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OBSERVATIONS ON THE FOOD AND FEEDING HABITS OF *GERRES OYENA* (FORSKÅL) AND *GERRES FILAMENTOSUS* CUVIER FROM THE PULICAT LAKE WITH NOTES ON THE FOOD OF ALLIED SPECIES

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INTRODUCTION

Gerres oyena (Forskål), *G. filamentosus* Cuvier and *G. limbatus* Cuvier are the three species commonly available in the Pulicat lake. Of these, the first mentioned is economically important being much demanded as food. In 1966 and 1967 *G. oyena* accounted for 1.91 and 0.49 per cent of the total landings and 23.71 and 6.62 per cent of the landings of the perches respectively. A size of 7½" (190 mm.) was recorded by Day (1878), whereas the species was found to grow to as big a size as 295 mm. in total length. The other two species mentioned above, though consumed as food, have limited value due to their small size.

As part of a general project on the biology of the economically important fishes of the Pulicat lake, the biology of the three species mentioned above was taken up by the author, and in the present communication an account of their food and feeding habits is presented together with notes on the food of other comparatively rare species of the genus in the lake.

Job (1940) gave an account of the food of *Gerres punctatus* (=*G. filamentosus*) along with the food of other perches from the Madras coast. Chacko (1949) furnished an account of the food and feeding habits of *G. filamentosus*, *G. oyena* and *G. abbreviatus* from the Gulf of Mannar. Basheeruddin and Nagappan Nayar (1961) studied the food of juveniles of *G. setifer* and *G. abbreviatus* from the coastal waters off Madras city. Information on the food of *G. setifer* from the Chilka lake is due to Jhingran *et al.* (1963) and Jhingran and Natarajan (1966).

MATERIAL AND METHODS

Fortnightly samples of the species investigated were obtained from the assembling centres of the lake. To supplement the above, samples of fish were also obtained from the fish markets located at Pulicat, Ponneri, Sunnambukulam and Arambakkam. When the samples were procured from the markets, information on the fishing ground and gear of capture was obtained by enquiry. The fishing grounds covered in the present work are indicated in figure 1 by shaded areas.

Juveniles under 25 mm. total length, which do not appear in the commercial gear, were obtained from departmental drag net collections made with konda valai and velon net. The former is made of terylene twine with a bar mesh of 7 mm. and the latter made of synthetic netting with 26-31 meshes per linear inch.

