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## STUDIES ON CARANGID FISH LARVAE FROM THE SOUTHWEST COAST OF INDIA : *ALECTIS CILIARIS* (BLOCH, 1788) *ALECTIS INDICUS* (RUPPELL, 1828) AND *ATROPUS ATROPUS* (BLOCH, 1801)

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### ABSTRACT

The paper deals with larval stages of three carangid fishes *Alectis ciliaris*, *A. indicus* and *Atropus atropus* collected during the survey programme of UNDP/FAO/Pelagic Fishery Project, Cochin during 1971-1975 along the Southwest coast of India. Observations on the distinctive features of the larvae, postlarvae and their seasonal occurrence and area of distribution are given. The larvae of the above species were rare in the collection, being represented by 48, 45 and 41 numbers respectively. The larvae of *Alectis* spp. were obtained during February to April and *A. atropus* during May-June.

### INTRODUCTION

SEVERAL studies on fish eggs and larvae have contributed to our knowledge on the life histories of commercially important species, most important among them being those of major pelagic fishes. Some of the earlier studies in India were mainly confined to the species of fishes from isolated inshore waters. Eggs and early stages of few species of carangids have been described by various authors. But reports on the above species were very few. Delsman (1926) described few stages of *Caranx ciliaris* from the Java Sea. Rao (1963) made a study on eggs and few stages of *A. indica* from Porto Novo Coast. Basheeruddin and Nayar (1962) reported the

occurrence of young fishes of *A. atropus* from the coastal waters off Madras.

The species of the genus *Alectis* belong to the family Carangidae. They grow to fairly large size (100-150 cm) and are generally caught in trawl nets from Wadge Bank area. The young ones are scarce and are present along with other carangid fishes. *A. atropus* appears as stray catches; hence relative contribution of this species in all India marine landings is rather insignificant. This is the first report on larval stages of the *A. atropus*. The main purpose of the larval study is to locate the spawning area and season, which is also cross checked with adult fishes caught at different periods in the routine collections of

the Integrated Fisheries Project, Cochin during the above period.

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#### MATERIAL AND METHODS

The materials studied are from the plankton collection of UNDP/FAO/Pelagic Fishery Project, Cochin during 1971-1975. The area of collections extended from Ratnagiri to Tuticorin (17° 00'N to 07° 00'N). The sampling details and other methodologies are the same for all carangid fish larvae studied as a part of the survey programme as described elsewhere (Premalatha, 1977). The percentage contribution and frequency of occurrence of the above species were less when compared to other carangid larvae. In the case of *A. ciliaris*, 48 specimens from 4.3 to 8.0 mm length were present in the collections. As regards *A. indicus*, 45 numbers ranging from 2.7 to 7.5 mm in length were obtained, whereas 41 numbers from 3.6 to 8.0 mm length, were identified in the case of *A. atropus*. The body proportion for the above stages are given in Table 1. Juveniles upto 33 mm length, collected in the pelagic trawl hauls from the southwest coast were also included in the study for linking the meristic and morphometric characters with the adults. Only selected stages with demarcating developmental characters are described here.

#### *Alectis ciliaris*

##### 4.3 mm stage (Fig. 1 a)

Body short and broad. Profile of head rather angular. Scattered pigments on head, especially on occipital, margin of dentary and on branchiostegal region. Dorsal fin with seven spines and sixteen to seventeen rays; anal with ten to eleven ray. Caudal flexion distinct and few rays on lower side of urostyle. Mid-lateral pigments present in a line towards posterior end. Pigments also seen on margin of myotomes, body cavity and in the region of air bladder. Pre-opercular spine four to five in number.

##### 5.0 mm stage (Fig. 1 b)

Body pigments more on dorsal side from occipital region to base of soft dorsal fin. Ventral side with less pre-anal pigments and more post-anal pigments. Two rows of spines present on gill cover. Branchiostegals present. Four gill arches without gill filaments. Pectoral fins with a flat base. Spines and rays clear in dorsal and anal fins; fin fold present towards caudal end.

##### 6.0 mm stage (Fig. 1c)

Body short and broad with small ventrals. Pigmentation more dense than in previous stage. Pigments concentrated on first dorsal fin in between third and fourth spines. Caudal fin round with sixteen primary rays.

