

Note

On the exploitation of portunid crab *Podophthalmus vigil* (Weber) along the Chennai coast in Tamil Nadu

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ABSTRACT

The trend in catch of *Podophthalmus vigil* at Chennai during 1984-'98 showed slow increase from stray occurrence to a small fishery in 1980's to be followed by an upsurge with the annual catch over 100t during 1992-'95. After reaching the maximum catch of 217t in 1994-'95, the catch declined drastically to 6 t in 1997-'98. The main fishery season was September-January. Males were relatively larger and heavier. Average sex-ratio was 55.2 : 44.8. Peak spawning activities were recorded in October and January.

Chennai coast has witnessed an annual crab landings of over 1500 t (Thangaraj Subramanian, 1998). The portunid crab, *Podophthalmus vigil*, a commonly relished species, is a recent addition to the crab fishery with wide fluctuations in abundance along this coast during 1984-'98. The species registered a maximum annual landing of 217.5 t in 1994-'95. Earlier information of the species in Indian waters is related to taxonomical records from the east (Premkumar, 1962; Raman and Srinivasagam, 1978) and the west coasts (Pillai, 1964) and early larval development and fishery off Portonovo (Srinivasagam and Natarajan, 1976). The present study provides some information on catch trend, seasonal abundance and biological features of the species from the Chennai coast.

Data on catch and effort for trawler landings were collected weekly from Kasimedu in Chennai from April 1984 to March 1998. During each observation, 10% of the trawlers were selected at random to record the total catch of crabs and the proportionate weight of *P. vigil*, along with effort in hauling hours. The average values for the units were raised to obtain the daily, monthly and annual estimates. The CPUE in kg/hr of *P. vigil* and its percentage contribution to total crab landings were then calculated for the months and years. Samples collected at random during each observation in 1993-'95 were analysed for sex, maturity stages, carapace width and weight.

The study of the fishery revealed a period of steady consolidation in the beginning, followed by sharp increase in

the middle and then a decrease reaching negligible level towards the end. The annual catch around 10 t until 1986 varied between 20 and 50t in the following few years. The catch above 100 t in 1992-'93 reached the maximum of 217.5 t at an average CPUE of 0.41 kg/hr forming 19.5 % of crabs in 1994-'95. However, the catch came down to 22 t in 1996-'97 and further to 6 t in 1997-'98. The sharp rise and fall in catches were not associated with fluctuation in effort. The average percentage contribution of the species to the total crabs during these years varied from 2.0% in 1991-'92 to 19.5% in 1994-'95. During the period of its abundance in 1992-'95, *P. vigil* was present in the catch throughout the year, although the main fishery was during September-March (Table 1). Peaks were recorded in September-October and in January during 1992-'93, June and December-January during 1994-'95. Only a single peak in the catch was noted in September-November during 1993-'94.

Males were relatively larger in size

with a few exception. The overall size range, modal size and mean width for males were 41-45 mm, 91-110mm and 94.1mm and that of females were 41-150mm, 760-90mm and 85.4mm respectively. Large sized crabs over 110 mm of females and 130 mm of males were rare. Males were heavier than females and the estimated formula for L/W relationship was:

$$\text{male} : W = .000876 L^{2.4423}$$

$$\text{female} : W = .003507 L^{2.1586}$$

where W was the weight in g and L the carapace width in mm. The mean weight calculated for the mean size of 94.1 mm was 57.9 g for male and 85.4 mm weighing 51.8 g for female.

The overall male-female sex ratio was 44.8 : 55.2 but the monthly ratio widely fluctuated between 33.1 and 81.1 for females. Males were dominant among large sized crabs above 100 mm, while females were predominant among smaller individuals upto 85 mm size (Table 2). Considering the cumulative abundance of smaller individuals of less than 70 mm in

TABLE 1. Estimated monthly catch (t), CPUE (kg/hr) and percentage contribution to total crabs of *P.vigil* at Chennai during 1992-'95.

