

First record of the immaculate puffer fish, *Arothron immaculatus* (Bloch and Schneider, 1801) from Chilika lagoon, India

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The immaculate puffer fish, *Arothron immaculatus* was recorded for the first time from Chilika with a single specimen (TL: 107.9 mm) collected from the outer channel sector, adding a new record to the ichthyofaunal diversity of finfish species from the lagoon.

[**Keywords:** Immaculate puffer fish, *Arothron immaculatus*, Chilika lagoon]

Introduction

Tetraodontidae (puffers) is the largest family under Tetraodontiformes, which includes 199 species of 28 genera as reported globally¹. About 25 species belonging to 9 genera are known to inhabit the Indian waters. Chilika lagoon, one of the most diverse tropical aquatic ecosystems providing home to 317 finfish species belonging to 207 genera of 88 families and 23 orders², is situated along the east coast of India. Tetraodontiformes has contributed significantly to the ichthyofaunal diversity of Chilika lagoon with ten species^{2,3}. Although two species (*Arothron reticularis* and *A. stellatus*) under the genus *Arothron* have already been reported, the occurrence of immaculate puffer fish, *A. immaculatus* (Bloch and Schneider, 1801) is reported for the first time from the lagoon.

Material and Methods

The descriptions based on the capture of a single live specimen while hauling a traditional screen barrier net (locally called *Khanda*) with a mesh size of 14 mm from outer channel sector of Chilika lagoon on 10 December, 2015. The collection site (85°441' E and 19°672' N) is within the geographical boundary of the lagoon located nearly 15 km away from the lagoon's mouth to the Bay of Bengal. The specimen was washed with freshwater and photographed immediately. The length and weight data was recorded and then preserved in 10% formaldehyde. The specimen was brought to the laboratory for

confirmation and preservation. The species was confirmed in the laboratory by following earlier descriptions^{4,5}. The morphometric and meristic characters were studied.

Results and Discussion

The species was identified as *Arothron immaculatus* (Bloch and Schneider, 1801) (Fig. 1) and is submitted to the fish museum of Wetland Research and Training Center (of Chilika Development Authority), Barkul, Khurda, Odisha with registration no. CDA/262/2015.

Systematic accounts

Order : Tetraodontiformes
Family : Tetraodontidae
Genus : *Arothron*
Type: *Arothron immaculatus*
(Bloch & Schneider, 1801)



Fig. 1 — *Arothron immaculatus* (TL, 107.9 mm; Weight, 32.4 g) recorded from Chilika lagoon (CDA/262/2015)

The total length (TL) and weight of the specimen was recorded as 107.9 mm and of 32.4 g. The specimen had 80.2 mm standard length while head length was 23.3 mm is characterized by a heavy blunt body, rounded in cross section with large, broad and blunt head (Fig. 1). Back is broad. In jaws the teeth are fused into a beak - like dental plate with a median suture on each jaw, thereby giving the appearance of four heavy and powerful teeth, two in each jaw. Eyes are situated in about the middle of the length of the head. Inter-orbital space is broad and flat. Two imperforate tentacles are present on either side. Either jaw with a median suture. Teeth are of about equal size, two each in both jaws. Distal portion of all fins are rounded. Dorsal fin is situated on the last third of the total length excluding the caudal fin. Pelvic fin is absent. Dorsal, pectoral and anal fins are transparent and light yellow. Dorsal fin, anal fin and caudal fin is with nine rays each, while pectoral fin with 18 rays. No spine was present in any fins. Caudal fin is longer, about 1/4th of the total length. Body is covered with fine dermal spinules but are absent on snout and posterior tail region (caudal peduncle). Whole body is greenish in colour, deeper above and dirty white below. Dorsal and anal fin are yellowish in colour but pectorals are greenish-yellow. Caudal fin is yellow but upper and lower edges as well as end is black. Moreover, the entire body is spotless with a dark blotch at the base of the pectoral fin. The detailed morphometric measurements are described in table 1.

The specimen had standard length 74.3 % of TL, head length (HL) 21.6 % TL and horizontal eye diameter 25.8 % of HL as shown in Table 1. Similarly, pre-dorsal length, pre-pectoral length, pre-

anal length, dorsal fin length (DFL), pectoral fin length (PFL), anal fin length (AFL) and caudal fin length (CFL) was 54.8 %, 24.3 %, 58.7 %, 11.4 %, 9.8 %, 8.2 % and 23.8 % of TL respectively (Table 1).