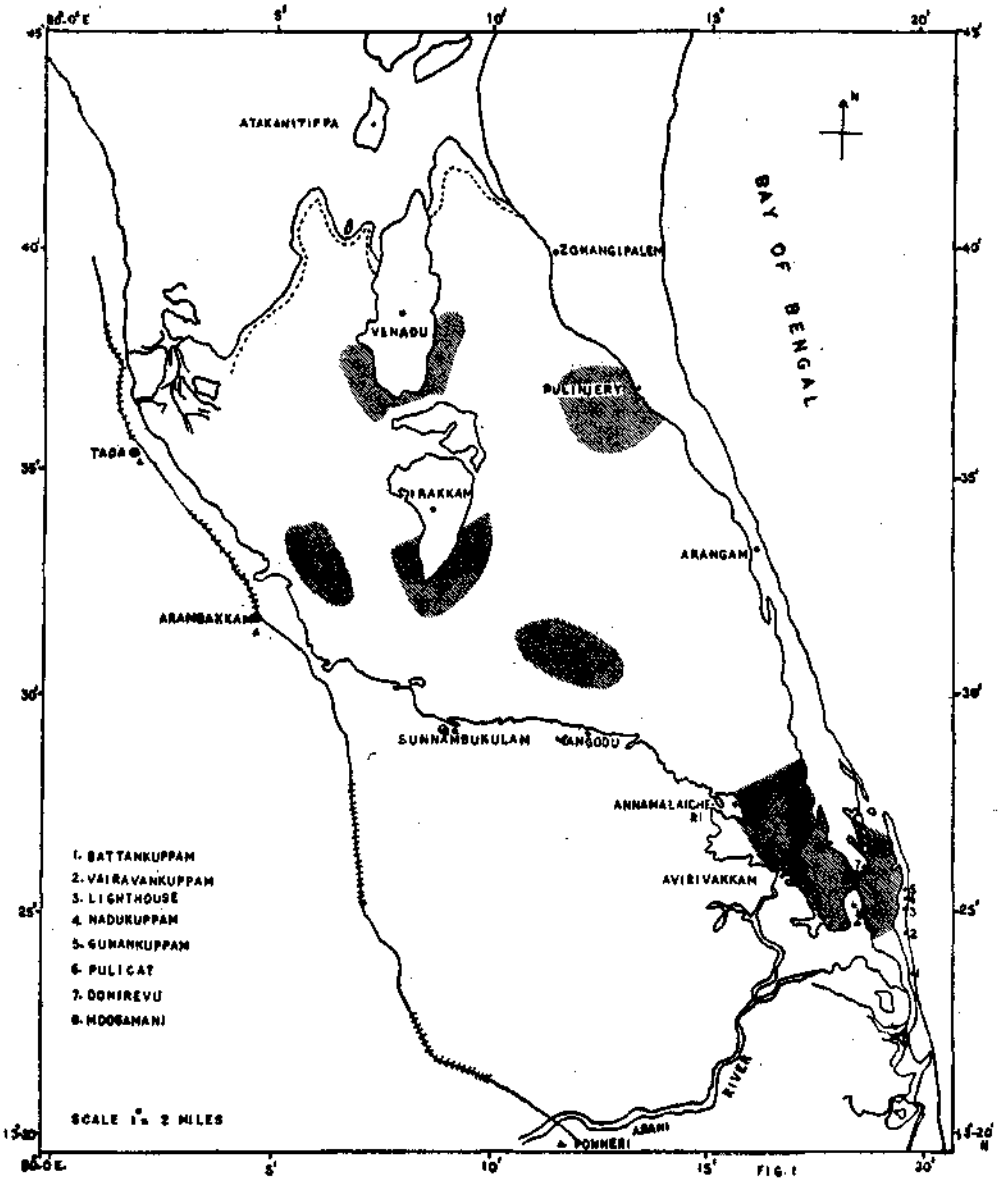

FIG. 1. Map of Pulicat Lake showing the different assembling centres and markets from where samples obtained. Fishing grounds are marked as shaded areas.

● Fishing village, ◉ Assembling centre, ▲ Market.

The samples were preserved in 5% formalin and all the subsequent observations were made on preserved material.

The fish being very tender, spoils in a very short time after its capture. Invariably the wall of the gut was found to be decaying by the time the fish were brought to the laboratory. Hence the distension of the stomach could not satisfactorily be gauged.

The fish were cut open and the contents of the gut washed into a petri dish, were analysed by Pearse's method of eye estimation as followed by Sarojini (1954). The number of guts analysed for each species is given in the text in appropriate places.

As majority of the catches of the different species of *Gerres* come from hook and line with polychaete worm used as bait, in estimations of the food of the different species, where they were obtained from hook and line catch, the bait was eliminated. The bait in the guts could easily be distinguished from the normal worms taken in by the fish, by the larger size of the bait worm cut into small pieces. However, to understand the relative importance of the polychaetes in their natural diet, samples from other gear such as drag nets, shore seines and bag nets also were obtained.

GERRES OYENA (Forskål)

Studies on the food and feeding habits of this species are based on examination of 589 specimens in the length range of 48 mm. to 295 mm. from the commercial gear, covering a period of two years from August 1965 to July 1967. Apart from the above, 14 specimens in the length range of 125 mm. to 247 mm. from the marine environment also were examined.

This species is a bottom feeder, with its protrusible mouth adapted for browsing on epiphytic animals like amphipods. Apart from this it picks up other benthic organisms like polychaetes, bivalves, gastropods etc. The average composition of food (by volume) for the different months did not show any seasonal pattern of the food preferences.

