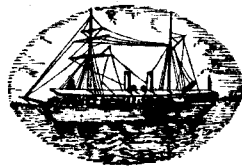


# **SYMPOSIUM ON**

# **SCOMBROID FISHES**

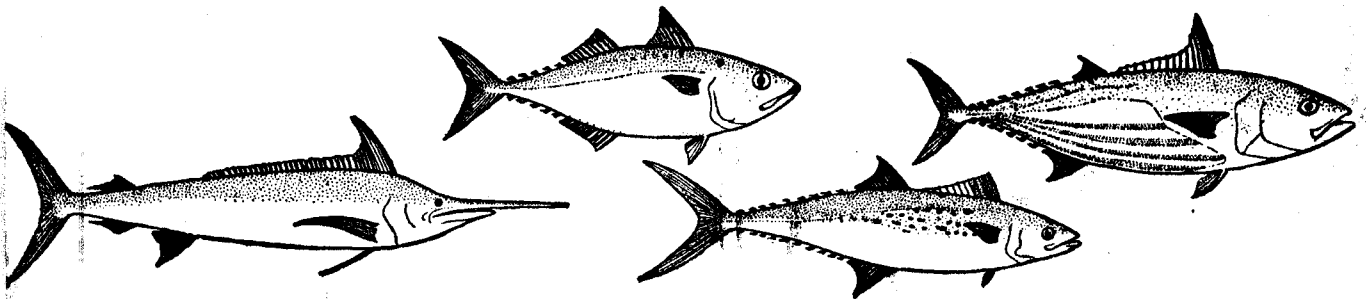
## **PART II**



**MARINE BIOLOGICAL ASSOCIATION OF INDIA**

**MANDAPAM CAMP**

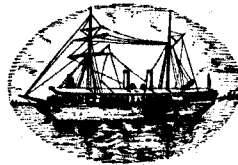
**S. INDIA**



PROCEEDINGS OF THE  
**SYMPOSIUM**  
ON  
**SCOMBROID FISHES**

HELD AT MANDAPAM CAMP FROM JAN. 12-15, 1962

**PART II**



SYMPOSIUM SERIES I  
**MARINE BIOLOGICAL ASSOCIATION OF INDIA**  
MANDAPAM CAMP  
S. INDIA

© COPYRIGHT 1964

**Marine Biological Association of India, Mandapam Camp**

PRINTED IN INDIA  
AT THE DIOCESAN PRESS, MADRAS—1964. C8787

**OBSERVATIONS ON THE FOOD OF JUVENILES OF *SCOMBEROMORUS*  
*COMMERSON* (LACÉPÈDE) AND *S. GUTTATUS* (BLOCH AND SCHNEIDER)  
FROM VIZHINGAM, WEST COAST OF INDIA\***

By M. KUMARAN

*Central Marine Fisheries Research Institute, Mandapam Camp, India*

INTRODUCTION

THE seerfishes form one of the economically important groups of food fishes of Indian seas, of which *Scomberomorus commerson* and *S. guttatus* are the most important species. The information we have on the biology of these fishes from Indian waters is scarce, being restricted to the studies by Vijayaraghavan (1955), Krishnamurthy (1958), Kuthalingam (1959) and Venkataraman (1960). However, according to Jones (1961) there is some mistake in the identity of the larval and juvenile stages worked out by Vijayaraghavan (*op. cit.*) and Kuthalingam (*op. cit.*) and so the food and feeding habits attributed to the larvae and juveniles by them cannot be taken as pertaining to those species. The present study was undertaken with a view to obtain preliminary information on the food preferences of juveniles of *S. commerson* and *S. guttatus*.

Juveniles of the above species are found in large numbers along with other fishes in the shore-seine catches at Vizhingam, on the south-west coast of India, from January to May and this account is based on the specimens collected from there during 1959. In evaluating the various food organisms it was found that the volumetric method and the points method cannot be used with any degree of accuracy due to smallness of the size of the stomachs, and wide variability in the sizes of the food organisms which were only few in number. Hence the occurrence method has been followed here, as this account is only of a preliminary nature.

OBSERVATIONS ON FOOD HABITS

***Scomberomorus commerson* (Lacépède)**

283 specimens measuring from 17 mm. to 225 mm. in fork length were examined. About 11% of the stomachs were found to be empty or nearly empty. The percentage of occurrence of important food constituents for all the specimens examined is given in Fig. 1. Larval and juvenile stages of small fishes formed the principal food and was present in about 79% of the total number of specimens examined. *Anchoviella* spp. (mostly *Anchoviella commersonii*) was the most important single item of food. The next important item among fishes was *Leiognathus* spp. which occurred in 21% of the stomachs. Larvae and juveniles of *Dussumieria*, *Kowala coval*, *Polynemus*, *Sphyraena* and sciaenids were occasionally encountered. Crustaceans ranked second in importance, their percentage of occurrence being about 21.5. The most important single item among crustacea, was copepods. *Pseudodiaptomus*, *Paracalanus*, *Acartia* and *Eucalanus* were the common forms observed. *Acetes*, *Lucifer*, *Mysis* and zoea of crustacea were found in some of the stomachs. Among the miscellaneous items were larval bivalves and chaetognaths found in a few specimens. Diatoms, the more dominant ones being *Coscinodiscus*, *Rhizosolenia* and *Fragilaria* were present in 5% of the specimens, but judging from the number of their occurrence (the maximum observed in one stomach was 7) it is presumed that they are not of much importance as food for the juveniles.

