PCR products were visualized in a 1% agarose gel stained with ethidium bromide (10mg/ml) to ensure that a fragment of the correct size had been amplified under gel documentation system (AlphaImager HP), and then purified using GeneJET PCR Purification Kit (Thermo Scientific, Massachusetts, USA). The purity and yield of the purified PCR products were performed using the Nanodrop spectrophotometer.

Sequencing analysis

The purified product was sent to First BASE Laboratories SdnBhd, Malaysia for sequencing. The raw sequence was viewed with CHROMAS software. The sequence was verified by BLAST and submitted to the NCBI GenBank for accession number.

Results and Discussion

Characteristics of the fish recorded were- body elongated deep and gradually tapering to the caudal fin. Eyes are large and high on head. Head short with short and blunt Snout. Mouth is large and oblique. Two nostrils, posterior nostril a simple pore, located just anterior edge of eye, slightly bigger than anterior one; posterior margin of pectoral fin rounded, all rays branched; pelvic fin inserted slightly anterior to pectoral fin. Caudal fin pointed. Both dorsal and anal fins are long, 75 and 84 soft rays respectively. Pectoral fin with 17 fin rays; pelvic with 1 long and 5 short fin rays; 6 spines on pre-operculum by which the pre-opercular margin is serrated; one at angle of pre-opercle, one on the vertical, and four on the horizontal margin. Dorsal fin origin slightly behind orbit and middle of pectoral fin. A large dark blotch present on the anterior portion between 9th and 16th dorsal fin rays. Both jaws equally protruding; upper jaw reach to the middle of eye; a single row of recurved canine teeth on both jaws, anterior teeth slightly bigger than lateral ones; anus located just before origin of anal fin; lateral line ascending from the upper part of gill opening, then running very close to dorsal fin base. Morphometric and meristic characteristics are given in table 1.

Molecular analysis

The obtained partial sequence of COI gene of the specimen has been submitted to the NCBI database. The BLAST tool was used to match the partial sequence of mitochondria COI gene with the pre-existing sequences in NCBI. Our generated sequence of *A. indica* assigned GenBank accession no. MH882462 and showed 99% identity, 99% query cover and E value 0.0 with pre-existing sequences of accession number KP244473.1, KP244474.1

Table 1: Morphometric data of the specimen of *A. indica* from the Bay of Bengal (DUZM_MF_363B). Biometrics based on Park et al. (2008) in percentage of SL.

Measurement (In %)	Present Study	Park et al. (2008)
Total length	31.50 cm	24.50 cm
Standard length	29.30 cm	22.04 cm
Body depth	12.97	13.70
Body width	5.46	5.70
Head length	14.68	14.40
Postorbital length	7.51	6.80
Snout length	3.07	3.30
Eye diameter	4.10	4.40
Upper jaw length	9.22	6.00
Interorbital width	3.41	3.20
Pre-dorsal length	11.60	11.30
Pre-pectoral length	14.33	14.40
Pre-pelvic length	12.29	13.80
Pre-anal length	19.11	17.20
Pre-anus length	16.04	16.60
Pectoral fin length	8.19	8.80
Pelvic fin length	8.87	7.80
Counts		
Dorsal fin rays	75	88
Anal fin rays	84	101
Pectoral fin rays	17	17
Pelvic fin rays	I,5	I,5
Spine on pre-operculum	6	6

and KP244476.1 that highly validate our molecular taxonomic identification. Mitochondrial COI molecular marker is utilized to validate the taxonomic identity of the specimen and it was identified as *A. indica.* Collection of the specimen from Cox's Bazar confirmed that the species occurrs in this area for the first time, thus filling the gap in the known distribution range of this species. This new record demonstrates gaps in sampling and recoding of band fishes in Bangladesh and suggests the need for further research on this rare species in Bangladesh.

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