

THE ELECTRIC RAYS OF THE GENUS *HETERONARCE* REGAN (RAJIFORMES : TORPEDINIDAE), WITH THE DESCRIPTION OF A NEW SPECIES

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ABSTRACT

*Heteronarce prabhui*, a new species of *Terpedinidae* from India, is described from six specimens recently trawled at 300 m off Quilon, Arabian Sea, and constitutes the first record of the genus *Heteronarce* Regan from India. A key is given to the three recognised species, all of which have been collected in recent years from our region. Further, the relationship of *Heteronarce* to other torpedinoid genera is reviewed and characters for the separation of the five Indian genera are keyed.

INTRODUCTION

Two species of the rather rare genus *Heteronarce* Regan, 1921, have generally been recognised from four nominal species, known only from the Western Indian Ocean : *H. garmani* Regan, 1921, *H. regani* von Bonde and Swart, 1924, *H. natalensis* (Fowler, 1925) all from Natal, and *H. mollis* (Lloyd, 1907), previously known only from three specimens taken from the Gulf of Aden. Very little taxonomic work has been done on this poorly known deep-water genus. However, since 1971 several specimens of *H. mollis* and *H. garmani* have been collected off the south-west coast of India. Also, six specimens of a new species have been collected recently also off the south-west coast of India. This new torpedinoid is named in honour Dr. M. S. Prabhu, Director, Integrated Fisheries Project, Cochin.

The specimens described below are referable to the genus *Heteronarce* primarily because the specimens have the disc rounded anter-

iorly, a very shallow groove around the mouth, jaws short and weakly protractile, eyes well developed and almost contiguous with the spiracles, the nasal curtain only slightly broader than long, and two dorsal fins. The techniques employed for measuring the morphological characters were similar to that used by Wallace (1967). Opportunity is taken here to briefly review the classification of the torpedinoids as they concern the genera found in India and present a key to their identification.

Key to the Species

- |       |   |                   |
|-------|---|-------------------|
| 1 (a) | Disc wider than long ; spiracles large, about 1.25 times eye ...  | <i>H. prabhui</i> |
|       | b) Disc longer than wide ; spiracles small, equal eye ...   | 2                 |
| 2 (a) | Length of disc more than 50% total length ; dorsal fins sub-equal ...                                       | <i>H. mollis</i>  |
|       | b) Length of disc less than 50% total length ; first dorsal fin slightly smaller than second dorsal fin ... | <i>H. garmani</i> |

## SYSTEMATIC ACCOUNT

Family : TORPEDINIDAE

**Heteronarce garmani** Regan

*Heteronarce garmani* Regan, 1921, *Ann. Mag. nat. Hist.*, (9) 7 : 414 (type locality : Natal, 220-238 m) ; Wallace, 1967, *Oceanogr. Res. Inst. Invest. Rep.*, (17) : 55, fig. 28.

**Material** : 4 ex., 193—212 mm in total length, off Quilon (Kerala), 300 m., 12—13 Mar. 75, coll. P. K. Talwar ; ZSI regd no. F 7205/2—F7208/2.

## DESCRIPTION

Disc subcircular, about 1.1 times longer than wide ; length of disc 44.0—48.8% total length. Eyes and spiracles small, of equal size. Mouth small and slightly undulate, its corners completely overlapped by nasal curtain.

Origin of first dorsal fin just behind base of pelvic fins ; first dorsal fin slightly smaller than second dorsal fin. Outer edges of pelvic fins concave.

**Colour** : in alcohol, dark brown above ; ventral surface creamy white with their outer edges greyish brown ; outer posterior edges of dorsal fins hyaline, outer edges of pelvic fins whitish.

**Distribution** : Natal (Western Indian Ocean) and the south-west coast of India ; 74—300 m.

**Remarks** : This species was earlier known only from the Western Indian Ocean. Of the four specimens from India, three are males and are similarly coloured whereas in the fourth specimen (F 7208/2) which is a female, the dorsal surface of the disc is considerably lighter in colour with faint reticulations and the ventral surface of the disc is also much paler in colour. These specimens agree very well with Wallace's (1967) description and figure of the species.

**Heteronarce mollis** (Lloyd)

*Narcine mollis* Lloyd, 1907, *Rec. Indian Mus.*, 1 : 5, 8 (type locality : Gulf of Aden, 235 m.) ; Lloyd, 1909, *Mem. Indian Mus.*, 2 : 144 ; *Illust. Zool. "Investigator"*, 1909, pl. 46, fig. 1. la.

*Heteronarce mollis* : Regan, 1921, *Ann. Mag. nat. Hist.*, (9)7 : 414 (name only) ; Norman, 1939, *John Murray Exped. Sci. Rep.*, 7 (1) : 12.

**Material** : 7 exs., 120—205 mm in total length, off Quilon (Kerala), 300 m, 3—4 Mar. 1971, coll. P. K. Talwar ; ZSI regd. F 6299/2.

