

ON SOME DEVELOPMENTAL STAGES OF
CARANX KALLA CUV. & VAL.¹

BY

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(With a plate and four text figures)

In a series of collections made in the Palk Bay (ca. lat. $9^{\circ} 17' 24''$ N. and long. $79^{\circ} 08' 00''$ E.) on the 1st, 4th and 5th July 1950, 427 specimens of *Caranx kalla* varying from 8.25 to 55.00 mm. in length were obtained and the details are given in Table I. They were found moving in small schools around the large medusae belonging to the species *Rhopilema hispidum* Maas. This association was first noticed by Dr. Panikkar while bathing in the Palk Bay who asked us to pursue the subject with further collections which were all subsequently made in the evenings when the medusae were found near the shore.

TABLE I

Date	Number of medusae	Diameter of bell	Number of fish	Size of fish (Total length)
1-7-1950	1	260 mm.	56	8.50 - 18.00 mm.
4-7-1950	1	380 mm.	244	8.25 - 55.00 mm.
5-7-1950	2	330 and 340 mm. }	127	8.25 - 53.00 mm.

These fish, when disturbed, were found to take shelter under the bell of the medusae. Judging from their movements, however, it may be mentioned that they seem to be cautious while moving about inside the bell, probably to avoid the stinging cells of the medusae. It is well-known that several species of carangids gather around floating objects such as, pieces of wood, coconut shell, medusae, etc. and the principle of lure-line fishing is based on this peculiar habit of carangids.

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Descriptions of representative specimens of the series collected are given below. Photograph 1 (plate) shows specimens ranging from 8.25 to 55.00 mm. in length. Another set of four specimens 58.00 to 125.00 mm. in length were obtained from Calicut (photo 2) but as these resemble the adults in all respects they have not been described here. The lengths given in this paper are total lengths, i.e., from the tip of the snout to the end of the caudal fin.

In the smallest specimen collected, 8.25 mm. (Fig. 1), the lower jaw is slightly longer than the upper. The dorsal fins are

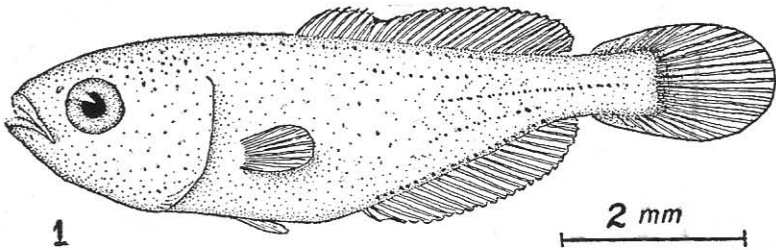


Fig. 1. Post-larva 8.25 mm. in length.

not separated and have about thirty rays of which the first nine form the spines as they do not show articulations, whereas all the remaining ones show signs of articulation and they become the rays of the soft dorsal fin. The anal fin has twenty-two rays of which the first three are simple and unarticulated and go to form the spines. The caudal fin, with sixteen to seventeen rays, is rounded and distinctly separate from the dorsal and anal fins. The pectoral fins are well developed, rounded and consist of eleven to twelve rays. At this stage the post-larvae have a light greenish yellow colour in the fresh condition with fine melanophores distributed uniformly all over the body except the abdomen. Devanesan and Varadarajan (1942) have described the eggs and early stages of *Caranx* collected from the Calicut coast. Post-larvae measuring 5-8 mm. in length have been described by Gopinath (1946). He remarks that they are transparent and the head and abdomen are broad. He further adds: 'Chromatophores are thick on the dorsal surface and also on the upper half of the lateral region. The lower jaw is longer and no teeth could be distinguished at this stage. The fins are not differentiated, but a total of 22 rays could be counted on the dorsal fin fold. Of these the first 8 are simple and all the rest show signs of articulation. The first 8 rays become the spinous portion of the dorsal fin. The anal fin fold has 22 rays, the first 3 being simple and unarticulated. The dorsal and anal fin folds are continuous with the base of the caudal, which unlike the adult, is circular in shape and carries 17 rays.' However, the post-larvae measuring 8.25 mm. in length described by us show the following differences from the 8.00 mm. post-larvae described by Gopinath (1946); they are no more transparent, the dorsal and anal fin folds are not continuous with the caudal and the dorsal fin has about thirty rays.

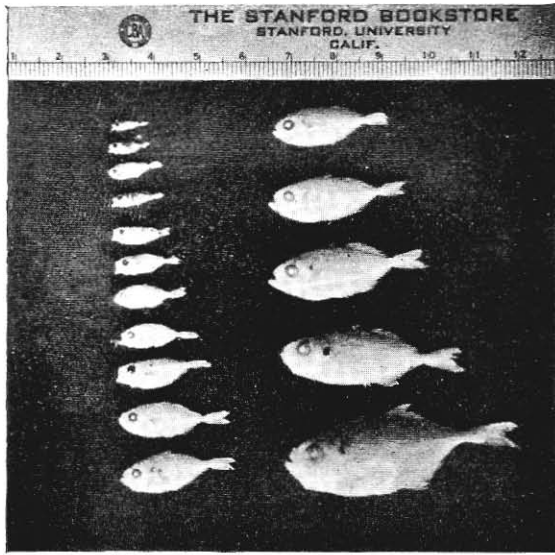


Photo 1. Post-larvae and juveniles of *Caranx kalla*



Photo 2. Juveniles of *Caranx kalla*

At 11.75 mm. the spinous and the soft parts of the dorsal fin are separated by a small notch. The third and fourth dorsal spines are the longest. The second dorsal and anal fins are nearly of the same height. The second anal spine is the strongest and is one and a half times the length of the first spine. The tendency of the first two anal spines to get separated from the rest of the fin is observed at this stage. Caudal fin appears more or less truncated.

