STUDIES ON FOOD AND FEEDING HABITS OF CATFISH *TACHYSURUS TENUISPINIS* (DAY)

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ABSTRACT

It is observed that 37% of the food of *Tachysurus tenuispinis*, consists of crabs, prawns, *Squilla* sp and crustacean remains; 26% polychaetes, 6.5% molluscs, 6.3% teleosts, 4.2% ophiuroids and the rest miscellaneous food items. *T. tenuispinis* is, therefore, a carnivorous bottom feeder. As a single food item, polychaetes are most preferred.

The fluctuations in the intensity of feeding (points) and the volume of stomach contents (ml) in different months generally showed similar trends both in the small (less than 27.5 cm total length) and large (more than 27.5 cm total length) catfish. The relative importance of various food items during different months shows that feeding is selective.

INTRODUCTION

Along with studies on the growth and reproduction in *Tachysurus tenuispinis*, an investigation on the food and feeding was also carried out in two periods—by the first author from 1964 to 1966, and by the second author from 1973 to 1975.

The present paper embodies the results of observations for both the periods covering six years and gives an opportunity for a comparative study as to whether any remarkable variation has occured in the food habit of the species after a lapse of so many years.

MATERIAL AND METHODS

The material for the studies was collected during April 1964 to December 1966 and again during January 1973 to October 1975 from the catches of the Government of India Exploratory Trawlers based at Visakhapatnam. Collections were made mainly from the fishing areas in 17°40'N and 18°10'N latitude zones off Visakhapatnam which are zones of high abundance of catfish (Sekharan 1973). The samples were gathered either at the time of fishing on board the vessel or during unloading of the catch at the jetty. Total length, standard length, sex, and stage of maturity of each fish were recorded, and the stomachs were preserved in 5% formalin to work on later.

The state of fullness of stomach (feeding intensity) was expressed in points as follows: Gorged-10, Full-8, ¾ full-6, ½ full-4, ¼ full-2, little-1 and empty-0.

The contents of each stomach were washed into a petridish and identified as far as practicable up to species. The volume of each category of organism was determined by the displacement method. The volume was then expressed as percentage of total volume of stomach contents. For each month the percentage of each item in the total volume of the stomach contents was calculated and is shown in fig. 1-4. Fishes of the size range 12 cm to 44 cm in total length were examined. They were divided into two groups, small (less than 27.5 cm in total length) and large (above 27.5 cm in total length). Studies on maturity of the species (Dan 1975) had shown that the size at 50% maturity was about 27.5 cm in the total length. Hence the grouping was expected to show the effect, if any, of maturity on food.

From the analysis of stomach contents, it was observed that food of the fish is composed of a variety of organisms which could be grouped as indicated below:

1) Crustaceans (crabs, prawns, *Squilla* spp., alima, amphipods).
2) Annelids (Polychaetes)
3) Molluscs (Bivalve, gastropod, cephalopod)
4) Fish (Eel, *Bregmaceros* spp, *Polynemus* spp, Engraulids, *Leiognathus* sp & other teleostean remains)
5) Echinoderms (Ophiuroids)
6) Miscellaneous items (Sponges, algal matter, isopods, sand-particles).

The data on fullness of stomach, volume of stomach contents, and the monthly percentage composition of the different food items are presented for the period 1964 to 1966 in Figs. 1 & 2 and for 1973 to 1975 in Figs. 3 & 4.

Pooling the data for all months during the period 1964 to 1966, it is seen that on an average 36% of the volume of stomach contents consisted of crustaceans; 18% polychaetes, 8.8% molluscs; 5% fish and the rest miscellaneous food items.

During the period 1973 to 1975 while the crustaceans (37%) and the polychaetes (35%) continued to predominate, the fish (7.6%) had better representation than molluscs (3.6%).

Feeding intensity

Fullness of stomach (points)

Three peaks in the fullness of stomach contents (points) of both small and large fishes were observed during the months of March, September/October,

and December in the period 1964 to 1966; while the corresponding peaks during 1973 to 1975 were observed four times in the months of January, May/June, September and November.

