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RESOURCES OF JUVENILE RABBITFISHES (PISCES : SIGANIDAE) IN THE LAKE PULICAT, TAMIL NADU *

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ABSTRACT

The importance of rabbitfishes in aquaculture had been realised in Israel, USA, Singapore, Japan, etc. However, in India, they are slowly gaining the attention of aquaculturists. The present paper deals with the juvenile resources of rabbitfishes of Pulicat Lake. Based on observations from April to August 1987 in six selected stations, dissolved oxygen content was found to play a dominant role in the abundance of juveniles. Phases of the moon (full moon and new moon) have been observed to bear no relationship with the abundance. Collections made during day time were devoid of siganid juveniles in contrast with the night collections.

INTRODUCTION

RABBITFISHES of the family Siganidae are found in large schools and their occurrence ranges from estuaries to coral reefs. Many of them are economically important with great mariculture potential (Ablan and Rosario, 1962 ; Catanaoan, 1965). Lam (1974) listed several reasons for the recent interest in siganid mariculture. Since siganids form a seasonal fishery in the Pulicat Lake (Lat. 13° 24′ to 13° 47′ ; Long. 80° 02′ to 80° 16′), an attempt has been made to investigate on the abundance of the juveniles of siganids, species composition and distribution.

MATERIAL AND METHODS

Six stations *viz.*, Station 1 : Mouth ; Station 2 ; Donraow ; Station 3 : Lighthouse ; Station 4 : Opposite Estuarine Biological Laboratory of Madras Christian College : Station 5 : Lock and Station 6 : Oyster bed were selected in Pulicat Lake. Collections were made from April 1987 to August 1987, once a week, during day and night. These collections were also adjusted to synchronise with full moon and new moon dates.

Juveniles of siganids were collected from all the six stations employing a conventional drag net measuring 4.5 m in length and 1 m in breadth. Ten hauls were made per hour in each station. From the material thus collected, siganids were separated and pooled stationwise for each collection and expression in numbers. Total length (TL) was measured to the nearest mm. Specimens measuring less than 25 mm were grouped under one class (< 25 mm), whereas specimens measuring above 25 mm in TL were grouped into length groups of 20 mm class intervals. The percentage occurrence of each length group was computed. In all the six stations, water samples were also collected for estimating the dissolved oxygen (DO) content by Winkler's method and salinity (Michael, 1984).

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Observations

Station 1 : *Mouth* : Pulicat Lake is connected to the sea by only one mouth. This is a shallow area of an average depth of 1 m, situated about 5 km north of the Pulicat village. The bottom is sandy with a sparse algal vegetation. Oxygen content ranged from 4.0231 to 5.6203 ml/l and salinity from 31.6471 to 34.7068‰. Water is clear.

Station 2 : *Donraow* : This is located about 2 km southwest of Mouth area, on the way from Pulicat village to Mouth. This is a very shallow area with an average depth of 0.5 m. Bottom is muddy with sparse algal vegetation. Oxygen content ranged from 4.2855 to 5.2600 ml/l and salinity from 32.6669 to 34.7068 ‰. Water is slightly turbid.

Station 3 : *Lighthouse* : This is about 3 km southeast of Mouth, with an average depth of 0.3 m. Bottom is clayey with plenty of algal vegetation. Oxygen content was between 4.6367 and 9.8355 ml/l and salinity was 30.6271 and 37.6525 ‰. Water is mostly clear.

Station 4 : *Opposite Estuarine Biological Laboratory of Madras Christian College* : This is about 5 km southwest of Mouth with an average depth of 0.5 m. Bottom is clayey with thick algal vegetation. Oxygen content varied between 4.2152 and 9.0627 ml/l and salinity ranged between 34.7068 and 38.2763 ‰. Water is slightly turbid.

Station 5 : *Lock* : This is about 3 km southwest of Mouth. Average depth is about 0.75 m. Bottom is muddy with sparse algal vegetation. Oxygen content ranged from 4.2855 to 5.6203 ml/l and salinity from 32.6669 to 37.2565 ‰. Water is mostly turbid.

Station 6 : *Oyster bed* : This is about 3.5 km southwest of Mouth and about 1.5 km from Donraow (Station 2) in the opposite direction to Lighthouse (Station 3). Bottom is muddy, covered by oyster beds and devoid of algal vegetation. Oxygen content from 4.1450 to 7.2361 ml/l and salinity 31.1006 to 36.7664 ‰.

Results

All the siganid juveniles collected from the stations 1, 2 , 3 and 4 during the course of this investigation were identified as *S. javus* except for a single specimen of *S. lineatus* (T L 136 mm) collected from the Station 4. Collections from Stations 5 and 6 (Lock and Oyster bed) were devoid of siganid juveniles. As day collections were devoid of siganids, only data of night collections are presented.

Station 1 : The peak availability of siganid juveniles (561) was on 18-6-1987. Juveniles of <25 mm length group dominated among all the other length groups upto May 1987. However, from 10-7-1987 onwards, they were not available. Length groups 26-45 and 46-65 mm were not collected from 18-7-1987 and 3-8-1987 onwards respectively. Length group 66-85 mm was available throughout the period of observation. Length groups 86-105, 106-125, 126-145 and 146-165 mm were available from 27-4-1987, 4-6-1987, 3-7-1987 and 10-7-1987 onwards respectively.

