

LARVAL BILLFISHES FROM THE BAY OF BENGAL*

K. BALASUBRAHMANYAN

CAS in Marine Biology (Marine Biological Station), PortoNovo, India

ABSTRACT

Ten larvae of *Istiophorus platypterus* and two swordfish-like larvae were present in the plankton collections of seven stations (ANTON BRUUN Cruise I) in the Bay of Bengal. Larvae of *Istiophorus platypterus* ranged in size from 3.0 mm to 6.9 mm in standard length and the two swordfish-like larvae measured 4.4 mm and 7.3 mm in standard length. Body measurements and description of these specimens have been given and compared with the previously published accounts.

INTRODUCTION

FISHES belonging to the two families Istiophoridae and Xiphiidae are popularly called as billfishes and they occur all over the world in the warmer regions of the Pacific, Atlantic and Indian Oceans. They are caught only occasionally, in the coastal waters of India and they do not form an important fishery in India. While various workers have reported the occurrence of larval billfishes from different places, very little is known about the breeding habits and spawning grounds of billfishes in the world oceans. Ueyanagi (1962) and Jones and Kumaran (1962) have reviewed and discussed the distribution of larval billfishes in the Indo-Pacific region.

The present study relates to the occurrence of larval billfishes in the plankton samples collected by the author while he was a visiting scientist on board R. V. ANTON BRUUN Cruise I in the Bay of Bengal. Plankton collections were made using non-standard net of 30 mesh size from 25 metres to surface.

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Istiophorus platypterus

Ten larval specimens of *Istiophorus platypterus*, 3.22 to 7.66 mm in T. L. were present in the plankton samples of seven stations and their body measurements and other particulars are given in Table 1. Since Jones (1959) and Jones and

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Kumaran (1962 a) have earlier described and figured the larvae of *Istiophorus* occurring in Indian waters detailed descriptions of the larvae of *Istiophorus platypetrus* are not attempted here.

The smallest specimen in the collection is 3.22 mm in total length and is from station No. 92. The larva appeared pale brown in colour from the pectoral base to the caudal base. The vertebral column is straight and tapering to a point caudally without any upturn. The ocular crest has not developed. The opercular spines are prominent and the second spine from the top is much longer than the rest. Pterotic spine is not present. The dorsal and ventral fins are continuous with the caudal fin and the pelvic fin has not formed yet.

The second smallest specimen measured 3.78 mm in total length and is from station No. 101. Scattered chromatophores are prominently present on the head, on the dorsal side, above the digestive tract and at the tip of the vertebral column. The jaws are almost equal and teeth are not present. The orbital crest is small without serrations. The pre-opercular spine is long and prominent, while the pterotic spine is small and just visible as a point.

Six specimens ranging in size from 4.22 mm to 4.44 mm in total length are present and they appear to be more or less alike in general shape and structure but they varied slightly in body measurements (Table 1). Several changes are noticeable from the earlier described specimens. The body is much more heavily pigmented in distinct areas. The orbital crest is well distinguished and serrated. Small teeth are present on the jaws. The pterotic and preopercular spines are strongly keeled and serrated. The dorsal and ventral fins are readily distinguishable from the caudal fin. The vertebral column is not turned upward caudally and it is still straight and rod like.

The remaining two larvae measuring 6.89 mm and 7.60 mm in total length are respectively from station No. 100 and No. 98 and they are well advanced in development than the other larvae. They did not differ from each other in structural details excepting the body measurements which are given in Table 1.

The body is much pigmented and appeared dark brown in colour. The snout has lengthened slightly and the lower jaw is shorter than the upper jaw. The lower jaw bears a conspicuous serrated ridge on the ventral surface. The teeth are numerous, strongly developed and prominent. The orbital crest is high and strongly serrated. The pterotic and preopercular spines have grown longer. The dorsal and ventral fins are separated from the caudal fin and the elements are appearing. The hypural bones have developed but not completely. Vertebral column is visible faintly. The caudal fin is still homocercal and the pelvic fins appear as small buds between the bases of the pectorals.

Istiophorid larvae collected from the western Indian Ocean have been described by Lutken (1880) and from the Laccadive Sea by Jones (1959). Fiftytwo out of fiftyfive *Istiophorid* larvae collected by the Research Ship DANA during her voyage were from the Indian Ocean (Jones and Kumaran, 1964 b). Jones and Kumaran (1964 b) have reported that thirtyone specimens came from the eastern Indian Ocean west of Sumatra and, the rest twentyone specimens came from the western part of the Indian Ocean near Madagascar. The present study reveals the occurrence of ten *Istiophorid* larvae from the Bay of Bengal also.