##### 6.8 mm stage (Fig. 1 d)

Pectoral fin with sixteen rays. Pigmentation intensified in occipital region and on dorsal fins; spines and rays on all fins more or less similar as in juveniles.

##### 15.0 mm stage

First few rays of dorsal and anal fins slightly prolonged. Pigments more on dorsal side. Fin counts and other meristic characters same as in juveniles.

*Alectis indicus*

3.4 mm stage (Fig. 2 b)

2.7 mm stage (Fig. 2 a)

Rhomboid body with pigmented ventral rudiments as two strips. Fin folds present on both sides of body. Pigments present on post-anal ventral margin and roof of body cavity. Few spines on gill cover. Branchiostegals absent.

Spines developed on the first dorsal and anal fins. Urostyle slightly turned upwards. Characteristic of this species is the peculiar shape and elongated ventral fin at early stage. Pigments on occipital region, ventral margin and lateral mid line. Pre-opercular spines distinct. Branchiostegals four in number. Gills four with filaments on two arches.

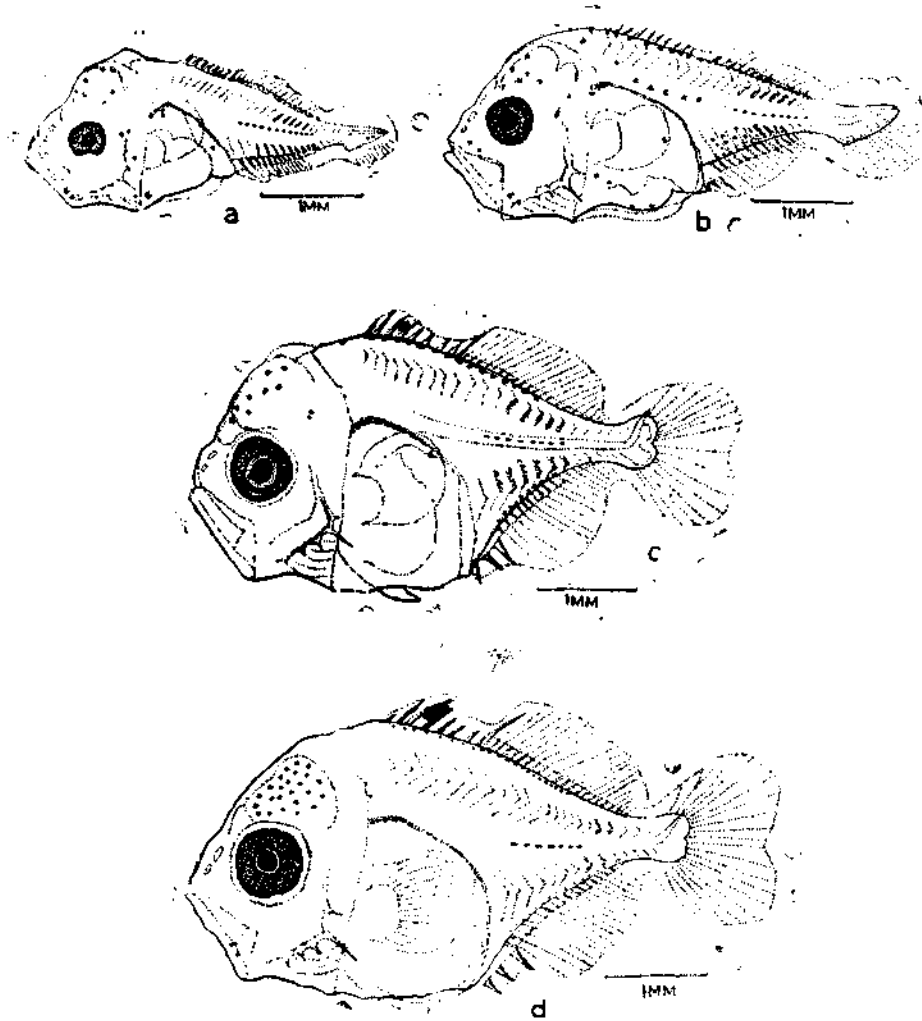


FIG. 1. Larvae of *A. ciliaris* : a. 4.3 mm, b. 5.0 mm, c. 6.0 mm and d. 6.8 mm.

