

SOME DEFORMITIES NOTICED IN THE INDIAN MACKEREL, *RASTRELLIGER KANAGURTA* (CUVIER)

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Eight specimens of abnormal mackerel caught at Cochin are described. Three of them had deformed tails. One was hunchbacked. Two had unusually long mandibles, while another one had a short mandible and a freak maxilla. The last specimen had an anomalous anal fin. The occurrence of abnormality was one in eight hundred. Irregularity in the caudal region was the most common abnormality.

Some abnormal morphological features in the Indian mackerel, *Rastrelliger kanagurta*, have been reported from the Indian coastal waters (George *et al.*, 1959; Jones and Silas, 1962; Bapat and Radhakrishnan, 1966). In the course of routine investigations on the fishery and biology of the mackerel at Cochin (Noble, 1971), out of about 6,500 specimens examined, 8 showed some abnormalities which are described in this communication.

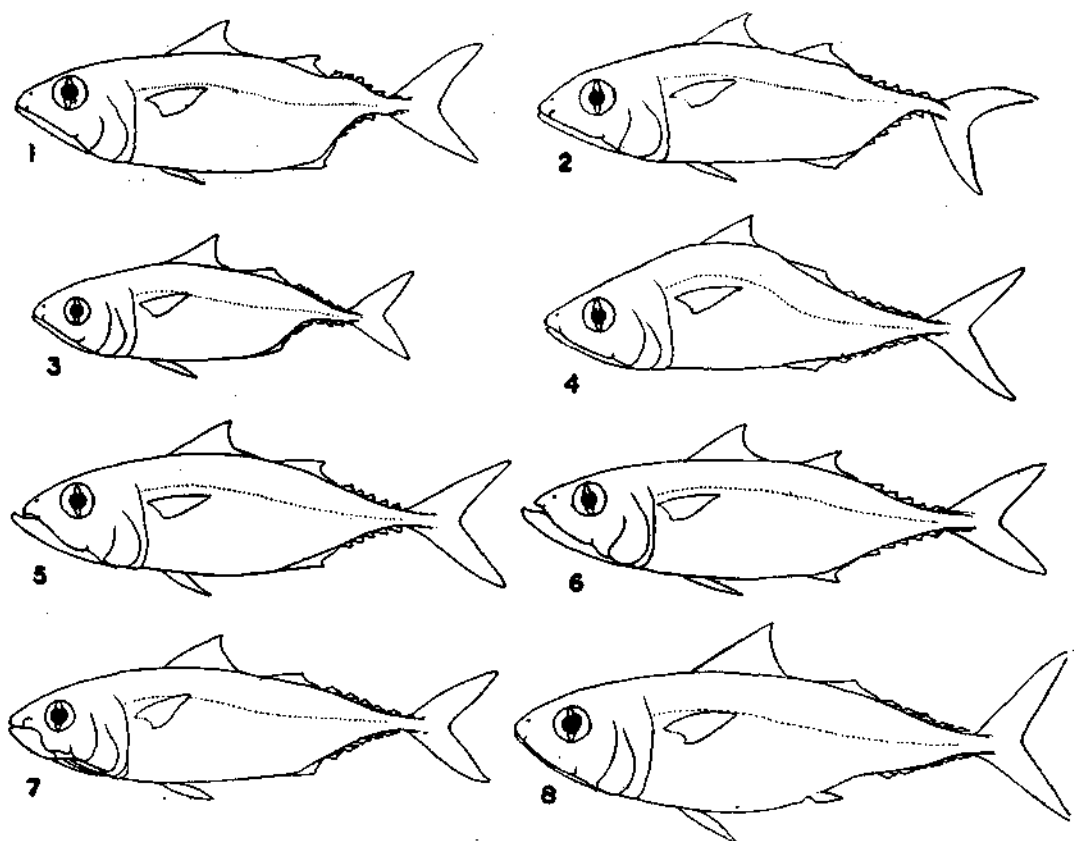
TABLE 1. *Details of the 8 abnormal specimens of mackerel caught at Cochin.*
All the length measurements are in millimetres

