

## A STUDY ON FOOD AND FEEDING HABITS OF *NEMIPTERUS JAPONICUS* (BLOCH) OFF BOMBAY COAST

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### ABSTRACT

The gut content of *Nemipterus japonicus* (Bloch) revealed that this fish is a carnivorous bottom feeder, feeding mainly on crustaceans, fishes, salps and polychaetes, with marginal variations in females. The intensity of feeding increased with the advancement of maturity till stage V except in stage III where the intensity of feeding indicated a decrease.

### INTRODUCTION

The threadfin bream, *Nemipterus japonicus* (Bloch), locally called "Rani fish" (family Nemipteridae) is an important commercial species which constitute a good fishery during January - October along North-West coast of India. Food and feeding habit of a fish is an index to its social habit, habitat, availability at time and space and the niche it occupies in an ecosystem and therefore is an important aspect of study for judicious exploitation and management of its fishery. Studies on the biology and fishery of this fish off Andhra-Orissa coast were done by Krishnamoorthi (1973), biology by Amarnath (1961) and Kuthalingam (1971) and biometry by Selvakumar (1971), but work on its food and feeding habit is meager. Hence the present study was taken up to evaluate the percentage composition, percentage of prevalence of different food items and intensity of feeding

alongwith their sexwise, maturity-stagewise variations.

### MATERIAL AND METHODS

423 specimens comprising of 201 males, 209 females and 13 juveniles of *Nemipterus japonicus* were collected for 12 months (April 1977 to March 1978) from Sagoon Dock and Ferry Wharf landing centres of Bombay. The males ranged 96-250 mm in length and 10.8 - 184.0 gm in weight; females 95-210 mm in length and 9.5 - 134.8 gm in weight and juveniles 83-190 mm in length and 8.5 to 94 gm in weight. 81 specimens with everted stomachs were also encountered.

Percentage composition of different food items including digested matter not as food but a product of all other food items, encountered in the gut contents were determined by points (volumetric) eye estimation method.

20, 15, 10, 5 and 2 points were allotted to stomach with full, 3/4th full, 1/2 full, 1/4th full and Trace food material respectively. The gorged stomach were allotted more than 20 points depending on their degree of gorgeness.

## RESULTS AND DISCUSSION

Crustaceans (av 52.7%) dominated over all other food items (Table 1) and was comprised of prawns, lobsters, *Squilla*, crabs, amphipods and ostracods. The next abundant food items were fishes (av. 22.71%) constituted mainly by young ones of *Polynemus tetradactylum*, *P.indicus*, *P.sexarius*, *Lactarius lactarius*, *Gazza minuta*, *Leiognathus sp.*, *Trypauchen vagina*, *Bregmaceros maccllellandi*. Other food items were *Salpa* (av.28%), polychaetes (4.49%), detritus (2.04%), miscellaneous (2.06%) and digested matter (6.65%).

Both males and females indicated marginal fluctuations in intake of different food material during different months. Crustaceans dominated throughout the year ranging 35.99% in November to 72.19% in July. Similarly fishes dominated throughout the year as the 2nd highest group of food item ranging 9.9% in May to 38.27% in October. Polychaetes were absent in July, August, October and January and during rest of the year its presence ranged 0.49% in May to 16.03% in April. Percentage contribution of *Salpa* in the gut

contents was from 23.26% in May to 28.0% in December. This item was absent only in October. Detritus occurred in the guts throughout the year except in June and October ranging from 0.49% in May to 6.16% in February. Other miscellaneous unidentified food items ranged from 0.37% in September to 9.25% in August.

In different length groups of males and females also, crustaceans dominated except in the smallest (81-90 mm) and the largest (251-260 mm) length groups. Contribution of crustaceans ranged from 19.98% in 231-240 mm to 100% in the 221-230 mm length groups.

Fishes were the next dominant food of *N.japonicus* which ranged from 1.26% in 101-110 mm to 52.28% in 231-240 mm length groups. Fish was absent in the length groups 81-90 mm, 91-100 mm and in 231-240 mm.

Crustaceans and fishes were followed by *Salpa* which were encountered in the gut contents of all the length groups between 101-110 mm and 201-210 mm, except in the length group 161-170 mm, with its lowest 2.6% in 201-210 mm to its highest 15.12% in 101-110 mm length groups. In the small fishes ranging from 80 mm to 100 mm and in the larger fishes of sizes 211 mm to 260 mm length groups *Salpa* was absent.

