

**DISTRIBUTION RANGE EXTENSION AND FIRST RECORD OF TONKIN
NUMBFISH *NARCINE PRODORSALIS* (BESSEDOV, 1966)
(TORPEDINIFORMES: NARCINIDAE) AN ELECTRIC RAY
IN BANGLADESH WATERS**

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Abstract: Three Tonkin numbfish, *Narcine prodorsalis* were caught off the coast of Bangladesh in April 2018. Amongst these three specimens, one was morphometrically measured, photographed and transported to be preserved and catalogued at the zoological museum in the University of Dhaka. The specimens were morphologically identified using taxonomic keys and DNA samples (fin clips) have been collected for further studies. These specimens represent the first record of *Narcine prodorsalis* in Bangladesh waters and extend its distribution range. This is the first western most confirmed record of this species from its previously designated range in the western Pacific and Eastern Indian ocean. This contemporary record includes Bay of Bengal within its current distribution range.

Key words: Bay of Bengal, Elasmobranchs, Electric rays, Marine conservation

INTRODUCTION

A diverse group of fish, the electric rays are circumglobally distributed in warm, sub-temperate marine waters to tropical continental and continental insular waters (Carvalho 1999a, de Carvalho *et al.* 2002). They inhabit in a range of habitats including sandy beaches, muddy bays, estuaries, coral reefs, river mouth with an exception to rivers (Carvalho 1999a). Although very easily identifiable morphologically from other batoids (de Carvalho *et al.* 2002) they are taxonomically extremely neglected (de Carvalho 2003). So far, 55 species of electric rays under 10 genera have been recognized globally (Bigelow and Schroeder 1953, de Carvalho 1999b) and the family Narcinidae has 9 genera and 24 species (Estupiñan-Montaña and Galván-Magaña 2015) alone.

Narcine prodorsalis so far has been native to China, Indonesia, Singapore, Taiwan, Province of China, Thailand and Viet Nam (Wang *et al.* 2009) but also have been reported from Thailand and Myanmar (Monkolprasit 1941, Howard *et al.* 2015) which asserts that, no confirmed record of *N. prodorsalis* has been reported western to Andaman sea, specifically in the Bay of Bengal region or western to that in the Arabian sea or adjacent waters so far. Which also is confirmed by the distribution range map generated by IUCN (Fig. 1). However, South-east Asian continental shelf has been incorporated to be a very likely range of the species (Last *et al.* 2016).

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Prior to this current report of *N. prodorsalis*, only two species of Narcinid electric rays were recorded off the coasts of Bangladesh (e.g. *N. timlei* and *N. brunnea*) along with a numbray *Narke dipterygia* (Hoq *et al.* 2011, Rahman *et al.* 2009). Although, six species from the family of Narcinidae have been reported from Indian waters (e.g. *Benthobatis moresbyi*, *Narcine brunnea*, *Narcine lingual*, *Narcine timlei*, *Narcine cf oculifera*, *Narcine maculata*) with an unconfirmed record of *N. prodorsalis* (Akhilesh *et al.* 2014); and from Arabian sea and the surrounding gulfs, five species of *Narcine* (e.g., *Narcine lingula*, *Narcine timlei*, *Narcine oculifera*, *Narcine atzi* and *Narcine riera*) have been documented (de Carvalho *et al.* 2003). Hence, no confirmed record of *N. prodorsalis* was documented further west to the Andaman sea.

N. prodorsalis is found at 40-100 m within both inshore and offshore in continental waters (de Carvalho *et al.* 1999b) and presumably demersal trawl fishing is a big threat as they may take them as by-catch (Wang *et al.* 2009). The species is not very common to site and due to less reports and species-specific studies not much information on biology, full distribution range and threats are available. Hence, *N. prodorsalis* has been designated as data deficient the International Union of Conservation of Nature (IUCN) in 2009 (Wang *et al.* 2009).

The aim of this paper was to report the 1st record of a female *N. prodorsalis* in Bay of Bengal, off the coasts of Bangladesh and extending the range of the geographical distribution of the species further west to Andaman sea, within the Bay of Bengal.

MATERIAL AND METHODS

A Tonkin numbfish *N. prodorsalis* (Bessednov, 1966) has been reported from Bangladesh on 15 April, 2018 while a regular field visit was conducted for identifying the trade chain of shark and ray products in Bangladesh. The specimen was recorded from the Bangladesh Fisheries Development Corporation (BFDC) landing site of Cox's Bazar (Fig. 1). The specimen was encountered in a pile of different smaller sharks and rays (*Gymnura* sp., *Himantura* sp., *Chiloscyllium* sp., *Glaucostegus* sp.) landed on the same day either targeted by un-baited hooks or as a by-catch in a purse-bag net to targeting an array of marine fish by artisanal fishers in the area. The specimen was identified following Last *et al.* 2016. The specimen was collected and transported as a voucher specimen at the Dr. Kazi Zakir Hossain Museum, Department of Zoology, University of Dhaka (the catalogue number is yet to be given) and preserved in 30% formalin. Prior to preservation tissue samples were collected and preserved in 98% ethanol for further molecular studies. A tape measure and Vernier caliper was used to measure point to point to the nearest millimeter of

44 different morphometric measurements following de Carvalho (1999b). All measurements are presented in Table 1 and are shown in proportion with the total length (TL).

