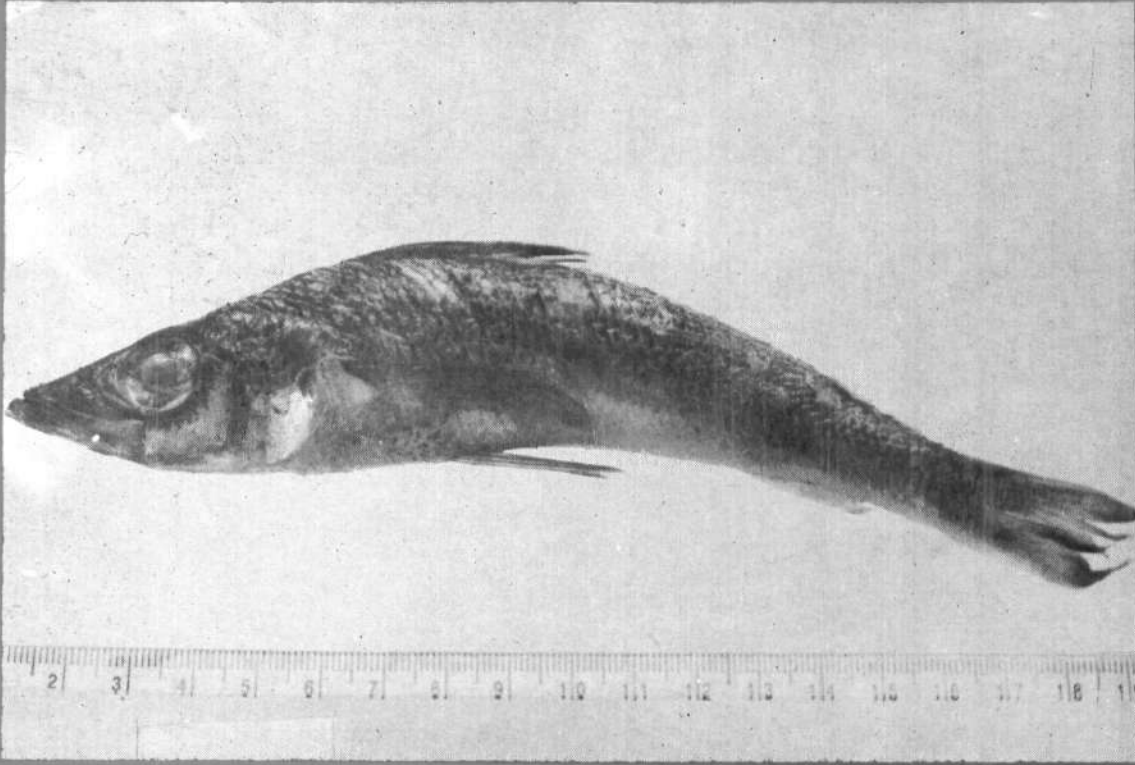




समुद्री मात्स्यकी सूचना सेवा MARINE FISHERIES INFORMATION SERVICE

No. 140

NOVEMBER - DECEMBER 1995



तकनीकी एवं विस्तार अंकावली TECHNICAL AND EXTENSION SERIES

केन्द्रीय समुद्री मात्स्यकी अनुसंधान संस्थान
कोचिन, भारत CENTRAL MARINE FISHERIES RESEARCH INSTITUTE
COCHIN, INDIA

भारतीय कृषि अनुसंधान परिषद
INDIAN COUNCIL OF AGRICULTURAL RESEARCH

THE FISHERY OF GREEN TIGER PRAWN PENAEUS SEMISULCATUS OFF TUTICORIN

M. Rajamani and M. Manickaraja

Tuticorin Research Centre of C.M.F.R.I., Tuticorin - 682 001

Introduction

The Green tiger prawn *Penaeus semisulcatus* de Haan is one of the commercially important species of marine prawns in the southeast coast of India, particularly in the Gulf of Mannar. It is also widely distributed in the Indo-West Pacific region extending to the Red Sea, South Africa and Australia (Motoh, *Southeast Asian Fish. Res. Center*, 1980). This species is the most dominant one among various species of penaeid prawns landed by mechanized trawlers at Tuticorin Fishing Harbour significantly contributing to the commercial fishery almost round the year in varying intensities. As information on the fishery of this species from Indian waters is limited an account of the fishery based on the data collected from the catches landed by mechanized trawlers at Tuticorin Fishing Harbour during the five year period from 1986-'87 to 1990-'91 is given in this paper.