**7.0 mm stage (Fig. 2 c)**

Broad body with large and round eyes. Body pigmentation intense than in previous stage. Almost all fin elements and other characters as in juveniles. Pre-opercle with spinous projections. Branchiostegals seven in number. Gill filaments developed on four arches. The distinguishing character of this stage is the elongated rays on dorsal fins.

**15.0 mm stage (Fig. 2 d - Alizarine stained)**

Anterior four rays of soft dorsal and anal fin prolonged into filaments. Elongated ventral fin present. Fin counts and other meristic characters as in young ones. Lateral line arch clear anteriorly, but scales or scutes absent.

***Atropus atropus*****4.0 mm stage (Fig. 3 a)**

Body broad anteriorly and tapered posteriorly. Pigments more on dorsal roof of body cavity and in intestinal region. Dot like pigments on post-anal ventral margin. Small occipital crest present. Margin of upper jaw serrated. Five branchiostegals present. Opercular spines, four in number, one at corner being the longest. Rudiments of ventral fin appear at this stage. Myotomes 10+14.

**6.8 mm stage (Fig. 3 b)**

Body pigmentation less in number compared to other species of carangids. Almost full set of fin elements present with a portion of distinct fin rays. Ventral fin long and well pigmented. Dorsal and anal spines are connected by membranes. Pectoral not developed.

**10.2 mm stage (Fig. 3 c)**

Punctate pigments all over body. Ventral fin long, black and in a groove. Branchio-

stegals seven in number. Gill rakers 15+5. Later line not clear. Margins of jaws well serrated. Pectoral fin with sixteen rays. Fin counts and other meristic characters agree with those of juveniles.

**DISTRIBUTION**

During the survey programme, plankton samples were collected from 1284 stations. Among them, carangid larvae were present in 531 samples. A total of 3284 carangid larvae were obtained and this formed about 7% of the larval biomass. From this, 93 specimens were identified as *Alectis* spp. and 41 as *A. atropus*. They were present all along the southwest coast; but more larvae were found towards the northern region in Calicut, Kasaragod and Ratnagiri area. In the case of *A. atropus* more larvae were collected from Cochin and Kasaragod profiles (Table 2).

Seasonal occurrence showed that *Alectis* larvae were present more during February to April, whereas *A. atropus* predominated during May to June. It was also observed that the larvae of the above species were collected from the mid shelf region than from near shore waters. Day and night collection also varied for the two genera. Nearly 56% of *Alectis* spp. were obtained from night samples and 60% of the *A. atropus* larvae were present in the day collections.

**DISCUSSION**

*Alectis ciliaris* and *A. indicus* are present along the southwest coast of India. Young ones are easily recognised by the much compressed and angular body with filamentous rays. In the case of *A. ciliaris* basals of spines and rays are clear in 4.3 mm stage and by 7.0 mm stage the fin formation is complete. For the larvae of *A. indicus*, ventral fin developed even at 2.7 mm stage, unlike in many