Presence of polychaetes were highest 9.62% in 171-180 mm length

Table 1 : Percentage composition of food items in *Nemipterus japonicus* (Bloch) during 1977 to 1978

Number/Food items	April 1977	May	June	July	Aug.	Sep.	Oct.	Nov.	Dec.	Jan. 1978	Feb.	Mar
Number of specimen	34	29	37	24	35	40	40	49	36	26	36	33
Diggested matter	7.5	1.5	18.7	6.3	5.8	6.1	3.2	7.7	2.0	13.3	2.6	5.2
Crustaceans	39.4	64.3	36.8	72.2	52.2	54.1	58.4	35.9	58.5	51.2	62.0	50.2
Fish	12.3	9.9	24.1	13.2	31.6	27.2	38.3	37.4	31.0	14.5	14.6	12.9
Polychaete	16.0	0.5	3.2	-	-	3.7	-	6.8	9.2	-	10.4	3.9
Salps	22.6	23.3	12.1	6.8	0.3	3.7	-	4.1	0.3	18.1	1.9	15.9
Detritus	2.6	0.5	-	1.5	0.6	3.4	-	4.8	0.9	2.4	6.2	1.7
Miscellaneous	-	-	1.1	-	9.2	0.4	-	6.2	-	0.4	2.3	5.2

Table 2 : Percentage composition of main groups of food items in *Nemipterus japonicus* (Bloch) males and females (brackets) during April 1977 to March 1978

Months	No. of specimen	Digested matter	Crustaceans	Fish	Polychates	Salps	Detritus	Misc.
April '77	15 (19)	0.3 (7.2)	34.7 (46.2)	6.9 (13.7)	10.4 (18.5)	36.1 (12.9)	3.5 (1.6)	- (-)
May	15 (14)	1.7 (1.8)	61.5 (68.2)	6.8 (14.1)	- (1.2)	29.9 (14.1)	- (1.2)	- (-)
June	17 (19)	35.8 (12.9)	37.2 (33.9)	9.4 (32.3)	1.9 (4.0)	5.7 (16.1)	- (-)	- (0.8)
July	10 (13)	8.8 (5.2)	57.9 (85.3)	17.7 (9.5)	- (-)	17.7 (-)	3.8 (-)	- (-)
August	17 (18)	3.3 (9.0)	46.4 (59.7)	32.6 (30.6)	- (-)	0.6 (-)	0.6 (0.7)	16.6 (-)
September	13 (27)	6.6 (7.9)	70.3 (45.8)	17.6 (32.2)	2.2 (4.5)	- (5.6)	3.3 (3.4)	- (0.5)
October	20 (20)	4.3 (2.4)	57.1 (59.7)	38.6 (37.9)	- (-)	- (-)	- (-)	- (-)
November	30 (19)	6.2 (11.9)	23.0 (69.2)	46.9 (11.1)	9.0 (0.8)	0.6 (2.6)	6.2 (0.9)	7.1 (3.4)
December	16 (20)	1.3 (2.6)	58.7 (54.9)	27.3 (33.8)	11.3 (7.7)	- (0.5)	1.3 (0.5)	- (-)
January '78	10 (15)	9.5 (12.6)	49.9 (53.4)	16.7 (13.8)	- (-)	22.6 (16.4)	1.2 (3.1)	- (0.6)
February	18 (14)	4.0 (1.9)	64.4 (62.5)	16.8 (4.8)	8.1 (14.4)	- (5.8)	4.7 (8.7)	2.0 (1.9)
March	20 (11)	7.4 (2.9)	61.3 (33.7)	4.9 (37.6)	3.1 (5.9)	20.2 (12.9)	2.5 (1.0)	0.6 (5.9)

group and lowest 0.89% in 201-210 mm length group. In the young fishes ranging 80-110 mm in total length and in the elder fishes ranging above 211 mm, polychaetes were absent conspicuously.

Detritus constituted 0.86% to 7.56% in the length groups 101-110 mm to 211-220 mm respectively. However, in the fishes of the youngest two length groups, from 81-100 mm, the three largest length groups from 221-267 mm and also in two other (111-120 mm and 201-210 mm length groups, detritus was absent in the guts.

Miscellaneous food items ranged from 0.4% in 191-200 mm to 5.4% in 151-160 mm. In the length groups of two smallest (80-100 mm) and in five largest (201-260 mm) length groups. Miscellaneous food items could not be traced.

Digested food material was present in all the length groups except in three (211-220 mm, 221-230 mm and 251-260 mm) length groups. The gut of the smallest specimen (80-90 mm) was cent percent filled with digested food matter.

Analysis of gut contents for percentage composition of different food items month-wise, sex-wise and length group-wise separately did not reveal any appreciable difference. In the females of different stages of maturity also, crustaceans and fishes dominated as the first and second dominant food items by volume in

the gut contents (Table 2).

