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AN ACCOUNT ON THE FISHERY AND BIOLOGY OF THE VELAMEEN *PRISTIPOMOIDES ARGYROGRAMMICUS* (VALENCIENNES)

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ABSTRACT

Pristipomoides argyrogrammicus commonly known as 'Velameen', was found to occur along the south-west coast of India within the depth range of 75 and 150 m. A brief study was made on the fishery potential of this species based on the bobbins trawl operations of the trawlers of Integrated Fisheries Project. Attempts were also made to study the food and feeding habits, length frequency distribution, age group, length-weight relationship, sex and sex ratio.

INTRODUCTION

THE FISHERY potential of the area lying between 75 and 150 metres along the south-west coast of India is insufficiently known. The area is not well explored except for 'Kalava' (*Epinephelus* spp.) with hooks and lines. In 1970 Integrated Fisheries Project (then Indo-Norwegian Project) charted a programme for trawling operations within this depth range. Generally the contour of this area is uneven and not suitable for ordinary demersal fish trawls and hence a trawl net with bobbins was used. The conspicuous member of the fish fauna hauled on board from this area was the Velameen, *Pristipomoides argyrogrammicus* (Valenciennes).

Velameen was first recorded from Indian waters by Day in 1878 and named as *Anthias multidens*. But later Smith (1957) recorded this specimen from Northern Mozambique area and described as *Pristipomoides typus* and in 1963 he collected the same species from Seychelles and named as *P. argyrogrammicus*. The biological or commercial fishery aspects of this fish is little known.

The present report is based on the operations carried out during November and December, 1970. The results of the trawling operations are discussed here. Attempts were also made to study the food and feeding habits, length frequency distribution, age groups, length-weight relationship, sex and sex ratio of the species.

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FISHERY

Craft

Fishing Vessel '*Klaus Sunnana*' of the Integrated Fisheries Project was engaged for the bobbin trawl fishing operations. She is a 19.8 metre long steel hull vessel

fitted with a 240 HP engine and a controllable pitch propeller. She has a hydraulic two drum trawl winch carrying 1400 metres of 14 mm wire rope and is also equipped with modern fish finding equipment like Echosounder, Sonar and Echoscope.

Gear

The gear employed was the Norwegian Deep Sea Fish Trawl with the following specifications. Head rope 22.5 metres, foot rope 33.4 metres, number of meshes in the square 316, mesh size bar/bar 60-35 mm. Foot rope carried 15 numbers of bobbins, of which the middle 5 were of a diameter of 35 cm and the remaining 10 of 25 cm.

Area

The area selected for this new programme of study was between the latitude 10°00′ and 11°00′ N within the depth range of 75 and 150 metres. Owing to the uneven nature of the ground the net usually got stuck up in the bottom and was forced to be hauled up at irregular intervals. So it was not possible to standardise the duration of hauls. The maximum duration recorded during the fishing operations was 2.50 hours and the minimum was 0.17 hours.

Catch

Table 1 gives the details regarding the area, duration of hauls, catch, etc. Altogether 33 hauls were made in 32.08 fishing hours from this area. Out of the 33 hauls, 9 were not successful. A total of 14,464 Kg of Velameen was caught during the fishing operations. Average catch per hour was 450.8 Kg and the average duration of haul was 0.97 hours.

TABLE 1. *Fishing Details*

Area	Depth range (mts)	Number of Hauls		Fishing hours	Total catch (Kg)	Catch per hour (Kg)
		Total Hauls	Negative Hauls			
10-75/5B	115-140	11	2	11.33	8302	732.70
10-75/6B	115-135	15	4	11.75	5382	458.04
10-75/5C	115-125	4	—	4.00	780	195.00
10-75/4C	75	1	1	2.50	—	—
10-75/4D	75-85	1	1	1.00	—	
10-75/3E	75	1	1	1.50	—	—
Total		33	9	32.08	14464	449.20

BIOLOGY

Food and Feeding

Nearly 950 guts were examined for the study which was mainly carried out on the materials preserved in 4% formaldehyde. Entire alimentary canal was preserved and utilized for the study because of the everted condition of the stomach. The whole alimentary canal was cut open and the contents were washed into a petridish and examined under the low power of a stereo-microscope. In all cases the contents were in an advanced stage of digestion and identification of the material was difficult. The materials which could be identified were classified upto the species. Examination of the gut contents was made using the occurrence method of Hynes (1950), whereby the frequency of each type of food item is expressed as its percentage occurrence in the sample as a whole.

Of the total of 950 stomachs examined 62% were in everted condition. Due to the everted nature it was not possible to classify the stomach according to the degree of its distension and the amount of food it contained, 32.5% were without any food and the remaining were with contents of varying stages of digestion. It is interesting to note that there was no significant differences in the food preference or in the composition of diet between males and females or between the younger and older size groups. So attempt has been made only to study the composition of food contents irrespective of sizes, sex and stage of maturity.