TABLE I

Qualitative and quantitative analysis of food composition of Gerres oyena *for different years.*

Item	1965-66	1966-67	Qualitative analysis
Bivalves	41.32	52.01	*Modiola striatula*
Detritus	24.07	2.56	—
Amphipods	17.92	24.93	Only broken animals seen
Gastropods	8.78	12.16	Cerithiid shells
Polychaetes	6.65	4.17	Partly digested
Plant matter	0.64	0.27	*Halophila* sp.
Decapod crustacea	0.23	0.58	Hermit crab remains of the genus *Diogenes*
Isopods	0.14	—	Partly digested
Sand	0.14	0.59	—
Copepods	0.10	2.25	*Euterpina*, *Macrosetella*, and *Microsetella*
Cypris of cirripedes	0.01	0.47	—
Diatoms	—	0.01	*Coscinodiscus*, *Biddulphia*

In Table I is given the average composition of the food (by volume) for the two years separately together with a qualitative analysis of food. It can be seen that though a variety of food is consumed, the contribution in bulk to the food of this species is from only five categories, viz., bivalves, amphipods, gastropods, polychaetes and organic detritus, being more than 95% of the food in both the years. It can also be seen that the order of importance of the different food items, as denoted by the percentage of their volume, is not the same for both the years. Thus the order for 1965-66 is bivalves, detritus, amphipods, gastropods, polychaetes and so on, while it is bivalves, amphipods, gastropods, polychaetes, detritus, copepods and so on for 1966-67.

TABLE II

Index of preponderance of food items of Gerres oyena
(Both years data combined)

Item	Vi	Oi	Vi Oi	$\frac{V_i O_i}{\Sigma V_i O_i} \times 100$
Bivalves	46.7	39.3	1835.31	67.90 (1)
Amphipods	21.4	28.0	599.20	22.17 (2)
Detritus	13.3	12.1	160.93	5.95 (3)
Gastropods	10.5	7.1	74.55	2.76 (4)
Polychaetes	5.4	4.7	25.38	0.94 (5)
Copepods	1.2	5.4	6.48	0.24 (6)
Plant matter	0.5	1.1	0.55	0.02 (7)
Decapod crustacea	0.4	0.8	0.32	0.01 (8)
Sand	0.4	0.9	0.36	..
Cypris of cirripedes	0.1	0.4	0.04	..
Isopods	0.1	0.2	0.02	..
Diatoms	0.005	0.1	0.0005	..
			Σ 2703.1405	

To assess the 'food proclivities' of *G. oyena*, the method of index of preponderance (Natarajan and Jhingran, 1961) was applied to the data combined for both the years and the results are tabulated in Table II. The notations in the above table are the same as those used by the above authors.

It can be observed that there is very good agreement between the method of index of preponderance and volumetric method. The food items contributing to the bulk of the food in the order of importance can be given as bivalves, amphipods, detritus, gastropods, polychaetes and copepods.

Sectorwise differences in food : The samples collected from the fishing grounds located between the lake mouth and Annamalaicheri were pooled, and this area called Southern sector. Samples from the fishing grounds north of Annamalaicheri were separately treated and the area referred to as Northern sector.

In Table III is given the sectorwise composition of food (by volume) for both the years combined. In the same table is given the composition of food of specimens from the marine environment. It can be noticed that amphipods, bivalves, gastropods and isopods were consumed to a greater extent in the northern sector, while polychaetes, detritus, plant matter, cypris of cirripedes and copepods were

TABLE III

Sector-wise composition of food of Gerres oyena *for both years combined*

Sector	Amphi-pods	Bi-valves	Gastro-pods	Poly-chaetes	Detri-tus	Cyp. of Cirrip.	Plant matter	Iso-pods	Sand	Cope-pods	Deca. Crusta.	Dia-toms
Northern sector ..	25.27	49.53	11.26	1.96	11.45	0.01	0.23	0.13	0.09	0.07	—	—
Southern sector ..	18.57	45.82	7.14	8.89	16.05	0.26	0.49	—	0.52	1.59	0.66	0.01
Sea ..	7.27	82.73	3.64	2.27	—	—	—	—	1.82	—	2.27	—

more consumed by fishes in the southern sector. In the marine environment this species was found to have fed to a much greater extent on the bivalves and decapod crustacea than in the lake. The extent of feeding on the other items like amphipods, gastropods and polychaetes was less in the sea than in the lake. It has to be confirmed by studies on the bottom biota of the lake, whether the sectoral differences noticed above are a result of differential distribution of the food organisms in the lake.