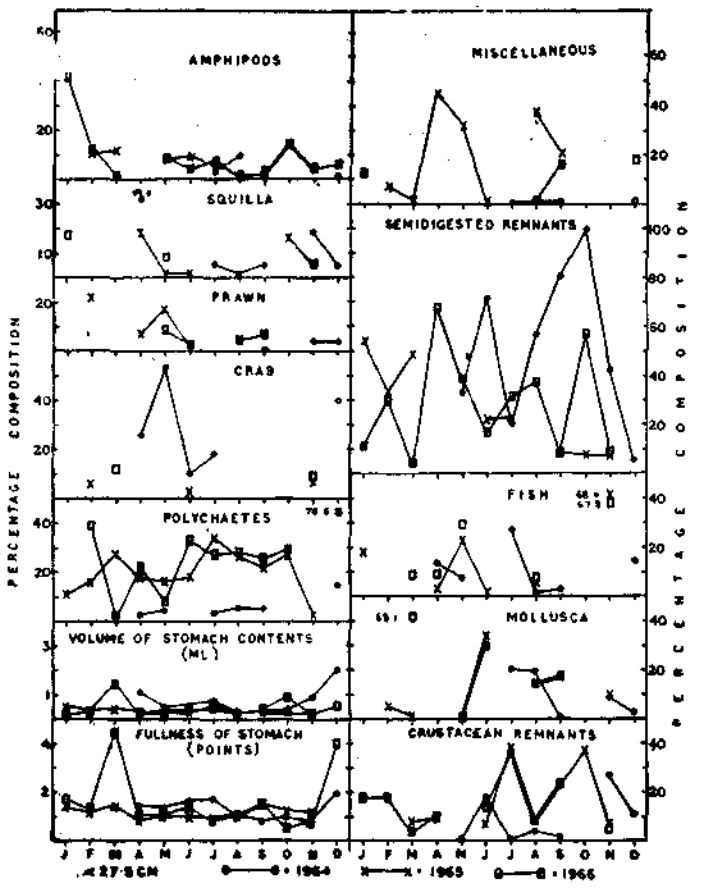

FIG. 1. The stomach contents of small *T. tenuispinis* (< 27.5 cm in total length). The volumes of different food items of diet are given in terms of percentages of total volume of stomach contents.
0 - 0 1949; X - X 1965; □—□ 1966.

Volume of stomach contents (ml)

The average volume of stomach contents (ml) in both the small and large fishes had identical fluctuations as those observed in the case of fullness of stomach.

Food elements and feeding intensity

(i) *Period* 1964 *to* 1966: The peak in the feeding intensity (both points and volume in ml) during March may be due to intake of large quantities of poly-

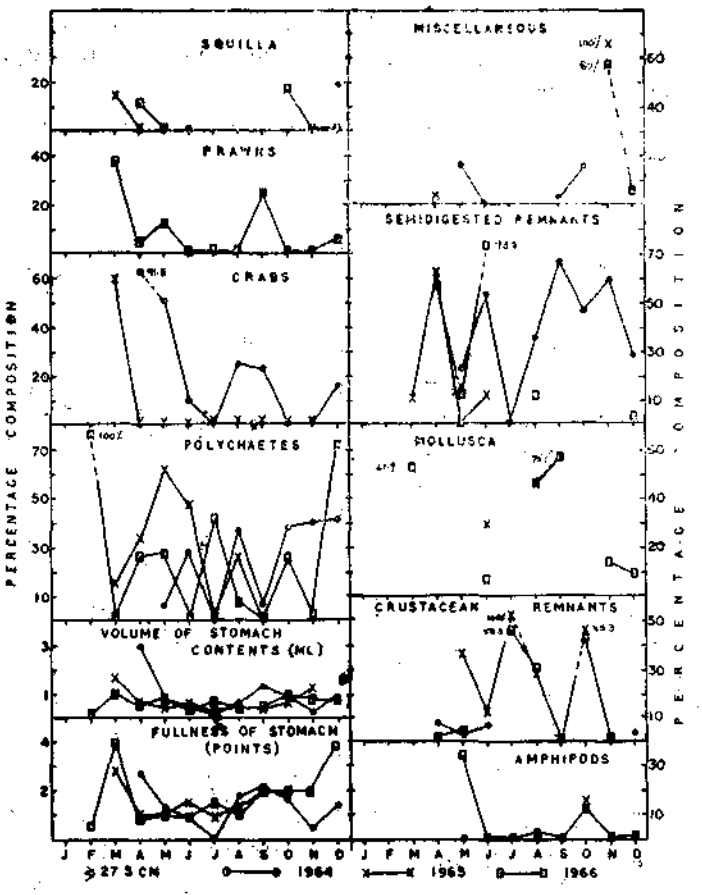

FIG. 2. The stomach contents of large *T. tenuispinis* (> 27.5 cm in total length).

chaetes and molluscs by the small group of fish, while for large groups, the same may be on account of crustaceans and molluscs. The peak in September/October is, probably, on account of the consumption of more polychaetes, crustaceans, molluscs and miscellaneous food items in the case of small group of fish, whereas the same in the large group is primarily on account of polychaetes and crustaceans. The peak in December seems to be due to more intake of polychaetes and crustaceans by both the groups of fishes. Low feeding intensity could be observed during June to July period with respect to the large group of fish.