TABLE 2. *Results of analysis of stomach contents*

Stomach contents	Percentage composition
Crustaceans (Unidentified)	30.0
Mysids	3.0
Cumaceans	6.0
Amphipods	1.3
Stomatopods	1.3
Crab	2.7
Fish remains	19.0
Cephalopods	2.7
Polychaetes	2.0
Digested matters	32.0

Table 2 gives the details of analysis of food contents. From this Table, it is evident that the crustaceans constituted the major food item. The crustaceans included many forms which were not able to be segregated into any sub-divisions. The identified crustaceans like mysids, cumaceans, amphipods, stomatopods and crabs

constituted a smaller percentage. The crabs were mainly *Charybdis edwardsi*. The second in importance among food items were fishes. Species of *Epinephelus* were present in small percentage. *Sepia aculeata* also formed a part in the food items. Polychaetes were also found among the stomach contents. The results of the study clearly indicate that the fish is bottom feeding and carnivorous.

Length frequency

The length frequency distribution of both sexes are presented in Fig. 1. The length measurements were classified into size group with a class interval of 15 mm. It may be observed that the male and female show a similar pattern in the distribution of length frequency. They show a tendency to bimodal distribution with the main peak at 260-274 mm class and a subsidiary one at 335-349 mm class. A total of 345 specimens were used for this study.

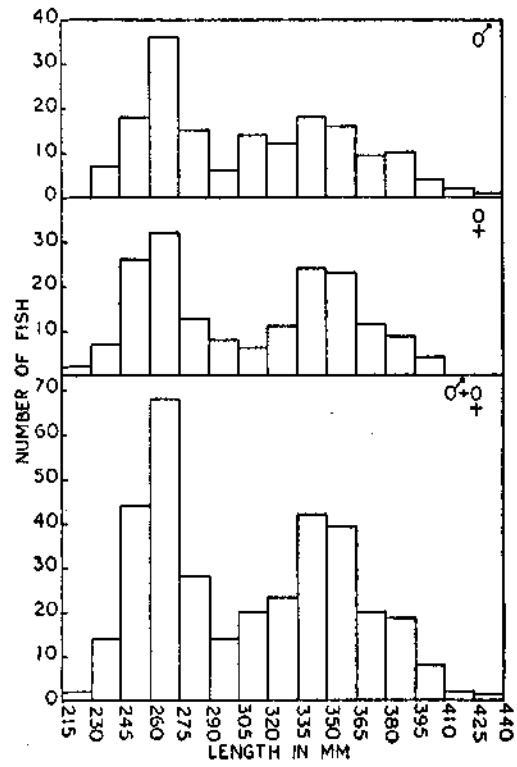

Fig. 1. The length frequency distribution of *Pristipomoides argyrogrammicus*.

Length-weight relationship

Length-weight relationship of the 345 specimens ranging between 215 and 349 mm in total length was determined. Since no marked difference was observed between the male and female in the length-weight relationship the calculations were made for the two sexes combined. The relationship was determined in the present

study by the equation $W = aL^b$ where W is the weight of the fish in grams, L is the total length in mm and a and b are constants. The values of a and b were determined by means of the formula recommended by Beekman (1945). Based on the formula the regression equation calculated for the logarithmic relation of length-weight relation is :

$$\text{Log } W = 3.0303, \text{ Log } L - 5.1002$$

From the regression equation Log W for various length group was calculated and have been plotted in the graph (Fig. 2) and it showed a straight line relationship. Figure 3 represents the relationship of the average weight to the length. From the figure it is seen that upto a length of 245 mm the increase in weight in relationship to the increase in length is not appreciable, but after 245 mm the increase in weight is very marked.

Age and Growth

No attempt has been made so far to employ the supra-occipital crest in the study of age and growth of fishes of Indian waters. Usually the age groups were segregated from the data on length frequency distribution. Most of the studies were mainly based on the scales, otoliths and opercular bones. Menon (1950) studied the age groups of *Gadus minutus* with the help of the supra-occipital crest and he has given a detailed informative account on the preparation method, use and advantages of this bone in the study of age groups in fishes.

Altogether 345 specimens were used for the study of age groups. All the fishes were examined in fresh condition. To segregate the age groups, scales, otoliths and supra occipital crest were collected. 10 to 15 scales were taken from each fish from the left side, the region below the lateral line just posterior to the pectoral fin. They were cleared in 4% KOH before the observations. Otoliths and supra-occipital crests were collected by boiling the head in water. The head was separated by cutting through the pectoral region. After boiling the flesh and other tissues were removed from the skull, bones were disarticulated and supra occipital bone with the crest was separated. The crest was then cut out with scissors and dried in sun light. Otoliths were collected after breaking the auditory apparatus. Of the three—scales, otoliths, supra occipital crest—supra occipital crest was found to be the most suitable material for the study of age groups.

