FOOD OF THE CAT-FISH, *TACHYSURUS THALASSINUS* (RUPPELL)

P. MOJUMDER

Central Marine Fisheries Research Institute; Sub-station, Visakhaptnam

ABSTRACT

The food habits of the cat-fish, *Tachysurus thalassinus*, were studied for a period of three years from April 1964 to March 1967, based mainly on specimens from the fishing areas off Waltair, and also some from further north in the Bay of Bengal.

From the pooled data of all zones it is observed that 67% of the food consists of crabs, prawns, *Squilla* spp., and crustacean remains, 22% of teleosts and 4% of molluscs. The fluctuations in the intensity of feeding (points) and the volume of stomach contents (ml) generally showed similar trends both in the small (less than 36 cm total length) and large (more than 36 cm total length) cat-fish. A rough correlation between the stomach contents and the availability of food items in the environment is observed.

INTRODUCTION

Cat-fishes form about 20% of the catches of the exploratory trawlers based at Visakhapatnam and operated off the Andhra and Orissa coasts (Sekharan *et al.*, 1968). They also form an important commercial fishery in the area. The landings are composed mostly of two species, *Tachysurus thalassinus* and *T. tenuispinis* (Sekharan, *et al.*, 1968).

The present account gives the results of a study made for a period of three years, from April 1964 to March 1967, on the food of *T. thalassinus* off the Andhra and Orissa coasts and forms part of an investigation on the biology of this species. Brief notes on the food of this species have been given by Devanesen and Chidambaram (1953).

MATERIAL AND METHODS

This study is based on material from the catches of the Government of India exploratory trawlers based at Visakhapatnam. The samples were collected either at the time of fishing on board the trawlers or at the time of unloading of catches at the jetty at Visakhapatnam. Total length, standard length, sex and stage of maturity of each fish in the sample were recorded and the stomachs were preserved in 5% formalin.

The state of fullness of stomach (feeding intensity) was expressed in points alloted 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, identified as far as possible up to species, and the volume of each category of organisms was determined by the displacement method. The volume was then expressed as percentage of the total volume of the stomach contents. Fishes of the size range 10.6 - 48.1 cm in total length were examined. They were divided into two groups, small (less than 36 cm in total length) and large (above 36 cm). The first group consisted of 938 specimens and the second group 220 fishes. The studies on maturity showed that the size at 50% maturity was about 36 cm and hence the grouping was expected to show the effect, if any, on food not only of fish size but also maturity.

The samples were collected from the north-western part of the Bay of Bengal between lat. 16°40'N and 21°10'N. This area was divided into 30' latitude zones (Sekharan *et al.*, 1968) and the sample from each zone was dealt with separately. Samples were available almost throughout the year from the 17°40' zone, which is also one of the zones of high abundance of cat-fish.

Observations and Discussion

The data on fullness of stomach, volume of stomach contents and the monthly composition of the different food items as percentages of total volume of stomach contents are presented in Fig.1 for *Tachysurus thalassinus* measuring less than 36 cm in total length, and in Fig. 2 for fish measuring more than 36 cm in respect of 17°40' zone (17°40' - 18°10'). Similar data for other zones of observation are presented in Table 1. The data in respect of the latter are limited, as observations could be made only for some months when the vessels operated in these areas.

In the 10°40' zone, generally the small size groups showed peaks in June-July, October and January, and the large size groups in September and January with regard to fullness of stomach as well as volume of stomach contents. The crustaceans formed the principal item of food both in the small and large size groups, followed by teleosts and molluscs. The food components in the other zones also were more or less the same although their fluctuations in the diet could not be followed due to the paucity of data.

Among fish that constituted the food of *T. thalassinus* the following could be identified: *Pseudosciaena aneus*, *Trichiurus* spp., *Decapterus* spp., *Polynemus* spp., *Saurida* spp., *Sardinella* spp., *Bregmaceros* sp., *Leiognathus* spp., *Cynoglossus* spp., *Apogon* spp., young eel, gobiids, mackerel and engraulids. *Penaeus monodon*, *P. indicus*, *Metapenaeus monoceros*, *Solenocera* sp. were the species among the prawn food. Miscellaneous items comprised starfish, sea-cucumber, isopods etc.