Station 2 : In this station, maximum number of juveniles (535) were collecte d on 13-5-1987. Juveniles of <25 mm length group ranked first in abundance upto 20-5-1987. They were not available from 10-7-1987 onwards. Length groups 26-45 mm and 46-65 mm were available upto 18-7-1987. Length group 66-85 mm was available throughout the course of investigation except on 3-8-1987.

Length groups 86-105, 106-125, 126-145 and 146-165 mm were encountered in the collections from 27-5-1987, 27-6-1987, 3-7-1987 and 18-7-1987 onwards respectively. Juveniles of above 106 mm could not be collected on 25-7-87 and 3-8-1987. Only two specimens measuring 88 mm were collected on 3-8-1987.

Station 3 : Maximum number of juveniles (754) were collected on 5-5-1987. However, they were not available from 10-7-1987 onwards. Juveniles of length groups <25 mm ranked first, followed largely by the length group 26-45 mm, upto 3-7-1987. Length groups 46-65 and 66-85 mm were collected upto 18-6-1987 and 25-6-1987 respectively. Juveniles of 86-105 mm length group were available in very low numbers, between 13-5-1987 and 27-5-1987s only.

Station 4 : In this station, peak availability of juveniles (808) was observed on 5-5-1987. But they were not available from 18-7-1987 onwards. Juveniles of <25 mm and 26-45 mm length groups ranked first and second in abundance upto 3-7-1987. Afterwards, they were not available. Length groups 46-65 and 66-85 mm were available upto 25-6-1987 and 18-6-1987 respectively. Except on 27-4-1987 and 5-5-1987, juveniles of 86-105 mm length group were not available. Except for three specimens, of which two measuring 127 and 129 mm and the other of 146 mm, collected on 10-7-1987 and 3-8-1987 respectively, juveniles of above 106 mm were not encountered throughout the period of investigation.

Discussion

The total number of juveniles caught in each station was : Mouth—5930, Donraow—5532 Lighthouse—5511, Opposite Estuarine Biological Laboratory—4992.

The main reason for the maximum abundance of juveniles in the mouth was due to the representation of all the length groups. Length group 66-85 mm was present all through the period of collection.

Length group <25 mm was predominant in all the stations. It was more pronounced in the Lighthouse and Opposite Estuarine Biological Laboratory stations, probably due to the presence of high dissolved oxygen content (4.6367-9.8355 ml/l and 4.2152-9.0627 ml/l respectively) in these areas. Further, it is interesting to note that these stations were rich in algal vegetations and probably they were responsible for the high DO content of these stations. Siganids prefer substrata with weeds (Lam, 1974). Since the bottom of oyster beds was devoid of vegetation, juveniles were absent in this station. Further, oyster beds become either very shallow or completely exposed during low tides.

In the Lock station, juveniles were absent mainly due to the disturbance caused by the movements of local people which prevailed almost throughout the day and night due to the fishing activities of nearby villages.

In the present study, no remarkable relationship was observed between the abundance of juveniles and salinity in all the stations. Algal vegetation and the higher DO content had an impact on the abundance of the smaller length groups as discussed earlier.

In the present observation, new moon and full moon did not exhibit any effect on the availability of juveniles. However, Subrahmanyam and Ganapati (1971) and James *et al.* (1984) had reported relationship between the phases of the moon and abundance of juveniles of prawns and *Sillago sihama* respectively.

In the present observation, juveniles were not collected during day collections. This may be due to the fact that they migrate into deeper waters during day time. However, this needs further confirmation. The absence of juveniles above 86 mm in the stations. Opposite Estuarine Biological Laboratory and Lighthouse and their presence in the Mouth suggest the migratory behaviour of these juveniles. Probably as they grow (above 86 mm) they move towards deeper waters

The very low abundance and absence of juveniles at the end of July and in August suggest that breeding and recruitment of the juveniles to the stock is poor during this time. The availability of higher length groups (above 86 mm) from the end of May onwards indicates that *S. javus* might have been in the breeding season three months prior to April.

From the present observation, in Pulicat Lake it is seen that siganid juveniles (*S. javus*) measuring upto 65 mm have been available in fairly good numbers in all the four stations throughout the period of investigation. It is suggested that they may be exploited for culture purposes.

References

ABLAN, G. L. AND W. M. ROSARIO 1962. Method of collecting and transporting live teuthid fry (Padas) for stocking. *Philipp. Bur. Fish. Gaz.*, **6** : 6-8.

CATANAOAN, C. C. 1965. For fish pond farming siganid gets acclaim. *Philipp. Farm Gard.*, October 1965. 15.

JAMES, P. S. B. R., R. SOUNDARARAJAN AND J. X. RODRIGO 1984. A study of the seed resources of the Indian sand whiting *Sillago sihama* (Forskal) in the Palk Bay. *Indian J. Fish.*, **31** (3) : 313-324.

LAM, T. J. 1974. Siganids : Their biology and mariculture potential. *Aquaculture*, **3** : 325-354.

MICHAEL, P. 1984. *Ecological methods for field and laboratory investigations*. Tata McGraw-Hill Publishing Co. Ltd., New Delhi, pp. 107-110, 120-123.

SUBRAHMANYAM, M. AND P. N. GANAPATI 1971. Observations on postlarval prawns from the Godavari estuarine systems with a note on their role in capture and culture fisheries. *J. mar. biol. Ass. India*, **13** (2) : 195-202.