Supraoccipital crest shows broad white opaque zones alternating with narrow clear transparent zones. These zones seem to run more or less parallel to the edge of the crest. The measurements were taken along the line which starts from the middle of the centre of growth and passes along the projected hypothetical triangle (Menon 1950). The zones are annual and one opaque zone and its immediately succeeding transparent zone from one year's growth and they are comparable to the annual rings of the scales and otoliths of other fishes.

An attempt was made to find out whether there is any relationship between the length of supra occipital crest and the total length of the fish expressible as an equation involving one or more constants. To express this relationship between the two variables X and Y, the equation for the regression line $Y = a + bX$ was used. Where X is the total length of the fish in mm, Y is the length of the supra occipital crest in mm and a and b are constants. The equation was found to be :

$$Y = -0.9547 + 0.0343\,X$$

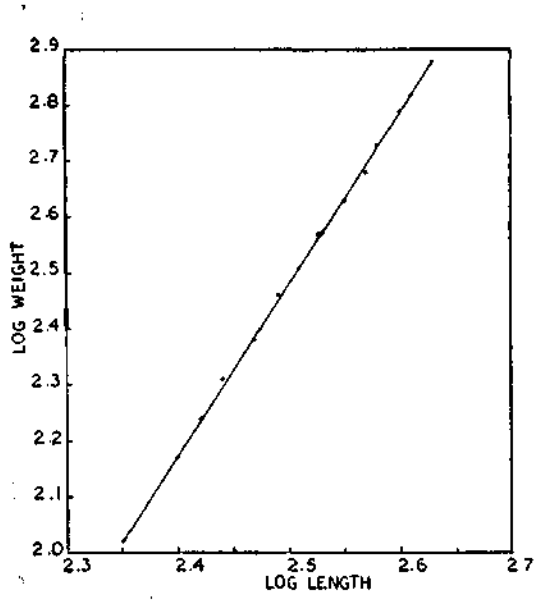

Fig. 2. Logarithmic relation of length and weight of *Pristipomoides argyrogrammicus*.

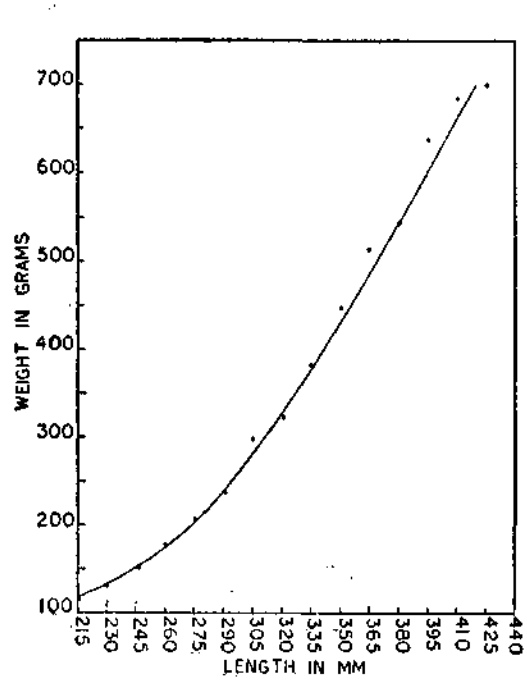

Fig. 3. The length-weight relationship of *Pristipomoides argyrogrammicus*.

The observed values of crest length were plotted against the respective values of fish length and the result was the linear regression line as shown in Fig. 4.

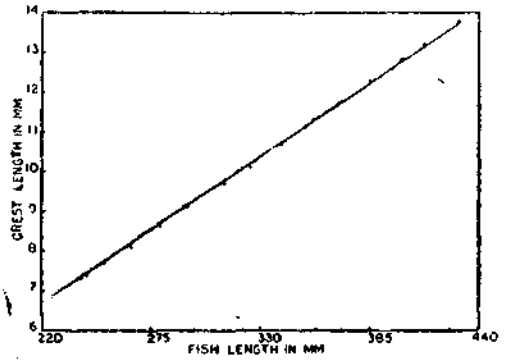

Fig. 4. The relationship between total length of the fish and the supraoccipital crest length in *Pristipomoides argyrogrammicus*.

The mean length of the 1st, 2nd, 3rd and 4th zones were calculated from all the supraoccipital crests examined. The results showed a proportionate increase in length for the crest with the increase in length of the fish. It is also observed that upto 260-274 mm length group possess only three annual zones while a fourth zone started to appear from 275-289 mm length group. The age was assessed by counting the number of opaque and transparent zones. From this study it is seen that both the sexes examined appear to belong to the same year classes i.e. 3rd and 4th year classes.

It is also clear from the present study that the rate of growth is rapid in the first year. In the second and third years the growth is reduced and becomes very little from fourth year onwards. No remarkable variation was observed in the rate of growth of males and females.

Sex and Sex Ratio

345 specimens were examined in fresh condition for sex studies. Of these 168 were males and 177 females giving a male to female ratio of 1 : 1.5.

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