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First record of the unicorn leatherjacket *Aluterus monoceros* (Tetraodontiformes: Monacanthidae) from the Southern coast of Bay of Bengal, Bangladesh

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Abstract

We report the first record of the unicorn leatherjacket *Aluterus monoceros* (Tetraodontiformes: Monacanthidae) from the Southern coast of Bay of Bengal, Bangladesh. A single specimen of *A. monoceros* was collected on 03 March 2018, from the Alipur Fish Landing Center of Kuakata, Bangladesh. Morphometric and molecular approach were applied for taxonomic identification. Body compressed with leathery skin almost oval in shape, a long pointed snout. Caudal peduncle is longer than deep; peduncle length into peduncle depth 0.66 times. Caudal fin relatively short, about 15% of standard length (SL). Eye to dorsal spine distance relatively large, 7.63% of S.L. Body depth is 38.5% of S.L. The morphometric, meristic and DNA barcoding data thus confirmed the presence of *A. monoceros* 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.

Keywords: *Aluterus monoceros*, leatherjacket, Bay of Bengal, new record

Introduction

The family Monacanthidae has 95 described species ^[1], one of which, *Aluterus monoceros* (Linnaeus, 1758). *A. monoceros* is a littoral filefish, living on the continental shelf to 50 m depth, with a circum global distribution mainly in tropical and sub-tropical waters occurring in the Atlantic, western Indian Ocean and eastern Pacific ^[2, 3]. It is widely distributed in the western Atlantic Ocean, occurring from Massachusetts to Argentina ^[4], whereas in the eastern Atlantic it has been considered a rather rare species, restricted to tropical waters off the coast of Africa ^[5, 6].

The presence of this species in the Bay of Bengal was found on 03 March 2018, one adult *A. monoceros* of 46.0 cm total length (TL) was captured from Kuakata (south-eastern Bangladesh). The present study reports the occurrence of unicorn leatherjacket *A. monoceros* from the coastal area of the Bay of Bengal, Bangladesh. The presence of *A. monoceros* was confirmed based on morphometric and molecular (DNA barcoding) approaches.

Material and Methods

Sampling and Morphological analysis

A single specimen of *A. monoceros* was collected on 03 March 2018, from the Alipur Fish Landing Center of Kuakata, Bangladesh (Fig. 1). It was caught by fishermen during fishing in the off coast of Kuakata (21°51'09.6"N 89°59'54.0"E) as a by catch. Immediately after collection the specimens was preserved in ice and transported to the DNA Barcoding lab, Department of Zoology, University of Dhaka. The specimens were kept frozen (-18 °C) until further use. Taxonomic identification of the specimen was performed based on morphometric and meristic characteristics following the guideline of Berry & Voegelé, 1961. Length was measured in cm scale. A portion of tissue was taken from specimen for genomic DNA extraction. The specimen was tagged with voucher ID (Voucher specimen number DUZM_MF_403B) and kept Dhaka University Zoology Museum.

Genomic DNA extraction and amplification by PCR

DNA was extracted from tissue samples and extractions were carried out following standard extraction protocol ^[7] with minor modification. The extracted DNA was checked by agarose

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(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 (forward) and FishR2 (reverse). 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.



Fig 1: *Aluterus monocero* TL 46.0 cm, ID DUZM_MF_403B

Results and Discussion

Description

Body compressed with leathery skin almost oval in shape, a long pointed snout, snout profiles of adult - upper convex, lower concave; a small mouth that opens above center line; teeth moderately strong, six in outer row on top jaw and six or less on outer row on bottom jaw; gill opening a short slit on side before pectoral base; II dorsal spines, 1st long and slender, over eye, erectile, can be locked in position by small 2nd spine; dorsal II, 44; anal 46; pectoral 14; median fins rays unbranched; tail fin usually shorter than snout, with straight to slightly concave edge; tail base longer than deep; scales minute, innumerable, equipped with small hairs, cover skin and give it a coarse texture like sand-paper; pelvic fins absent, no scales encasing area where pelvics should be; no patch of enlarged scales above pectoral base; lateral line inconspicuous. Pale grey to grey-brown; brown spots and blotches on upper side; dorsal and anal pale yellowish brown; tail membranes dark brown. This morphometric and meristic characteristics fall within the range of described specimens^[2, 4]. The detail morphometric measurements and ratios are described in table 1 & 2.

Table 1: Morphometric data of the specimen of *Aluterus monoceros* from the Bay of Bengal (DUZM_MF_403B). Biometrics based on Berry & Vogele (1961).

Measurements (cm)	
Standard length (SL)	40
Total length	46
Snout length	10.1
Head length	11.9
Eye diameter	1.5
Eye to spine	3.0
Body depth	15.4
Caudal length	5.4
Caudal peduncle length	6.4
Caudal peduncle depth	4.25
Number of soft rays:	
Dorsal	II+44
Anal	46
Pectoral	14
Caudal	12

Table 2: Morphometrics of the specimen caught off Kuakata, Bay of Bengal

Measurement	Berry & Vogele (1961)	Present study
Caudal fin	18–26% SL	15% SL
Caudal peduncle: Depth/ length	0.65–0.95	0.66
Distance from the posterior margin of the eye to the dorsal spine	7.0–8.6% SL	7.63% SL
Body depth	34.4–43.8% SL	38.50 % SL

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. monoceros* showed 99% identity with pre-existing sequences of accession number MF041574, MF041570 and JQ365216 that highly validate our taxonomic identification.

Mitochondrial COI molecular marker is utilized to validate the taxonomic identity of the specimen identified as *A. monoceros* collected from Kuakata and confirmed the species occurrence 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 leatherjacket fish in Bangladesh and suggests the need for further research on this rare species in Bangladesh.

Conclusions

No previous occurrence is documented for this species from this area of the Bay of Bengal. Present study is thus indicating an extension of geographical distribution. It is also extending the species number of marine fish from the area. This taxonomic identification will be helpful for proper management and conservation of this species in future.

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