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KURUMA SHRIMP FROM BOMBAY WATERS

— A NEW RESOURCE*

The prawn fishery of Maharashtra State has shown great strides in recent years and with the increasing introduction of mechanised trawlers of different sizes and their operations beyond the conventional zones exploited by the traditional fishery, more and more species growing to different sizes are appearing in the fishery. Thus from 1977 onwards one species of prawn belonging to the genus *Penaeus* has been increasingly represented in the catches of the trawl fishery of Bombay and landed at Sassoon Dock. Although not contributing to a very large fishery the species has been found in the catches sporadically in small quantities, amounting to nearly 10 to 15 tonnes annually. In view of the larger sizes of this prawn and the attractive colour bands resembling the Japanese prawn, there is great demand for the species from the processors exporting frozen shrimps especially to Japan. The species was later identified as *Penaeus japonicus* which is the favourite 'Kuruma shrimp' of Japanese waters. Since the occurrence of this prawn in fairly good quantities has come as a new resource not reported earlier, a close study of its fishery and biological aspects was undertaken based on the landings at Sassoon Dock and the results are reported in this contribution.



Fig 1. Kuruma Shrimp, *Penaeus japonicus*.

Systematics

Detailed examinations of the specimens collected from the catches showed that the species is *Penaeus japonicus* Bate. Considerable confusion exists regarding the identity of this species in Indian waters. The species is very closely allied to *P.canaliculatus* which was recently reported occurring in the fishery as a new resource in Quilon area in the Kerala coast (*Mar. Fish. Infor. Serv. T & E Ser.*, 35: 15-17, 1982). There are reports of *P.canaliculatus* as well as *P.japonicus*

in stray numbers from other parts of Indian coast. Both species show very similar morphological features in the number of rostral teeth, extension of the adrostral sulcus or the groove on the dorsal aspect of the carapace to the posterior end of the carapace and the colour pattern. However, a closer examination would show that the two species are quite different. The most important diagnostic features which distinguish these species are: 1) while 3 pairs of spinules are present on the lateral sides of the telson in *P.japonicus* the spinules are absent in the telson of *P.canaliculatus*, and 2) the seminal receptacle in the thelycum is divided in *P.canaliculatus* while it is cylindrical in *P.japonicus*. With the help of these clearcut differences it has been possible to identify the species presently occurring in the fishery in Bombay as undoubtedly *P.japonicus*. It is quite possible that the record of *P.canaliculatus* from Bombay waters by Kunju (*Mar. Biol. Ass. India, Proc. Symp. Crust. IV*: 1382-97; 1967) may probably be *P.japonicus*.

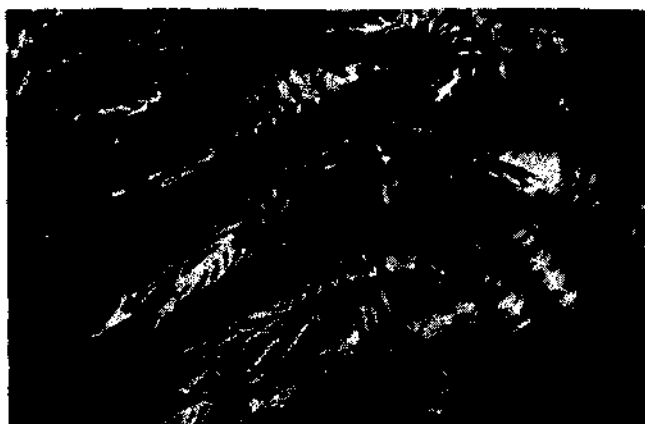


Fig 2. A collection of *Penaeus japonicus* landed at Sassoon Dock, Bombay in June 1982.

The popular name given for the species by FAO is "Kuruma prawn" (L.B.Holthuis, FAO species Catalogue, *FAO Fish. Synop.* (125) Vol. 1: p.46, 1980). It is known under different popular names in different countries eg. Ginger prawn in South Africa, Flowery prawn in Hong Kong and India, Banded shrimp in Taiwan, Kuruma ebi in Japan, Oriental brown shrimp in Korea, Japanese king prawn in Australia and Kuruma shrimp in U.S.A. Recently some firms in Japan have imported the frozen prawns of the species under the trade name of bamboo prawn. The species has a wide distribution in Indo-west Pacific and in some parts of

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Eastern Atlantic. It is of major commercial importance in Japan, being the most valuable of the commercial shrimps there, both in trawl fishery as well as pond fishery.

