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FISHERY OF THREADFIN BREAMS AT WALTAIR WITH NOTES ON SOME ASPECTS OF BIOLOGY OF *NEMIPTERUS MESOPRION* (BLEEKER)

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ABSTRACT

At Waltair, during 1980-82, threadfin breams were abundant in the catches of private trawlers during the first half of the year. The average annual landings were 895 tonnes.

Nemipterus mesoprion is carnivorous subsisting mainly on crustaceans and teleosts. Among crustaceans young prawns, crabs and *Squilla* sp. are dominant.

Studies on growth rate of *N. mesoprion* showed that the fishery was supported mainly by fishes measuring 70-140 mm. The species showed a monthly growth rate of 10 mm in fishes measuring 70-140 mm. It was also observed that the percentage contribution of males was more than the females.

INTRODUCTION

AMONG the threadfin breams, *Nemipterus japonicus* and *Nemipterus mesoprion* occupy an important position in the trawl catches at Waltair, as these species together contribute 10-12% of trawl catches. In India, studies on the fishery, some aspects of biology and population dynamics of *Nemipterus japonicus* have been made by Kuthalingam (1971), Nammalwar (1973), Krishnamurthy (1973, 1976, 1978), Vinci *et al.* (1975), Vinci (1983), Muthu *et al.* (1977), Dan (1980), Murty (1983, 1984, 1987), Nair *et al.* (1986), Vivekanandan *et al.* (1986) and Rao *et al.* (1986). Murty (1982) studied some aspects of the biology of *N. mesoprion* from Kakinada. The present account deals briefly with the fishery of threadfin breams at Waltair during 1980-83 with particular reference to food and feeding habits and length frequency studies of *N. mesoprion*.

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MATERIAL AND METHODS

Fresh samples were collected at weekly intervals during 1980-82, from the private mechanised trawlers which were operated off Waltair and the catches were landed at the post fishing harbour jetty, Visakhapatnam. The data on total length, weight, sex and stage of maturity of each fish were recorded. From the data collected on the number of units, catch and effort, the total catches per day were first estimated and subsequently raised to a month.

The points method of Hynes (1950) was followed for quantitative analysis of food. The feeding intensity was determined by studying

TABLE 1. *Estimated effort (in hours), catch (in kg) and catch per hour (C/E) values (in kg) of different species of* Nempiterus *during* 1980-82

Month		Effort	*N. japonicus*		*N. mesoprion*		Other species	
			Catch	C/E	Catch	C/E	Catch	C/E
1980	January ..	17794	33600	1.88	8400	0.47	267	0.01
	February ..	29311	102600	3.50	68400	2.30	51	0.01
	March ..	14150	141000	9.96	140400	9.89	716	0.05
	April ..	9075	124119	12.80	186178	20.51	—	—
	May ..	12368	180366	14.58	270547	21.87	—	—
	June ..	13093	—	—	—	—	—	—
	July ..	24652	1100	0.04	—	—	57	0.002
	August ..	31931	2500	0.07	—	—	100	0.002
	September ...	20964	4000	0.19	—	—	4246	0.20
	October ..	17825	12218	0.68	—	—	1270	0.07
	November ..	24925	9000	0.36	13604	0.55	69	0.002
	December ..	21111	22978	1.08	25525	1.21	2552	0.12
1981	January ..	26398	10920	0.41	25480	0.96	—	—
	February ..	35062	36950	1.05	55408	1.58	20	0.0005
	March ..	119311	19000	0.98	6340	0.33	24	0.012
	April ..	5323	10100	1.89	13058	2.45	200	0.04
	May ..	9421	3249	0.34	24999	2.63	266	0.02
	June ..	20995	2113	0.10	1855	0.08	260	0.01
	July ..	3101	13144	4.24	6589	2.12	333	0.11
	August ..	3935	3449	0.84	520	0.13	46	0.01
	September ..	3278	18563	5.66	675	0.21	1189	0.36
	October ..	15946	23987	2.97	—	—	712	0.06
	November ..	22757	36815	3.20	—	—	1188	0.10
	December ..	13024	25627	2.83	10500	1.27	—	—
1982	January ..	17670	20926	1.18	65772	3.12	970	0.05
	February ..	18354	14063	0.76	305036	16.61	7094	0.38
	March ..	10662	4107	0.37	156242	14.38	2879	0.26
	April ..	6692	734	0.11	19089	2.85	549	0.08
	May ..	17395	2516	0.14	235	0.01	—	—
	June ..	15000	9623	0.64	2561	0.17	293	0.02
	July ..	19355	15530	0.50	287	0.01	1000	0.05
	August ..	21784	50974	2.33	3299	0.15	8025	0.36
	September ..	28292	72157	2.55	1982	0.07	10430	0.36
	October ..	16718	16412	0.98	532	0.03	16338	0.98
	November ..	31459	65210	2.07	8864	0.28	8351	0.26
	December ..	26077	45129	1.73	38687	1.48	5427	0.20