The data indicate that *T. thalassinus* is a voracious carnivore. Pooling the data of all zones for all months, it is seen that on an average about 67% of the volume of stomach contents consisted of crabs, prawns, *Squilla* spp. and crustacean remains which indicates that the species is primarily a bottom feeder. Teleosts comprised about 22 % and molluscs about 4 % of the food. These items were found in the

stomach contents of *T. thalassinus* by Devanesen and Chidambaram (1953) also, although they did not study the seasonal variations in the food of the fish. Longhurst (1957) reported in the stomach contents of *Arius latiscutatus* off West Africa, a high proportion of polychaetes, fishes, penaeid and other prawns, crabs etc. In the stomach of a related species of cat-fish *Arius heudeleti* from the French Cameroons, Monod (1927) recorded fish scales, crustaceans and other benthic organisms.

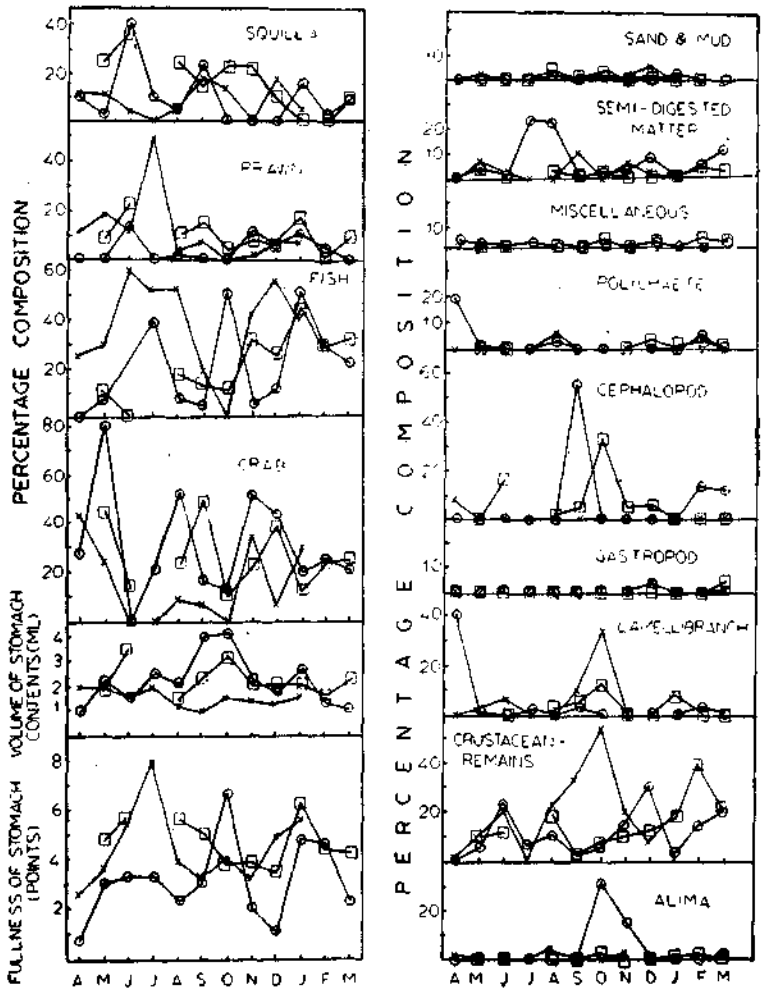

FIG. 1. The stomach contents of small *Thalassinus* (< 36 cm in total length). The volumes of different items of diet are given in terms of percentages of total volume of stomach contents. 0 —— 0 1964—65; x——x 1965-66; □ —— □ 1966-67.