Differences in food associated with size : To study the food of this species at different sizes, the fish were arbitrarily grouped into five stages as done by Bapat and Bal (1952). The grouping was as follows : stage I 10-25 mm., stage II 48-80 mm., stage III 81-120 mm., stage IV 121-200 mm. and stage V above 200 mm. in total length. The food composition of the fishes of the above stages is given

TABLE IV

Food composition of Gerres oyena *in relation to size*

Item	Size Categories				
	I 10-25 mm.	II 48-80 mm.	III 81-120 mm.	IV 121-200 mm.	V Above 200 mm.
Copepods	94.03	—	3.70	1.10	0.03
Diatoms	3.33	—	—	0.01	—
Nauplii	1.11	—	—	—	—
Cypris of cirripedes	0.70	—	—	0.28	—
Bivalves	0.83	26.7	59.79	48.48	59.90
Gastropods	—	33.3	4.32	5.86	6.10
Amphipods	—	40.0	20.95	26.18	18.19
Detritus	—	—	8.89	9.94	10.36
Polychaetes	—	—	2.05	6.36	5.00
Plant matter	—	—	—	0.72	0.42
Sand	—	—	0.30	0.48	—
Decapod crustacea	—	—	—	0.54	—
Isopods	—	—	—	0.05	—
No. of guts examined	63	20	109	367	93
No. of empty guts	27	17	43	73	23
No. of guts with food	36	3	66	294	70

in Table IV. Out of the above stages specimens of the I stage could not be specifically identified. However, to facilitate a ready comparison with the food of larger fishes, they were included in the same table. It is observed that the size of the food taken by the fish increases with the size of the fish. Thus smaller items like copepods, diatoms and cirripede nauplii are to a great extent found in the guts of stage I fish. In stage II amphipods form a conspicuous part in the diet, while it is reduced in larger groups. In stages III-V glaring differences are not noticeable ; but the percentage of polychaete worms is more in stages IV and V than in stage III.

GERRES FILAMENTOSUS CUVIER

The observations on the food and feeding habits of this species are based on examination of 500 specimens in the length range of 10 mm. to 172 mm. over a period

of two years from August 1965 to July 1967. Besides 18 specimens in the length range of 86 mm. to 190 mm. from the sea were also examined.

G. filamentosus also has food habits identical with those of *G. oyena*, having a similar construction of mouth. The average composition of food (by volume) for the different months did not indicate any definite pattern.

Table V gives the percentage composition of food (by volume) for the two years separately. Some difference is noticeable between the two years as regards the order of importance of the different items.

TABLE V

Average composition of food of Gerres filamentosus *by volumetric method*

Item	1965-66	1966-67
Amphipods	35.09	47.23
Detritus	25.30	3.19
Polychaetes	21.67	13.56
Bivalves	13.39	17.08
Decapod crustacea	0.50	8.96
Copepods	3.75	—
Sand	0.29	4.96
Plant matter	0.01	4.51
Cypris of cirripedes	—	0.50
Gastropods	—	0.01

By the method of index of preponderance (Natarajan and Jhingran, *op. cit.*) (Table VI) the order of preference of the food items in this species was found to be amphipods, polychaetes, bivalves, detritus and decapod crustacea. The above items accounted for 99.89% of the food.

TABLE VI

Index of preponderance of food items of Gerres filamentosus (*Data for both years combined*)

Items	V_i	O_i	$V_i O_i$	$\frac{V_i O_i}{\sum V_i O_i} \times 100$
Amphipods	41.2	28.3	1165.96	55.99 (1)
Polychaetes	17.6	18.5	325.60	15.64 (2)
Bivalves	15.2	19.8	300.96	14.45 (3)
Detritus	14.2	16.6	235.72	11.32 (4)
Decapod crustacea	4.7	6.6	31.02	1.49 (5)
Sand	2.6	6.2	16.12	0.77 (6)
Copepods	1.9	2.6	4.94	0.24 (7)
Plant matter	2.3	0.9	2.07	0.10 (8)
Cypris of cirripedes	0.3	0.3	0.09	..
Gastropods	0.005	0.2	0.001	..
			$\sum$ 2082.481	

TABLE VII

Food composition (by volume) of G. filamentosus *from different sectors*

Sector	Amphi-pods	Detritus	Bivalves	Poly-chaetes	Decapod Crustacea	Plant matter	Cypris Cirripedes	Copepods	Sand	Gastro-pods
Northern sector ..	48.306	11.709	26.408	9.938	0.486	2.528	0.625	—	—	—
Southern sector ..	43.417	15.704	5.785	22.977	5.626	1.250	—	2.360	2.871	0.010
Marine environment ..	18.300	—	8.400	64.400	8.900	—	—	—	—	—

Qualitative analysis of the food :

Bivalves : Generally broken fragments of shells were seen but occasionally *Modiola striatula* also was seen.