Text-figures	1	2	3	4	5	6	7	8
Date of capture	30-12-66	17-11-67	30- 9-70	23-11-70	10- 2-67	21- 8-68	18-11-70	6- 5-69
Weight in gm	74	87	39	76	74	86	72	135
Total length	185	200	155	199	199	208	197	232
Standard length	149	159	125	152	158	166	157	182
Pre-1st dorsal distance	58	60	49	61	61	63	61	68
Pre-pectoral distance	48	50	41	51	53	52	49	57
Pre-pelvic distance	57	58	47	59	60	64	59	65
Pre-anal distance	106	105	85	94	105	111	103	117
Maximum depth	47	46	37	49	47	47	45	53
Depth at anus	40	40	33	42	42	42	39	46
Depth at 3rd anal finlet	12	15	11	16	16	17	15	18
Length of head	46	48	39	48	51	50	46	53
Length of snout	14	15	12	14	14	15	13	15
Diameter of eye	12	13	10	12	12	12	11	13
Length of maxilla	27	27	21	29	28	27	28	30
Length of mandible	35	35	28	37	41	39	35R 22L	40

R - Right side; L - Left side.

Morphological and biological data of the abnormal specimens of mackerel are given in Table 1 and their sketches are given in Figs. 1 to 8.

In the first 3 specimens (Figs. 1 to 3) the tail region abruptly narrowed down to the caudal peduncle. Consequently, the depth at third anal finlet was less than the normal 10% of the standard length. In the first specimen (Fig. 1), the tail was shorter also, forming only 29% of the standard length. There were only 4 anal finlets as against the usual 5. Deviating from the normal, the depth of the body was greater than the length of the head. In the second (Fig. 2) and third (Fig. 3) specimens, though the post-anal region narrowed down abruptly to the caudal peduncle as already stated, the tail was not short as it formed 34 and 32% respectively of the standard length, as is common in the normal specimens in which the tail becomes almost one-third of the standard length. However, the caudal peduncle in the second specimen was twisted and flexed (Fig. 2).



FIGS 1-8. Diagrams of the abnormal specimens of mackerel, *Rastrelliger kanagurta* (Cuvier) caught at Cochin. See Table 1 for measurements.

The fourth abnormal mackerel was hunchbacked (Fig. 4) and was broader in the middle. At the maximum depth the fish measured 32% of the standard length which happened to be more than the length of the head. The trunk was comparatively short, consisting of only 62% in standard length and the tail region was 38%.

The abnormal specimens sketched in Figs. 5 and 6 looked quite normal as regards the shape of their trunk and tail, and the body proportions. But their lower jaws were unusually long and were protruding out in front of the maxillary symphysis. The length of the maxilla was almost twice the diameter of the eye as is seen in the normal ones. The mandibles in general in normal condition measure less than thrice the diameter of the eye. But in these 2 specimens, the mandibles being longer, measured more than 3 times the diameter of their eyes.

The seventh freak specimen (Fig. 7) showed the abnormality in the maxilla and the mandible on the left side of the fish. Nevertheless, on the right side the specimen appeared absolutely normal. The left maxilla, as in a normal fish, was about 2 times the diameter of the eye. But it differed in its shape, having a downward bulge almost at mid lower margin in the posterior half. Unlike in other specimens, the mandible was extremely short and less than twice the diameter of the eye. Being shorter than the maxilla it reached only up to the middle of the eye and stopped at three-fourth the length of the maxilla which, in turn, as in a normal fish, extended up to the posterior margin of the eye. Consequently, the branchiostegal rays were exposed and were clearly visible under a thin cuticle. In a normal mackerel, when the mouth is closed the mandible is superimposed by the maxilla. But in this abnormal specimen, the mandible stayed outside the maxilla in the posterior half and vice versa in the anterior half.

The last specimen was the biggest of the lot (Fig. 8). The anal fin in the fish was small and stumpy with a few feeble and very short fin rays at its tip and looked more or less like the head of a worn-out painting brush. There were 6 well-developed anal finlets in place of the usual 5 of a normal fish. There was a gap of 22mm long concavity between the insertions of the anal fin and the first anal finlet. The anus actually opened out into a small depression in front of the anal fin.