Fishery in Bombay

P.japonicus was caught along with other penaeid prawns by the mechanised vessels using 18 and 22 m otter trawls operated at depths ranging from 40 to 60 m off Bombay coast. Small quantities have been noticed in the dol net catches also. The landings of the species at Sassoon Dock indicate that the fishery is highly fluctuating and also sporadic to a certain extent. The species was first noticed to have some magnitude of a fishery in 1977. The annual catch figures increased in subsequent years and in 1979 a catch of 15 tonnes was registered (Fig.1). Thereafter a decline was seen in the following years and in 1982 the catches registered 16.7 tonnes. The average landings at this centre amounted to 7.6 tonnes a year. The percentage of this species at this landing centre works out to about 1 in the total prawn landed. It is landed in very small quantities at New Ferry Wharf, Dabhol, Ratnagiri and some other centres also. The annual catch per unit at Sassoon Dock showed a maximum of 15.1 kg per unit in 1978 and minimum of 7.4 kg per unit in 1979.

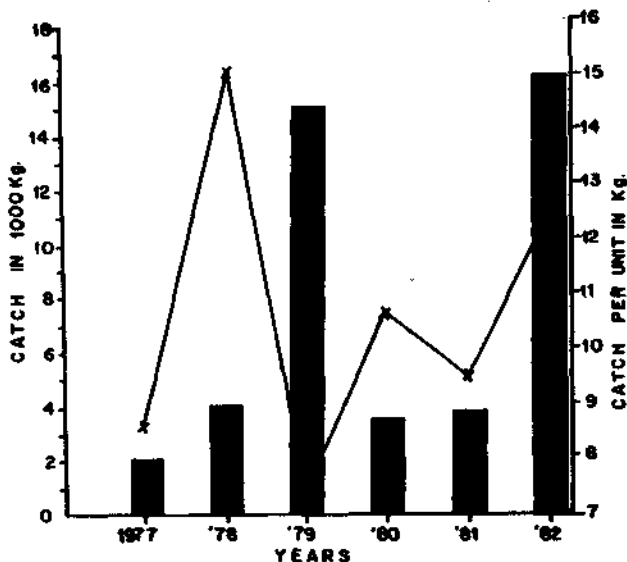


Fig. 1. Total catch and catch per unit of *Penaeus japonicus* at Sassoon Dock during 1977-1982.

The monthly trend of catches during 1977-1982 is presented in Table.1. In all the years the maximum landings are noted in June to September period except in 1979 when it continued in October, Novem-

ber months also. During the other months the fishery is at a low level, probably due to the fact that the trawlers operate in slightly deeper zones where the species is available in abundance during the May - August period and in shallower zones during October -December period. The catch per unit also shows the maximum in June to August period and the minimum in October to March period as in the case of total catch. The catch rate gave a maximum of 33.3 kg per unit in June 1979.

Size distribution

The sizes of these prawns represented in the catches ranged from 110 mm to 225 mm, the females as usual showing larger sizes. The largest male specimen noted measured 190 mm in total length and that of female specimen 225 mm. The annual picture of the length frequency distribution of the species in the fishery during the years, 1977-82 is depicted in Fig.2. In 1977 the dominant size groups were in the larger size range of 148-163 mm. In the next three years the major modal sizes went down to the size ranges of 118-133 mm. In 1981, although the smaller sizes were dominant the larger size ranges of 148-163 were equally dominant, especially the females. In 1982 the smaller sizes were not noticed in the catches, large sized females being present in good quantities.

Food of the species

In order to get an idea about the food of this species the stomach contents of 240 specimens were examined. Based on this study, on an average 40% of the stomach contents were crustacean remains, 20% polychaete remains, 25% molluscan remains and the rest 15% sand grains and debris. The crustacean remains consisted mainly of decapods. The study reveals that *P.japonicus* is carnivorous in food habits and also bottom feeding. Similar results were obtained for the species from a study in Malaysian waters by Hall (Fish. Publ. Colonial Off, 17: 1-229. 1962).