Decapod crustacea : Hermit crabs of the genus *Diogenes* and appendages of crabs were encountered.

Copepods : These were found in the fishes of small size (upto 75 mm. total length). In juveniles of 10-25 mm. total length a large number of copepodid stages of harpacticoidea were commonly seen. The adult copepods belonging to the genera *Acartia, Schmackeria, Oithona, Macrosetella, Euterpina* and *Microsetella* were seen in larger specimens.

Gastropods: Very frequently cerithiid shells were seen.

Diatoms: *Coscinodiscus* and *Biddulphia* were the genera seen frequently in the guts of juveniles of 10-25 mm. total length.

Mysids: In juveniles of 25 mm. group caught at Dhonirevu *Mesopodopsis orientalis* was the only mysid recorded.

Nauplii: Copepod nauplii and cirripede nauplii were seen in the guts of juveniles. Amphipods and polychaetes could not be identified because the former were generally broken into fragments and the latter in an advanced stage of digestion.

The sectorwise composition of the food by pooling the data as stated under *G. oyena* is tabulated in Table VII.

Alongside is given the composition of food of specimens from the marine environment for comparison. It can be noticed that fish in the northern sector consumed more of amphipods, bivalves and plant matter, while they fed to a greater extent on detritus, polychaetes and decapod crustacea in the southern sector. Further, copepods and gastropods were found only in the fishes from northern sector only. Specimens from the marine environment did not show a large variety of food items in their guts as was the case in the lake. Much of the food in the former case was polychaetes (64.4%). The next important item of food was amphipods (18.3%). The rest of the food was formed of bivalves and decapod crustacea.

To find out differences associated with size, the following arbitrary stages were studied. Stage I included fishes from 10-25 mm. in total length, stage II 30-75 mm., stage III 76 to 110 mm. and stage IV all the fishes above 110 mm. of total length. The stagewise data is presented in Table VIII. Small-sized prey like copepod eggs, polychaete eggs, diatoms, mysids, *Oikopleura* and nauplii larvae were exclusively consumed by fishes of stage I. Copepods being larger in size than many of the above items, were found in both stages I and II. Decapod crustacea were found more in stages III and IV than in stage II, while they were completely absent in stage I. The percentage of polychaetes gradually increased towards stage IV.

GERRES LIMBATUS CUVIER

Observations on the food and feeding habits of this species are based on an analysis of 414 specimens in the length range of 51 mm. to 149 mm. during the period August 1966 to July 1967. It has feeding habits similar to those of the two preceding species.

The average food composition of the species for 1966-67 by volumetric method together with that by the method of index of preponderance is furnished in Table

TABLE VIII

Food composition (by volume) of Gerres filamentosus *in relation to size*

Food items	Size Categories			
	I 10-25 mm.	II 30-75 mm.	III 76-110 mm.	IV Above 110 mm.
Amphipods	—	28.83	31.28	36.94
Detritus	—	17.91	21.12	11.11
Bivalves	2.50	18.84	17.75	16.02
Polychaetes	—	11.86	17.54	25.91
Gastropods	—	—	—	0.11
Decapod crustacea	—	0.94	11.24	4.17
Sand	—	1.39	0.81	4.44
Plant matter	—	—	0.02	1.30
Cypris of cirripedes	1.07	—	0.24	—
Copepods	61.37	20.23	—	—
Copepod eggs	4.26	—	—	—
Diatoms	0.71	—	—	—
Mysids	23.58	—	—	—
Nauplii larvae	0.36	—	—	—
Polychaete eggs	5.37	—	—	—
Oikopleura	0.07	—	—	—
No. of guts examined	29	111	194	166
No. of empty guts	1	68	71	58
No. of guts with food	28	43	63	68

IX. From the table it can be seen that the order of preference of the food items is amphipods, bivalves, polychaetes, decapod crustacea and cypris of cirripedes, out of which the first three categories accounted for 99.58% of the food. A qualitative statement of the food is also given in the above table.