## DESCRIPTION

Disc ovoid, about 1.1 times longer than wide ; length of disc 51.6—54.0% total length. Eyes and spiracles small, of equal size. Mouth small and slightly undulate, its corners completely overlapped by nasal curtain.

Origin of dorsal fin just behind base of pelvic fins ; dorsal fins subequal. Outer edges of pelvic fins convex.

**Colour** : in alcohol, dark brown above, greyish brown on ventral surface ; margins of dorsal, pelvic and caudal fins with white margins.

**Distribution** : Gulf of Aden and the south-west coast of India ; 238—288 m.

**Remarks** : Lloyd (1907) described this species on two specimens from the Gulf of Aden. Subsequent to its original discovery it has been reported only once (Norman, 1939) by the *John Murray Expedition* also from the Gulf of Aden. The fate of the two syntypes is unknown (Talwar, 1977). One syntype (ZSI F 1456/1), a male, 225 mm in total length, is not traceable in the ZSI collections and the fate of other syntype (ZSI F 1457/1) which was given to the British Museum (Natural History) on 9 March 1909, is also unknown.

**Heteronarce prabhui** sp. nov.

*Material* : *Holotype* (Fig. 1) : an example, 220 mm in total length, collected from the Arabian Sea off Quilon (approx. 09°N. 76°E), otter trawl haul, 300 m, 7 March, 1979, coll. P. K. Talwar, Zoological Survey of India regd. no. F 7614/2.

**DESCRIPTION**

Based on the holotype and five paratypes. Measurements are presented in the table.

Disc almost circular, 1.05—1.07 times wider than long ; length of disc 48.1—52.4% total length. Eyes small, contiguous with

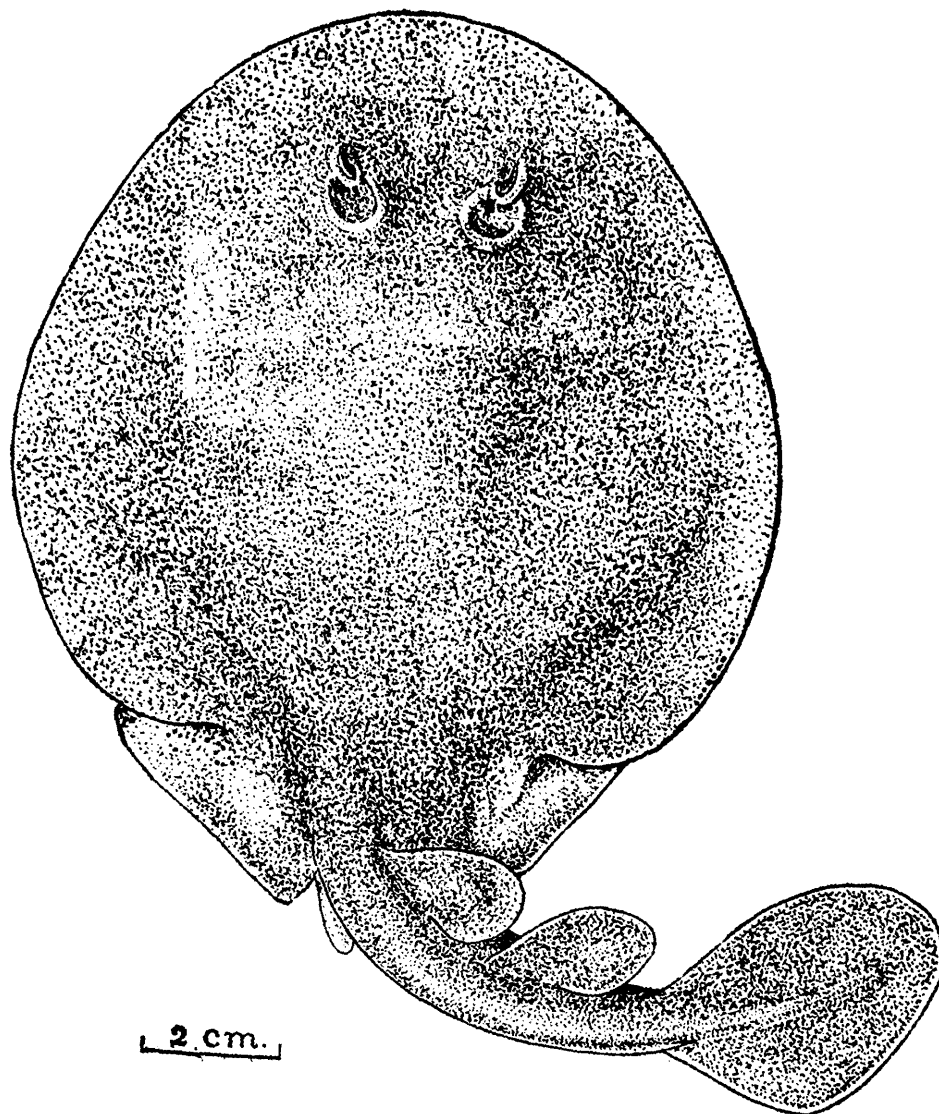


Fig. 1. *Heteronarce prabhui*, holotype, dorsal view.