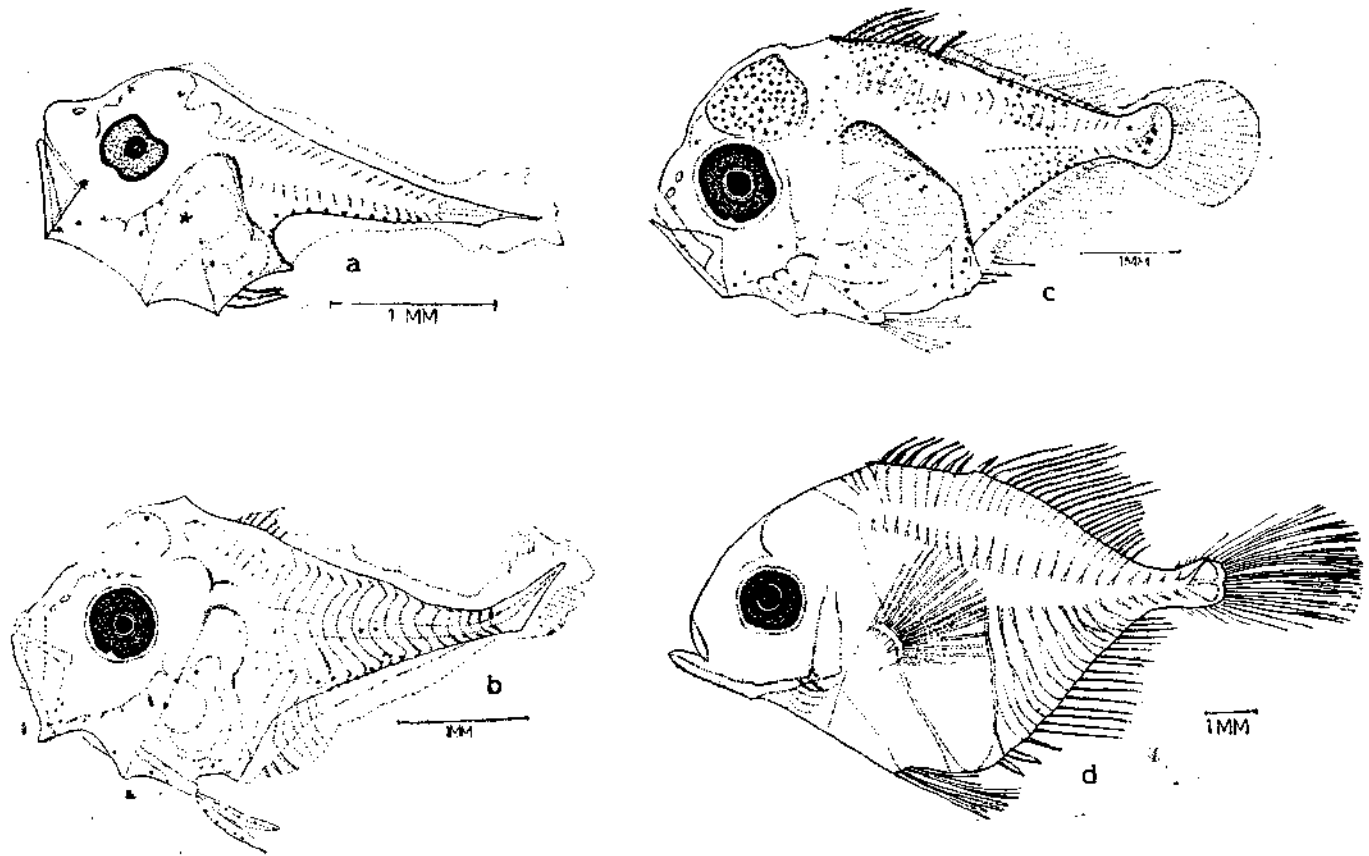


FIG. 2. Larvae of *A. indicus* : a. 2.7 mm, b. 3.4 mm, c. 7.0 mm and d. 15.0 mm.

other carangid fish larvae. The elongated rays on fins are noticed in young ones of both the species, but the filaments disappear with growth in adults. Among the two species only in *A. indicus* the ventral fin rays are elongated in young ones which gives the specific identity. Differences are also noticed in the nature of pigmentation and meristic counts for the two species.

The identification of *A. atropus* is based on the ventral groove and meristic characters

of the adults. In the present study, the ventral fin appears at 4.0 mm stage and by about 5.0 mm length it is seen in a groove. Full set of fin elements corresponding to young ones are noticed from 6.0 mm stage. By the time it reaches 8.0 mm length, ventrals are long and black as in young ones. Lateral line arch is clear in 15.0 mm stage and 30-34 scutes are noticed in 20.0 mm stage, which aids in the confirmation of the identification.

