OBSERVATIONS ON SOME ASPECTS OF BIOLOGY OF *OTOLITHUS CUVIERI* (TREWAVES) FROM VERAVAL

ABSTRACT

At Veraval, *Otolithus cuvieri* together with *Pseudosciaena diacanthus* and *Otolithus brunneus* contributes nearly 70% of total sciaenid catches. *O. cuvieri* is carnivorous in its feeding habits, subsisting mainly on prawns viz. *Acetes* sp., *Solenocera* sp., *Hippolysmata* sp. and teleosts. Intraovarian studies showed that the spawning period of *O. cuvieri* extended from November to April. Fecundity in this species varied from 1,05,454 to 3,55,913. The relationship between fecundity and length of fish, weight of the ovary and fish weight was estimated.

DURING the investigations on the resource characteristics of sciaenids of Veraval Coast, studies on the biology of *Otolithus cuvieri* were initiated in 1983. The species together with *Pseudosciaena diacanthus* and *Otolithus brunneus* forms a good fishery and these species together contribute about 70% of the sciaenid catches, while sciaenids themselves contribute about 20% of total fish catches. The data collected from the trawlers during the period 1983-85 were utilised for the study. Previously from the west coast, studies on different aspects of the biology of different species of *Otolithus* were made by Devadoss (1949), Bapat and Bal (1952), Kutty (1961, 1968), Annigeri (1963), Jayaprakash (1974), Nair (1980) and Mahadevan Pillai (1983). Since no work had been done on the biology of *Otolithus cuvieri* from Saurashtra Coast, an investigation on some aspects on the biology of this species was made and results are given in this paper.

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Material and methods

The samples which were obtained from trawler catches were analysed in fresh condition in the laboratory for data on total length, weight, condition of stomach, sex and stage of maturity. Maturation stages were determined on the basis of macroscopic examination of fresh ovaries and ova diameter measurements taken from ovaries preserved in 5% formalin. For measurement of ova, the procedure of Clark (1934) was followed. Small portions from the middle region of the ovary were taken and their diameters were measured with ocular micrometer at a set magnification where each micrometer division (m.d) is equal to 0.01 mm.

The points method of Hynes (1950) was followed for quantitative analysis of food. The feeding intensity was determined by studying the condition of stomachs which were classified as gorged, full, 3/4 full, 1/2 full (moderate), 1/4 full (poor) and empty.

Results

The percentage occurrence of guts in various degrees of fullness is given in Table 1. It was observed that during the period October — December of 1983, the feeding intensity was high and during the period January — March '84 it was low with corresponding increase in the percentage occurrence of empty stomachs. There after the intensity of feeding increased upto May '84. The percentage occurrence of empty stomachs was high in November '83 and during January - February '84 the intensity of feeding was low.

Composition of food : The percentage occurrence of prawns and teleosts is given in

TABLE 1. *Percentage occurrence of guts in various degrees of fullness in* Otolithus cuvieri *during* 1983-84

Months	Gorged	Full	3/4 full	1/2 full	1/4 full	Empty
October '83	..	36.1	13.8	8.4	22.2	19.5
November	12.2	26.3	10.5	14.0	14.0	23.0
December	32.6	30.4	..	10.8	4.3	21.9
January '84	9.4	28.3	12.1	..	..	50.2
February	2.8	10.2	6.1	2.8	10.2	67.9
March	2.0	7.5	2.8	5.6	2.0	80.1
April	13.3	43.4	20.0	13.3	10.0	..
May	13.1	35.5	3.9	7.8	19.7	20.0
August	..	..	..	20.0	40.0	40.0
September	9.0	33.0	3.0	8.5	10.5	36.0
October	3.0	21.0	13.0	10.0	21.0	32.0
November	3.8	26.6	..	..	..	69.6
December	2.9	33.0	5.8	10.6	6.9	40.8

Table 2. Among crustaceans mainly prawns *viz. Acetes* sp., *Solenocera* sp., *Hippolysmata* sp., dominated, their percentage occurrence ranged from 41.1—100.0. The occurrence of teleosts

TABLE 2. *Percentage frequency of dominant food components in different months during* 1983-84 *in* Otolithus cuvieri

Months	Teleosts (%)	Crustaceans (%)	Main Food Items
October '83	32.5	67.5	Prawns (*Hippolysmata* sp.
November	33.1	66.9	*Solenocera* sp.)
December	2.0	98.0	Prawns (*Acetes* sp.)
January '84 ..	7.3	92.7	,,
February	16.5	83.5	,,
March ..	58.9	41.1	Teleosteans & Prawns (*Acetes* sp., Solenocera sp.)
April ..	10.8	89.2	Prawns (*Acetes* sp.)
May ..	18.0	82.0	,,
August ..	..	100.0	,,
September	50.6	49.4	Teleosteans & Prawns (*Acetes* sp.)
October	51.4	48.6	Prawns (*Acetes* sp.)
November	20.0	80.0	,,
December	38.5	61.5	,,

varied from 2.0 to 58.9 % and values higher than for crustaceans were recorded in March, September and October.