Thirty larvae collected from the eastern part of the Indian Ocean ranged in size from 3.82 mm to 10.48 mm and they were collected in September and October 1929. Twentyone larvae collected from the western part of the Indian Ocean ranged in size from 3.97 mm to 8.95 mm and were collected in December 1929 and January 1930 (Jones and Kumaran, 1964 b). Jones (1959) has reported the occurrence of sixteen larvae ranging in size from 3.40 mm to 7.66 mm from the Bay of Bengal in April and May 1963. Thus it is seen that the larvae ranging in size from about 3 mm to about 10 mm were collected at different times from different parts of the Indian ocean and it is likely that the fish may breed throughout the year in the equatorial waters of Indian Ocean.

Swordfish-like larvae

Two swordfish-like larvae measuring 4.5 mm and 7.5 mm were found respectively in the plankton collections made at station No. 67 and No. 98. The body measurements in mm of the two larval specimens are given below:

	Larva I	Larva II		Larva I	Larva II
Total length	4.5	7.5	Upper jaw	1.3	2.7
Standard length	4.4	7.3	Lower jaw	1.3	2.4
Head length	1.5	3.6	Snout to dorsal	1.8	3.3
Snout length	0.9	1.9	Snout to Anal	2.6	4.8
Eye diameter	0.3	0.5			

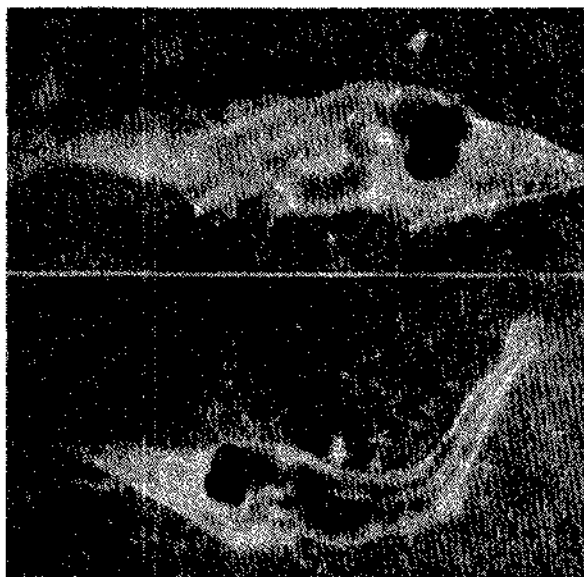


Fig. 1. Swordfish-like larvae : Top - 4.4 mm larva from Station 67 and Bottom - 7.3 mm larva from Station 98.

4.5 mm larva: This specimen is laterally compressed and not stout. The tip of the snout and the body from the pectoral base to the caudal base appear to be pale brown in colour. Dark spots are present on the digestive tract and one on

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TABLE 1. *Details of the sailfish larvae from the Bay of Bengal (Measurements in mm)*

No.	Station No.	Date	Latitude	Longitude	T. L.	St. L.	H. L.	Sn. L.	Eye	Pt. sp.	P.O. sp.	Sn. to D.	Sn. to V.
1	92	29.4.1963 Night	16.40°N	83.58°E	3.22	3.00	1.00	0.44	0.33	—	0.22	1.00	2.00
2	101	2.5.1963 Day	13.09°N	82.22°E	3.78	3.44	1.11	0.56	0.44	0.11	0.33	1.11	2.11
3	102	3.5.1963 Night	13.10°N	81.17°E	4.22	3.78	1.11	0.56	0.44	0.22	0.67	1.11	2.22
4	67	15.4.1963 Day	16.30°N	85.32°E	4.22	3.89	1.11	0.56	0.44	0.11	0.44	1.11	2.22
5	72	17.4.1963 Day	14.23°N	89.23°E	4.33	3.89	1.33	0.56	0.44	0.22	0.56	1.33	2.33
6	102	3.5.1963 Night	13.10°N	81.17°E	4.44	4.00	1.44	0.78	0.56	0.44	0.89	1.33	2.44
7	92	29.4.1963 Night	16.40°N	83.58°E	4.44	4.00	1.44	0.78	0.56	0.44	0.89	1.44	2.56
8	98	1.5.1963 Day	13.03°N	85.21°E	4.00	4.44	1.44	0.89	0.67	0.56	1.11	1.44	2.67
9	100	2.5.1963 Day	13.04°N	83.10°E	6.89	6.11	2.22	1.56	0.89	0.89	1.67	2.78	4.44
10	98	1.5.1963 Day	13.03°N	85.21°E	7.66	6.89	3.22	2.00	1.00	1.00	2.00	3.33	5.00

T.L.—Total Length. St. L.—Standard Length. H. L.—Head Length. Sn. L.—Snout Length. Pt. sp.—Pterotic spine.
P. O. sp.—Preopercular spine. Sn. to D.—Snout to Dorsal. Sn. to V.—Snout to Vent.

the ventral side near the caudal base (Fig. 1, Top). The jaws are equal and many small teeth are present. Preopercular spines are present and supra-orbital crest is not present. The dorsal and ventral fin folds are separate from caudal fin. Nearly 65 myotomes are seen.