The data analysed according to three arbitrary size groups, viz., 17-30 mm., 31-60 mm., and 61-225 mm. are presented in Table II. It is evident that the percentage of occurrence of juvenile

\* Published with the permission of the Director, Central Marine Fisheries Research Institute Mandapam Camp.

fish and larvae was comparatively more in the first size group of length 17-30 mm. than in the other size groups. Similarly larger crustaceans of the plankton became increasingly important in the food as the fish grew in size. Diatoms occurred more often in small specimens than in the larger ones.

TABLE 1

Percentage of occurrence of food items in *Scomberomorus commerson* and *S. guttatus*.  
Number of specimens examined is shown in parentheses.

Items of food	S. commerson (283)	S. guttatus (208)
	%	%
<i>Anchoviella</i> spp. .. .. .	42.8	47.1
Other clupeids .. .. .	10.9	23.1
<i>Leiognathus</i> spp. .. .. .	20.8	6.7
Carangids .. .. .	6.4	7.2
Other fishes .. .. .	18.0	26.9
Molluscs .. .. .	2.8	1.4
Copepods .. .. .	14.4	12.0
Other crustaceans .. .. .	10.9	13.9
Diatoms .. .. .	5.0	7.2

TABLE 2

Percentage of occurrence of food items according to size groups in *S. commerson*.  
Number of specimens examined is shown in parentheses.

Length groups	17-30 mm. (66)	31-60 mm. (165)	61-225 mm. (52)
Items of food :	%	%	%
Diatoms .. .. .	10.6	4.8	2.0
Copepods .. .. .	18.2	12.7	15.4
Other crustaceans .. .. .	6.0	10.3	19.2
Molluscs .. .. .	—	3.6	3.9
<i>Anchoviella</i> spp. .. .. .	30.3	46.0	48.1
<i>Leiognathus</i> spp. .. .. .	7.6	21.8	34.6
Other fishes .. .. .	21.3	36.3	42.2

#### *Scomberomorus guttatus* (Bloch and Schneider)

The percentage of occurrence of important food constituents obtained by the analysis of stomach contents of 208 juveniles of size 16-161 mm. is presented in Fig. 1. About 13% of the specimens had empty stomachs. It is evident that juveniles of small-sized fishes constitute the principal food. About 75% of the specimens consumed several species of larval and juvenile fishes, the more important of these being *Anchoviella* spp. which occurred in about 47% of the specimens. *Leiognathus* spp. were comparatively rare, being only 6.7%. Juveniles of *Sphyræna*, *Polynemus*, and carangids were present occasionally. Crustaceans were present in 18% of the stomachs. Of these, copepods were the most dominant ones. *Mysis* was second in importance among crustaceans. *Acetes*, *Lucifer*, alima, small penaeids, isopods and amphipods were rarely encountered in larger specimens. Diatoms (*Coscinodiscus*, *Asterionella*, *Rhizosolenia* etc.) were observed in 7% of the specimens, but the presence in lesser number of these precludes the assumption that they form even a minor item of some value in the food of juveniles

of the species. As there was no evidence to show that they were feeding at the bottom, sand grains observed in some of the stomachs are presumed to be accidentally swallowed while being dragged ashore in shore-seines.



Fig. 1. Histograms showing the percentage of occurrence of food constituents. (1) *Anchoviella*; (2) Other clupeids; (3) *Leiognathus*; (4) Other fishes; (5) Molluscs; (6) Crustaceans; and (7) Diatoms.

TABLE 3

Percentage of occurrence of food items according to size groups in *Scomberomorus guttatus*.  
Number of specimens examined is shown in parentheses.

Length groups	16-30 mm. (143)	31-60 mm. (52)	61-161 mm. (13)
Items of food :	%	%	%
Diatoms .. .. .	9.1	3.8	—
Copepods .. .. .	14.6	5.8	7.7
Other crustaceans .. .. .	9.7	23.1	23.1
Molluscs .. .. .	—	5.8	—
<i>Anchoviella</i> spp. .. .. .	34.9	65.6	53.8
<i>Leiognathus</i> spp. .. .. .	—	19.2	23.1
Other fishes .. .. .	37.0	53.8	46.1

Table III shows the percentage of occurrence of the important food elements analysed according to size groups. The food of the juveniles of 16-30 mm. was mostly fish as evidenced by its higher percentage of occurrence, but the quantity is definitely far less than that consumed by fishes

of larger size groups. Copepods were present in about 14.6% of the specimens and the prevalence in percentage of diatoms (9.1%) was much higher than in the next size group viz., 31-60 mm. Diatoms were entirely absent in specimens larger than 61 mm. The decrease in the composition of copepods in the larger size groups is substituted by the increase in the amount of larger crustaceans like *Lucifer*, *Acetes*, *Alima* larvae and small prawns.

