

Short Communication

First Record of three Electric Rays (Order: Torpediniformes) from Odisha Coast, India

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Abstract

This paper reports three species of elasmobranchs of the order Torpediniformes, *Torpedo sinuspersici* Olfers, 1831 and *Torpedo fuscomaculata* Peters, 1855 (Torpedinidae), and *Narcine prodorsalis* Bessednov, 1966 (Narcinidae), for the first time from Odisha coast. The specimens were collected from Gopalpur coast, southern part of Odisha state. Diagnostic characters of the species were presented to record their occurrence and distribution along Odisha coast.

Keywords: Gopalpur, Narcinidae, New Records, Odisha, Torpedinidae

Introduction

The state of Odisha [= Orissa] lies along the north-eastern coast of India with a stretch of 482 kilometres of coastline adjoining the Bay of Bengal. Day (1869) pioneered the study on fishes of Odisha in two parts and his account included both marine and fresh water fishes. Since then, several works piled up with regard to the fish faunal study of this maritime state. A total of 605 species of fishes under 138 families and 27 orders has been reported from Odisha Coast (Barman *et al.*, 2007). However, few more bony fishes were also reported to occur in this region during last decade, but none of those works included any electric ray or elasmobranch.

As listed in Barman *et al.*, (2007), the electric rays of the order Torpediniformes along Odisha coast are represented by five species belonging to three families, viz., Torpedinidae: *Torpedo panthera* Olfers; Narcinidae: *Narke dipterygia* (Bloch & Schneider); Narcinidae: *Narcine brunnea* Annandale, *Narcine maculata* (shaw) (currently synonymous with *N. timlei*) and *Narcine timlei* (Bloch & Schneider). Another species, *Bengalichthys impennis* Annandale (1909), described from Balasore

Bay of Odisha coast is now relegated to the synonym of *Narke dipterygia* (Bloch & Schneider) (Sujatha, 2002; Compagno and Heemstra, 2007).

While observing fish faunal components in catches, three specimens were collected from Gopalpur coast, southern Odisha, of which two were identified as *Torpedo sinuspersici* Olfers (Torpediniformes: Torpedinidae) and one as *Narcine prodorsalis* Bessednov (Torpediniformes: Narcinidae). Along with these, a single specimen of *Torpedo fuscomaculata* Peters was also identified from old preserved collection. This paper reports these three species from the Odisha coast for the first time.

Material and Methods

Two specimens of an electric ray were collected from Gopalpur Beach (19°15'47.56"N, 84°54'59.26"E) on 12th December, 2017 and 17th March, 2018 which were later identified as *Torpedo sinuspersici* Olfers, 1831. One more specimen from Golabandha beach, Ganjam, 5 km south of Gopalpur, collected during 1984 was found lying among old preserved collections of the Estuarine Biological Station, Zoological Survey of India, Gopalpur

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and determined as the same species. Apart from these, another specimen of same old preserved collections from Golabandha beach, Ganjam was identified as *Torpedo fuscomaculata* Peters, 1855. A single sample of spotted numbfish of the genus *Narcine* was collected on 25th December, 2017 from Gopalpur fish landing centre. Examination of this numbfish resulted in confirming its identity as *Narcine prodorsalis* Bessednov, 1966. The fresh specimens were photographed soon after collection to note the colouration and later preserved in 10% formaldehyde. Measurements were taken in mm by dial callipers up to 0.1 mm accuracy. The morphometric measurements of the *Torpedo* species and *Narcine* species were following Compagno (1986); Compagno and Heemstra (2007); and Carvalho and Seret (2002). The identification of the specimens was done following standard literatures (mostly Fraser-Brunner, 1949; Carvalho *et al.*, 2002; Carvalho *et al.*, 1999; Carpenter and Niem, 1999) and web based information. All these specimens were deposited in the Estuarine Biological Station, Zoological Survey of India, Gopalpur-on-Sea, Odisha.

Results

Taxonomic accounts of all these three species are given hereunder based on collected specimens.