The first 4 types of abnormalities presented here are embraced in the list of seven abnormal conditions for mackerel given by Jones and Silas (1962). However, while these authors noticed an increase in the number of dorsal and anal finlets due to 'twisting' of the caudal peduncular region, a decrease in the number of the anal finlets (Fig. 1) was observed at present. One of the abnormal specimens observed by Jones and Silas (1962) had only 2 anal finlets. The abnormalities noticed in the specimens shown in Figs. 4 to 8 have not been described earlier. It is interesting to note that the atrophy of the anal fin (Fig. 8) is linked with the increase in the number of the anal finlets. The gap developed between the anal fin and the first anal finlet in this fish appears to be due only to the atrophy of the anal

fin. However, a similar gap that is found in one of the abnormal mackerels studied by Jones and Silas (1962) as shown in the figure by them, may be due to loss of the first 3 anal finlets out of the usual 5, leaving behind only the 2 posterior-most finlets in place.

Occurrence of abnormality is reported by Jones and Silas (1962) as occasional and rare, and Bapat and Radhakrishnan (1966) made no mention of the frequency of the occurrence. The present observations, based on the total number of specimens examined, indicate the possibility of the occurrence of one abnormal fish out of every 800 normal ones. While Jones and Silas (1962) have included in their observations fish with no apparent abnormality other than having chances of being "mistaken for *R. brachysoma* by those not familiar with the latter species" due to variations in the body proportions, all the specimens dealt with in this account show definite structural peculiarities.

A large number of abnormal caudal fins having sub-equal lobes were noticed in the mackerel by George *et al.* (1959). Some of the fish examined at Cochin also exhibited this dissimilarity in the caudal lobes. While George *et al.* (1959) observed only the lower lobes becoming shorter, 2 specimens of female mackerel caught at Cochin had the upper lobes of their caudal fins shorter and round. Nevertheless, the disparity in the length of the lobes of the caudal fins, being more frequent and common, is not included in the present account. The sub-equal caudal lobes were invariably found to be bleached towards the tip and such a condition has been noticed in the lower lobe in a greater number of mackerel with even caudal lobes. The whiter tip of the lower caudal lobe of a normal fish can be ascribed to constant friction on the ground. But the examination of the stomach contents of such fish did not give any indication of the bottom habitat. The sub-equal caudal lobes may probably be the result of other fish nibbling at them or the predators pecking at them from behind.

Discrepancies in growth, twisting or curvature of the vertebral column and injury to the fish were some causative factors assigned by Jones and Silas (1962) in the formation of abnormalities in the mackerel. The causes of abnormality in the fishes in Figs. 1 to 6 of the present study seem to be defects in the embryonic stages of development and in the fish in Fig. 7 to be due to injury in subsequent stages. Whether the abnormality is inborn or acquired is difficult to state in the case of the fish in Fig. 8.

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ON AN UNUSUAL ABUNDANCE OF *PSEUDOSCIAENA DIACANTHUS* (LACEPEDE) OFF GOA

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In November 1964 and September-October 1965, the purse-seiner of the Directorate of Fisheries, Panaji (Goa), landed unusually large catches of *Pseudosciaena diacanthus*. The catches were dominated by fish weighing 12 to 14 kg and ranged in size 75-120 cm. The data indicate the possibility of finding new fishing ground for 'ghol' in the deeper region along the Goa coast.

On 25th November 1964, the purse-seiner M.F.V. *Mandovi* of the Fisheries Department, Goa, while operating along the 15-metre line off Aguada lighthouse (Lat. 15°29'N, Long. 73 46'E), caught 4,569 kg of fish in a single haul. About 92% of the catch was constituted by 'ghol' *Pseudosciaena diacanthus*.

Subsequently during the year 1965, in the same period and in the same area further fishing was carried out and on 4 occasions *Pseudosciaena diacanthus* was landed by the purse-seiners M.F.V. *Mandovi* and M.F.V. *Zuari*. The details of the total fish catch and the percentage of *Pseudosciaena diacanthus* are given in the Table I.

It is evident from the table that *Pseudosciaena diacanthus* was the dominant species on all the dates. The species was unusually predominant; its percentage by weight varied from 40.90 to 91.77. This high percentage was very significant particularly for this area where the commercial fishery of this species was not known to exist.

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