### Intensity of feeding

An overall analysis of feeding intensity of *N.japonicus* for the whole year for both sexes together (Table 4) indicates that feeding intensity was highest (12.15) in the month of October, followed by April (11.28) and it was low in the months of June (5.06) and May (6.96). In all the others months of investigation intensity of feeding was more or less same. Maximum number of specimens having empty stomach were encountered in the month of May. However, seasonwise intensity of feeding indicated a little rise in intensity from monsoon (av.7.39) to premonsoon (av.8.88) to postmonsoon (av.10.05)

Length group-wise investigation showed that intensity of feeding increased with increasing length of fish with maximum in 220-230 mm size group.

No appreciable differences in feeding intensity was observed in between sexes or seasons (Table 4). However, in females when feeding intensity was analysed for different stages of maturity (Table 3) an increase in feeding intensity with the advancement of maturity stages except in maturity stages III was observed.

The present study clearly revealed that *N.japonicus* of Bombay coast is a carnivore, feeding at the

Table 3 : *Percentage composition of main group of food items in Nemipterus japonicus (Bloch) females in different stages of maturity.*

Maturity stage	Number of specimen	Digested matter	Crustaceans ceans	Fish	Polychaetes	Salps	Detritus	Misc.
Stage I	83	7.53	47.22	19.91	9.67	11.80	2.70	1.13
Stage II	18	12.65	58.85	23.41	-	5.06	-	-
Stage III	24	8.28	66.26	22.48	-	1.08	1.77	-
Stage IV	29	5.88	69.84	20.58	1.83	0.73	1.10	
Stage V	23	2.48	48.54	39.00	1.24	7.46	0.82	0.41
Stage VI & VII	9	4.76	51.18	22.61	5.95	10.71	2.38	2.38
Stage VIII	23	2.53	59.38	27.41	8.12	0.50	-	2.03

Table 4 : *Percentage occurrence of stomachs in various degree of fullness, and number of points per fish, during April 1977 to March 1978 in both sexes.*

Months	No. of Specimen	G	F	3/4 F	1/2 F	1/4 F	Trace	Empty	Everted excluded	Points/ Fish excluding everted
April '77	42	7.14	21.42	7.14	11.90	19.04	26.19	-	7.14	11.28
May	35	2.85	11.42	5.71	2.85	20.00	28.57	11.42	17.14	6.96
June	42	-	4.76	4.76	9.52	28.57	38.09	2.38	11.90	5.05
July	30	3.33	10.00	3.33	20.00	20.00	20.00	-	23.33	8.54
August	41	4.87	2.43	12.19	34.14	21.95	9.75	-	14.63	9.28
September	40	-	7.50	7.50	25.00	30.00	27.50	2.50	-	6.70
October	42	4.76	26.19	14.28	21.42	9.52	19.04	-	4.76	12.15
November	50	6.00	18.00	6.00	10.00	22.00	36.00	-	2.00	8.95
December	39	-	23.07	2.56	23.07	23.07	20.51	-	7.69	9.58
January '78	48	2.08	6.25	8.33	10.41	18.75	8.33	-	45.83	9.53
February	50	-	8.00	10.00	14.00	30.00	8.00	2.00	28.00	8.55
March	43	4.65	11.62	2.32	11.62	18.60	27.90	-	23.25	8.75

bottom and close to the bottom by hunting motile large animals by sight. Presence of bottom dwelling organisms such as polychaeta, bivalves, *Squilla* etc. support this fact. Although crustaceans and fishes in the guts were compensatory to each other the first preference was for crustaceans.

Larger fishes had the narrower, and the smaller fishes had the broader food spectrum. With growth, an increase in the size of the food particle was also observed. In the females of different stages of maturity and also between the sexes a little seasonal difference has been observed in feeding intensity. Percentage of full guts were less in maturing and more in mature and spent females.

Egglestons (1972) in the specimens of northern part of the South China Sea observed *N.japonicus* to be a predator and the diet of larger fishes consisted mainly of crustaceans, fish and cephalopods. He opined that the fish feed by day only, which is but natural but natural because the species hunt food by sight. Krishnamoorthy (1971), after about 6 years of investigation in Andhra-Orissa coast, and reviewing previous works of Job (1940), Rao (1964) and Egglestone (1972) also concluded that *N.japonicus* is more a bottom feeder and primarily carnivore.

The present observations are in conformity with both Rao (1964), Krishnamoorthy (1971) and Egglestone

(1972), except that Egglestone (1972) reported higher intake of cephalopods instead of Salpa as observed in the present study. This difference appears to be due to geographical variations in food availability.

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