A rapid informal survey in the landing site has been conducted post encountering the species amongst the regular landing site workers and fishers available that day (n = 15). The landing site workers, fishers and fish traders were asked questions about the availability of the species in this area, how many times in their lifetime working in the landing site, they have encountered it and when was the last time they have seen it. They were shown the photograph prior to asking the following questions.

1. Have you ever seen this species (upon showing the photograph)?
2. How often the species is landed here?
3. When was the last time you have encountered this species?
4. What are the gears they are entangled in or caught by?
5. Is it an important species for you (economic value)?

RESULTS AND DISCUSSION

This study reports the presence of the Tonkin numbfish *Narcine prodorsalis* (Bessednov 1966) (Batoidae: Torpediniformes: Narcinidae) in Bangladesh waters in the Bay of Bengal region for the first time. To date, this is the western most confirmed record of this species in the Western Indo Pacific, from its previous range in the western Pacific and Eastern Indian ocean (Fig. 1). Thus, confirming and increasing its range till the Bay of Bengal, Bangladesh region. The distribution range of *Narcine prodorsalis* has extended approximately another ca. 700 km from Andaman sea with this report. Including this, three electric ray species have been recorded in Bangladesh till date, indicating under representation of this group in the Bay of Bengal indicating Wallacean and Prestonian knowledge shortfall. With this record of a female Tonkin numbfish (TL = 46.6 cm) in the Bay of Bengal, Bangladesh region (Fig. 2), the species richness of elasmobranchs increased. This study extends the geographical distribution of *N. prodorsalis* in the Bay of Bengal (Fig. 1).

The *N. prodorsalis* specimen along with its measurements is listed in Table 1. The specimen was recorded in the Bangladesh Fisheries Development Corporation's landing site within a pile of other ray species in Cox's Bazar. The identification was unmistakable due to its very distinct morphological features. The *N. prodorsalis* is medium size animals characterized by having numerous small regular dark black and brown spots and the background is light brown and an oval to heart shaped disc (Last *et al.* 2016). The species may resemble with Chinese numbfish and Smallspot numbfish but relatively distinguishable by the color pattern and smaller spots (Last *et al.* 2016). Last *et al.* 2016

assumed its widespread distribution on the continental shelf of South-east Asia and this report confirms that.