Month	1992-'93	1993-'94	1994-'95	Average (1992-95)		
				Catch	kg. h	%
Ap.	10.1	0.1	8.9	6.4	0.21	25.4
May	6.9	0.5	1.1	2.8	0.07	29.4
Jun.	1.2	8.2	33.2	14.2	0.35	26.5
Jul.	4.2	0.9	1.3	2.1	0.05	6.7
Aug.	8.4	9.8	1.0	6.4	0.16	12.3
Sep.	17.7	17.4	17.0	17.4	0.40	11.6
Oct.	11.4	41.2	26.5	26.4	0.62	19.1
Nov.	7.5	27.6	16.0	17.0	0.63	20.6
Dec.	6.3	6.5	31.2	14.7	0.22	12.2
Jan.	20	2.5	43.4	22.0	0.55	14.5
Feb.	8.4	2.2	21.8	10.8	0.30	10.3
Mar.	9.8	11.3	16.1	12.4	0.40	8.6
TOTAL	111.9	128.2	217.5	152.6	-	-
kg.h	0.31	0.29	0.41	-	0.35	-
%	12.6	19.5	16.9	-	-	16.2

carapace width in the pooled population for 1992-'95, a strong spell of recruitment was noted during February-March, with another moderate spell stretching from June to September, with slight dip in July. The smallest ovigerous female, which could be considered as the minimum size at maturity, measured 62.0 mm in carapace width but bulk of such berried females belonged to 66-70 mm and above. Females carrying egg masses were seen throughout the year with the peak in January and moderate increase in October indicating repetitive breeding.

The initial stray occurrence, subsequent improvement and later decline were the salient observations of the present study. Such an upsurge and fall has been reported as a natural phenomenon occurring periodically in crabs. Methot (1989) reported similar fluctuation of crab catches along the California coast with peak abundance occurring with a rhythmic periodicity of 9-10 years. In years of higher abundance, fishing extended over June-January, with one or two peaks. The fishery

was poor during summer months, March - May. Srinivasagam and Natarajan (1976) observed the peak abundance of *P. vigil* in the trawl catches off Portonovo during the pre-monsoon months (August-October). It would explain the improvement of the fishery in recent years, which coincided with shifting of trawl fishing towards deeper waters with low temperature. The fluctuation of commercial fishery obviously depend not merely on population abundance, but on the extent of population invasion into exploitable territories.

The spawning activities of the species was intense in October and January. Similar spawning seasonality has been noted for few other crabs along the east coast (Ajmal Khan and Natarajan, 1977 and Rehman, 1967). Although the overall sex-ratio was not significantly deviating from an even distribution, the monthly fluctuation between 33.1 and 81.1% for females, indicated the possibility of unisexual migration. Rare occurrence of very large females of 141-150 mm would further support migration and re-entry into

TABLE 2. Sex-ratio of *P. vigil* landed at Chennai during 1992-'95

Quarter	F : M	Size group (mm)	F : M
Apl. - Jun /92	49.8 : 50.2	51-55	53.8 : 46.2
Jul. - Sep /92	65.9 : 34.1	56-60	87.5 : 12.5
Oct. - Dec /92	81.1 : 18.9	61-65	86.4 : 13.6
Jan. - Mar /93	69.2 : 30.8	66-70	90.5 : 9.5
Apl. - Jun /93	52.8 : 47.2	71-75	72.6 : 27.4
Jul. - Sep /93	53.4 : 46.6	76-80	80.9 : 19.1
Oct. - Dec /93	44.0 : 56.0	81-85	73.9 : 26.1
Jan. - Mar /94	46.3 : 53.7	86-90	60.4 : 39.6
Apl. - Jun /94	40.3 : 59.7	91-95	30.6 : 69.4
Jul. - Sep /94	52.7 : 47.3	96-100	33.3 : 66.7
Oct. - Dec /94	41.6 : 58.4	101-105	25.5 : 74.5
Jan. - Mar /95	33.1 : 66.9	106-110	14.3 : 85.7
		111-115	8.2 : 91.8
Average	55.2 : 44.8	116-120	4.8 : 95.2
		121-125	3.2 : 96.8
		126	24.2 : 75.8

the area of fishing. Engel (1958) has reported such offshore migration of females after mating and their remaining there for a few spawning spells in the blue crab, *Callinectes sapidus*. Further studies are required to understand the fluctuations of the catches and the dynamics of the population that support the fishery.

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