the condition of stomachs which were classified into gorged, full, 3/4 full, 1/2 full (moderate), 1/4 full (poor) and empty. For length frequency studies, the total length of specimens were grouped into 10 mm class intervals and monthwise percentage contribution of eachs size group was calculated.

RESULTS

Fishery

In 1980, the catch of *N. japonicus* per hour increased from 1.88 to 14.58 kg per hour during January-May and in the later half of the year the values were very low, ranging from 0.04 to 1.08 kg per hour. During 1981, the c.p.h

fluctuated between theminimum of 0.41 kg per hour in January and maximum of 5.66 kg per hour in September. Similar fluctuations in the catch per hour values were recorded during 1982 also, with a minimum c.p.h. of 0.10 kg in June and maximum of 5.66 in September (Table 1).

During 1980, the fishery for *N. mesoprion* was seasonal, the catch rates in January-May ranging from 0.47 kg per hour to 21.87 kg per hour and in November-December from 0.55 to 1.31 kg per hour.

In 1981, no seasonal trend was observed in the c.p.h. values since they fluctuated from month to month irrespective of increase or decrease in the effort.

In 1982, during the first quarter the yield was good since c.p.h. values ranged from 3.72 to 16.61 kg per hour, thereafter there was a decline in the catches as well as in the catch rates and the values ranged from 0.01 (May, July) to 2.85 (April).

As the catches of other species of *Nemipterus* were very meagre they did not contribute to the fishery.

Food

The stomach contents were analysed quantitatively and qualitatively. The main food items were teleosts and prawns, crabs, *Squilla* sp. which were identified upto genera and the percentage occurrence of individual items calculated separately (Table 2 and 3).

The feeding intensity was found to be good during August-September, 1981 and in 1982 from February to April, June and September

TABLE 2. *Percentage occurrence of guts in various decree of fullness in* Nemipterus mesoprion *during* 1981 and 1982

	Month		Gorged	Full	3/4 full	1/2 full	1/4 full	Empty
1981	January	..	5.0	10.0	—	—	—	85.0
	February	..	8.7	14.5	10.0	15.5	2.5	48.8
	March	..	—	15.0	5.0	10.0	—	70.0
	April	..	10.2	11.5	10.7	25.6	5.0	37.0
	May	..	—	2.5	20.0	47.5	6.0	30.0
	June	..	—	—	—	—	—	—
	July	..	—	—	—	—	—	—
	August	..	35.0	15.0	20.0	30.0	—	—
	September	..	—	33.4	26.6	34.0	6.0	—
	October	..	—	—	—	—	—	—
	November	..	—	—	—	—	—	—
	December	..	1.8	6.6	2.6	28.0	—	61.0
1982	January	..	—	10.0	—	—	—	90.0
	February	..	3.4	9.4	9.0	10.7	—	67.5
	March	..	1.0	7.2	3.0	16.1	17.0	55.7
	April	..	—	18.3	—	70.0	—	11.7
	May	..	—	—	35.0	50.0	—	15.0
	June	..	—	10.0	—	70.0	—	20.0
	July	..	—	—	—	—	—	—
	August	..	—	—	—	—	—	—
	September	..	—	7.8	7.0	40.4	13.3	31.5
	October	..	—	13.3	3.3	10.0	—	73.4
	November	..	4.3	4.3	14.9	70.2	—	6.3
	December	..	—	—	—	25.0	—	75.0