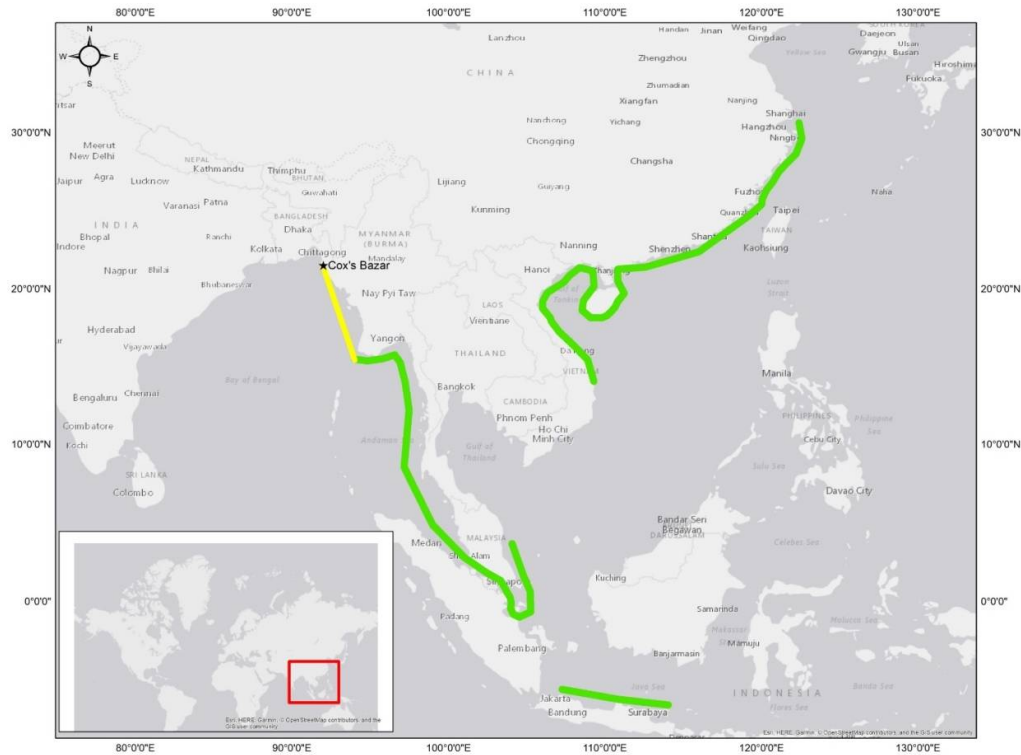


Fig. 1. Area of occurrence of Tonkin numbfish (inset) and map showing previously designated distribution range (extant) in green line according to IUCN distribution range map (<http://maps.iucnredlist.org/map.html?id=161545>). The extension in distribution range is shown in yellow from Andaman sea to Cox's Bazar. Black star: site (Cox's Bazar) from where the specimens were reported.

Upon discovering the specimen, a very rapid informal survey was conducted amongst the regular landing site workers to understand the frequency of the species landing in Cox's Bazar. Amongst all the respondents ~33% (n=5) have seen the specimen before and ~66% (n=10) have never seen the species before. The respondents who have encountered the species stated that this is an extremely rare species to be landed and they normally encounter one in years (2-5 years) apart. This is normally caught by the long line hooks or as a non-discarded