Maturing and spawning : The size distribution of ova from ovaries of stage IV-VI shown in Fig. 1. In Fig. 1, it may be seen that in the ovary of stage IV mature ova are distributed around two modes (a, b), one mode at 30 m.d and the other at 27 m.d.

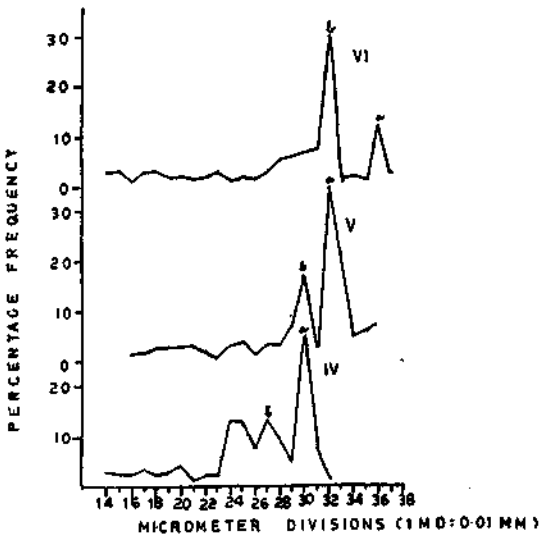

FIG. 1. Ova-diameter frequency polygon of *Otolithus cuveri*.

In Fig. 1 is shown the progression of modes 'a', 'b' formed by the mature ova from the ovary of stage V. The mode 'a' which was noticed at 30 m.d. in Fig. 1 had progressed to 32 m.d and mode 'b' had shifted to 29 m.d showing the growth in the size of ova.

In the running or ripe ovaries (Fig. 1) obtained from specimens whose total length varied from 298 to 305 mm groups of ova get separated and form two modes, one at 36 m.d and another at 32 m.d (Fig. 1). The mode 'a' which was noticed at 32 m.d (Fig. 1) had progressed to 36 m.d, and mode

'b' at 29 m.d had also shifted to 32 m.d showing the growth in the size mature ova. The ova falling under this mode 'b' will further increase in size and turn translucent before liberation in the ensuing spawning season. As the mature ova formed more or less two modes in each stage and they are distinctly separated from the rest of stock of eggs, it is concluded that *O. cuvieri* is a fractional spawner releasing the ripe ova in batches during the spawning season. Since specimens with running overies are obtained during the period of November '83 — April '84 and large numbers of spent females occurred during the period of February — April '84, it is concluded that the spawning period *O. cuvieri* extends from November '83 to April '84.

Fecundity: Twenty eight mature specimens whose total length varied from 243 to 330 mm were examined to study the fecundity. The mature ovary of *O. cuvieri* contained an average of 2,16,993 eggs. It was observed that the fecundity varied irrespective of length and weight of fish, but increased with the weight of ovary. The relationship between fecundity and total length was found to be

$$\text{Log } F = 1.4366 + 3.3542 \text{ Log } L$$

The correlation co-efficient was 3.6130.

The relationship between fecundity and ovary weight was expressed as:

$$\text{Log } F = 2.4824 + 0.8341 \text{ Log } L.$$

The values of correlation co-efficient r: 1.0171.

Fecundity (F) and fish weight could be expressed as:

$$\text{Log } F: 3.9091 + 0.8408 \text{ Log FW}.$$

The correlation co-efficient r: 1.4997.

Remarks

Studies on food and feeding habits of *O. cuvieri* revealed that the species is carnivorous, feeding mainly on *Acetes* sp. and *Solenocera* sp., supplemented by teleosts. There is not much difference in feeding habits between medium and large-sized specimens. Feeding intensity is low during the period January - April, which is associated with breeding period of this species. It may be stated that the spawning period of this species is prolonged and extends from November to April as revealed by the occurrence of running and spent ovaries during the period.

Fecundity in *O. cuvieri* varied from 1,05,454 to 3,55,913 with an average value of 2,16,993 eggs.

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