TABLE 3. *Percentage frequency of dominant food components during the different months of* 1981 and 82 *in* N. mesoprion

Months	Teleosts	Prawn	Crabs	*Squilla* sp.
Jan. 1981	42.9	57.1	—	—
Feb.	21.1	58.3	17.2	3.4
Mar.	—	100.0	—	—
Apr.	2.2	90.6	—	7.2
May	20.0	75.0	5.0	—
June	—	—	—	—
July	—	—	—	—
Aug.	17.6	50.2	—	32.2
Sep.	—	100.0	—	—
Oct.	—	—	—	—
Nov.	—	—	—	—
Dec.	20.5	60.1	19.4	—
Jan. 1982	—	—	50.0	50.0
Feb.	42.3	41.6	5.0	11.1
Mar.	14.0	81.3	4.7	—
Apr.	4.8	71.2	24.0	—
May	—	36.8	36.8	26.4
June	—	84.0	16.0	—
July	—	—	—	—
Aug.	—	—	—	—
Sep.	6.2	45.2	42.7	5.9
Oct.	—	50.0	30.0	20.0
Nov.	66.2	23.7	—	11.2
Dec.	100.0	—	—	—

to November. Further it was also found to be poor in January and December in both the years.

Teleosts : During 1981, the percentage occurrence of teleosts ranged from 2.2 (April 1981) to 42.9 (January 1981) and in 1982 the values ranged from 4.8 (April 1982) to 100 (December 1982).

Prawns : Among the crustaceans, small, ones of both penaeid and non-penaeid prawns. *viz. Penaeus* sp., *Metapenaeus* sp., *Acetes* sp. and *Solenocera* sp. mainly contributed to its food, besides small crabs and *Squilla* sp. During January-May 1981, the percentage contribution of prawns was more than 50 while other crustaceans contributed sporadically to the diet of this species, comprising less than 17.2%. In 1982 also it was observed that crabs formed the main food of this species in almost all the months.

AGE AND GROWTH

Total length of 4177 specimens ranged from 40 to 170 mm during January 1981—December 1982 and length frequency distribution of *N. mesoprion* is shown Fig. 1. Even though adequate number of specimens were obtained for about 6-7 months in each year in some months sufficient number of length measurements could not be obtained. Hence, only those months when distinct modes could be traced were taken into consideration for estimating the growth rates.

TABLE 4. *Monthwise percentage occurrence of males and females of* Nempiterus mesoprion *during* 1981 and 82

Months	Male	Female
Jan. 1981 ..	21.0	79.0
Feb. ..	26.8	73.2
Mar. ..	70.0	30.0
Apr. ..	68.7	31.3
May ..	—	—
June ..	—	—
July ..	—	—
Aug. ..	100.0	—
Sep. ..	100.0	—
Oct. ..	—	—
Nov. ..	—	—
Dec. ..	—	—
Jan. 1982 ..	62.5	37.5
Feb. ..	71.4	28.6
Mar. ..	—	—
Apr. ..	33.6	66.4
May ..	—	—
June ..	—	—
July ..	—	—
Aug. ..	—	—
Sep. ..	—	—
Oct. ..	75.0	25.0
Nov. ..	97.7	2.3
Dec. ..	50.0	50.0

From Fig. 1 it may be seen that during 1981 mode (a) at 110 mm in January 1981 could be traced to 120 mm in February thus showing a growth of 10 mm during the period of one month. Further a mode 'a^1' at 110 mm in April has also shifted to 120 mm in May. The mode 'a^2' at 90 mm in August could be traced to 120 mm in December 1981 thus showing average growth rate of about 8 mm per month. Almost similar results were obtained in 1982 also as the mode 'b^1; at 110 mm in January 1982 could be traced to 120 mm in February giving a growth rate of 10 mm per month. Further the mode 'b^2' at 90 mm in May progressed to 140 mm in October thereby showing a growth of 50 mm within 5 months or showing a growth rate of 10 mm per month. From these observations it is inferred that the species showed a monthly growth of 10 mm per month. From Kakinada, Murty (1981) observed that in this species a growth rate of 20 mm between 50-70 mm, 10 mm between 70 to 120 mm and 5 mm between 120 to 170 mm and the fish attained a length of 140 mm at the completion of one year and 170 mm at the completion of one and half year. From the present studies it is inferred that the species attains a length of 140 mm at the end of one year.