Class ELASMOBRANCHII Bonaparte, 1838
Order TORPEDINIFORMES de Buen, 1926
Family TORPEDINIDAE Henle, 1834
Genus *Torpedo* Duméril 1805

1. *Torpedo sinuspersici* Olfers, 1831 (Variable torpedo ray) (Figure 1)

1831. *Torpedo sinuspersici* Olfers, *Die Gattung Torpedo*: 15, 17
(Type locality: Persian Gulf).

Materials examined: EBRC/ZSI F-9283, 01 ex., 192 mm TL, 138 mm Disc Width (DW), inshore waters near Golabandha (19°13'48"N, 84°52'42"E), Ganjam, Odisha, H.S. Rao. 04/viii/1984; EBRC/ZSI F-9330, 01 ex., 250 mm TL, 178 mm DW, Gopalpur beach (19°15'47.56"N, 84°54'59.26"E), Ganjam, Odisha, S. Roy and S.R. Mohanty, 12/xii/2017; EBRC/ZSI F-9831, 01 ex., 467 mm TL, 328 mm DW, Gopalpur beach (19°15'47.56"N, 84°54'59.26"E), Ganjam, Odisha, S.R. Mohanty and S. Roy, 17/iii/2018.



Figure 1. *Torpedo sinuspersici* Olfers, 1831, 250 mm TL, EBRC/ZSI F-9330.

Description: Disc Length (DL) 1.17- 1.20 times in Disc width; eye diameter 19.2- 24.3 times in disc length; pre-orbital length 6.6- 9.3 times in DL; pre-oral length 5.4- 7.0 times in disc length; pre-nasal length 7.7- 9.5 times in disc length. Anterior contour of disc slightly arched; snout short; eyes and spiracles small, close together on top of head. Spiracles armed with 8 or 9 papillae on margin, the posterior one the largest. Nostrils transverse and relatively large, closer to mouth than to snout; anterior lobe expanded posteriorly and medially to form nasal curtain continuous in front of mouth, except for narrow isthmus, and with smooth posterior margin. Mouth of moderate size and arched, flanked by longitudinal furrows but without well-developed labial cartilages. Pectoral fins very thick near margin; two well-developed, kidney-shaped electric organs visible externally on either side of head; caudal fin small; skin very soft, naked. Rear end of base of first dorsal fin considerably posterior to rear ends of pelvic fin bases; inter-dorsal distance shorter than the distance between the second dorsal and caudal fin. Bright golden colour pattern of circles and irregular marks on dark red or brown to blackish background dorsally and white under surface.

Distribution: Western Indian Ocean: Persian Gulf, Red Sea eastward to India and southward to Natal, South Africa (Froese & Pauly, 2018). From Indian waters, it has been recorded from Maharashtra (Barman *et al.*, 2012), Kerala (Biju Kumar & Raghavan, 2015), Tamil Nadu

(Biswas *et al.*, 2012) and Andhra Pradesh (Sujatha, 2002; Sujatha *et al.*, 2014); also from Lakshadweep by Carvalho *et al.* (2002) treated the illustration of Jones and Kumaran (1980) as of this species. This species is usually found in inshore waters over sandy bottom, also well offshore from the surf zone down to 200 m.

Remarks: Among the three specimens examined one specimen (F-9831, 328 mm DW) is having smaller eyes than other two samples with an eye diameter 24.3 times in disc length. The Inter-dorsal distance is more or less equals to the distance between the second dorsal and caudal fin being it a much larger specimen than the other two.

2. *Torpedo fuscomaculata* Peters, 1855
(Black-spotted torpedo ray) (Figure 2)

1855. *Torpedo fuscomaculata* Peters, *Arch. Naturgesch*, 21: p. 278 (Type locality: Mozambique).

Materials examined: EBRC/ZSI F-9832, 01 ex., 189 mm TL, 132 mm (DW), inshore waters near Golabandha (19°13'48"N, 84°52'42"E), Ganjam, Odisha, H.S. Rao, 04/viii/1984.

