

Maturation of the penaeid prawn *Metapenaeus moyebi* in Mandovi estuary, Goa

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Metapenaeus moyebi contributed a good share of penaeid prawn population in the Mandovi estuary of Goa throughout the year. Both males and females of this species with fully mature gonads were observed in the estuary, suggesting possible spawning in the estuary.

Most commercial penaeid prawns undergo early development and growth in the estuaries before migrating to the sea for maturation and spawning¹. *Metapenaeus moyebi* (Kishinouye) [= *M. burkenroadi* (Kubo)] is of considerable importance in the capture fisheries in Philippines² and Japan³, and in Malaysia and Singapore it is important in pond culture operations⁴. However, in India this species is rare as only stray catches have been reported⁵. Recently authors have observed almost continued occurrence of this species in the Mandovi estuary of Goa and hence some aspects of its maturation in the estuarine environment are reported here.

Prawn samples were randomly collected once a month for a year (Jan.-Dec. 1990) from a commercial stake net, operated year-round in the Mandovi estuary (lat. 15°30'N, long. 75°50'E). All specimens of *M. moyebi* were separated from the sample and their total length, sex and maturity stage were recorded. Males carrying well developed spermatophores were considered mature. Females in maturity stages⁶ III and IV were treated mature. Three exploratory trawlings (March, June and Dec. 1990) were also carried out in the Mandovi estuary and nearshore waters so as to compare the size distribution and maturity condition with those of stake net catches.

Thirteen species of penaeid prawns were caught in the stake net. *M. moyebi* was represented almost throughout the year except in July, September and October. It formed 7.2% of the annual penaeid prawn landings in this area. But wide fluctuations occurred in the monthly catch which varied from 0.8% in May to 43.2% in December. The relative monthly composition of this species showed that March (38.2%), June (14.9%) and December (31.5%) accounted for ~ 85% of the total catch of this species

(Fig. 1a). Thus, it is apparent that this species which hitherto was considered not important in Indian waters, contributes substantially to the estuarine prawn fishery of Goa. On the other hand, only a few specimens were caught in the trawling operations from the inshore waters. This suggests the possibility that *M. moyebi* is a species more widely distributed in the estuarine region than in the marine environment. The earlier records of this species from the Indian waters were also mostly from the estuarine region⁷⁻⁹.

Only minor variations were noticed in the monthly composition of sexes (Fig. 1b, c). But unlike other species of Indian penaeid prawns, both males and females in fully mature condition were caught during different months. Mature males were more frequent and abundant in the samples, often exceeding 50% of the monthly population of males (Fig. 1d) with an annual average of 42.7%. In the case of mature females, frequency of occurrence was less compared to males. But the fact that females in fully mature state occur in the estuary, is not in agreement with the classic life cycle of penaeid prawns. They were collected on 4 occasions and their percentage to total female population varied from 2.1% in March to 16.6% in February (Fig. 1d) with an overall average of 8.6%.

The estuarine population consisted of size classes ranging between 31-40 and 81-90 mm. However, both smaller and larger size classes were relatively less and were dominated by 51-60 mm class (37.2%, Fig. 2a). Among males also 51-60 mm group showed higher abundance (54%, Fig. 2b). In females (Fig. 2b), a clear domination of any size group was not discernible, but 61-70 mm class was relatively more abundant (27.8%).