The bifurcation of the caudal fin into two lobes by means of a small notch is apparent in a specimen 13.50 mm. in length (Fig. 2). The pectorals are rounded and fan-like. The pigmentation is deeper than that of the previous stage.

In a specimen 21.50 mm. in length the notch in the caudal fin has slightly increased but the lobes are still rounded. The pectoral fins

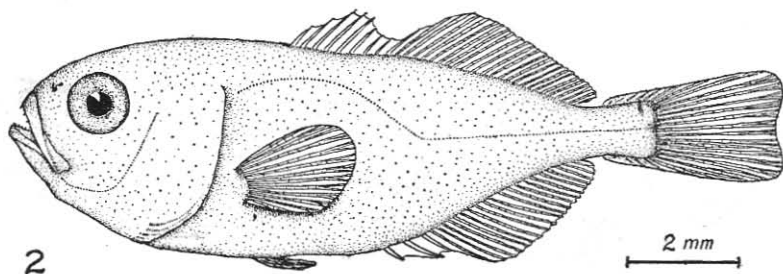


Fig. 2. Post-larva 13.75 mm. in length.

show signs of becoming falcate. General pigmentation of the body is almost similar to that of the previous stage except that of a small opercular spot, a characteristic feature of the species, appears for the first time.

The most striking feature in a specimen 31.00 mm. in length is the thickening of the lateral line just below the soft dorsal fin to form

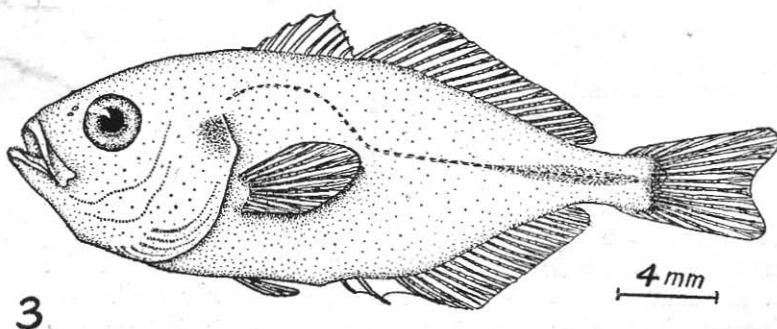


Fig. 3. A specimen measuring 31.00 mm. in length.

the scutes. The thickening is not clearly seen in fresh specimens but can be easily made out in specimens stained with alizarine red. The teeth in both jaws are well developed and are in single series. A procumbent spine is seen in front of the dorsal fin. The bifurcation of the caudal fin is more pronounced and the upper lobe is slightly longer than the lower. The opercular spot has become more prominent. Two light grey vertical bands are seen just below the first dorsal and above the ventral fins. Fig. 3 shows a specimen 31.00 mm. in length.

The largest specimen in the series is a single juvenile 55.00 mm. in length (Fig. 4). It almost resembles the adult in all meristic

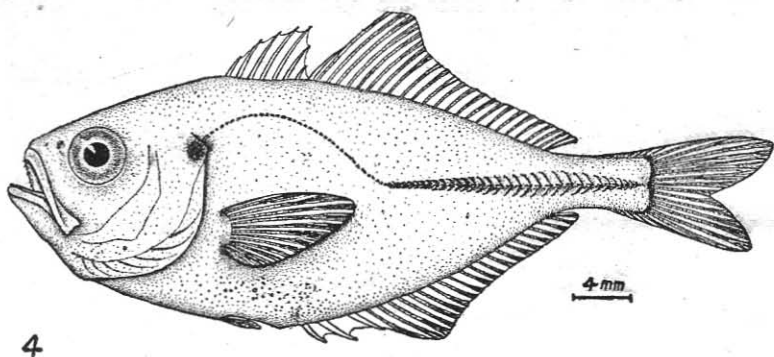


Fig. 4. A juvenile 55.00 mm. in length.

characters except that the first dorsal fin contains seven instead of eight spines. This appears to be an individual variation as the earlier stages described in this paper and the adults have been observed to have eight spines. The procumbent spine is concealed. The second dorsal had twenty-four rays. The caudal fin contains seventeen rays and has assumed the shape of that of the adult with the upper lobe longer than the lower. The anal fin has nineteen rays preceded by three spines. The pectoral fins with twenty rays are more pointed but yet have not taken the shape of those of the adult. About thirty scutes can be counted. The opercular spot is very prominent. The general colouration is greenish grey above and silvery below. The margins of the second dorsal, caudal and anal fins are light grey, and the ventral fins are light yellow in colour.

The scutes covering the lateral line make their appearance when the fish attains a length of about 35.00 mm. Blegvad (1944) has remarked that the number of scutes in *Caranx kalla* seems to increase with the total length. Our observations also show a similar trend of increase in number according to length. Table II shows a comparison of our observations with those of Blegvad op. cit.

TABLE II

Present observations		Blegvad's observations	
Total length of fish (mm.)	Number of scutes	Total length of fish (mm.)	Number of scutes
35	21-22	—	—
41	25-26	—	—
50	29	—	—
55	30	—	—
110*	35	—	—
118	36-37	—	—
120	37-38	120	33
122	38	—	—
125	38-39	125	36
128	40	—	—
130	40	—	—
—	—	131	37
—	—	133	39
—	—	134	40

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Devanesan, D. W., and S. Varadarajan (1942): On the hatching of fish eggs in 1940-41 in the laboratory of West-Hill Biological Station, Calicut. *Proc. 29th Indian Sci. Cong. Assoc.*, Baroda, Abstract, 157-158.

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* Specimens measuring 110 mm. and above were obtained from Calicut.

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