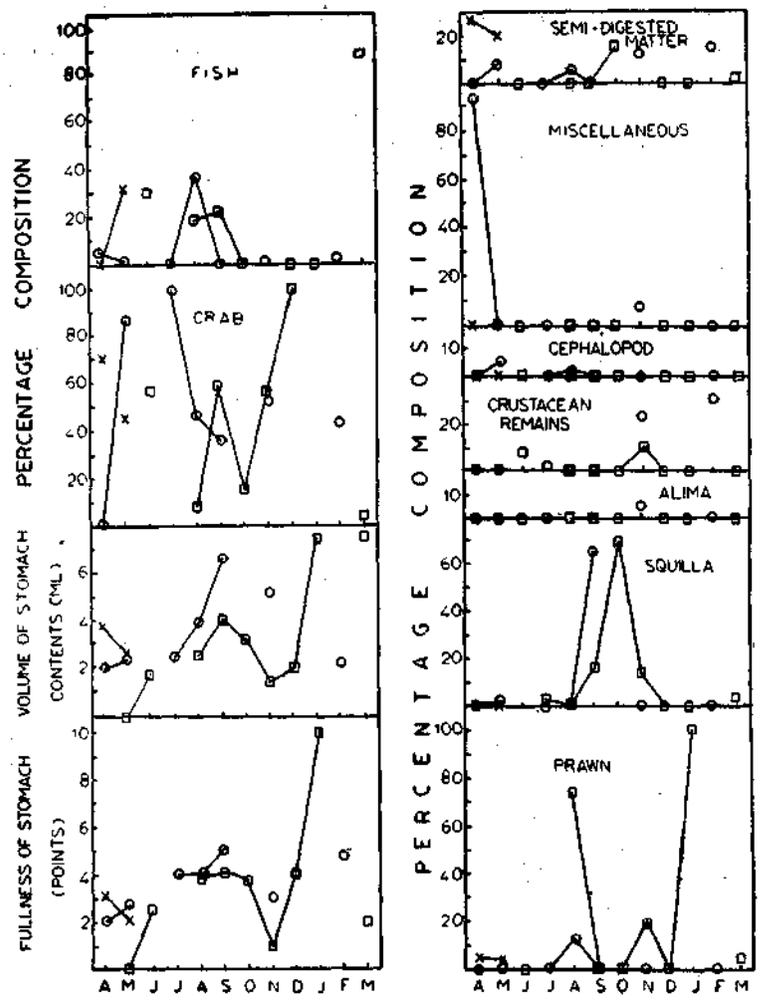

FIG. 2- The stomach contents of large *T. thalassinus* (> 36 cm in total length). (Explan ation are same as for Fig. 1.)

While the fluctuations in the intensity of feeding, expressed in points and volume of stomach contents, are generally similar both in the small and the large cat-fish (Fig. 3), certain differences in the composition of the diet are found. Amphipods and *Acetes* spp. were not recorded from the stomach of large fish unlike in the case of small fish.

The peaks in the monthly average volume of stomach contents can be correlated with the abundance of certain items in the diet. In large fish the March-April peak may be attributed to increased intake of fish item, and the June peak to increased feeding on prawns. On the other hand both prawns and fishes appear to contribute