(ii) *Period* 1973 *to* 1975: The intake of crustaceans, fish and brittle star in the case of small fish seems to be responsible for the peak in January both in the fullness of stomach (points) and volume of stomach contents (ml); whereas polychaetes, crustaceans, fish and molluscsc are responsible for the peak in large group of fish.

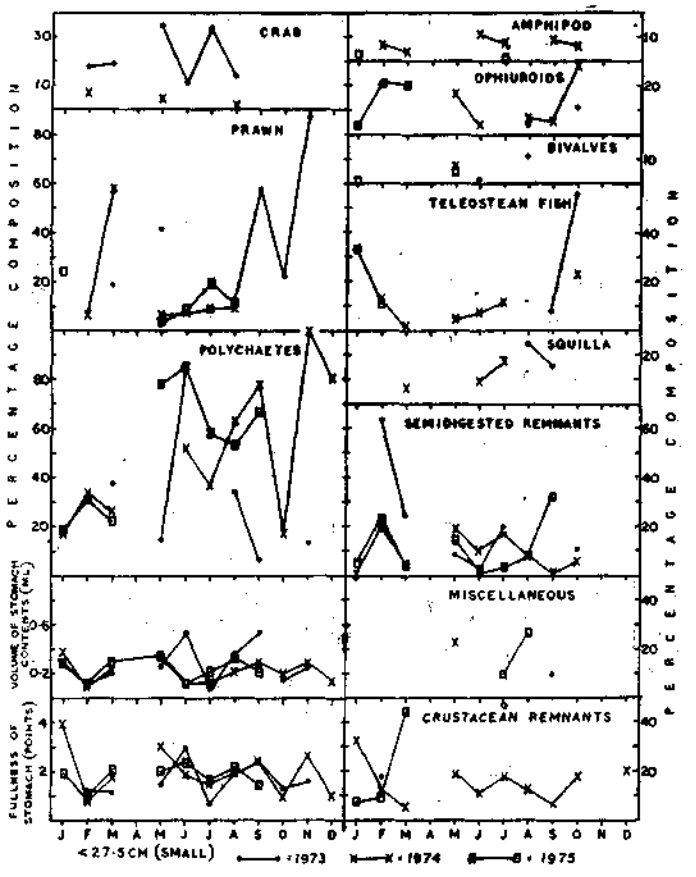

FIG. 3. The stomach contents of small *T. tenuispinis* (< 27.5 cm in total length). The volume of different food items of diet are given in terms of percentages of total vlume of stomach contents.
0 - 0 1973; X - X 1974; □—□ 1975

Again, the peak observed during May/June in small fishes may be due to high consumption of polychaetes, molluscs, and also crustaceans. In the case of large fishes food items like polychaetes and crustaceans are responsible for the peak. During September, the high values in the feeding intensity may, perhaps, be on account of polychaetes and crustaceans in the case of small fish, and polychaetes, crustaceans, fish and brittle star in the case of large fish. November peak in the feeding intensity, may be due to the intake of a large proportion of polychaetes and crustaceans by the small group of fish whereas food items like crustaecans and brittle star are responsible for high value in the case of large fishes.

Food in relation to size

The relative occurrence of the important food items of the fish in different size groups are shown graphically for both the periods of observation (Figs. 5 & 6).