#### GENERAL REMARKS

The study of the food habits of the two species collected from Vizhingam during January to May shows that postlarval and juvenile fishes formed the most important item of food and that crustaceans were only second in importance and conspicuously low in numbers. In one of the papers presented for this symposium Rao, K. S. (M.S.) observes that the food items of juveniles of *S. commerson* (50-160 mm.) and *S. guttatus* (45-165 mm.) collected in February and March from Waltair on the east coast constituted mainly of *Anchoviella*, *Sardinella*, *Leiognathus* and *Caranx*. My observations show that crustaceans also form an item of some importance as food for the early juveniles from Vizhingam. Venkataraman (*op. cit.*) observed that *S. guttatus* collected from Calicut were feeding on fish and occasionally ostracods. He also reported the presence of fish in the stomachs of *S. commerson* and *Cybium interruptum*.

The occurrence of postlarvae and juveniles of *Anchoviella* spp. and other clupeids in the stomach contents is attributed to their abundance in the coastal waters during the period. Nayar (1958) reports that the peak season for *Anchoviella* at Vizhingam is between April and June. The food habits of both species are somewhat similar and this may be due to the fact that they were collected from the same locality. The present studies show that *S. commerson* and *S. guttatus* are essentially carnivorous in habits. Some juvenile *Anchoviella* were even almost the length of the fish that had eaten them. The piscivorous tendency is more pronounced in larger fishes. The small clupeids eaten by juvenile seerfishes usually occur in shoals in the inshore waters. Judging from the nature of the food species consumed it is presumed that both species were feeding near the surface. It is possible that one of the reasons for the availability of juvenile seerfishes in good quantities in the inshore areas of Vizhingam is the abundance of juvenile fishes and planktonic crustaceans which form their food.

#### SUMMARY

Analysis of the stomach contents of juveniles of *Scomberomorus commerson* and *S. guttatus* collected from Vizhingam during January to May 1959 shows that postlarvae and juveniles of small fishes and crustaceans are the most favourite food items and that there is some similarity in the food preferences of both species. Juvenile fishes of the family Clupeidae were more common. Piscivorous tendency was observed even among the smaller specimens examined. Crustacea was second in importance, the more common being copepods, *Acetes*, *Lucifer* and small prawns.

#### ACKNOWLEDGEMENT

I am grateful to Dr. S. Jones, Director, Central Marine Fisheries Research Institute, Mandapam Camp, for critically going through the manuscript and suggesting improvements.

## REFERENCES

- JONES, S. 1961. Notes on eggs, larvae and juveniles of fishes from Indian waters. VII. *Scomberomorus guttatus* (Bloch and Schneider) and IX. *Scomberomorus commerson* (Lacépède) and X. *Scomberomorus lineolatus* (Cuvier). *Indian J. Fish.*, 8 (1): 107-120.
- KLIMA, EDWARD F. 1959. Aspects of the Biology and Fishery for Spanish Mackerel, *Scomberomorus maculatus* (Mitchill), of Southern Florida. *Florida St. Bd. Conserv., Technical Series*, No. 27: 1-39.
- KRISHNAMURTHY, B. 1958. Observations on the spawning and fisheries of the spotted seer, *Scomberomorus guttatus* (Bloch and Schneider). *Indian J. Fish.*, 5 (2): 270-81.
- KUTHALINGAM, M. D. K. 1959. Observations on the food and feeding habits of postlarvae, juveniles and adults of some Madras fishes. *J. Madras Univ.*, 29 (2): 139-50.
- NAYAR, S. G. 1958. A preliminary account of the fisheries of Vizhingam. *Indian J. Fish.*, 5 (1): 32-55.
- RAO, K. S. 1962. Observations on the food and feeding habits of *Scomberomorus guttatus* (Bl. & Schn.) and juveniles of *S. lineolatus* (Cuv. & Val.) and *S. commerson* (Lac.) of the Waltair Coast. *Symposium on Scombroid fishes*. Mandapam Camp. (M.S.).
- VENKATARAMAN, G. 1960. Studies on the food and feeding relationships of the inshore fishes off Calicut on the Malabar coast. *Indian J. Fish.*, 7 (2): 275-306.
- VIJAYARAGHAVAN, P. 1955. Life-history and feeding habits of the spotted seer, *Scomberomorus guttatus* (Bloch and Schneider). *Ibid.*, 2 (2): 360-72.