

A STUDY ON THE PRAWN FISHERY OF NETRAVATI-GURUPUR ESTUARY, MANGALORE

K. K. SUKUMARAN, O. THIPPESWAMY AND Y. MUNIYAPPA
Central Marine Fisheries Research Institute Centre, Mangalore.

ABSTRACT

Eight species of penaeids, one species of sergestid and three species of caridians were noticed in the Netravati-Gurupur estuary. The penaeids *Penaeus indicus*, *P. monodon*, *Metapenaeus dobsoni*, *M. moyebi* and *M. monoceros* were common. Peak recruitments of early juveniles of *P. indicus* were in May, June and December and of *M. dobsoni* were in January and June-September.

INTRODUCTION

Earlier, Ramamurthy (1972) gave a brief account on the prawn fishery of this estuary at Mangalore for the period 1963-68. In the present paper, in addition to the estuarine prawn fishery during 1981 and 1982, an account on the experimental fishing conducted in the estuary with the departmental shore seine during this period is also incorporated, so that a comparison would be possible between the commercial catches and the experimental net particularly in regard to the abundance of juveniles.

MATERIAL AND METHODS

Departmental shore seine (length - 32 m, height - 3.6 m and mesh stretched - 12 mm) was operated in the Netravati-Gurupur estuary once a week, near Hoige Bazar, during low tide. Generally 2-3 hauls, each lasting around 30 minutes, were made on each day. When the catch was heavy, a subsample was analysed for total length and weight of constituent species but when the catch was low the entire catch was analysed.

In addition, the artisanal fishery by shore seine, cast net and mini otter trawls (with codend mesh 17-18 mm) at Bengare, on the western bank of the Gurupur river, was also studied, estimating the catch and effort. On each observation day 20% of each unit with a minimum of 5 were examined for species-wise catches in weight, from which the day's catches and raising which the monthly catches were computed.

Mini-otter trawl is a small version of otter trawl with the cod end 17-18 mm. This is operated in the estuary at 5-10 m depth by 1 to 3 fishermen from a non-mechanised canoe measuring 6-6.5 m for catching prawns and miscellaneous fishes.

GENERAL CHARACTERS OF THE ESTUARY

The Netravati-Gurupur estuary is formed by the confluence of the rivers Netravati (in the south) and the Gurupur (in the north) and draining into the Arabian Sea at Mangalore. Though the depth at the bar mouth is reported to be changing, the estuary is open throughout the year. The bottom soil is muddy in most of the area.

Seasonal variations were noticed in temperature and salinity values. Surface temperature varied between 25° and 32°C with maximum values in April and May. Salinity ranged between 0.08 ‰ and 37‰. The maximum values were obtained during March-May, and the minimum in August owing to the influx of rain water (Bhat and Gupta 1983).

OBSERVATIONS

Experimental fishing: The prawns occurred in varying abundance in the different hauls of the experimental shore seine taken on the same day. Prawn catch per haul was high in January, June, September and November (Table 1).

Altogether twelve species of prawns were recorded from the estuary, which included three species of caridians (*Macrobrachium rosenbergii*, *M. idae* and *M. idella*), one species of sergestid (*Acetes* spp.) and the penaeids *Metapenaeus dobsoni*, *Metapenaeus monoceros*, *Metapenaeus moyebi*, *Metapenaeus affinis*, *Penaeus indicus*, *Penaeus monodon*, *Penaeus semisulcatus*, and *Parapenaeopsis stylifera*. The bulk of the catch consisted of the penaeids, while sergestids and caridian prawns occurred in stray numbers only.

M. dobsoni was abundant in January and from June to December, whereas it was scarce during February-May. *P. indicus* occurred in good numbers in May, June and December. *M. moyebi* was available during June-December. Even though penaeids such as *P. semisulcatus*, *M. affinis* and *P. stylifera* were recorded from the estuary, they were extremely rare. *M. dobsoni* was in sizes ranging from 18 mm to 63 mm (Fig. 1). In the case of *P. indicus*, the size ranged from 32 mm to 120 mm during 1981. However, during 1982, it is striking to note that smaller sized prawns as small as 18 mm were also found in large proportions (Fig. 2). In *M. moyebi*, the size ranged from 18 mm to 78 mm during 1981, and from 28 to 63 mm during 1982.

Fishery: It is estimated that 5.28 t and 14.37 t of prawns were landed during 1981 and 1982 respectively at Bengara. The gearwise break up of prawn landings together with catch per unit of effort (c.p.u.e.) and percentage composition is

TABLE 1. Monthly penaeid prawn catch in weight (g) and in numbers per operation of the experimental shore seine in the Netravati-Gurupur estuary. (Average for 1981 and 1982 given. Number is given in parenthesis).