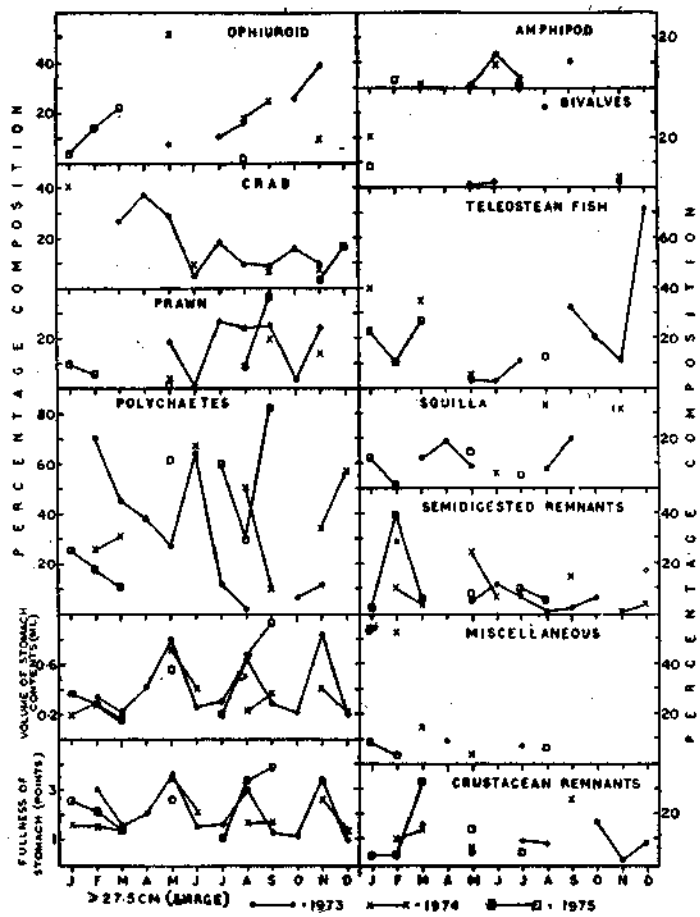

FIG. 4. The stomach contents of large *T. tenuispinis* (> 27.5 cm in total length).

The trends in the fluctuations of feeding intensity in points and volume are more or less similar in both the periods of observation and also with respect to the small as well as large catfishes. But certain differences in the composition of diet could, however, be observed. The peaks in the monthly average volume of stomach contents can be correlated with the abundance of certian items in the diet. In large fish, peak in the month of March may be attributed to the increased intake of crustacean food items, such as crabs, prawns and *Squilla* spp, while the peak in the case of small fishes is due to more consumption of molluscan

food items. Polychaetes as a single food item is very common in stomach contents in both small and large groups of fishes, in varying proportions throughout the years of observation and it contributes the maximum proportion among all the food ingradients. The peak in September/October period in large fishes may be correlated with rise in their consumption of polychaete and *Squilla* spp, while in case of small fishes amphipods and prawns were also present in addition to polychaetes and *Squilla* spp. The peak in the month of July in small catfish of *T. tenuispinis* is due to intake of high quantity of the food items like polychaetes and fish. But in the case of large catfishes, low feeding was observed during June/July, which might have some correlation with their spawning period (Dan 1975).

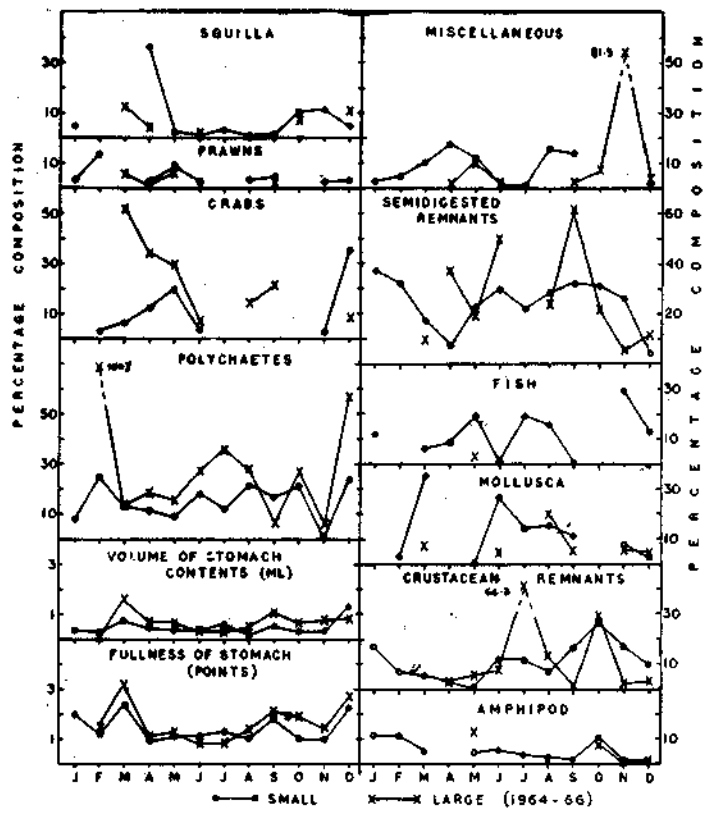

FIG. 5. Average monthly variation in feeding intensity and the percentage volumes of various items in the diet during 1964-66. (Based on the arithmatic averages of the data of the corresponding months of the three years).
0 - 0 (*T. tenuispinis* $<$ 27.5 cm in total length);
X - X (*T. tenuispinis* $>$ 27.5 cm in total length).

