OBSERVATIONS ON SOME ASPECTS OF THE BIOLOGY AND FISHERY OF *PSETTODES ERUMEI* (BLOCH) AT PORTO NOVO.

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ABSTRACT

Psettodes erumei is a carnivorous fish subsisting mainly on fishes (81.73%). Crustaceans (11.93%) and molluscs (6.34%) are also found in the stomach. The spawning season is observed to be a prolonged one extending over a period of nearly 7 months from November to May as against the short and restricted spawning of this species in west coast of India. The fishery is a minor one, estimated to contribute about 8.6 metric tons annually, forming 0.58% of the total marine fish catches in Porto Novo during 1971-1973. Seasonal abundance and fluctuations in the catches are also dealt with.

INTRODUCTION

Relative abundance of different organisms in the food, spawning period and fishery of *Psettodes erumei* at Porto Novo were studied. Literature concerning the fish is meagre, although some information is available in the papers by John (1951), Jones and Pantulu (1958), Basheeruddin and Nayar (1961), Pradhan (1965) and Devadoss and Pillai (1973).

MATERIAL AND METHODS

The materials for the present study were collected at random from the fish landed at Porto Novo by the small trawlers, as well as Catamarans operating bottom set gillnets. Food estimations done by the occurrence method (Hynes 1950). Ova-diameter studies were made on the preserved ovaries. Ova below 5 M.D., which occurred in large numbers in all ovaries, were not taken into account. Particulars on the fishery were collected at random once a week from the small mechanised vessels operating from Porto Novo.

FOOD

Food analysis was based on the gut contents in fresh condition. About 36% of the stomachs were found empty. Fishes formed a major portion of the feed, followed by crustacea and squids. An interesting observation is that the

animal, being a bottom dweller, is able to feed on both pelagic and demersal forms. The following items were observed in the gut contents.

Fish

A wide range of species of fish and their larvae were encountered in the stomachs (Table 1). Some of the common items were Leiognathids (22.27%), *Nemipterus japonicus* (13.14%), *Saurida* spp. (8.11%), soles (5.50%), apogonids (4.94%), anchovies (4.19%) and polynemids (2.05%); sciaenids and small-sized eels were occasionally met with. Fishes in fresh and semi-digested condition together formed 81.73% of the total food.

Crustacea

Prawns (7.74%) and crabs (4.19% together constituted the second major item of the feed. The most common species of prawns taken by this fish were *Solenocera indica* followed by *Parapeneopsis hardwickii, p. stylifera, Metapenaeus dobsoni* and *M. monoceros.*

Molluscs

Squids formed about 6.34% of the total food.

Maturation and Spawning

The maturity stages were determined according to ICES scale described by Woods (1930) and as adapted by Pradhan (1965). Fig. 1 shows the frequency polygon of ova-diameter measurements in different stages of maturity. Mode a represents immature eggs which are numerous in all overies irrespective of the stages of maturity, while d represents nature and ripe ova in stages V and VI ovary respectively. The other modes b and c indicate ova in various other stages of maturity. Thus it is possible that a well marked differentiation of ova represented by mode b from the immature stock may take place even when the ova at mode d are being shed; so is the case with the development and shifting of mode c to mode d. By the time the ova at mode d are shed, another batch of mature eggs at c may be ready to be shifted to mode d and subsequently be extruded out. In other words, excepting the immature and ripe stock of ova, the different batches of eggs in the entire ovary were not sharply differentiated from one another, thereby indicating that the passing of one batch of eggs into the next higher was more or less a continuous process. Hence it is most likely that extrusion of ova may take place in batches.

From the observations it is clear that the spawning season of this fish is a prolonged one extending over a period of nearly 7 months from November to May as ripe and spent ovaries were collected during the period. From Trivandrum coast John (1951) mentioned the occurrence of small *P. erumei* of 25 mm in total length during July. Jones and Pantulu (1958) recorded early

TABLE 1. *The percentage occurrence of the different items of the food in the stomach of* Psettodes erumei.