Mature males were represented in all size classes

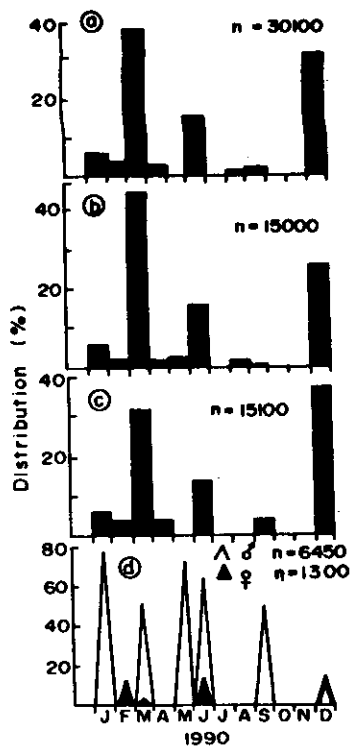


Fig. 1—Monthly distribution of *M. moyebi* in the Mandovi estuary: (a) to the total sample of this species, (b) males to the total male sample, (c) females to the total female sample, (d) mature males and females to the respective total sample

above 41 mm and up to 70 mm. Maximum population (46.8%) was observed in the 41-50 mm class (Fig. 2c). Gravid females were encountered in size classes above 50 mm and the population was more (17.5%) in 71-80 mm class (Fig. 2c). However, those above 80 mm were found to be in spent recovering stage. More or less similar size distribution and maturity conditions were observed for both sexes in the exploratory trawlings conducted in the estuary. The presence of mature females suggests the strong possibility of their spawning in the estuarine environment because females with such advanced stages of ovarian development may not be able to reach the sea in time for spawning. Incidentally, a few mature females of this species were reported earlier in the Pulicat barmouth⁹, along the east coast of India. Considering the continued occurrence of mature males and females of *M. moyebi* in the Mandovi estuary, it is speculated that unlike other species of penaeid prawns, this species may be attaining its first maturity and also possibly spawn in the estuarine

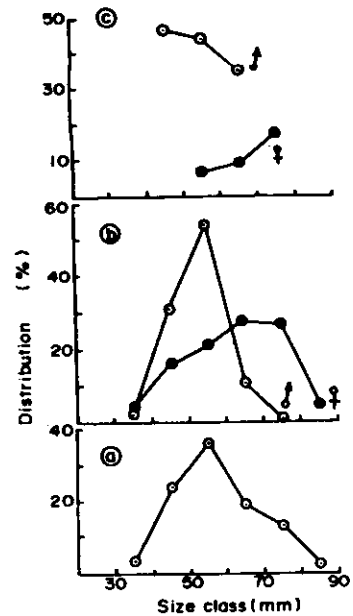


Fig. 2—Size class distribution of *M. moyebi* in the Mandovi estuary, (a) total sample, (b) males and females to respective total sample, (c) mature males and females to total males and females of respective size class

environment. Very few females (> 88 mm) and males (> 60 mm) of this species were caught in the exploratory trawling operations in the nearshore waters. None was in mature condition. This again strengthens the earlier view point.

Although *M. moyebi*¹⁰ does not grow to any appreciable size (male 83 mm, female 126 mm), it qualifies as a suitable candidate for brackish water prawn culture as production of seed would be easier.

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References

- 1 Wickins J F, *Oceanogr Mar Biol Ann Rev*, 14 (1976) 435.
- 2 Longhurst A R, *FAO Fish Tech Pap*, No. 97 (1970) 252.
- 3 Yasuda J, *Bull Naikai Reg Fish Res Lab*, 10 (1957) 28.
- 4 Holthuis L B, *FAO Fish Synop*, No. 125 (1980) pp.271.
- 5 Kurian C V & Sebastian V O, *Prawn and prawn fisheries of India*, (Hindustan Publishing Company, New Delhi) 1976, pp.280.
- 6 Rao P V, *FAO Fish Rep*, No. 57, Vol. 2 (1968) 285.
- 7 George M J, *Bull Cent Mar Fish Res Inst*, 14 (1969) 5.
- 8 George M J, *J Bombay Nat Hist Soc*, 76 (1980) 297.
- 9 Muthu M S & Manickam P E S, *Indian J Fish*, 20 (1973), 61.
- 10 Fisher W & Bianchi G, *FAO species identification sheets for fishery purposes*, Vol. 5, (FAO, Rome) 1984.