The fishery

The prawn fishery off Tuticorin is carried out almost round the year with peak activities extending for a period of five months from May to September every year. The resource is exploited from the trawling grounds off Pinnakkayal and Manapad in the south and off Erwadi in the north of Tuticorin by mechanized trawlers of medium size (11.6-12.8 m) using shrimp trawl net with a mesh size of 20 mm at the cod end. The depth in the area of operation ranges from 20 to 60 m. During the peak season the trawlers normally leave the Fishing Harbour by 05 hours and after the fishing, return to the base at night mostly between 20 and 22 hours. This time schedule is in accordance with the statutory regulations imposed by the State Government to avoid conflicts between the fishermen operating indigenous gear and those operating the trawl net.

Trend in production

The average annual catch of prawns landed by mechanized trawlers at Tuticorin Fishing Harbour

during the five year period of observation was estimated as 251 tonnes, out of which 59.6% was constituted by *P. semisulcatus* (Table 1). The fishery was good during the past four year period

TABLE 1. Estimated effort, catch and catch rate of *P. semisulcatus*, landed by mechanized trawlers at Tuticorin Fishing Harbour from 1986-'87 to 1990-'91.

Year	Effort (hours)	Total prawn catch (kg)	<i>P. semisulcatus</i>		
			Catch (kg)	Composition (%)	Catch rate (kg/ha)
1986-'87	53,200	107,207	51,952	48.5	0.98
1987-'88	146,910	348,508	179,882	51.6	1.22
1988-'89	91,830	288,612	144,693	50.1	1.58
1989-'90	121,585	284,456	199,908	70.3	1.64
1990-'91	99,490	226,274	171,311	75.7	1.72
Average	102,608	251,011	149,549	59.6	1.46

with the annual catch ranging between 144.7 and 199.9 tonnes. It can be seen from the Table that the catch rate of *P. semisulcatus* steadily increased from 0.98 kg in 1986-'87 to 1.72 kg in 1990-'91 per hour of trawling. A steady increase in the composition also was observed from year to year. From 48.5% in 1986-'87 the composition of *P. semisulcatus* increased to 51.6% in the subsequent year. Then after a marginal decline in 1988-'89 the composition increased to 70.3% in 1989-'90 and then to 75.7% in 1990-'91.

The monthly estimated catches of *P. semisulcatus* pooled for the five year period indicated two peaks in its landings, the main peak extending for a long duration of five months from May to September during which period the average monthly catch ranged between 13.4 and 23.7 tonnes. The ancillary peak was observed in December with an average landing of 15.8 tonnes. The pooled data indicated that the landing of *P. semisulcatus* was maximum in June with an average of 23.7 tonnes followed by 19.5 tonnes in July. The highest catch per effort was also recorded in June with a catch of 2.07 kg per hour of trawling. The composition of *P. semisulcatus* in the total catches of prawns exceeded 50% during all the months except

November. The maximum composition of 76.9% was recorded in April followed by 71.3% in December (Table 2).

TABLE 2. Average month-wise effort, catch and catch rate of *P. semisulcatus* landed at Tuticorin Fishing Harbour from 1986-'87 to 1990-'91

Year	Effort (hours)	Total prawn catch (kg)	<i>P. semisulcatus</i>		
			Catch (kg)	Composition (%)	Catch rate (kg/hr)
Apr.	6,859	14,209	10,930	76.9	1.59
May.	10,436	24,154	13,448	55.7	1.29
Jun.	11,407	45,015	23,659	52.6	2.07
Jul.	12,938	28,366	19,541	68.9	1.51
Aug.	9,179	25,095	14,652	58.4	1.60
Sep.	11,220	33,500	17,969	53.6	1.60
Oct.	8,545	15,467	8,176	52.9	0.96
Nov.	7,673	11,785	5,017	42.6	0.65
Dec.	8,182	22,195	15,826	71.3	1.93
Jan.	5,476	10,760	7,331	68.1	1.34
Feb.	5,036	9,193	6,303	68.6	1.25
Mar.	5,627	11,273	6,698	59.4	1.19
Average	8,548	20,918	12,463	59.6	1.46