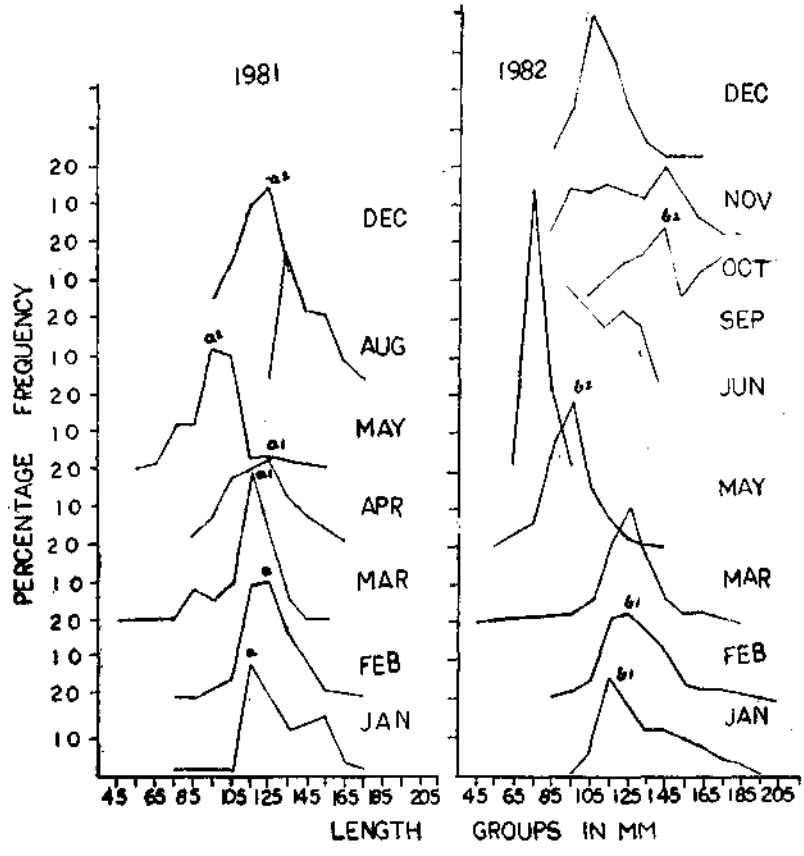

FIG. 1. Monthly length frequency distribution of *N. mesoprion* in 1981 and 1982.

SEX RATIO

The percentage occurrence of males and females of *N. mesoprion* in 1981-82 is given in

Table 4. It is seen that excepting during January-February, 1981 and April, 1982 the males are more in number than the females.

Conclusion

The fishery for the threadfin breams at Visakhapatnam is contributed mainly by the two species *N. japonicus* and *N. mesoprion*. It was observed that the catches of *N. mesoprion* were better during the first half of every year than in the later period. The abundance of this species during the first half of the year to some extent may be explained when food and feeding habits and spawning period of this species are taken into consideration.

Generally the intensity of feeding was greater during the first half than the later half of the year. Krishnamoorty (1971) brought a sort of relationship between the rate of feeding and the rate of catches of *N. japonicus* from Waltair. Another factor for their abundance might be breeding since as reported by Murty (1981), the spawning period of this species extended from January-April. During the present investigations also mature and ripe specimens of *N. mesoprion* could be obtained during the period. Thus there is some reason to believe that in *N. mesoprion* food and maturity exert some influence on the abundance of this species in the fishing grounds.

Studies on length frequency distribution of *N. mesoprion* showed that the species exhibit a growth rate of 10 mm per month in fishes measuring 70-140 mm and the fish attains a length of 140 mm at the end of one year.

The species is carnivorous, feeding on crustaceans and teleosts and fishes measuring less than 100 mm substantially feed on crustaceans rather than teleosts. Among the crustaceans the main items are *Penaeus* sp., *Metapenaeus* sp., *Acetes* sp., and *Squilla* sp. and the percentage of abundance of crustaceans was more during January-May.

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