Indian Journal of Geo Marine Sciences
Vol. 51 (04), April 2022, pp. 363-367

Short Communication

First record of Bengal reticulated puffer *Chelonodontops bengalensis* (Tetraodontiformes: Tetraodontidae) from Odisha coast, north-western Bay of Bengal with taxonomic notes

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Received 06 October 2021; revised 05 April 2022

The present study reports the first record of Bengal reticulated puffer, *Chelonodontops bengalensis* from Odisha coast in the north-western Bay of Bengal based on two specimens (226 – 301 mm SL), each collected from Paradeep and Bahabalpur in 2018 and 2019, respectively. The detailed morphological features of *C. bengalensis* are provided and compared with its previous records. The species is distinguished from its congeners by having 12 dorsal fin rays, 10 anal fin rays, 18 – 19 pectoral fin rays, 10 – 11 caudal fin rays, nasal organ cup shaped with unequal sized flaps, and dorsal profile of body covered with white spots of various shape and size and ventral side silvery white. Our study indicated the range extension of *C. bengalensis* from its known geographical range *i.e.* Bangladesh and West Bengal towards south in the northern Bay of Bengal.

[**Keywords**: Bengal reticulated puffer, *Chelonodontops bengalensis*, First record, Odisha coast, Range extension]

Introduction

Puffer fish belongs to the family Tetraodontidae Bonaparte, 1832, are small to medium size fish, native to inshore shallow waters of tropical and subtropical areas of the Atlantic, Indian and the Pacific Oceans[1]. The family contains 195 valid species in 28 genera across the globe[2]. The Genus *Chelonodontops* Smith 1958 comprises six valid species: *C. bengalensis* Habib, Neogi, Oh, Lee & Kim, 2018; *C. alvheimi* Psomadakis, Matsuura & Thein, 2018; *C. laticeps* (Smith, 1948); *C. leopardus* (Day, 1878), *C. patoca* (Hamilton, 1822), and *C. pleurospilus* (Regan, 1919)[3-5]. *Chelonodontops bengalensis* was originally described from the south coast of Sundarbans mangrove forest, Bangladesh, northern Bay of Bengal based on a molecular approach and morphological examination of two fresh specimens[3]. Later, the species was reported and redescribed by Mohapatra *et al.*[5] based on five specimens collected from Digha, West Bengal coast. The species was believed to be more similar with *C. patoca* until the discovery of *C. alvheimi* by Psomadakis *et al.*[4] from off Myanmar (Eastern Indian Ocean). In the present study, two specimens of puffer fish were identified as *C. bengalensis* during an ichthyofaunal collection along the Odisha coast (north-western Bay of Bengal). The specimens herein represent the first record from Odisha coast and extending its known geographical range *i.e.* Bangladesh and West Bengal towards south in the northern Bay of Bengal (Fig. 1).

Materials and Methods

During the regular fishery surveys (2017–2019), one specimen of *C. bengalensis* was collected from Bahabalpur (Kasafal South) landing centre (21°30'46.5192" N, 087°6'54.414" E), Balasore (Odisha, India) on 3 August 2018 (Fig. 2). The fish was captured by a drift gill net (mesh size 40–120 mm) along with other pelagic fishes operated at a depth of 18–22 m in coastal water. Another specimen of this species was also collected from Paradeep Fishing Harbour (20°17.345' N, 086°42.422' E), Jagatsingpur (Odisha, India) on 30 January 2019 (Fig. 3). The fish was captured along with other puffers by a bottom trawl (cod end mesh size 40 mm) operated at a water depth of 40–70 m along the coastal waters of Odisha. The specimens were brought to the laboratory in iced condition for detailed taxonomic investigation. Fish were identified based on the morphological description provided by Habib *et al.*[3] and Mohapatra *et al.*[5], and photographed fresh to retain the original colour and spotting pattern. Morphometric measurements and meristic counts were recorded following Dekkers[6] and Han *et al.*[7]. All measurements were recorded with a digital Vernier caliper with an accuracy of 0.1 mm, and total body weight (TW) with 0.1 g accuracy using an electronic weighing balance. Measurements of head region were presented as percentage of Head Length (%HL), while the measurements of body parts as percentage of Standard