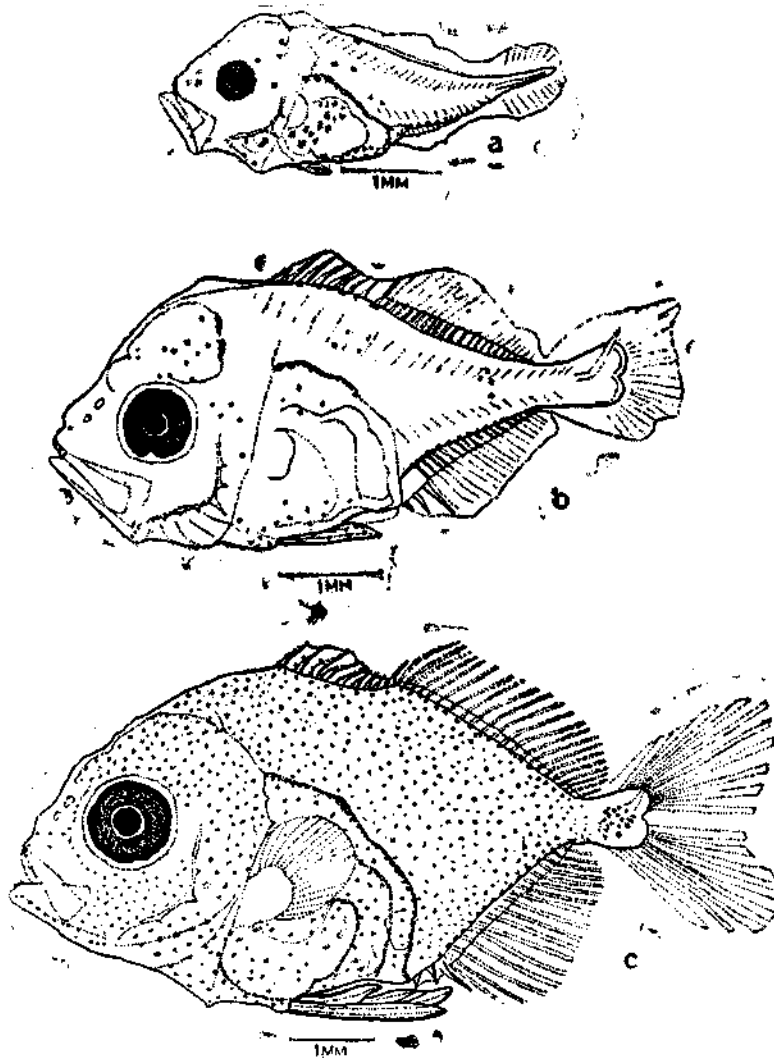


FIG. 3 Larvae of *A. atropus*: a. 4.0 mm, b. 6.8 mm and c. 10.2 mm.

TABLE 1. *The body measurements (mm) of A. ciliaris, A. indicus and A. atropus*

Size range in TL	No of specimens	Standard length	Head length	Eye diameter	Snout to anus	Depth
<i>A. ciliaris</i>						
4.1—4.5	6	3.6	1.5	0.5	2.5	1.8
5.1—5.5	5	4.5	1.5	0.5	2.5	2.0
5.6—6.0	7	4.7	2.1	0.6	3.0	2.3
6.1—6.5	13	5.0	2.1	0.7	3.2	2.7
6.6—7.0	4	5.8	2.1	0.8	3.5	3.0
7.1—7.5	8	6.5	2.8	0.8	4.3	3.3
7.6—8.0	5	7.5	3.0	0.9	4.5	3.5
<i>A. indicus</i>						
2.5—3.0	6	2.1	0.9	0.3	1.4	1.2
3.1—3.5	9	2.5	0.9	0.3	1.2	1.2
3.6—4.0	8	2.8	0.9	0.3	1.3	1.6
4.1—4.5	7	3.8	1.5	0.4	2.6	1.7
7.1—7.5	15	6.5	2.4	0.8	3.6	3.0
<i>A. atropus</i>						
3.6—4.0	7	3.6	1.5	0.5	2.4	1.5
4.1—4.5	10	3.8	1.5	0.5	2.4	1.6
6.6—7.0	14	6.3	2.3	0.7	3.8	2.8
8.1—8.5	10	7.0	3.2	0.9	4.0	3.5

TABLE 2. *The presence of larvae of Alectis spp. and Atropus atropus obtained from different areas during 1971 to 1975*

Area	Total hauls	No. of Hauls with carangid larvae	<i>A. ciliaris</i>	<i>A. indicus</i>	<i>A. atropus</i>	Total carangid larvae
Tuticorin	77	36	0	3	0	74
Cape Comorin	141	75	4	3	6	687
Quilon	173	85	5	1	3	637
Cochin	236	98	6	4	15	785
Calicut	55	24	12	16	5	420
Kasaragod	176	79	6	10	8	253
Coondapur	7	7	4	—	0	37
Karwar	206	67	3	0	4	204
Ratnagiri	208	57	8	8	0	187

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