Description: Disc Length (DL) 1.15 times in DW; eye diameter 17.6 times in disc length; pre-orbital length 7.6 times in DL; pre-oral length 5.3 times in disc length; pre-nasal length 7.6 times in disc length. Anterior contour of disc slightly arched; snout extremely short; eyes and spiracles small, close together on top of head; seven small knob-like papillae around the posterior margin of spiracles, central posterior papilla largest, about twice the next large outer papilla. Nostrils transverse, close together, closer to mouth than to snout; anterior lobe expanded posteriorly and medially to form nasal curtain continuous in front of mouth, except for narrow isthmus, and with a convex posterior margin and slightly overlaps the mouth. Mouth moderate in size and arched, flanked by longitudinal furrows but without well-developed labial cartilages. Pectoral fins thick near margin; two well-developed, kidney-shaped electric organs visible externally on either side of head; skin very soft and naked. Rear end of base of first dorsal fin slightly anterior to rear ends of pelvic fin bases; inter-dorsal distance shorter than the distance between the second dorsal and caudal fin. Brownish-black spots and white periphery on reddish brown background dorsally and white under surface.

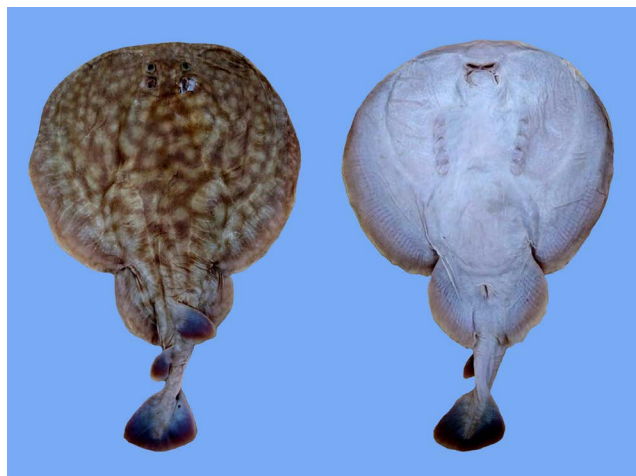


Figure 2. *Torpedo fuscomaculata* Peters, 1855 189 mm TL, EBRC/ZSI F-9832.

Distribution: Western Indian Ocean: from South Africa to Zanzibar and possibly as far north as the Kenyan coast. Possibly occurring off smaller islands in the Indian Ocean but identity of specimens uncertain and need verification (Froese & Pauly, 2018). From Indian waters, this species has been reported from Kerala (Talwar, 1981) and Andhra Pradesh (Sujatha, 2002; Sujatha *et al.*, 2014). *Torpedo fuscomaculata* usually inhabit estuaries and intertidal zone, down to beyond 400 m and occur in sandy areas near deep rocky reefs.

Class ELASMOBRANCHII Bonaparte, 1838
Order TORPEDINIFORMES de Buen, 1926
Family NARCINIDAE Gill, 1862
Genus *Narcine* Henle, 1834

3. *Narcine prodorsalis* Bessednov, 1966
(Tonkin numbfish) (Figure 3)

1966. *Narcine prodorsalis* Bessednov, *Zoologicheskyy Zhurnal*, 45: 77-82 (Type locality: Tonkin Gulf, Viet Nam).

Materials examined: EBRC/ZSI F-9316, 01 ex., 351 mm TL, 196 mm DW, Gopalpur beach (19°15'47.56"N, 84°54'59.26"E), Ganjam, Odisha, S. Roy and S.R. Mohanty; 25/xii/2017.

Description: Disc Length (DL) 1.10 times in Disc width; eye diameter 23.6 times in disc length; pre-orbital length 3.4 times in DL; pre-oral length 3.5 times in DL; pre-nasal length 4.1 times in DL. It is a moderately large ray with a

tail length equal to that of disc length. Eyes large, placed very close to spiracles than anterior margin; anterior contour of disc highly arched, snout moderately long. Spiracle with an elevated rim, devoid of papilla; nostrils circular, close together, closer to mouth than to snout; anterior lobe expanded posteriorly and medially to form a small nasal curtain continuous in front of mouth, except for narrow isthmus, and with a convex posterior margin and slightly overlaps the mouth. Mouth of moderate size; lower tooth band narrow, not as wide as upper tooth band, lower tooth band not wide and angular in outline posteriorly. Pectoral fins thin near margin; two well-developed, kidney-shaped electric organs visible externally on ventral side of head; skin thick and naked. Rear end of base of first dorsal fin posterior to rear ends of pelvic fin bases; inter-dorsal distance shorter than the distance between the second dorsal and caudal fin. Small, numerous regular black and dark brown spots present on very light brown dorsal background while under surface is white; small blackish spots present on caudal fin; most spots of about the size of eyes or less and very few larger than eyes.