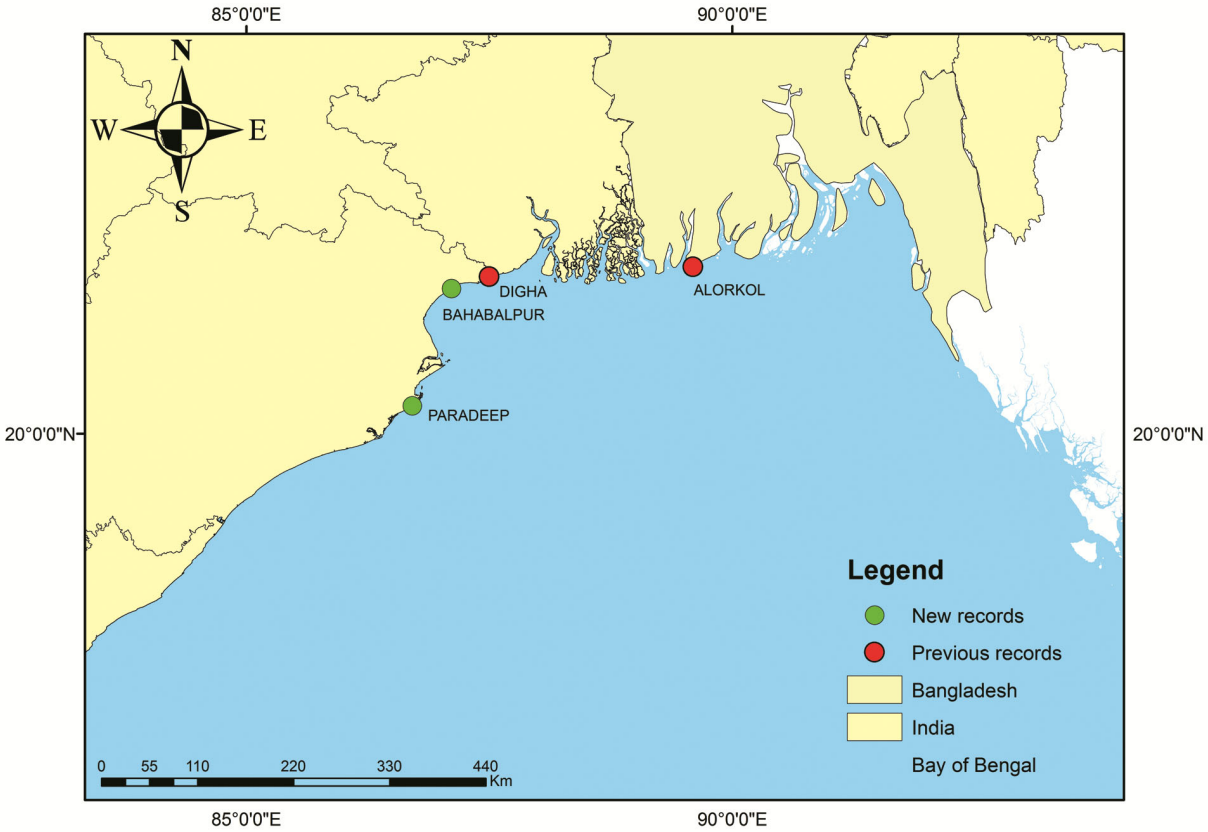

Fig. 1 — Map showing the distribution of *Chelonodontops bengalensis*. The red circles indicate previous records and green circles indicate present records

Fig. 2 — *Chelonodontops bengalensis*, 301 mm SL, fresh, Bahabalpur (Kasafal South) landing centre, Odisha, India, drift gill net, 18 – 22 m depth, 3 Aug 2018

Length (%SL). One specimen was preserved in 10 % formalin and deposited in the Marine Biodiversity Referral Museum of ICAR-Central Marine Fisheries Research Institute (CMFRI), Cochin, Kerala, India under the Accession Number GB 43.6.7.1 for future reference.

