

Research Note

Redescription of Smooth Lantern Shark, *Etmopterus pusillus* (Lowe, 1839) from the EEZ of India

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Correct taxonomic identification of species is a prerequisite for carrying out biological research (Last, 2007). The identification of the deep water elasmobranchs is a strenuous procedure due to their complex morphological similarities, taxonomic ambiguities and lack of studies on these groups (Coelho and Erzini, 2008). Among these, the lantern sharks of the genus *Etmopterus* are particularly challenging because of small size of most species and lack of commercial interest. In-depth study on taxonomy of elasmobranch where most taxa have been identified to species level, failed to identify lantern sharks to species level (Coelho & Erzini, 2008). In the FAO official fisheries data (FAO, 2007) there are only two categories to accommodate lantern sharks (*Etmopterus* spp. and *Etmopterus spinax*) indicating that still these exhibit identification problems. In genus *Etmopterus* particulars needed in respect of the species identification are poorly known and are having uncertain validity (Compagno, 1984).

Etmopterus pusillus has a worldwide distribution, having been recorded on both sides of the Atlantic, the western and south-east Pacific (Compagno *et al.*, 2005). As both species of lantern sharks presented in this paper are morphologically rather similar, it is found essential to specify distinguishing morphometric parameters which will be

useful for researchers for a quick and easy differentiation.

The specimens used for the study were *E. pusillus*-Non type female, 380.26 mm TL, from western Indian Ocean (11° 59' N Lat. and 74° 18' E Long. 770 m depth). Specimen is deposited in the fish museum (ID No. DF 250/283) of School of Industrial Fisheries, Cochin University of Science & Technology, India. Type measurements were archived from Coelho & Erzini (2008). During cruise number 250 of *FORV Sagar Sampada*, one species of deep water shark was collected using EXPO model trawl net and identified following Compagno (1984); Bass (1986); Smith & Heemstra (1986) and Compagno *et al.* (2005). Morphometric measurements were taken to the nearest mm using a dialed vernier calipers (Bigelow & Schroeder, 1948; Compagno, 1984).

Diagnosis: Two dorsal fins with spines; no anal fin; origin of first dorsal well behind pelvic insertion; both the dorsal fin spines are almost equal sized; low, flat, concave and truncated dermal denticles; first dorsal fin origin above the rear tips of pectoral fin; gill openings laterally curved; no precaudal pits on caudal peduncle; prespiracular length slightly greater than distance from spiracles to pectoral origins; trunk width 10.7% of total length; prebranchial length 19.0% of

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Fig. 1. Lateral view of *Etmopterus pusillus* from Indian EEZ



Fig. 2. Ventral view of head



Fig. 3. Dermal denticles

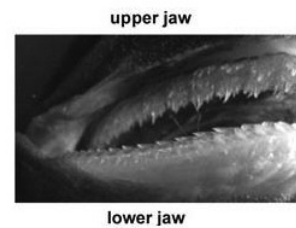


Fig. 4. Dentition of *Etmopterus pusillus*

total length; presecond dorsal length 64.8% of total length; precaudal length 83.8 % of total length; pectoral pelvic space 25.3 % of total length; inter dorsal space 24.7 % of total length; posterior margin of first dorsal 2.3 % of total length; second dorsal slightly greater than first and its length 8.8 % of total length; height and width of trunk somewhat equal; interdorsal space slightly greater than head length; head length slightly over three times of preoral length.

Description: Lateral view of the *E. pusillus* and ventral view of the head are shown in Fig. 1 and 2 respectively. Proportional body measurements are given in Table 1. A fairly slender-bodied lantern shark with a moderately short tail; body tapering towards tail; body covered with dermal denticles (Fig. 3); snout rounded; nostrils fairly small, 2.3% of total length; eyes are large, its length is two times of nostril width; mouth fairly large, its width is greater than preoral length; well developed labial furrows with the upper longer, (3.8 times) than lower; teeth in lower jaw without cusplets and in upper jaw with three pairs of cusplets (Fig. 4); gill openings rather long and laterally

curved and much wider than spiracle; pectoral fin with light margins and its base and height are almost equal; origin of first dorsal fin above free rear tips of pectoral fin, dorsal fin base much closer to pectoral bases than pelvic. Interdorsal space fairly long, nearly as long as pectoral pelvic space; second dorsal fin much larger than first; pelvic fin length 9 % of total length; distance between vent and caudal fin smaller than interdorsal space; length of dorsal caudal margin slightly less than head length; distance between dorsal caudal origin to caudal tip is much greater than dorsal caudal margin.

First report of *E. pusillus* was made by Lowe (1839) from Madeira, eastern Atlantic. Bass *et al.* (1976) reported it from the east coast of southern Africa. Many subsequent reports came from countries like South Africa and Mosambique (Compagno *et al.*, 1989), Canary Island (Brito, 1991), Taiwan (Shen, 1993), Australia (Last & Stevens, 1994) New Zealand (Cox & Francis, 1997), Trinidad Tob (Ramjohn, 1999) and Hawaii (Mundy, 2005). However, there is no report of this species from Indian waters. Bigelow &

Table 1. Comparison of the morphometrics of *Etmopterus pusillus* (% of TL in mm) with its type specimen and closely related species *Etmopterus unicolor*