Sex ratio

Females were noticed to be predominant in the catches during all the years, with the sex ratio of females to males 3:1. However, during June-July months when the catches were higher the ratio of females to males was 2:1. Males did not dominate in the catches at any time of the study.

Maturity and spawning

Mature male and female specimens were noticed in the catches in most of the months. However, gravid females were represented in maximum quantities in the months July, August and September, their percentage representation reaching from 60 to 80 in

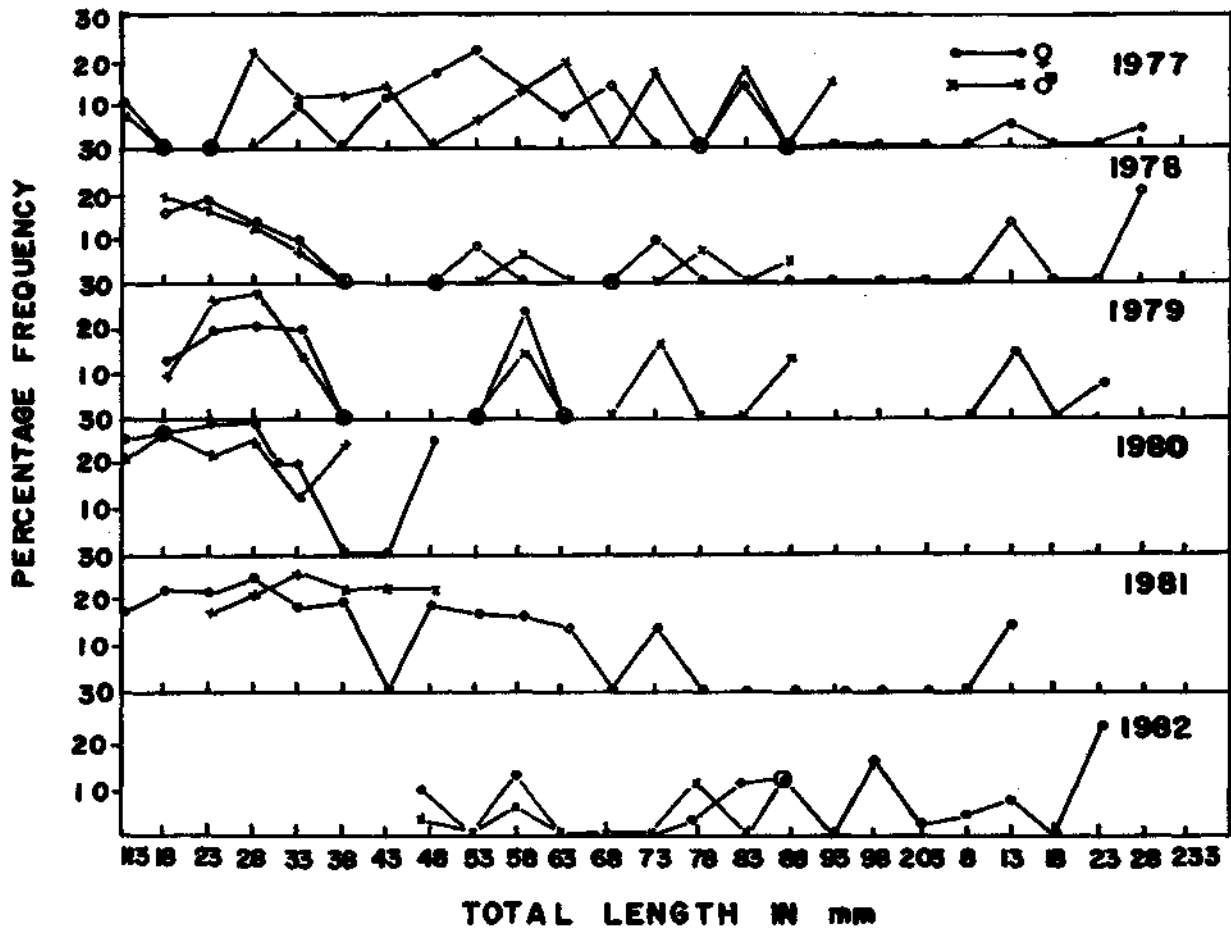


Fig. 2. Length frequency distribution of *Penaeus japonicus* at Sassoon Dock in 1977-1982