Months	<i>M. dobsoni</i>	<i>M. monoceros</i>	<i>M. moyebi</i>	<i>P. indicus</i>	<i>P. monodon</i>	Total
Jan.	38.0(74)	1.2(1)	—	1.0(1)	—	40.2(76)
Feb.	—	—	—	7.6(2)	—	7.6(2)
Mar.	0.2(1)	—	—	11.4(5)	2.2(2)	13.8(8)
Apri	No operation					
May	2.5(3)	—	—	24.0(50)	—	26.5(53)
June	24.5(38)	8.5(4)	12.5(6)	27.5(23)	0.5(1)	73.5(72)
July	6.2(16)	0.2(1)	2.0(2)	0.5(1)	0.8(1)	9.7(21)
Aug.	19.8(36)	0.9(1)	0.2(1)	—	—	20.9(38)
Sep.	35.0(46)	0.7(1)	3.0(3)	3.3(1)	4.2(2)	46.2(53)
Oct.	25.6(35)	0.3(1)	0.8(1)	0.8(1)	1.8(1)	29.3(39)
Nov.	7.4(15)	—	4.4(2)	12.8(8)	21.0(4)	45.6(29)
Dec.	3.6(19)	—	1.8(1)	12.1(14)	1.9(1)	19.4(35)

presented in Table 2. As is seen from this table, mini-otter trawl landed bulk of the prawn catch (60.8% and 67.2% respectively during 1981 and 1982) followed by cast net and shore seine.

The c.p.u.e. values were 1.46 kg and 2.63 kg, 0.53 kg and 0.62 kg and 2.24 kg and 5.60 kg for mini-otter trawl, cast net and shore seine respectively during this period. The c.p.u.e. values were higher for shore seine.

Catch composition and seasonal abundance: Although eight species of penaeids were recorded from the estuary, only five of them were common. They were *M. dobsoni*, *M. moyebi*, *M. monoceros*, *P. indicus* and *P. monodon*.

The monthwise species composition (%) in various gears is presented in Fig. 3, which shows that prawns occurred throughout the year in the mini-otter trawl, and *P. indicus* was the dominant species in the first half of the year whereas *M. dobsoni* was the principal species in the second half. In the shore

seines the prawn catch was negligible in April, May, September and October. *P. indicus* was caught in February, March and June whereas *M. dobsoni* occurred in February, March, August and November in fairly good quantities. *M. moyebi* was also available in considerable numbers in June and July. In cast net prawns were caught in January, February, March, May, June and December and *P. indicus* was the chief species in January, February, March and December.

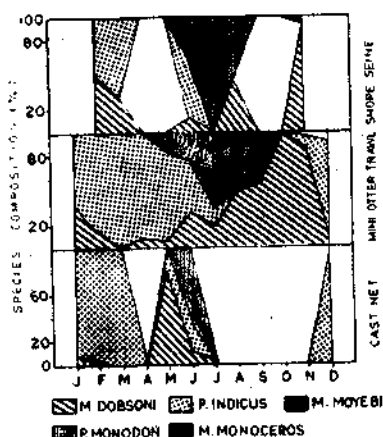


FIG. 3. Average monthly species composition of prawn landings by commercial nets at Bengare.

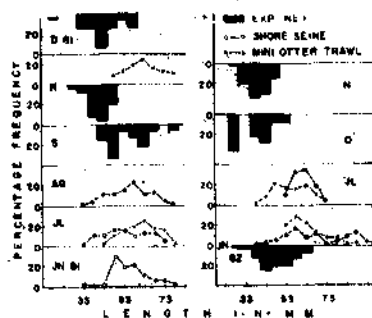


FIG. 4. Size distribution of *M. moyebi* in the commercial gears and in the experimental shore seine in the Netravati-Gurupur estuary.

M. dobsoni: The estimated catch of this species amounted to 1411 kg and 6340 kg, forming 26.7% and 44.7% of the annual prawn catch during 1981 and 1982 respectively. Bulk of the catch was obtained by mini-otter trawl. This species was abundant in January, June and November-December in the estuary.

P. indicus: This prawn was the principal species during 1981, contributing 42.6% to the annual estuarine catch of 2248 kg. Although the landings of this prawn was fairly high during 1982 (5609 kg), it then formed only 39% of the total catch. Bulk of the catch was obtained by cast net during 1981, and by mini-otter trawl during 1982. Catch was fairly good during January-April, June and December.

M. moyebi: This is a prawn newly recorded from the Karnataka coast (Sukumaran and Nandakumar 1983). It contributed 30.2% and 15% to the fishery with 1592 kg and 2163 kg, during 1981 and 1982. Mini-otter trawl landed bulk of the catch. This occurred from May to December with peak during May-July.