Months		*No. fish examined*	*No. emty stomach*	*Percentage empty stomach*	*Stomach contents*												
					Leiognathus	*Nemipterus sp.*	*Saurida*	*Soles*	*Apogon*	*Anchoviella*	*Polynemids*	*Sciaenids*	*Eels*	*Prawns*	*Crabs*	*Squids*	*Digested fish*
September,	1972	31	15	48.39	15.48	14.84	25.81	12.90	—	8.06	—	—	—	9.68	—	6.45	5.16
October,	1972	38	17	44.74	4.42	26.55	14.16	2.83	—	7.08	—	—	—	2.65	8.85	14.16	19.29
November,	1972	14	5	35.71	13.15	21.13	4.69	2.35	—	9.39	—	—	—	11.74	7.04	7.04	23.47
December,	1972	28	10	31.71	26.82	28.73	15.70	—	—	—	—	—	—	9.58	3.83	7.66	7.66
January,	1973	23	9	31.03	45.18	9.34	—	—	2.41	—	—	—	2.41	1.84	1.20	—	37.65
February,	1973	14	2	14.29	38.98	15.59	—	—	4.87	—	—	—	—	7.41	5.85	3.90	23.39
March,	1973	17	4	23.53	32.66	16.33	9.18	—	4.08	3.06	—	—	—	6.12	—	3.06	25.51
April,	1973	28	8	28.57	—	—	18.18	12.12	12.12	9.09	—	—	—	9.09	—	—	39.40
May,	1973	22	6	27.27	13.22	—	—	17.62	—	—	22.02	11.01	—	9.69	—	17.62	8.89
June,	1973	27	6	22.22	14.28	8.93	—	10.71	17.85	—	—	—	—	5.36	10.71	3.57	28.58
July,	1973	34	10	29.41	34.78	—	—	—	11.59	8.69	—	—	—	10.14	7.24	4.38	23.18
Average percentage		—	—	—	22.27	13.14	8.11	5.50	4.94	4.19	2.05	1.02	0.19	7.74	4.19	6.34	20.32

larval forms ranging from 3.95 mm to 4.77 mm in total length during January while Basheeruddin and Nayar (1961) mentioned the incidence of larval forms of about 30 mm in Madras during March-April period. Devadoss and Pillai (1973) observed the occurrence of young ones of about 41 mm to 78 mm during May in Porto Novo.

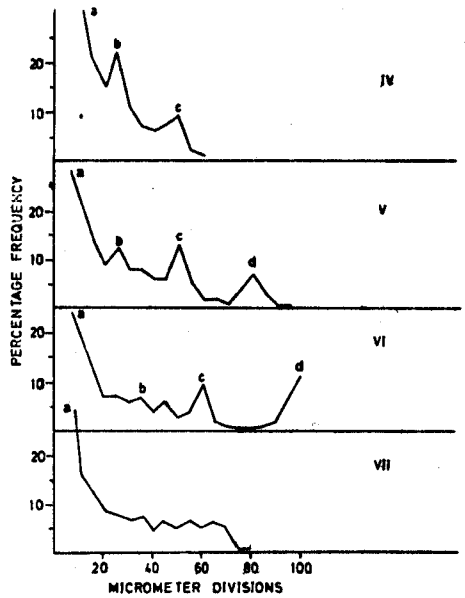

FIG. 1. Ova-diameter frequency of *P. erumei* of stages IV-VII

FISHERY

The annual average catch of the soles and other flat fishes in India for the period 1961-72 is 10,045 metric tons forming 1.28% of the marine fish (CMFRI annual reports 1961-72). *P. erumei* occurs in some quantities in Bombay-Saurashatra and south eastern coasts. Along other coasts it occurs in small quantities. *P. erumei* has been estimated to contribute an average annual catch of 8.6 metric tons, forming 0.58% of total marine fish catches at Porto Novo during the period 1971-1973.

There are about 40 small mechanised vessels based at Porto Novo. The estimated number of daily fishing trips in a month varied between 638 and 875 in 1971, 330 and 1608 in 1972 and a mere 31 and 3810 in 1973. Boats from other areas moved over and with the local ones the maximum number of boats were operated from February to June 1973, because of the large-scale occurrence of prawns at that time of the year. Generally this fishing is done by the trawl nets being operated by small powered boats at a depth of 18-22 meters

up to a distance of 10 Km from the shore. The areas fished were 2 F, 3 F and 4 F of the major area 11-79 and 2A, 3A and 4A of the major area 11-80 (Pillai and Devadoss — in press).

Seasonal Abundance

The fishery, in general, forming a minor one, occurs throughout the year. It may be seen from Table 2 that the 1st quarter registered the maximum landings with catch of 1.57 kg and 1.66 kg per unit of effort in both the years 1972 and 1973, and declined gradually from the second quarter onwards, with some improvement in the last quarter. The catches touched the lowest level during the 3rd quarter with 1.18% and 0.13% of the total catches in 1972 and 1973 respectively.