Morphometric measurements	Present Specimen (male)	<i>Etmopterus pusillus</i> Type specimen (female, male)	<i>Etmopterus unicolor</i> (NZ) male	<i>Etmopterus unicolor</i> (JP) male
Total length (mm)	380.26	365.35	476.3	484.5
Standard length	75.9	NA	NA	NA
Trunk height	10.9	11, 10.5	10.57	10.80
Trunk width	10.7	10.9, 10.2	10.75	13.98
Abdominal width	10.1	10.2, 8.9	NA	NA
Abdominal height	11.0	11.2, 10.1	NA	NA
Fork length	NA	89, 89.4	NA	NA
Tail height	5.9	5.1, 5.1	NA	NA
Tail width	4.3	4.2, 4.5	NA	NA
Caudal peduncle width	1.8	1.8, 1.8	NA	NA
Caudal peduncle height	2.3	2.1, 2.1	NA	NA
Head length	24.1	23.7, 23.6	22.25	21.51
Head width	NA	9.6, 9.0	NA	NA
Head height	8.1	8.2, 8.4	NA	NA
Mouth length	2.2	NA	NA	NA
Mouth width	9.4	NA	10.81	9.40
Nostril width	2.3	NA	NA	NA
Eye length	4.6	3.6, 3.7	5.53	5.52
Eye height	1.7	NA	2.13	2.33
Interorbital space	6.8	NA	8.69	9.11
Internarial space	2.5	NA	3.19	3.70
Upper labial furrow length	1.9	NA	NA	NA
Lower labial furrow length	0.5	NA	NA	NA
Inner gill length	NA	5.3, 5.5	NA	NA
First gill slits length	1.9	NA	1.44	1.67
Fifth gill slits length	2.2	NA	1.39	1.52
Prespiracular length	11.8	NA	11.78	11.21
Preoral length	7.9	9.9, 9.6	8.92	7.95
Prenarial length	NA	NA	1.68	1.77
Preorbital length	4.9	7, 7.1	4.12	4.30
Postorbital length	10.1	NA	NA	NA
Prebrachial length	19.0	NA	17.81	17.03
Pre first dorsal length	36.3	NA	34.80	34.15
Pre second dorsal length	64.8	NA	60.89	60.19
Precaudal length	83.8	80.7, 81.1	77.83	78.98
Prepelvic length	54.5	NA	55.33	54.19
Prepectoral length	25.5	NA	22.25	21.91

Preventral caudal margin	NA	9.8, 9.4	NA	NA
Pectoral pelvic space	32.1	NA	30.48	28.74
Dorsal caudal space	NA	NA	9.71	10.18
Pelvic caudal space	NA	NA	14.61	15.55
Snout-vent length	NA	NA	59.89	58.70
Vent-caudal length	20.2	NA	NA	NA
Preventral caudal margin	NA	NA	5.37	5.16
Interspace between:				
nostril and mouth	5.8	NA	NA	NA
Inter dorsal space	24.7	24.2, 24.3	21.07	19.07
First dorsal anterior margin	7.5	5.5, 6.0	NA	NA
First dorsal posterior margin	2.3	NA	3.56	3.81
First dorsal inner margin	3.9	NA	NA	NA
First dorsal height	2.3	NA	2.60	2.84
First dorsal base	4.4	NA	5.24	6.82
First dorsal length	7.8	NA	9.83	11.37
Second dorsal anterior margin	5.4	6.8, 7.0	NA	NA
Second dorsal posterior margin	2.9	NA	5.34	6.00
Second dorsal inner margin	4.8	NA	NA	NA
Second dorsal height	3.7	NA	3.87	4.23
Second dorsal base	4.2	NA	7.00	9.02
Second dorsal length	8.8	NA	12.18	14.27
Pectoral anterior margin	7.5	8.4, 8.1	8.24	8.97
Pectoral posterior margin	4.0	NA	5.84	6.63
Pectoral inner margin	4.3	NA	4.07	4.88
Pectoral fin height	4.8	NA	NA	NA
Pectoral fin base	4.4	NA	4.78	5.38
Pectoral length	8.5	NA	NA	NA
Pelvic length	9.0	NA	11.27	12.44
Pelvic height	3.6	NA	NA	NA
Pelvic base	6.5	NA	6.56	7.07
Pelvic anterior margin	6.0	6.3, 6.1	6.57	6.95
Pelvic posterior margin	5.2	NA	NA	NA
Pelvic inner margin	6.2	NA	NA	NA
Dorsal caudal margin	18.7	18.8, 18.7	21.59	22.50
Caudal fin lower origin to tip	21.6	NA	NA	NA
Caudal fin fork length	NA	10.4, 10.0	NA	NA

Source: *Etmopterus pusillus* (type specimen) –Coelho & Erzini (2008), *Etmopterus unicolor* (NZ & JP) – Yano (1997) (NA - Not Applicable, NZ - New Zealand, JP - Japan)

Schroeder (1948) treated *E. frontimaculatus* as a synonym of *E. pusillus*. Bigelow & Schroeder (1954) reported that the two species have only simple interspecific variation. Study on

taxonomical resolution of the present species and *E. frontimaculatus* was carried out by Shigeru & Hiroyuki (1993). Population biology and life history parameters of this

species were studied by Coelho & Erzini (2008).

In FAO species catalogues (Compagno, 1984; Compagno *et al.*, 2005) characters differentiating between *E. pusillus* and *E. unicolor* are very poorly described. This paper presents more differentiating characters (Table 1) such as difference in the positioning of first and second dorsal fin, size of dorsal fin spines, shape of the gill slits and position of eye in relation to snout. Even though each morphometric measurement contributed relatively little for the overall differences, when all these small differences were considered together, it is possible to separate the species. The main difference mentioned by earlier authors (Compagno, 1984; Compagno *et al.*, 2005) was in the shape of dermal denticles. But the characters presented in this study are useful for the field identification of *E. pusillus*.

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