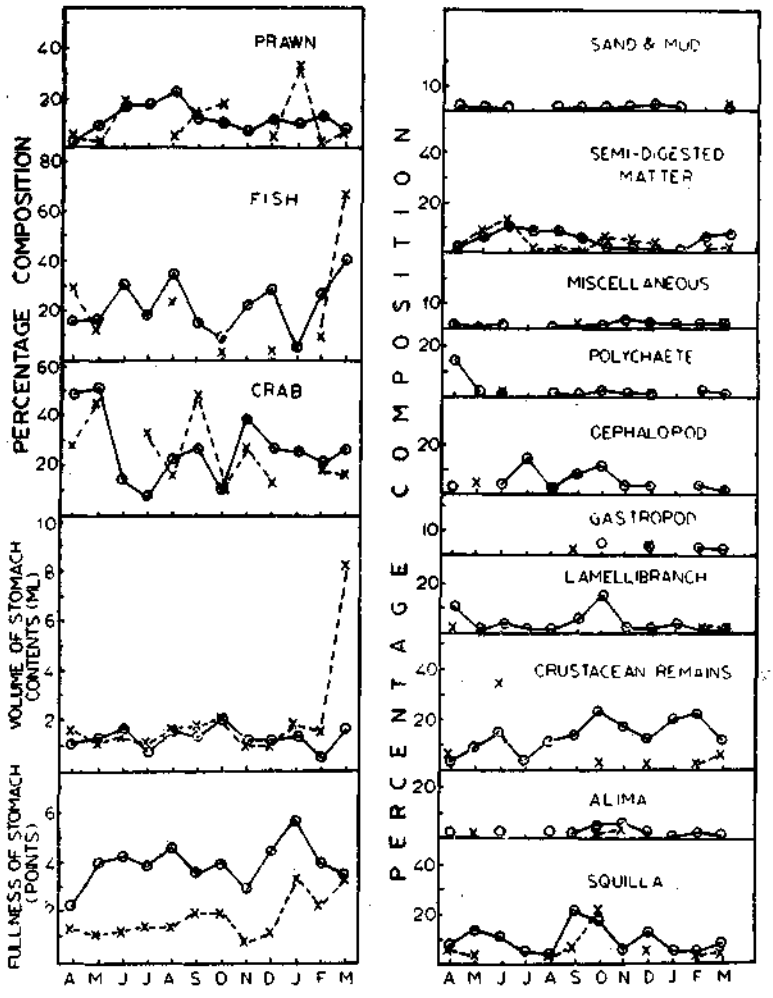

Fig. 3. Average monthly variation in feeding intensity and the percentage volumes of various items in the diet during 1964-67. (Based on the arithmetic averages of the data of the corresponding months of the three years, for all the zones). 0——0 (*T. thalassinus* $<$ 36 cm in total length); x——x (*T. thalassinus* $>$ 36 cm in total length).

to the April and June peaks in the small fish. In August high percentages of fishes and prawns are found in the diet of both the large and small fish, resulting in high volume of stomach contents. Peak in October in both the large and small cat-fish may be correlated with the rise in their consumption of crustaceans and molluscs. For the large cat-fish, the peak in January corresponds with a peak in the percentage of prawns in the diet.

TABLE 1. *Feeding intensity and food items in* Tachysurus thalassinus *from zones other than* 17° 40' *zone for fishes less than* 36 *cm* (*Sm*) *and above* 36 *cm* (*Lar.*)

	17° 10' zone						18° 10' zone											
	Apr 65		Mar 66		Apr 66		Sep 64		Oct 64		Dec 64		Mar 65		Apr 65		Mar 66		Apr 66	
	Sm.	Lar.	Sm.	Lar.	Sm.	Lar.	Sm.	Lar.	Sm.	Lar.	Sm.	Lar.	Sm.	Lar.	Sm.	Lar.	Sm.	Lar.	Sm.	Lar.
Feeding intensity																				
A. Points	1.2	2.3	4.6	3.0	3.3	1.8	1.0	4.5	2.7	3.0	4.0	—	1.2	1.3	2.3	—	3.2	5.0	3.3	1.8
B. Vol. (ml)	1.7	2.2	13.7	5.4	2.5	1.8	1.3	5.0	2.3	4.7	2.4	—	0.6	1.5	2.2	—	1.7	3.0	2.4	1.8
Percentage composition of food items																				
1 Crab	46.8		3.5	30.8	70.5	69.5	9.6	51.8	32.8	—	13.1		14.3	48.2	60.4		44.9	50.0	70.5	69.5
2 Fish	29.3	100.0	94.5	42.9	27.4	13.9	48.5		9.8	7.1	10.4		25.4		1.3		22.5		27.4	13.9
3 Prawn	11.7		0.5	24.5			16.1	44.7		63.8	31.0						14.4			
4 *Squilla*						8.3			9.8	14.9	11.4			11.8	29.2		3.6	50.0		8.3
5 Alima									3.3											
6 Crustacean remains	5.8		0.4			8.3	4.8		18.0		10.8		6.3	27.1						8.3
7 Lamellibranch	0.6		0.1								0.2									
8 Gastropod											0.9									
9 Cephalopod										14.1										
10 Polychaete									16.5		11.4		8.7							
11 Miscellaneous														10.5						
12 Semidigested food matter	5.8		1.0	1.8	2.1		21.0	3.5	9.8		10.4		45.3		9.1		14.0		2.1	
13 Sand & mud											0.4			2.4			0.6			