Results

Systematic Position

Order: Tetraodontiformes Berg, 1940

Family: Tetraodontidae Bonaparte, 1832

Genus: *Chelonodontops* Smith 1958

Chelonodontops bengalensis Habib, Neogi, Oh, Lee & Kim, 2018

Bengal reticulated puffer (Figs. 2 & 3; Table 1)

Type material: *Chelonodontops bengalensis* Habib, Neogi, Oh, Lee & Kim, 2018. Type locality down of Ganges estuaries, Alorkol, Dubla Island, south coast of Sundarbans mangrove forest, Bangladesh, northern Bay of Bengal.

Holotype: FBGN-SAU_F1612sb-186, 312 mm SL, down of Ganges estuaries, at Alorkol, near Dubla Island, south of Sundarbans, Bangladesh, 21.71° N, 89.59° E, collector Kazi Ahsan Habib & Amit Kumer Neogi, 16 Dec 2016 (fresh colour photo).

Paratypes: FBGN-SAU_F1612sb-64, 243 mm SL, same as holotype (fresh colour photo).

Material examined for comparison: *Chelonodontops bengalensis* (*n* = 2): 1 ex., 301 mm SL, Bahabalpur (Kasafal South) landing centre, Odisha, India, 21°30'46.5192" N, 087°6'54.414" E, drift gill net, 18–22 m depth, 3 Aug 2018; 1 ex., 226 mm SL, Paradeep Fishing Harbour, Jagatsingpur, Odisha,

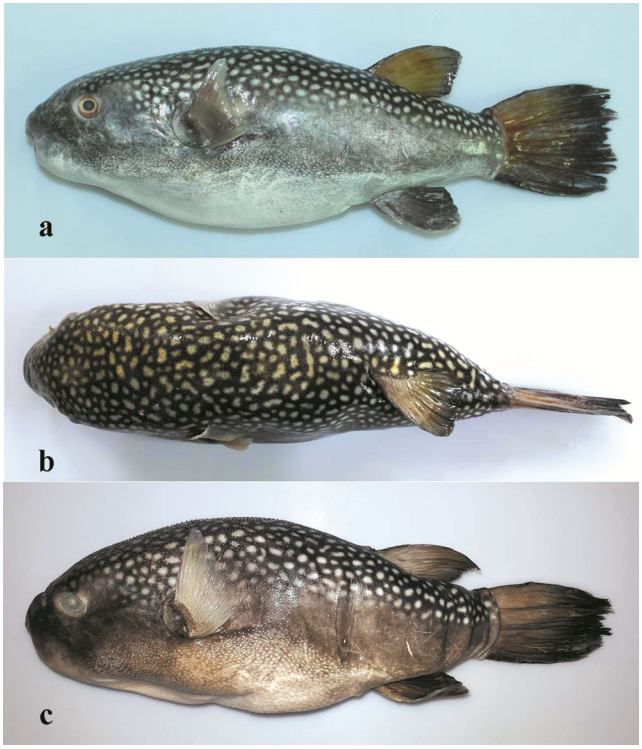

Fig. 3 — *Chelonodontops bengalensis*, GB 43.6.7.1, 226.3 mm SL, Paradeep Fishing Harbour, Odisha, India, bottom trawl, 40 – 70 m depth, 30 Jan 2019: (a) whole fresh specimen; (b) dorsal view; (c) formalin preserved specimen

India, 20°17.345' N, 086°42.422' E , bottom trawl, 40–70 m depth, 30 Jan 2019.

