

**Differences in the Food of the Young and the Adult Indian Mackerel, *Rastrelliger kanagurta* (Cuv.)**

THE problem of the food of fishes with its varied bearings on their shoaling habits and migrations has engaged the attention of fishery biologists since the beginning of the present century. The mackerel is an important food fish in both hemispheres. Several contributions<sup>1-5</sup> have been made to our knowledge of the food of the Indian mackerel, *Rastrelliger kanagurta*, which contributes to one of the largest fisheries of India. All these observations, except those of Chacko<sup>3</sup>, which are from the Gulf of Manaar, are confined to the west coast of India. According to these workers, mackerel is a noted plankton feeder, securing its food by filtration. Chidambaram<sup>2</sup>, while observing the adult mackerel as plankton feeder, suggested the carnivorous habits of the young mackerel. Later, in a detailed account on the food of this fish, Bhimachar and George<sup>4</sup> observe that "the food of the young mackerel does not radically differ from that of the adult". Pradhan<sup>5</sup> has arrived at a similar conclusion regarding the food of mackerel ; but one will not fail to note from his observations that young mackerel less than 89 mm. in total length are not represented in his material.

In the course of the present investigation, extending for more than a year, 593 mackerel belonging to all sizes ranging from 32 mm. to 243 mm. in total length have been collected from the Lawson's Bay landings near Waltair, and their food contents examined. From this analysis it became evident that mackerel of the size of 90 mm. and more in total length are plankton feeders, consuming large quantities of Protophyta (phytoplankton) along with some zooplankton. Further, it was noted that the adult mackerel is not an indiscriminate feeder. Though the proportions of the phyto- and zoo-planktonic elements in the stomach contents of this fish are more or less in accordance with their relative abundance in the plankton, a sort of selective feeding (avoidance) exists at least with regard to such macroplanktonic forms such as medusæ, ctenophores, salps and

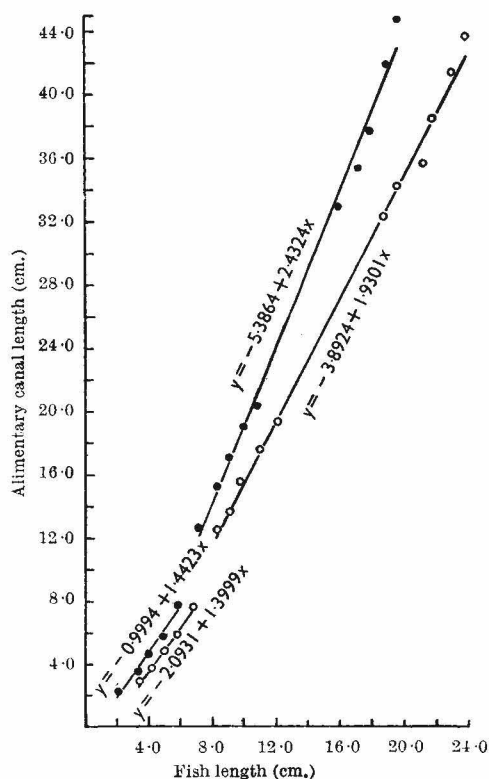


Fig. 1. Number of fish measured, 575; all measurements were grouped at 1-cm. class-intervals and each point represents the average value for each 1-cm. class. The straight line in each case represents the best fit as calculated from the equation given alongside.

Standard length against alimentary canal length, —●—●. Taking the first five values as normal (that is,  $y = -0.9994 + 1.4423x$ ) the difference in slope between the first five and the remaining ten points is significant at the 5 per cent level of  $\chi^2$  for nine degrees of freedom.

Total length against alimentary canal length, —○—○. Taking the first five values as normal (that is,  $y = -2.0931 + 1.3999x$ ) the difference in slope between the first five values and the remaining eleven points is significant at the 5 per cent level of  $\chi^2$  for eleven degrees of freedom.

chaetognaths. In the stomach contents of mackerel of size-range 90–243 mm. total length, relatively little zooplankton was found and this consisted of the following forms: copepods, larval cirripeds, larval pelecypods, *Lucifer*, *Evadne* and larval crustaceans.

The food habits of juvenile mackerel ranging in total length from 32 to 90 mm. are different. The stomach contents of these juvenile fish showed that fish larvae (*Anchoviella* species) form their staple food, and this is supplemented by the planktonic sergestid, *Lucifer*. In rare cases, copepods and a few Protophyta were noted in the stomach contents. These observations suggest that the juvenile mackerel are carnivorous and selective in their food habits.

While making biometrical studies on some marine fishes of the Waltair coast, we have observed an allometric growth in the alimentary canal of the mackerel. The relationship between the linear measurements of the alimentary canal and total and standard lengths of the mackerel is plotted in Fig. 1. It is clear from the graph that the relative length of the digestive tract is greater in the adult fish than in the juveniles. It is interesting to note that both the change in the food habits of the fish and the relative length of its alimentary canal take place at

the same total length of fish. It is very likely that this change in the relative length of the alimentary canal of the mackerel is associated with the change in the food habits of the fish at about 90 mm. total length.

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<sup>2</sup> Chidambaram, K., *Curr. Sci.*, **13**, 214 (1944).

<sup>3</sup> Chacko, P. I., *Proc. Ind. Acad. Sci.*, **29**, 83 (1949).

<sup>4</sup> Bhimachar, B. S., and George, P. C., *Proc. Ind. Acad. Sci.*, **36**, 105 (1952).

<sup>5</sup> Pradhan, L. B., *Ind. J. Fisheries*, **3**, 141 (1956).