TABLE 2. *Monthwise catch particulars of* P. erumei *against the total marine fish catches at Porto Novo for the years* 1971-72 *to* 1973-74
(*Catch in kg per unit of efforts are given in brackets*)

Quarter and Month	*Total catch of P.erumei*	*Total catch of other fish*	*Percentage*
September, 1971	704 (0.80)	126,102	0.56
IV Quarter:			
October,	246 (0.33)	126,735	0.19
November	89 (0.14)	112,316	0.08
December	2,029 (2.85)	169,682	1.20
Total	2,364 (1.12)	408,733	0.58
I Quarter:			
January, 1972	1,215 (1.35)	122,111	1.00
February	3,111 (1.98)	294,883	1.05
March	1,524 (1.20)	183,563	0.83
Total	5,850 (1.57)	600,557	0.97
II Quarter:			
April, 1972	1,517 (1.45)	140,603	1.08
May	1,303 (1.02)	192,114	0.68
June	—	243,758	—
Total	2,820 (1.21)	576,475	0.49
III Quarter:			
July, 1972	333 (0.21)	288,762	0.12
August	221 (0.28)	95,488	0.23
September	184 (0.56)	30,932	0.59
Total	738 (0.27)	415,182	0.18
IV Quarter:			
October, 1972	771 (1.30)	136,910	0.56
November	88 (0.25)	40,299	0.22
December	Data not available		
Total	859 (0.91)	177,209	0.49

Quarter and Month	*Total catch fo P.erumei*	*Total catch of other fish*	*Percentage*
I Quarter:			
January, 1973	Data not available		
February	2,492 (0.79)	296,828	0.84
March	6,138 (3.00)	170,407	3.60
Total	8,630 (1.66)	467,235	1.85
II Quarter:			
April, 1973	1,500 (0.53)	163,500	0.92
May	837 (0.25)	194,742	0.43
June	150 (0.04)	278,090	0.05
Total	2,487 (0.25)	636,332	0.39
III Quarter:			
July, 1973	310 (0.23)	183,768	0.17
August	—	195,517	—
September	240 (0.38)	57,570	0.42
Total	550 (0.14)	436,855	0.13
IV Quarter:			
October, 1973	1,023 (0.85)	156,705	0.65
November	—	9,750	—
December	31 (1.00)	3,317	0.93
Total	1,054 (0.90)	169,772	0.62
I Quarter:			
January, 1974	1,457 (2.61)	108,996	1.33
February	924 (1.18)	78,204	1.18
March	155 (0.19)	35,278	0.44
Total	2,536 (1.30)	222,478	1.14
II Quarter:			
April, 1974	90 (0.13)	30,240	0.30
May	372 (0.80)	35,154	1.06
June	810 (0.98)	67,530	1.20
Total	1,272 (0.64)	132,924	0.96

Again, catches of *P. erumei* showed a revival during the last quarter of the year. A little over 3100 kg was estimated in February 1972 and over 6100 kg in March 1973 with catch rate of 1.98 kg and 3.00 kg respectively per unit effort. December 1971 recorded 2.85 kg of catch of *P. erumei* per unit of effort.

General Remarks

Observations on the food of *Psettodes erumei* established the piscivorous nature of both the juveniles (41 mm-78 mm) (Devadoss and Pillai 1973) as well as the adults. Hickling and Rutenberg (1936) showed that the measurements of the eggs in the ripe ovary correctly reflected the spawning habits of fishes and accordingly when the spawning period is long and indefinite, the

withdrawal of eggs from the egg stock to undergo maturation, will be a continuous process, and there will be no sharp separation between the general egg stock and the maturing eggs. These will pass on continuously one with the other. In *P. erumei* the maturing group of eggs are not sharply differentiated from one another.

Pradhan (1965) while studying on the maturity and spawning of *P. erumei* in Bombay waters by ova-diameter measurements, observed a short and restricted spawning, with only two distinct stock of mature and immature ova in the ovaries of stages V and VI. The ripe and spent fish occur during September and October. But in the present study carried out in Porto Novo there are more than one group of maturing and mature ova in the ovaries of stages V and VI ready to be spawned out one after the other. Ripe and spent ones occur simultaneously from November to May thereby indicating a prolonged spawning.

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