*Paratypes* : 5 examples, 141—218 mm in total length, collected along with the holotype ; ZSI regd. no. F 7615—9/2.

spiracles ; spiracles large, about 1.25 times in eye diameter. Mouth small and slightly undulate, its corners completely overlapped

by the nasal curtain; mouth apparently suctorial.

Teeth in  $\frac{10-12}{11-12}$  transverse rows, each with a sharp median cusp.

Dorsal fins subequal, origin of first dorsal fin just above or slightly anterior to rear ends of pelvic fin bases. Pelvic fins with outer edges convex.

*Colour*: in alcohol, dorsal surface greyish, uniform; ventral surface greyish with whitish margins to the disc, pelvic fins and tail.

*Distribution*: South-West coast of India, 300 m.

ed a classification in which three families were defined by the number of dorsal fins wherein he also considered *Heteronarce* near *Narcine*. Compagno (1973), however, has shown that the genus *Heteronarce* is more closely related to the genus *Narke* (a genus with one dorsal fin only) than with *Narcine*. He placed *Narke* and *Heteronarce* in the family Narkidae, *Narcine* and *Benthobatis* in the Narcinidae, and proposed new characters for separating them. Lindberg (1976), however, continued to follow the older classification whereas Nelson (1976) employed Compagno's basis of division but at a subfamily/tribal level. It seems best to regard the torpedinoids as constituting a

TABLE: Selected measurements (in mm) of holotype and paratypes of *Heteronarce prabhui*

	HOLOTYPE		PARATYPES			
	F 7614/2	F 7615/2	F 7616/2	F 7617/2	F 7618/2	F 7619/2
Total length	220.0	205.0	202.0	202.0	218.0	141.0
Length of Disc	108.0	100.0	106.0	106.0	102.0	74.0
Snout to origin first dorsal fin	125.0	122.0	121.0	120.0	124.0	85.0
Snout to origin second dorsal fin	148.0	141.0	141.0	138.0	148.0	96.5
Snout to anterior end orbit	24.0	23.0	26.0	24.0	23.0	15.5
Snout to origin upper caudal fin	174.0	161.0	159.0	160.0	169.0	112.5
Disc width	112.0	105.0	108.0	114.0	105.0	75.0
First dorsal fin base	12.5	11.5	12.5	12.0	13.5	9.0
Interspace between dorsal fin bases	10.5	7.5	8.0	8.5	12.0	7.0
Second dorsal fin base	12.5	12.5	13.5	13.5	13.5	7.5
Distance between spiracles	13.5	13.0	13.5	12.5	13.0	9.5
Snout to tip lower jaw	25.0	22.0	27.0	24.5	27.0	18.5
Snout to anterior end vent	102.0	101.0	94.0	93.0	102.0	70.0
Mouth width	10.5	8.5	9.5	9.5	9.0	6.0
Between inner ends first pair gill slits	33.0	28.5	27.5	28.5	29.5	18.5
Between inner ends fifth pair gill slits	18.0	16.5	16.5	17.0	17.0	15.0

#### DISCUSSION

Earlier workers arranged the torpedinoids (electric rays) in a single family Torpedinidae and the genus *Heteronarce* has usually (Regan, 1921; Fowler, 1941; Norman, 1957) been placed in the vicinity of the genus *Narcine* Henle. Bigelow and Schroeder (1953) introduc-

single distinct family. Misra (1969) listed five genera of Torpedinidae in the *Fauna of India* of which *Bengalichthys* Annandale is considered a subgenus of *Narke* Kaup by Garrick (1951), and subsequent workers by implication. The following key will serve to distinguish the five Indian genera;

- 1 (a) Disc truncate or emarginate anteriorly ; jaws extremely slender ; mouth arcuate (Subfamily Torpedininae) ... *Torpedo*
- (b) Disc rounded anteriorly ; jaws stout ; mouth transverse (Subfamily Narcininae) ... 2
- 2 (a) Deep groove around mouth ; jaws long and strongly protractile ... 3
- (b) Shallow groove around mouth ; jaws short and weakly protractile ... 4
- 3 (a) Eyes obsolete (degenerate) ; disc elongate ... *Benthobatis*
- (b) Eyes well developed ... *Narcine*
- 4 (a) One dorsal fin ... *Narke*
- (b) Two dorsal fins ... *Heteronarce*

## ACKNOWLEDGEMENTS

The author is grateful to the Director and Dr. K. C. Jayaram, Deputy Director, Zoological Survey of India, for their sustained encouragement. The author is also grateful to the Directors, Integrated Fisheries Project and Central Institutes of Fisheries Operatives, Cochin, for facilities on board the fishing trawlers.

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