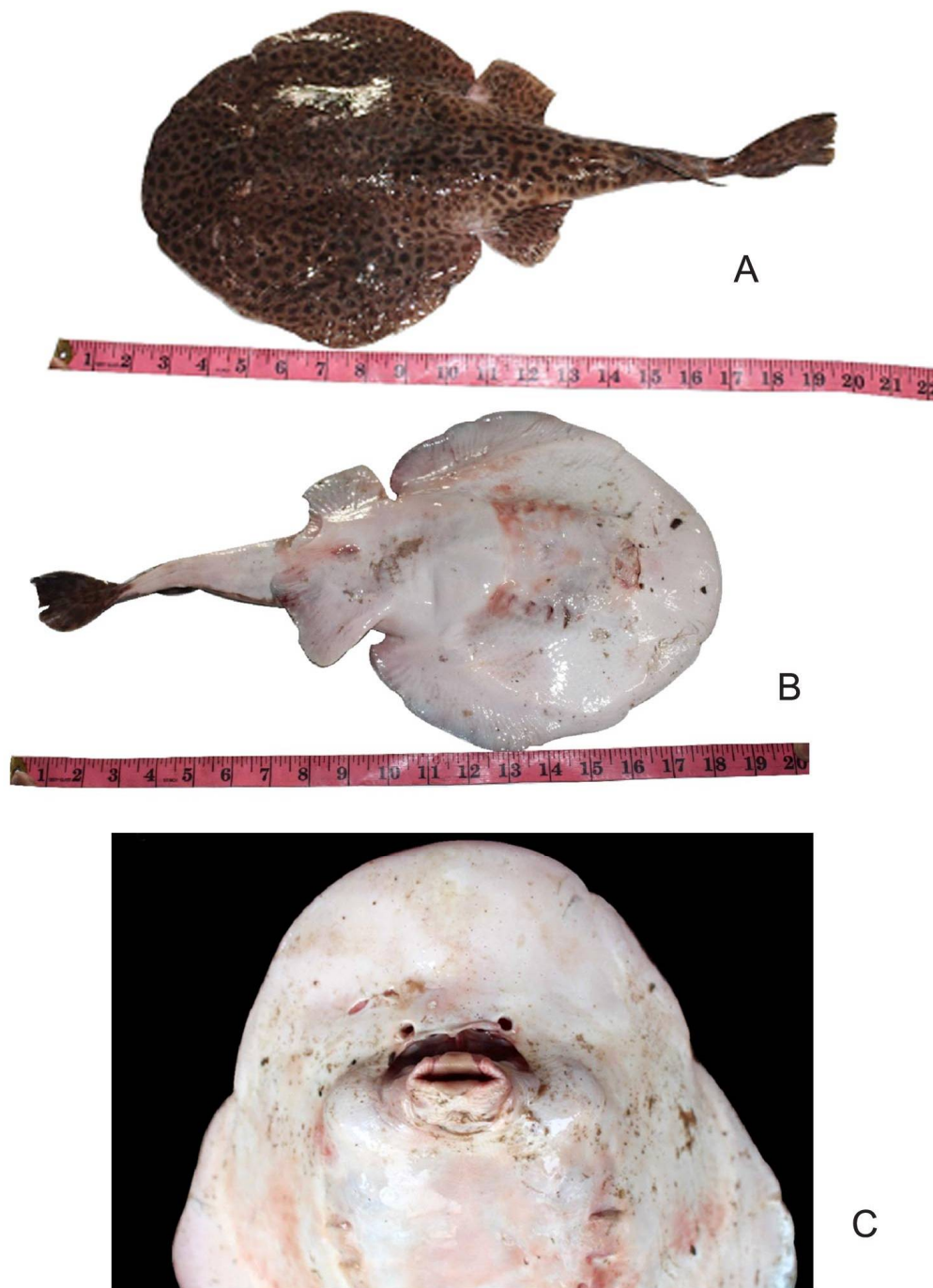


Fig. 2: A and B. Dorsal and ventral view of the specimen *Narcine prodorsalis*, total length 46.6 cm; Tape measure is set. C. Protrusible mouth structure of the specimen recorded.

Table 1. Morphometric measurements of the reported specimen of *Narcine prodorsalis* recorded from Cox's Bazar, Bangladesh following de Carvalho (1999b)

Sl. No.		Measurements (cm)	% of TL	Sl. No.		Measurements (cm)	% of TL
1	Sex	Female					
2	Total length (TL)	46.6		24	Distance between nostrils (DBN)	2.4	5.15
3	Disc width (DW)	26.0	55.79	25	Distance between 1 st gill openings (FGO)	1.2	2.58
4	Disc length (DL)	22.5	48.28	26	Distance between last gill openings (LGO)	0.8	1.72
5	Pre-orbital snout length (PBS)	6.7	14.38	27	Pelvic fin length (PFL)	6.8	14.59
6	Pre-oral snout length (POS)	6.6	14.16	28	Pelvic fin width (PFW)	5.0	10.73
7	Pre-nasal snout length (PNS)	5.5	11.8	29	Anterior margin of pelvic fin (AMP)	6.0	12.88
8	Snout to greatest disc width (SDW)	15.2	32.62	30	Posterior margin of pelvic fin (PMP)	11.1	23.82
9	Interorbital distance (IOD)	4.2	9.01	31	Tail width (TW)	8.4	18.03
10	Eye length (EL)	0.6	1.29	32	Height of 1 st dorsal fin (HFD)	4.8	10.3
11	Interspiracular distance (ISD)	3.0	6.44	33	Length of 1 st dorsal fin (LFD)	2.9	6.22
12	Spiracle length (SPL)	1.45	3.11	34	Length of 2 nd dorsal fin (LSD)	3.5	7.51
13	Spiracle width (SPW)	0.95	2.04	35	Height of 2 nd dorsal fin (HSD)	6.0	12.88
14	Mouth width (MW)	2.4	5.15	36	Length of dorsal lobe of caudal fin (LDC)	7.0	15.02
15	Upper tooth band width (UTB)	1.0	2.15	37	Length of ventral lobe of caudal fin (LVC)	6.9	14.81
16	Lower tooth band width (LTB)	1.0	2.15	38	Height of dorsal lobe of caudal fin (HDC)	3.0	6.44
17	1 st gill width	1.0	2.15	39	Height of ventral lobe of caudal fin (HVC)	2.5	5.36
18	2 nd gill width	1.2	2.58	40	Distance between dorsal fins (DBD)	2.4	5.15
19	3 rd gill width	1.0	2.15	41	Distance between 2 nd dorsal and caudal fin (SDC)	3.5	7.51
20	4 th gill width	1.1	2.36	42	Snout to cloaca length (SCL)	24	51.5
21	5 th gill width	0.9	1.93	43	Cloaca to caudal fin length (CLC)	22.6	48.5
22	Snout to 1 st dorsal fin length (SFD)	28.5	61.16	44	Electric organ length (EOL)	11.2	24.03
23	Snout to 2 nd dorsal fin length (SSD)	33.5	71.89	45	Electric organ width (EOW)	4.6	9.87

by-catch by gill net fishing. The rare landing may also have resulted from discarding the species as the demand and value is not very high amongst the

fishers and consumers. It can also be assumed that it might have gone a population depletion due extensive bottom trawling and targeted demersal ray fishing practices. This report also indicates the Prestonian and Wallacean knowledge shortfall regarding elasmobranch species here in Bangladesh region of the Bay of Bengal.

Considering the characteristics of the collected specimen in Cox's Bazar, we confirm the presence of *N. prodorsalis* in Bangladeshi waters and increasing and confirming its distribution another ~700 km in the Bay of Bengal from Andaman sea.

CONCLUSION

The results of this report are crucial, as they enhance our knowledge of the distribution of *Narcine prodorsalis* in the Bay of Bengal and also increasing the richness of elasmobranch diversity in Bangladesh. More systematic researches are cardinal in this area on abundance, ecology and biology of electric rays in order to assess their conservation status and threats in the extremely data poor Bay of Bengal.

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