Distribution: Western Pacific: off China to Java, Indonesia (Froese & Pauly, 2018). From Indian water this species has been reported only from Kakinada, Andhra Pradesh (Devarapalli, 2017). *Narcine prodorsalis* is generally found in continental waters, both inshore and offshore.

Discussion

Weigmann (2016) recognised 2 genera and 24 species in the electric ray family Torpedinidae and the genus



Figure 3. *Narcine prodorsalis* Bessednov, 1966 351 mm TL, EBRC/ZSI F-9316.

Torpedo containing 12 species. The two genera is now being distinguished in presence of a row of papillae on spiracle edge (*Torpedo*) or absence of papillae (*Tetronarce*). Identification of Torpedinids in coastal waters of Indian subcontinent still remains confusing and problematic. Misra (1969) gave description of two species, *Torpedo panthera* Olfers and *T. sinuspersici* Olfers, with *T. marmorata* of Annandale (1909) as synonym of *T. panthera*. Talwar (1981) reported occurrence of four species, viz., *Tetronarce fairchildi* Hutton, *Tetronarce macneilli* (Whitley), *Torpedo fuscomaculata* Peters, and *Torpedo sinuspersici* Olfers, whereas, he observed that both *T. panthera* of Misra (1969) and *T. marmorata* of Annandale (1909) as synonym of the last mentioned species. Sujatha (2002) listed three species, *T. panthera*, *T. fuscomaculata* and *T. sinuspersici*, from Visakhapatnam, but Sujatha *et al.* (2014) added one more species reporting *T. marmorata* Risso with range extension of the species to east coast of India. Akhilesh *et al.*, (2014) listed 5 species, i.e., *T. panthera*, *T. fuscomaculata*, *T. marmorata*, *T. sinuspersici* and *T. zugmayeri*, from India, excluding any *Tetronarce* species reported by Talwar (1981). However, Weigmann (2016) observes that *T. marmorata* Risso is confined to Atlantic Ocean and *T. panthera* is from western Indian Ocean, mostly the Gulf and Red Sea. More studies are needed to determine its distributional extent of all *Torpedo* species along East coast of India.

Identity of spotted *Narcine* in Indian waters, *N. indica* Henle, *N. ligula* Richardson, *N. maculata* (Shaw), *N. prodorsalis* Bessednov, and *N. timlei* (Bloch and Schneider), remained confusing. *N. indica* Henle, described from Tharangambadi coast, India and *N. microphthalmalma* Duméril (ex Valenciennes), described from Malabar Coast are now relegated to synonym of *N. timlei* (Bloch & Schneider) (Carvalho & Randall 2003; Eschmeyer *et al.*, 2018). *Narcine maculata* (Shaw) was described from Visakhapatnam, India and *N. timlei*, from Tharangambadi, India. Carvalho *et al.*, (1999) observed that identification of *Narcine* species from western Pacific is provisional and usually based on common usage in the literature, which may change with progress in future research. Wang *et al.*, (2009) also opined that the taxonomic status of *N. prodorsalis* is uncertain and it may possibly be junior synonym of the Chinese Numbfish (*Narcine lingua*). He also stressed on the collection series of topotype specimens of different age group may provide insight towards stabilization in taxonomy of these species.

Following this, Akhilesh *et al.*, (2014) though listed *N. prodorsalis* from Indian waters remarked on need of verification. However, Devarapalli (2017) had confirmed its occurrence along Kakinada coast, Andhra Pradesh.

The present report of three species of the order Torpediniformes, viz., *Torpedo sinuspersici*, *Torpedo fuscomaculata* (Torpedinidae) and *Narcine prodorsalis* (Narcinidae), forms its first record from Odisha coast.

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