Diagnosis: Dorsal fin rays 12; anal fin rays 10; pectoral fin rays 18–19; caudal fin rays 10–11; body oblong, its depth 38.7–39.6 % in SL and its dorsal profile slightly convex; dorsal fin rounded inserted slightly behind the vent above anal fin, length 17.6–22.8 % in SL; anal fin also rounded, length 17.2–20.9 % in SL; caudal fin truncate to slightly rounded, length 28.8–30.8 % in SL; pectoral fin small and round, originates slightly below upper margin of gill opening, positioned more towards head than body, its length 12.5–15.6 % in SL; snout rounded and eye small, diameter 11.0–13.5 % in HL; interorbital space convex and broad, width 55.9–62.9 % in HL; lips fleshy with numerous small papillae; nasal organ easily visible with naked eye and enclosed by a small sac with a pair of nostrils, looks like a depression with a little elevated margin with a pair of elongated flaps (an upraised cup with 2 fleshy lobes); double rooted spinules present on both dorsal and ventral sides of the body but absent on the area from snout tip to nostrils both at dorsal and ventral side, caudal peduncle area and the lateral sides of the body except at two regions such as midway between eye and gill opening, and pectoral fin tip where two narrow bands joined dorsal and ventral spinules patch; dorsal spinules starts from near boarder of eye and spreads up to the origin of dorsal fin; upper and lower jaws with two tooth plates and joined together to form a beak-like structure; two inconspicuous lateral lines, the upper one connecting the lower in the area behind the anal fin in caudal peduncle area.

Colour of fresh specimen: Dorsal fin fleshy and light yellowish with blackish edge; anal fin also fleshy with blackish/greyish in colour; pectoral fins transparent; caudal fin light yellowish towards base and blackish towards tip; dorsal surface of body blackish grey, silvery white towards ventral side; except snout tip, dorsal profile of body covered with white spots of various shape and size extending up to caudal fin origin (Figs. 2 & 3).

Colour of formalin preserved specimen: Yellow colour of dorsal and caudal fin turned to dirty white in preservation. Body pale grey/black on dorsal surface, belly and ventral side are dull white. White spots along the body are prominent in preservation (Fig. 3c).

Distribution: *Chelonodontops bengalensis* is currently known only from Sundarban region[3] and Digha, West Bengal[5] in the northern Bay of Bengal. The present study confirmed its distribution along the coast of Odisha, further extending its known geographical ranges towards south in the Bay of Bengal (Fig. 1).

Discussion

Chelonodontops bengalensis was first described based on two specimens collected from local fishermen at Alorkol, near Dubla Island, located in the south coast of the Sundarbans mangrove forest, Bangladesh, northern Bay of Bengal[3]. Subsequently, the species was reported from Digha, West Bengal with a detailed description of morphological characters, comparison of the dorsal spinules of all the species in the genus so far reported from the Indian waters and a revised key for the genus *Chelonodontops*[5]. Historically, it was believed that *C. bengalensis* closely resembles with *C. patoca* and a detailed morphological comparison of both the species was provided by Habib *et al.*[3]. However, with the discovery of *C. alvheimi* from the Myanmar coast[4], Mohapatra *et al.*[5] noted that *C. bengalensis* resembles more with *C. alvheimi*, but not *C. patoca* and provided a detailed comparison of all the six species of *Chelonodontops* (Table 2 and Fig. 2 in

Table 1 — Morphometric and meristic data of *Chelonodontops bengalensis*

Parameters	Present study	Mohapatra *et al*.[3]	Habib *et al*.[5]
	n = 2	*n* = 5	*n* = 2
Counts			
Dorsal rays	12	12	12
Anal rays	10	10	10
Pectoral rays	18-19	18-19	19
Caudal rays	10-11	10-11	10-11
Total gill rakers	-	-	8
Standard length (mm)	226-301	140-310	243-312
Proportions (% of SL)			
Total length	128.6-133.4	-	121-123
Body depth	38.7-39.6	26.4-31.9	51-52
Body width	26.8-28.1	-	-
Depth at dorsal origin	28.8-29.4	-	-
Head length	33.2-35.4	31.0-35.5	31-34
Predorsal distance	72.9-73.8	70.3-72.9	63-79
Prepectoral distance	35.7-36.8	31.6-38.5	35-38
Preanal distance	69.8-75.1	67.5-75.7	62-76
Dorsal base	9.7-9.9	8.7-10.0	9
Anal base	8.5-8.6	8.0-8.8	8
Pectoral base	10.7-11.0	9.7-10.6	13-14
Dorsal fin length	17.6-22.8	17.5-21.9	19
Pectoral fin length	12.5-15.6	14.2-16.8	13-14
Anal fin length	17.2-20.9	16.0-21.2	17-18
Caudal fin length	28.8-30.8	-	21.4-24.6
Caudal peduncle length	19.1-20.2	17.5-20.6	19-20
Caudal peduncle depth	13.5-14.0	12.6-16.4	13-14
Proportions (% of HL)			
Head depth	85.1-87.5	77.3-80.8	75-79.3
Head width	75.6-79.1	72.6-75.9	62-66
Preorbital	39.6-52.3	45.4-52.9	45-51
Postorbital	41.7-43.6	44.2-47.9	44-43
Snout length	42.5-52.3	45.4-52.9	45-51
Nostril to snout	22.3-35.0	24.0-29.5	26-33
Eye diameter	11.0-13.5	12.6-15.6	12-13
Interorbital width	55.9-62.9	54.2-60.7	64-65

