ON THE BIOMETRY, FOOD AND FEEDING AND SPAWNING HABITS OF *OTOLITHES RUBER* (SCHNEIDER) FROM PORTO NOVO

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ABSTRACT

Out of the 17 morphometric characters studied, the distance between the tip of snout and insertion of anal fin was observed to have the fastest growth rate in *Otolithes ruber* (Schneider) along the Porto Novo coast. *O. ruber*, highly carnivorous, shows a selectivity of feeding. The ova-diameter frequency suggests that spawning takes place in *O. ruber* only once a season, for a short duration.

INTRODUCTION

Otolithes ruber (Schneider) contribute to an important demersal fishery along the Indian coast. Though caught by most of the indigenous units all along the coast, their landings are mainly by the trawlers. Apart from the studies of Rao (1964) and Dutt and Thankam (1965), very little is known on the biology of *O. ruber* along the east coast. Hence a preliminary study on the biometry, food and feeding and spawning habits of this species along the Porto Novo coast was taken up during 1977-78.

BIOMETRY

Biometric analysis of various characters of *O. ruber* in relation to standard length has been made and the results are presented in Fig. 1. Of the 17 characters studied, the distance between the tip of snout and the origin of anal fiin followed by the depth of caudal peduncle was observed to have fastest growth rate while the diameter of eye exhibits slowest growth rate.

FOOD AND FEEDING HABITS

Samples of *O. ruber* were collected from the mechanised trawlers landed at Porto Novo fish landing place and the fishes in the length range of 81-250 mm were analysed. Intensity of feeding was judged from the distension of stomachs which were classsified as full, 3|4 full, 1|2 full, 1|4 full, little and empty (Job 1940) and the presence of different items of food in different size groups were estimated by the occurrence method (Hynes 1950).

The percentage volume of various feeding intensities suggests that food intake was intense in lower size groups in the size range of 81-120 mm (Table 1). The larger size groups of fishes in 211-250 mm exhibited more or less moderate feeding, whereas the intermediate size groups of 151-190 mm were in poor feeding condition.

TABLE 1. *Feeding intensity of* Otolithes ruber *in various size groups as judged from the fullness of stomach (in percentage).*

Size groups (mm)	Full	3|4 full	1|2 full	1|4 full	little	empty
81-90	——	33.33	——	——	——	2.94
91-100	——	33.34	——	——	——	2.94
101-110	44.44	——	14.24	——	5.00	5.88
111-120	22.22	——	9.52	13.33	10.00	20.58
121-130	11.12	——	14.29	19.44	15.00	11.76
131-140	——	——	23.80	19.44	20.00	13.27
141-150	——	——	——	13.12	5.00	4.41
151-160	11.17	——	——	——	5.00	4.41
161-170	——	——	9.52	——	5.00	1.47
171-180	——	——	——	——	10.00	4.41
181-190	——	——	——	——	5.00	1.47
191-200	——	33.33	4.76	——	5.00	1.47
201-210	——	——	4.76	6.31	——	5.88
211-220	——	——	9.52	19.44	20.00	5.88
221-230	——	——	4.77	6.31	5.00	7.35
231-240	——	——	——	——	——	1.47
241-250	11.11	——	4.77	6.31	——	4.41

The percentage occurrence of various food elements in different size groups of *O. ruber* is shown in Table 2. The food constituents included prawn remains, mysids, *Acetes*, *Squilla*, apogonid fishes and juveniles of sciaenids. The unidentifiable food elements were categorised as semidigested matter due to their extreme degree of digestion.

Though detailed studies on the food and feeding habits of *O. ruber* are lacking from Indian waters, reference may be made to those of Venkataraman (1960), Basheeruddin and Nayar (1961), Rao (1964) and Nair (1979). The present observation on the abundance of prawns and mysids as the main food elements of younger fishes agrees with the findings of Venkataraman (1960) and Nair (1979). The selectivity of *Acetes* by the small size groups of *O. ruber* is further evidenced by the observations of Basheeruddin and Nayar (1961). Some marked differences in the feeding habits of juveniles and adults were also

TABLE 2. *Percntage occurrence of various food elements in different size groups of* Otolithes ruber.

Size groups (mm)	Prawns	Mysids	Acetes	Squilla	Apogonid fishes	Juvenile sciaenids	Semi-digested matter
81-90	—	6.25	4.00	—	—	—	6.67
91-100	—	18.75	4.00	—	—	—	—
101-110	9.82	31.25	16.00	8.69	—	—	—
111-120	12.28	43.75	12.00	4.35	—	—	—
121-130	14.73	—	16.00	13.04	—	—	26.68
131-140	17.39	—	24.00	13.05	—	—	—
141-150	4.91	—	12.00	8.70	—	—	—
151-160	2.46	—	8.00	13.04	—	—	—
161-170	4.91	—	4.00	17.40	—	—	—
171-180	2.46	—	—	21.74	—	—	—
181-190	7.37	—	—	—	4.17	—	6.62
191-200	4.91	—	—	—	8.34	—	—
201-210	4.91	—	—	—	12.51	9.09	20.01
211-220	9.82	—	—	—	8.34	27.27	13.34
221-230	2.46	—	—	—	16.68	18.18	26.68
231-240	2.46	—	—	—	20.85	27.27	—
241-250	7.37	—	—	—	29.11	18.19	—

noted. The preference of juveniles mainly to the crustacean feed agrees with the observation of Bapat and Bal (1949), that younger forms of all sciaenids take prawns as the main diet, and the percentage of their fish food goes on slowly increasing as they grow in size. From the investigations made it can be concluded that *O. ruber* is a highly carnivorous fish exhibiting a selectivity of feeding within various size groups.