Table 1. Catches of *Penaeus japonicus* at Sassoon Dock during 1977-82

Years	Months (catch in kg with catch per unit in paranthesis)												Total
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
1977	80 (4)	90 (5.5)	70 (7)	65 (5)	60 (4)	200 (20)	600 (20)	650 (25)	50 (5)	60 (4)	50 (2)	25 (2)	2,000 (8.6)
1978	120 (3)	140 (7)	320 (10)	440 (11)	250 (10)	600 (20)	800 (20)	750 (25)	660 (30)	—	—	—	4,080 (15.1)
1979	60 (3)	52 (3)	48 (2)	502 (12)	450 (1.5)	2,000 (33.3)	—	3,150 (20)	2,480 (1.5)	2,500 (1.4)	3,200 (1.7)	600 (1.5)	15,042 (7.4)
1980	100 (4)	124 (10)	138 (5)	142 (15)	600 (20)	400 (10)	600 (25)	1,400 (30)	80 (2)	60 (2)	120 (3)	80 (2)	3,844 (10.7)
1981	121 (3.5)	200 (5)	128 (10.2)	132 (15)	500 (22)	600 (10)	825 (25)	1,200 (15)	70 (2.5)	90 (2)	130 (2)	90 (1.5)	4,086 (9.5)
1982	95 (3.5)	180 (9)	115 (7.1)	135 (9)	240 (20)	170 (17)	6,506 (26)	6,000 (20)	3,018 (10.1)	80 (8)	90 (6)	115 (6.5)	16,744 (11.9)

these months. From this it appears that the peak spawning period in the offshore regions is in these months. The sizes of mature females, in general, ranged between 150 and 225 mm.

Exports

Upto 1980 *P.japonicus* was exported from Bombay, mostly to Japan, under the commercial packings known as "tiger" and "flower" which included species like *P.monodon*, *P.semisulcatus*, *P.penicillatus* and *P.japonicus*. M/s Castle Rock Fisheries and Castle Rock Sea foods (P) Ltd., Bombay and Tata Fisheries (P) Ltd were the chief exporters. Later Japan showed interest in importing *P.japonicus* their favourite species, packed exclusively. Therefore, these exporters located in Bombay packed this species, head on, and exported under the trade name "bamboo prawn" in 1981 and 1982, fetching higher unit value of upto 15 U.S. dollars per kg. Yearly 9 to 20 tonnes of export of the species has been made by these firms.

General Remarks

Penaeus japonicus is one of the penaeid prawns growing to fairly large sizes which are very much in demand from the industry. Being a species occurring in great abundance in Japanese waters and greatly sought after by the shrimp industry there, the species would be of great interest in the export market, especially to Japan. Therefore, the appearance of this species, hitherto not reported to contribute to any significant fishery anywhere along the coast of India, in the magnitude of a fishery in Bombay waters is very

interesting. This prawn fetches premium prices in the Bombay market, 1 kg of the species costing Rs.80 to 100 even in the local auction sales at the landing centre, indicating the demand for export purposes. Now that the species has appeared in appreciable quantities in the trawl fishery in Bombay, it is likely that it is available in other areas along the coasts of India. Hence a proper assessment of the resources of this species in Indian waters would be useful.

Among the species of prawns cultured in the different parts of the world *P.japonicus* has an important place, being the first species of penaeid prawn subjected to laboratory spawning and pond culture. In Japan the complete early larval history of the species was worked out as early as 1942 and from that time onwards large scale commercial culture of the species is practiced in that country, in addition to the natural harvest from the sea. In the present fishery of the species from Bombay the presence of fully mature males and females indicates that aquaculture of this prawn could be developed to a very great advantage by collecting spawners, inducing them to spawn in controlled environment and adopting proper hatchery and rearing techniques. This would go a long way in satisfying the demand from the export industry for species growing to larger sizes and thus add to the foreign exchange earning of the country.

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