The fish were arbitrarily grouped into four categories—I stage to include fishes from 10 to 25 mm. total length, II stage from 51 to 75 mm., III stage 76 mm. to 125 mm. and IV stage all fish above 125 mm. of total length.

In Table X is given the food composition of *G. limbatus* at different sizes. Here also it can be noticed that fishes of stage I feed to a great extent on copepods followed by diatoms. Among the other groups the contribution of small-sized food items gradually decreases to stage IV and their place is taken by larger items. Thus in stage IV more than half of the food is due to bivalves.

GERRES SETIFER (HAMILTON)

This being an uncommon species, only four specimens observed in the length range of 142 to 170 mm had an average food composition of decapod crustacea 33.3%, bivalves 36.7% and amphipods 30.0%.

TABLE IX

Index of preponderance in Gerres limbatus *for* 1966-67 *together with qualitative analysis*

Food item	Vi	Oi	Vi Oi	$\frac{Vi\ Oi}{\sum Vi\ Ci} \times 100$	Qualitative analysis
Amphipods ..	41.0	38.8	1588.80	52.12 (1)	Broken specimens.
Bivalves ..	32.2	35.6	1146.32	37.60 (2)	Shell fragments.
Polychaetes ..	18.9	15.9	300.51	9.86 (3)	Semi-digested.
Decapod crustacea ..	2.0	2.8	5.60	0.18 (4)	*Diogenes* sp.
Cypris of cirripedes ..	2.4	1.6	3.84	0.13 (5)	—
Sand ..	1.2	1.6	1.92	0.06 (6)	—
Detritus ..	1.7	0.6	1.02	0.03 (7)	—
Gastropods ..	0.5	0.6	0.30	0.01 (8)	Cerithiid shells.
Diatoms ..	0.1	0.9	0.09	..	Coscinodiscus sp.
Copepods ..	0.01	1.3	0.013	..	*Acrocalanus*, *Labidocera*, *Acartia*, *Schmackeria*, *Oithona*, *Corycaeus*, *Euterpina*, *Macrosetella* and *Microsetella*.
Plant matter ..	0.003	0.3	0.001	..	*Halophila* sp.
-			$\sum$ 3048.414		

GERRES OBLONGUS CUVIER

Three specimens in the length range of 130 to 138 mm. examined during January-February of 1968 had an average food composition of polychaetes 48.3%,

TABLE X

Food composition (by volume) of Gerres limbatus *in relation to size*

Food items	Size Categories			
	I 10-25 mm.	II 26-75 mm.	III 76-125 mm.	IV Above 125 mm.
Copepods	94.03	—	0.020	—
Diatoms	3.33	—	0.032	0.080
Nauplii	1.11	—	—	—
Bivalves	0.83	—	34.000	51.930
Cypris of cirripedes	0.70	9.09	1.851	—
Amphipods	—	83.64	34.331	32.34
Polychaetes	—	7.27	23.182	14.43
Detritus	—	—	1.948	—
Decapod crustacea	—	—	3.182	—
Gastropods	—	—	0.649	0.65
Sand	—	—	0.825	0.55
Plant matter	—	—	—	0.02
No. of guts examined	63	68	263	83
No. of empty guts	27	57	109	21
No. of guts with food	36	11	154	62

decapod crustacea (*Acetes* sp.) 33.3%, crustacean appendages 6.7%, sand 6.7%, amphipods 3.3% and copepods (*Macrosetella* sp.) 1.7%.

DISCUSSION

From the observations made on different species of *Gerres* in the Pulicat lake, it is evident that all the species have identical food habits consuming the same food items. However, the extent to which any particular item is consumed may differ among the different species. Therefore besides an intraspecific competition, an interspecific competition for food also seems to exist within the lake.

Regarding the sectorwise composition of food, a close similarity can be noticed between *G. oyena* and *G. filamentosus*. In both the species bivalves and amphipods are more consumed in the northern sector, while polychaetes, detritus, copepods and decapod crustacea are more consumed in the southern sector. Similarly in the marine environment also as regards the consumption of decapod crustacea, both the species show resemblance in the sense that the percentage of this item is more in the sea than in the lake. In *G. oyena* bivalves are consumed to the maximum extent in the marine environment, while in *G. filamentosus* consumption of it in the sea is more than in the southern sector but much less than in the northern sector. The above sectoral differences are whether manifestations of the differential distribution of the food organisms in space or not, is to be verified by quantitative studies of bottom biota of the lake.