Size distribution

The annual mean size of males during the five year period ranged between 129.3 and 134.9 mm and that of females between 149.9 and 157.2 mm. In males the mean size increased from 130.8 mm in 1986-'87 to 134.9 mm in 1987-'88 and thereafter it was at 132.3 mm in 1988-'89 and 1989-'90 and then decreased to 129.3 mm in 1990-'91. But in females a steady increase was recorded in the mean size from 149.9 mm in 1986-'87 to 157.2 mm in 1990-'91 (Table 3). The annual size-frequency distributions of male and female of this species are given in Fig. 1. It can be seen from the Fig. that a sizeable proportion of the commercial fishery consisted of males within the size range of 120 to 140 mm only. On the other hand, females in the size groups of 130 to 170 mm dominated the fishery all the years.

TABLE 3. Annual size ranges and mean size of *P. semisulcatus* landed at Tuticorin from 1986-'87 to 1990-'91

Year	Male			Female		
	Min. (mm)	Max. (mm)	Mean (mm)	Min. (mm)	Max. (mm)	Mean (mm)
1986-'87	82	190	130.8	101	208	149.9
1987-'88	103	177	134.9	101	203	153.0
1988-'89	95	168	132.3	105	232	153.2
1989-'90	102	169	132.3	105	231	156.6
1990-'91	91	173	129.3	94	238	157.2

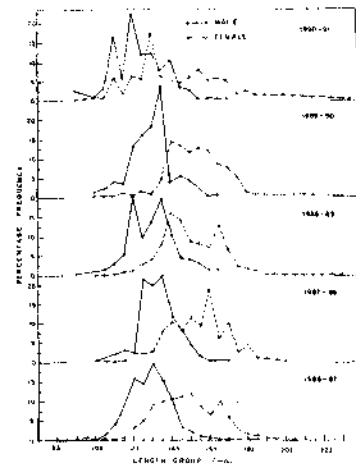


Fig. 1. Annual length-frequency distribution of *P. semisulcatus* landed by mechanized trawlers at Tuticorin Fishing Harbour during the years 1986-'87 to 1990-'91.

The overall size ranges recorded in *P. semisulcatus* during the five year period were from 82 to 208 mm in male and 94 to 238 mm in female. Smaller prawns less than 100 mm were encountered in males in April, June, November, December and March whereas in females they were recorded only in February and March. Larger prawns above 200 mm were encountered in females during all the months and females above 230 mm were recorded in May, June, July, September and February. The maximum size of 238 mm was recorded during September (Table 4).

Sex ratio

The sex ratio of *P. semisulcatus* landed by the trawlers during the five year period is given in

TABLE 4. Average month-wise size ranges and mean size of *P. semisulcatus* landed at Tuticorin from 1986-'87 to 1990-'91

Months	Male			Female		
	Min. (mm)	Max. (mm)	Mean (mm)	Min. (mm)	Max. (mm)	Mean (mm)
Apr.	95	164	122.6	101	228	142.6
May	106	177	129.4	106	232	148.2
Jun.	95	204	136.7	115	234	157.8
Jul.	102	177	130.8	115	231	159.3
Aug.	118	190	137.3	120	213	163.3
Sept.	112	175	138.1	121	238	160.3
Oct.	131	163	142.6	123	220	164.0
Nov.	85	208	134.2	118	208	154.6
Dec.	93	163	128.3	104	212	148.6
Jan.	107	153	129.3	105	201	143.5
Feb.	103	164	130.7	94	231	155.2
Mar.	82	159	128.1	94	225	151.8
Annual	82	208	132.3	94	238	154.1

Table 5. It can be seen from the Table that females dominated in the catches during all the years with its annual composition ranging from 57.8 to 66.5%. The proportion of females was high during