Mohapatra *et al*.[5]). Most of the proportional morphometric measurements and meristic counts of the present specimen are concurrent with the ranges provided by Habib *et al*.[3] and Mohapatra *et al*.[5] (Table 1).

Conclusions

The present record of *C. bengalensis* from Odisha coast indicating a significant range extension from its known distribution such as Digha, West Bengal in the northern Bay of Bengal. It's difficult to ascertain the frequency of occurrence of the species in the catch/landings or there is a well-established population in its newly reported environment or the species has a wider distribution in the entire east coast of India which needs to be addressed through a dedicated ichthyofaunal surveys and fishery expeditions along the coast. Future work is highly essential to identify the species at molecular level with a detailed phylogenetic analysis of all the species in the genus *Chelonodontops*.

Acknowledgments

The authors are highly grateful to Dr. A. Gopalakrishnan, Director, ICAR-CMFRI, Cochin for providing all necessary facilities during the study period. We also thank the staff of Puri field centre of ICAR-CMFRI for their help both in field and laboratory.

Conflict of Interest

The authors declare no conflict of interest.

Ethical Approval

This article does not contain any experimental studies with animals performed by any of the authors.

Author Contributions

SKR conceptualise the work, collected and analysed the morpho-meristic data and wrote the manuscript. SG & PR corrected and improved the language of the manuscript.

References

1 Nelson J S, Grande T C & Wilson M V, *Fishes of the World*, 5th edn, (John Wiley and Sons, Hoboken, New Jersey), 2016, pp. 707.

2 Fricke R, Eschmeyer W N & Van der Laan R, Eschmeyer's catalog of fishes: genera, species, references (http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp), 2022, Electronic version accessed 30 June 2022.

3 Habib K A, Neogi A K, Oh J, Lee Y H & Kim C G, *Chelonodontops bengalensis* (Tetraodontiformes: Tetraodontidae): a new species of puffer fish from the northern Bay of Bengal based on morphology and DNA Barcode, *Ocean Sci J*, 54 (1) (2019) 79-86. http://doi.org/10.1007/s12601-018-0054-7

4 Psomadakis P N, Matsuura K & Thein H, *Chelonodontops alvheimi*, a new species of pufferfish (Actinopterygii: Tetraodontiformes: Tetraodontidae) from the Indian Ocean, with redescription of the rare pufferfish *Chelonodontops leopardus* (Day 1878), *Ichthyol Res*, 66 (1) (2019) 49-56. https://doi.org/10.1007/s10228-018-0646-3

5 Mohapatra A, Mohanty S R, Mishra S S & Tudu P C, First report of *Chelonodontops bengalensis* (Tetraodontiformes: Tetraodontidae) from Indian coast, *FishTaxa*, 16 (2020) 37-41.

6 Dekkers W J, Review of the Asiatic freshwater puffers of the genus *Tetraodon* Linnaeus, 1758 (Pisces, Tetraodontiformes, Tetraodontidae), *Bijdragen Dierkunde*, 45 (1975) 87-142. https://doi.org//10.1163/26660644-04501006

7 Han K H, Baek J, Shin L S, Kim H J, Yoon B I, *et al.*, Morphological description of three species of pufferfishes (Tetraodontidae) from India, *Korean J Fish Aquat Sci*, 50 (1) (2017) 77-84. https://doi.org//10.5657/kfas.2017.0077