TABLE 1 *continued*

	18°40' zone										19°10' zone				19°40' zone									
	Sep 64		Oct 64		Feb 65		Mar 65		Apr 65		Sep 64		Oct 64		Sep 64		Oct 64		Dec 64		Jan 65		Mar 65	
	Sm.	Lar.	Sm.	Lar.	Sm.	Lar.	Sm.	Lar.	Sm.	Lar.	Sm.	Lar.	Sm.	Lar.	Sm.	Lar.	Sm.	Lar.	Sm.	Lar.	Sm.	Lar.	Sm.	Lar.
A.	2.0	3.0	2.7	4.0	1.7	4.5	2.1		2.3	0.3	2.7	4.5		3.0	1.0	3.6		2.0	1.8		2.8		5.0	
B.	2.0	4.1	1.9	6.9	1.4	5.8	1.1		2.2	0.3	2.7	6.1		7.0	1.6	4.3		4.7	0.7		1.5		4.1	
1	34.6	27.0	35.1		54.5	49.2	24.3		60.4		35.0	27.0		27.1	9.6	55.1		28.4			43.8		28.5	
2	0.6		10.5	7.2	3.0	34.5			1.3		0.6			0.7	48.5			0.7			21.8		49.0	
3	30.9	36.0		63.3	3.0	3.4	24.3				31.3	36.0		37.1	16.1	41.2		36.9					0.8	
4	3.7	28.7	5.3	15.1	3.0	8.6	23.8		29.2		3.8	28.7		21.4				21.3					10.7	
5	0.6		1.8				1.1				0.6			1.4				0.4						
6	24.7		19.3		6.0		10.3			100.0	23.7			3.6	4.8			3.8			33.9		6.5	
7							1.1																0.1	
8		1.6										1.6												
9				14.4																				
10			17.5		3.0	1.7													32.4				0.1	
11		2.5										2.5							54.1		0.5		3.6	
12																							0.5	
13	4.9	4.1	10.5		27.5	2.6	15.1		9.1		5.0	4.1		8.7	21.0	3.7		8.5	13.5				0.2	

TABLE 1. *continued*

	20°10' zone			21°40' zone			21°10' zone		
	Dec. 64 Sm.	Jan 65 Sm.	Mar 65 Sm.	Dec. 64 Sm.	Jan 65 Sm.	Feb 65 Sm.	Mar 65 Sm.	Feb 65 Sm.	Mar 65 Sm.
A.	2.8	5.0	4.1	3.0	6.7	3.5	3.7	3.5	3.6
B.	2.6	1.5	4.7	3.8	2.0	3.8	6.5	3.8	3.0
1	42.7	44.5	60.6	48.8	44.5	51.7	31.5	51.3	18.2
2	5.0	22.3	24.1	6.6	22.3	26.5	16.8	26.4	18.8
3	11.4		7.6	17.1		2.6	14.2	2.6	22.6
4	2.8		4.1	14.5		7.3	14.9	1.4.	7.8
5				0.2			0.8		0.9
6	14.9	32.5	0.9	2.1	32.5	1.3	20.7	1.3	20.8
7		0.2	0.3		0.2		3.1		
8				3.0					
9	17.8								0.3
10			0.1	0.2		2.0		1.8	
11		0.5	2.3	0.5	0.5	0.7		1.3	4.7
12	3.6			6.8		7.9		7.9	5.6
13	1.8			0.2					0.3

From the data of 17°40' zone it is seen that the large cat-fish have low feeding intensity from April to July-August. This may perhaps be associated with their breeding cycle; for studies on maturity show that April to July-August is the peak spawning period of the species.

A rough correlation between the stomach contents and the availability of food items in the environment is also seen. In 17°40' zone prawns were found in large numbers in June-August and January in the stomach of large cat-fish, and in March-April, June to August and December in the stomach of the small cat-fish. These are approximately periods of their high relative abundance in the fishing grounds as seen from trawl catches (Sekharan *et al.*, 1968).

The present study has an important bearing on the cat-fish fishery. The local fishermen use mostly fishes and sometimes molluscs as bait in hook and line fishing. From the results reported here, it would appear that an increased use of crustaceans as baits may, perhaps, improve the catch rates of cat-fishes in the hook and line boats.

ACKNOWLEDGEMENTS

I wish to express my gratitude to Dr. S. Jones, Shri K. Virabhadra Rao and Dr. K.V. Sekharan for their encouragement and guidance during the course of the work.

REFERENCES

DEVANESEN D.W. AND K. CHIDAMBARM. 1953. *The common food fishes of the Madras Presidency*, Government Press, Madras.

LONGHURST, A.R. 1957. The food of the demersal fish of a West African estuary. *J. Anim. Ecol.*, **26**: 369-387.

*MONOD, Th. 1927. Contribution à l'etude de la faune du cameroun. Pisces I. *Faune coln. franc.*, **1** (b):643-742.

SEKHARAN K.V., M.S. MUTHU, K.V. SUBBA RAO, V. RAMAMOHANA RAO, P. MOJUMDER AND S. REUBEN. 1968. Exploratory trawling on the continental shelf along the north-western part of the Bay of Bengal. *Symposium on the Living Resources of the Seas around India*, Abstracts 34. Central Marine Fisheries Research Institute.

*Not consulted in original.