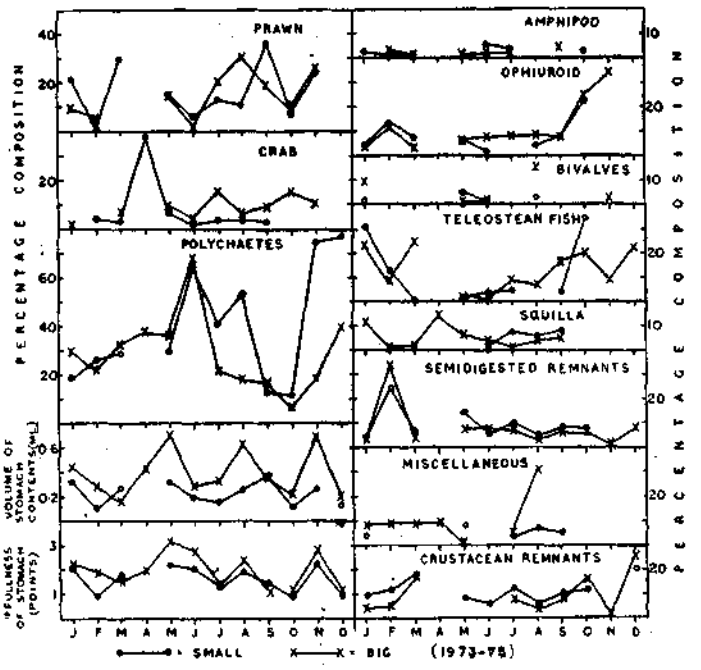

FIG. 6. Average monthly variation in feeding intensity and the percentage volumes of various items in the diet during 1973-75 (Based on the arithmatic averages of the data of the corresponding months of the three years).
0 - 0 (*T. tenuispinis* < 27.5 cm in total length);
X - X (*T. tenuispinis* > 27.5 cm in total length).

Following table shows the percentages of various items in stomach contents during 1964-1966 and 1973-1975 in respect of the two size groups.

	1964 to 1966		1973 to 1975	
	< 27.5 cm	> 27.5 cm	< 27.5 cm	>27.5 cm
Polychaetes	28.1	23.3	43.5	25.7
Crabs	10.6	21.9	3.1	10.3
Prawn	3.3	2.1	14.9	15.5
Squilla	3.5	3.9	3.5	5.7
Amphipod	4.4	2.5	3.1	1.8
Crustaceans	9.3	6.4	9.2	6.6
Molluscan	13.0	1.1	2.6	4.6
Fish	2.5	9.5	5.6	9.5
Ophiuroids	0.6	0.8	4.4	10.9
Semidigested food matters	20.5	23.0	8.2	7.2
Miscellaneous	4.5	5.5	1.9	2.2

While comparing the fullness of stomach and volume of stomach contents of both large and small fishes, as well as between the two periods, we observe that these are higher for larger size than the smaller, as well as during the period of 1973-75 than that of 64-66. The large group of fish always consume more percentage of polychaetes than the small group. Further, during 73-75, fish, both large and small, had greater intake of polychaete food item than the previous season, 64-66. It appears, therefore, that fullness of stomach and feeding intensity is dependant to a certain extent on the intake of polychaete food, an item mostly preferred.

Discussion

Devanasan and Chidambaram (1953) observed that *Arius Jella* (Day) feed on molluscs, crabs, prawns, Lucifers and other small fishes. Rao (1967) in his report on the food of *Pseudarius jella* (Day) from the Bay of Bengal, recorded crustaceans, molluscs, polychaetes, fish etc. Longhurst (1957) reported in the stomach contents of *Arius latisculatus* off West Africa, a high percentage occurrance of polychaetes, fishes penaeid and other prawns, crabs etc. In the stomach of the related species of *Arius heudeleti* from the French Cameroons, Monod (1927) recorded fish scale, crustacea and other benthic organisms.

The present investigations also have revealed that *T. tenuispinis* is a carnivorous bottom feeder. The fish feeds mainly on crustaceans, although as a single item of food, polychaetes seem to be preferred most and these are supplemented by molluscs, ophiuroids (Brittle star) and teleostean fishes. The relative importance of various food items during different months show that the fish do exercise selection while feeding. Crustacea and polychaetes constitute the bulk, about 65% of the food of *T. tenuispinis*. Large sized catfishes, however, have low feeding intensity during monsoon period (June to July) which may be associated with their breeding cycle; for, the studies on their maturity show that the peak period of spawning of the species includes June-July months (Dan 1975).

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