7.5 mm larva: This specimen is also not stout but laterally compressed. The tip of the snout and the body showed pale brownish colouration. A black patch on the dorsal side above the anal region is seen. Two pinkish bodies are seen, one behind the stomach and another near the anus. The upper jaw projects slightly like a rostrum beyond the tip of the lower jaw (Fig. 1, Bottom). The preopercular spines are prominent. The supra-orbital crest is less prominent and seen as a slight ridge only without serrations. The posterior corner of the mandible is keeled. Myotomes are not clearly visible but they appear to be around 60.

These two larvae from the Bay of Bengal resemble the 6.32 mm larva described by Jones (1965) in having the postanal region longer, in the presence of elongated snout with upper jaw projecting beyond lower jaw, in the absence of pigmentation on the head and preanal region of the body and in having the supraorbital crest less prominent. Further these larvae are also compressed laterally and show more than fifty myotomes (i. e. nearly 65). The above mentioned characters are also the major differences which distinguish these larvae from the larva of *Xiphias gladius* described by Sanzo (1930), Arata (1954), Taning (1955), Yabe *et al.*, (1959), Jones (1960). So they cannot be the larva of *Xiphias gladius*. These two larvae from the Bay of Bengal superficially resemble the larva of swordfish, but they do not belong to *Xiphias gladius*. In the absence of connected series of larvae it is not possible to identify them correctly and hence they have been described here as swordfish-like larvae.

REFERENCES

- ARATA, G. F. Jr. 1954. A contribution to the life-history of the swordfish, *Xiphias gladius* Linnaeus from the South Atlantic Coast of the United States and the Gulf of Mexico. *Bull. Mar. Sci. Gulf and Caribbean*, 4 (3): 183-243.
- JONES, S. 1958. Notes on eggs, larvae and juveniles of fishes from Indian waters. I. *Xiphias gladius* Linnaeus. *Indian J. Fish.*, 5 (2): 357-361.
- , 1959. Notes on eggs, larvae and juveniles of fishes from Indian waters. II. *Istiophorus gladius* (Broussonet). *Ibid.*, 6 (1): 204-210.
- , 1965. Notes on eggs, larvae and juveniles of fishes from Indian waters XIV. Further notes on *Xiphias gladius* Linnaeus. *Ibid.*, 9 (2): 525-529.
- AND M. KUMARAN 1964a. Eggs, larvae and juveniles of Indian scombroid fishes. *Proc. Symp. Scombr. fishes*, Mandapam Camp, (*Mar. Biol. Ass. India*), 1962, Pt. I: 343-378.
- AND ——— 1964 b. Distribution of larval billfishes (Xiphiidae and Istiophoridae) in the Indo-Pacific with special reference to the collections made by the Danish Dana expedition. *Ibid.*, 1962, Pt. I: 483-498.
- *LUTKEN CHARLES 1880. *Spolia Atlantica. Vidensk Selsk, Skr.*, 5 Rackke, Copenhagen, 441-447.
- SANZO, LUIGI 1930. Giovanissimo stadio larvale di *Xiphias gladius* L., di mm. 6, 4. *R. Comitato Talassografico Ital.*, Mem. 170 : 1-8.

- TANING, A. VEDEL. 1955. On the breeding areas of the sword-fish (*Xiphias*). *Pap. Mar. Biol. and Oceanogr., Deep Sea Research*, Suppl. to Vol. 3: 438-50.
- UEYANAGI, S. 1964. Description and distribution of larvae of five Istiophorid species in the Indo-Pacific. *Proc. Symp. Scombr. fishes*, Mandapam Camp (*Mar. Biol. Ass. India*), 1962, Pt. I: 499-528.
- *YABE, H. *et al.*, 1959. Study on the life-history of the swordfish, *Xiphias gladius* Linnaeus. *Rept. Nankai Reg. Fish. Res. Lab.*, 10 : 107-50.

*Not referred in original