The specimen was recorded from sandy bottom (sand 54%, clay 33%, silt 13%) with water depth of 310 cm; water temperature 27 °C, transparency 64 cm, pH 9.12, salinity 5.5 ppt, total alkalinity 108 ppm and dissolved oxygen 7.2 ppm.

The species has several synonyms i.e. *Tetraodon immaculatus* (Bloch & Schneider, 1801), *Tetraodon sordidus* (Ruppell, 1819), *Dilobmycteris sordidus* (Ruppell, 1819), *Tetraodon parvus* (Joannis, 1835), *Tetraodon kunhardtii* (Bleeker, 1850), *Tetraodon scaber* (Eydoux & Souleyet, 1850), and *Tetraodon aspilos* (Bleeker, 1851). However, *A. immaculatus* (Bloch and Schneider, 1801) is the valid name and is being used widely¹. The morphological and meristic characters of the current specimen were found to be similar to the earlier descriptions^{1,5,6}. In general, within a genus and even within broad genetic groupings (sub-families), fin rays counts are nearly always the same. So, closely related tetraodontid fishes are often difficult to separate⁶. Although the species *A. immaculatus* and *A. manilensis* is similar in morphological appearances, both species can be distinguished by caudal fin lengths⁶. In general, the caudal fin of *A. manilensis* is comparatively longer than that of *A. immaculatus*. As per Randall's observation⁶, the ratio of caudal fin length to standard length is 2.66 for *A. manilensis* and 3.00 for *A. immaculatus*. Since the present ratio of caudal fin length (25.7 mm) to standard length (80.2 mm) was 3.12, very close to the estimate of Randall, the species

Table 1 — Morphometric measurements of *Arothron immaculatus*

Parameters	Present study	Froese and Pauly, 2015	
		(Specimen 0)	(Specimen 1)
Total length (mm)	105.9	-	-
Standard length (mm)	80.2 (74.3 % TL)	104 (75.3 % TL)	100 (79.3 % TL)
Measurements (mm)			
Head length	23.3 (21.6 % TL)	(21.5 % TL)	(22.0 % TL)
Dorsal fin length	12.3 (11.4 % TL)	-	-
Pectoral fin length	10.6 (9.8 % TL)	-	-
Anal fin length	8.8 (8.2 % TL)	-	-
Caudal fin length	25.7 (23.8 % TL)	-	-
Dorsal fin base length	5.7 (46.3 % DFL)	-	-
Pectoral fin base length	8.3 (78.3 % PFL)	-	-
Anal fin base length	5.8 (65.9 % AFL)	-	-
Pre-dorsal length	59.1 (54.8 % TL)	(53.8 % TL)	(55.8 % TL)
Pre-pectoral length	26.2 (24.3 % TL)	(23.0 % TL)	(22.0 % TL)
Pre-anal length	63.3 (58.7 % TL)	(56.9 % TL)	(61.3 % TL)
Horizontal eye diameter	6.0 (25.8 % HL)	(25.6 % HL)	(27.4 % HL)

TL, total length; HL, head length; DFL, dorsal fin length; PFL, pectoral fin length; AFL, anal fin length

is confirmed as *A. immaculatus*⁶. Moreover, the foremost distinctive character of this species is the black edge to the caudal fin⁶.

Tetraodontids are distributed circum-globally, from tropical to temperate waters, most of them are marine but several enters lakes and estuaries (brackish environments) and some are freshwater dwelling^{7,8,9}. Occurrence of *A. immaculatus* in the west coast of India i.e., Cochin coast⁶ and Goa coast¹⁰ has already been reported. Similarly, in the east coast its distribution has confirmed from Madras coast up to Vishakhapatnam coast⁶. Therefore, the first record of this species from Chilika lagoon indicates the northward range expansion of this species in the Bay of Bengal. Moreover, the present specimen was collected from a sandy bottom of water depth of 3.1 m in brackish water environment having salinity 5.5 ppt. Hence, it could be conclude that *A. immaculatus* shows a euryhaline distribution from marine to brackish water environment.

As only one specimen has been recorded presently, it is premature to conclude its finding as rare or it has a well established population in the area or the species might have entered from the Bay of Bengal to the lagoon by the new mouth, which is an indication of the distribution of the species in the Odisha coast of Bay of Bengal too. Therefore, the abundance and distribution of the species in the lagoon needs to be investigated further. However, the present record is a new addition to the family Tetraodontidae as well as to the ichthyofaunal diversity of Chilika. Further, it shows significant range expansion of its previously known distribution in the East coast of India.

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