FECUNDITY AND SPAWNING HABITS

To determine the maturity stages, the method of ICES (Wood 1930) was followed with slight modifications. Mature ovaries of *O. ruber* were met with during July-September at Porto Novo.

The fecundity estimation of *O. ruber* revealed that the number of ova in the mature ovaries varied between 43,810 and 1,70,130 with an average of 1,30,761. Figure 2 represents the ova diameter frequency distribution of maturity stages IV-VI. The size of eggs in the mature ovary of stage VI ranged from 0.0630 to 0.6930 mm with a single mode at 0.3906-0.4410 mm. In other maturity stages viz., IV and V, also the presence of single modes at 0.2646-0.3150 mm and 0.3270-0.3780 mm respectively were visible. On the basis of observations of Hickling and Rutenburg (1936), de Jong (1937) and Prabhu (1956), it

appears that spawning takes place in *O. ruber* only once a season for a short period of definite duration due to the presence of a single mode in different maturity stages which were all well separated from the immature egg stock.

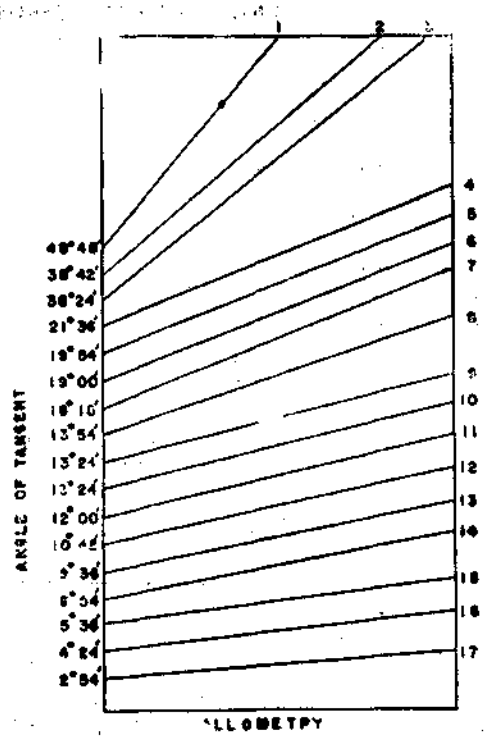

FIG. 1 Growth rate of various parameters of *Otolithes ruber* 1. Total length 2. Tip of snout of insertion of anal fin 3. Depth of caudal peduncle 4. Length of second dorsal fin base 5. Head length 6. Snout to insertion of ventral fin 7. Snout to origin of dorsal fin 8. Snout to pectoral fin 9. Length of pelvic fin 10. Body depth 11. Depth of head 12. Length of first dorsal base 13. Post orbital distance 14. Length of pectoral fin 15. Snout length 16. Length of anal fin 17. Eye diameter.

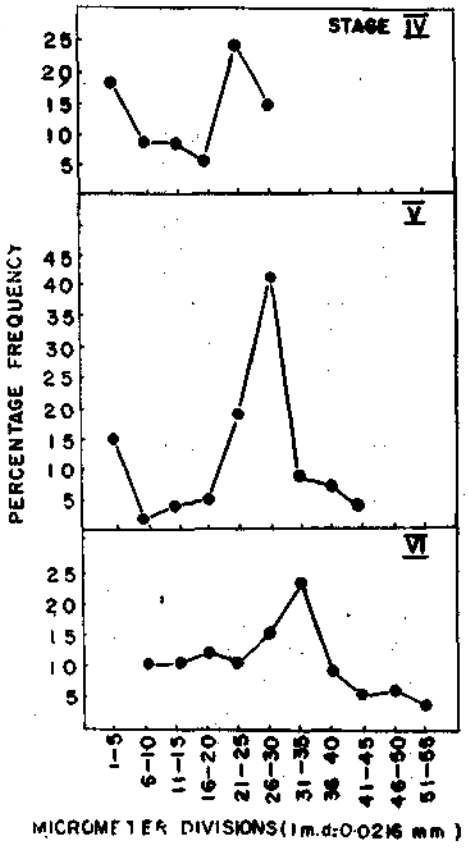

FIG. 2 Ova diameter frequency of *Otolithes ruber* in maturity stages IV-VI.

The restricted and short spawning nature of *O. ruber* in the present study agrees with the earlier findings of Devadoss (1969) along the Bombay coast.

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