TABLE 5. Annual sex ratio in *P. semisulcatus* landed at Tuticorin from 1986-'87 to 1990-'91

Year	No. sampled	No. of males	No. of females	Males (%)	Females (%)
1986-'87	1368	577	791	42.2	57.8
1987-'88	847	284	563	33.5	66.5
1988-'89	602	205	397	34.1	65.9
1989-'90	463	160	303	34.6	65.4
1990-'91	895	368	527	41.1	58.9
Total	4175	1594	2581	38.2	61.8

1987-'88 and 1989-'90. Month-wise pooled data also indicated that the composition of female was high exceeding 55% during all the months (Table 6).

TABLE 6. Month-wise sex ratio in *P. semisulcatus* landed at Tuticorin (Data from 1986-'87 to 1990-'91 pooled)

Months	No. sampled	No. of males	No. of females	Males (%)	Females (%)
Apr.	352	140	212	39.8	60.2
May	357	122	235	34.2	65.8
Jun.	479	158	321	33.0	67.0
Jul.	554	240	314	43.3	56.7
Aug.	282	122	160	43.3	56.7
Sep.	531	193	338	36.3	63.7
Oct.	153	48	105	31.4	68.6
Nov.	164	70	94	42.7	57.3
Dec.	251	97	154	38.6	61.4
Jan.	255	109	146	42.7	57.3
Feb.	338	120	218	35.5	64.5
Mar.	459	175	284	38.1	61.9
Total	4175	1594	2581	38.2	61.8

Spawning season

P. semisulcatus spawns throughout the year as indicated by the occurrence of mature females during all the months. On an average, the spawning population constituted 32.9% of the total number of females landed with the monthly composition ranging between 14.9 and 46.9%, the minimum and the maximum being in May and August respectively. The proportion of mature female was high from August to November during which period the composition ranged from 37.6 to 46.9% indicating the peak spawning activities of this species during these months (Table 7).

General remarks

The data collected during the five year period from 1986-'87 to 1990-'91 clearly show that the Green tiger prawn *P. semisulcatus* constitutes a major proportion of the prawn catches landed by mechanized trawlers at Tuticorin Fishing Harbour contributing to the commercial prawn fishery

TABLE 7. Month-wise percentage composition of mature females of *P. semisulcatus* (Data from 1986-'87 to 1990-'91 pooled)

Months	No. of females observed	No. of females in mature stage	Composition of mature females (%)
Apr.	212	61	28.8
May	235	35	14.9
Jun.	321	114	35.5
Jul.	314	85	27.1
Aug.	160	75	46.9
Sep.	338	127	37.6
Oct.	105	42	40.0
Nov.	94	37	39.4
Dec.	154	51	33.1
Jan.	146	45	30.8
Feb.	218	75	34.4
Mar.	284	102	35.9
Total	2581	849	32.9

significantly almost round the year. With an average annual landing of 149.5 tonnes constituting nearly 60% of the total prawn catches the commercial fishery of Tuticorin is supported to a very great extent by the landing of this species particularly from June to August every year. Although the resource is exploited from various grounds in the Gulf of Mannar along the Tuticorin coast the potential ground for this species appears to be off Manapad in the south and off Erwadi in the north of Tuticorin.

Females with fully developed ovary and in spent-recovering stages were recorded in sizable proportions during most of the months with maximum percentage composition from June to September. This is in agreement with what has been reported earlier for the same species from Mandapam area by Thomas (*Indian J. Fish.*, 21 (1), 1974).

Nandakumar (*Indian J. Fish.*, 27 (1 & 2), 1980) also has reported that this species is the most dominant one among various species of penaeid prawns landed at Mandapam throughout the year. But according to him the principal season in the Mandapam area was from January to June whereas in the present investigation it was from May to September. Although the peak season of the fishery varied between the two places the data collected from both the centres clearly indicate that the commercial prawn fishery of the Gulf of Mannar is supported almost exclusively by *P. semisulcatus*. An increase in the catch per effort together with an increase in the percentage composition of this species from year to year during the five year period suggest that the exploitation of this resource can be further intensified in the Gulf of Mannar.