The data showing the food composition of the different species at different sizes indicated that fishes of smaller sizes depend to a greater extent on smaller prey for their food requirements and as they grow, this dependence on small-sized food organisms is reduced and their place is taken by large-sized prey, some times to the total exclusion of the smaller food organisms in larger fish. These observations are in agreement with the predator-prey size relationship worked out in the case of plaice larvae in temperate waters (Shelbourne, 1962) and with the observations of Bapat and Bal (1952) and Kuthalingam (1957, 1958 and 1959).

The importance of polychaete worms as brought out in the present study indicates the extent to which they are relished by the fish. The fishermen make use of this habit of the fish and a large quantity of *Gerres* spp. are landed by hook and line by using polychaete worm as bait.

In the case of juveniles of *Gerres* spp. (11 mm. to 25 mm.) some difference in the intensity of feeding between the day and night was noticed. Thus out of a total of 83 specimens caught during the day, 60 stomachs had food and 23 were empty, the percentage of stomachs with food working out to 72.3. On the other hand in a sample of 18 specimens caught during the night time, excepting one, all had empty stomachs. This difference associated with diurnal periodicity may be due to visual feeding of the fish. Such a case was reported in the case of plaice larvae (Shelbourne, 1953). However, existence of such a phenomenon can be conclusively proved only after conducting feeding experiments under controlled light.

The observations made by the author on the food of different species of *Gerres* differ from those made by other workers. Chacko (1949) observed in *G. oyena* the presence of only sea weeds (*Halimeda* and *Gelidium*) by an examination of 35 specimens from the Gulf of Mannar in the size range of 14 cm. to 20 cm. But in the Pulicat lake the variety of food is much. Similarly in the case of *G. filamentosus* though Chacko's (*op. cit.*) observations are based on fairly a large number of specimens, they are only qualitative and do not indicate the relative importance of the different items of food. Chacko (*op. cit.*) did not mention crustaceans in the food of either *G. oyena* or *G. filamentosus*, whereas in the present studies a fairly high percentage of crustacea was found. Job's (1940) observations on the food of *G. punctatus* (=*G. filamentosus*) that 40% of the food comprised of crustacea is in close agreement with the average composition of food arrived at by the author for 1965-66. According to Job (*loc. cit.*) the highest percentage of food (57%) was due to polychaetes. In the present investigation the first rank is occupied by crustacea (including amphipods and decapod crustacea), being 39.34% in 1965-66 and 56.69% in 1966-67.

The food composition of *G. setifer* from the Pulicat lake is different from that of the same species from the Chilka lake. Thus Jhingran *et al.* (1963) reported that crustacea formed 42%, mollusca 31%, algae 6%, decayed organic matter 13% and miscellaneous matter 8%, whereas in the Pulicat lake the composition is decapod crustacea 33.3%, bivalves 36.7% and amphipods 30.0%. Basheeruddin and Nagappan Nayar (1961) have encountered only crustacean remains (*Acetes indicus*) in the food of *G. setifer* from the Madras coast.

SUMMARY

The food studies covering a period of two years (1965-67) in the case of *Gerres oyena* and *G. filamentosus* and one year in *G. limbatus* were based on examination of a large number of specimens covering the entire length range of the commercial catch. Juveniles of 10-25 mm. total length, obtained from departmental drag nets, were made use of to get a fairly complete picture of the food habits. All the three species were bottom feeders with identical food habits, subsisting on bivalves, detritus, amphipods, polychaetes, gastropods, copepods, decapod crustacea, plant matter etc. Small-sized fish were seen to feed to a greater extent on copepods and diatoms, which in larger fish were replaced by larger items like bivalves, polychaetes and amphipods.

Sectoral differences in the food composition were observed among northern and southern sectors of the lake and the marine environment.

Brief notes on the food of *G. setifer* and *G. oblongus* also were given. These two species also seem to have food habits similar to those of the species mentioned earlier.

Diurnal difference in feeding activity in juveniles attributable to visual feeding was discussed.

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