Size distribution and recruitment of important species: In *P. indicus*, the size ranging from 33 to 128 mm supported the estuarine fishery. However, majority of them were within 48-108 mm size. The modal sizes fluctuated between 53 and 118 mm (Fig. 2).

In the distribution of size there was marked difference between the experimental net and the indigenous gear. Larger sizes (43-128 mm) were supporting the estuarine fishery, whereas comparatively smaller sizes (18-120 mm) occurred in the experimental net in February, March, November and December 1981 and May, June, July and December 1982. Slight variations in the distribution of sizes was observed even within the different gears operated in the estuary (Fig. 3). Peak recruitment of juveniles into the fishery was observed in May, June and December (see table 1).

In the case of *M. dobsoni*, the size ranging between 18 mm and 78 mm (mostly within 28-53 mm) supported the fishery and the dominant mode fluctuated between 28 mm and 48 mm. (Fig. 1). The sizes in the estuarine fishery did not vary from the experimental net, particularly in November 1981, and in July, October, November and December 1982. However, slight variations were noticed in August 1981 and in May 1982, when larger sizes were occurring in the estuarine fishery. Although the species occurred in the experimental net in January, July, September and December 1981, and in June and September 1982, it was rarely present in the estuarine fishery in these months. Among the commercial gear, larger sizes of this species (28-58 mm) were present in shore seines, while smaller sizes (23-48 mm) occurred in mini-otter trawl, in November 1982 (Fig. 1). Peak recruitment of juvenile *M. dobsoni* was in June-December and January (Table 1; Fig. 4).

In *M. moyebi*, the size ranging 33-98 mm supported the estuarine fishery (Fig. 4). There was remarkable variation in size between the indigenous gear and the experimental net; larger sizes (33-98 mm) were in the fishery while smaller sizes (18-78 mm) occurred in the experimental net, particularly in June 1982. Even though the species had occurred in the fishery, it was not caught by the experimental net in June, July and August 1981 and in July 1982. However, it occurred in the experimental net in September and December 1981 and in October and November 1982, when it was absent in the fishery. Even among the indigenous gear, marked variation in size was observed; in July 1981, the size range was 33-73 mm in shore seines, while it was 43-78 mm in mini-otter trawl. In June and July 1982 the size ranges were 38-98 mm and 53-73 mm in shore seines, and 48-88 mm and 38-73 mm in mini-otter trawl.

Recruitment of juveniles of this species into the estuary was noticed in June and November (Table 1 and Fig. 4).

DISCUSSION

M. dobsoni appears to enter the estuary at a size of 40 mm,* when they are just 3 months old, in contrast with the 50 mm recorded as the minimum size at emigration of the same species in Cochin area (Mohamed and Rao 1971). In the case of *P. indicus*, emigration seems to be at a minimum size of 93 mm,* when they are just 7 months old. The prawn also seems to remain in the estuary for a longer duration compared to Cochin back waters, where it has been reported to leave the estuary at a minimum size of 80 mm when they are just 6 months old (Mohamed and Rao 1971).

It is interesting that juveniles of *M. moyebi* is supporting a fishery in the Netravati-Gurupur estuarine system though the adults are seldom caught in the estuary or in the marine area. Experimental trawling at different depths along this coast, particularly during March-May, might help locating the adults, which may possibly form an exploitable resource.

ACKNOWLEDGEMENT

The authors are grateful to Dr. P. S. B. R. James, Director, Central Marine Fisheries Research Institute, Cochin, for encouragement. Our thanks are due to Shri M. S. Muthu, Scientist S-3 & Head, Crustacean Fisheries Division and Dr. C. Suseelan, Scientist S-2 of the same institute, for reading through the manuscript critically and suggesting improvements.

REFERENCES

- BHAT, B. V. AND T. R. C. GUPTA. 1983. Zooplankton distribution in the Netravati-Gurupur estuary, Mangalore. *Indian J. Mar. Sci.*, 12(1): 36-42.
- MOHAMED, K. H. AND P. VEDAVYASA RAO. 1971. Estuarine phase in the life history of the commercial prawns of the west coast of India. *J. mar. biol. Ass. India*, 13(2): 149-161.
- RAMAMURTHY, S. 1972. Observations on the prawn fishery of the Mangalore estuary on the south-west coast of India. *Indian J. Fish.*, 19: 143-155.
- SUKUMARAN, K. K. AND G. NANDAKUMAR. 1983. A potential new resource of prawn from the Karnataka coast. *Mar. Fish. Infor. Serv. T & E Ser.* No. 54.

* The dominant mode in the annual size distribution is considered as the minimum size of emigration from the estuary since there is a progressive fall in the percentage of occurrence of juveniles from that size onwards.