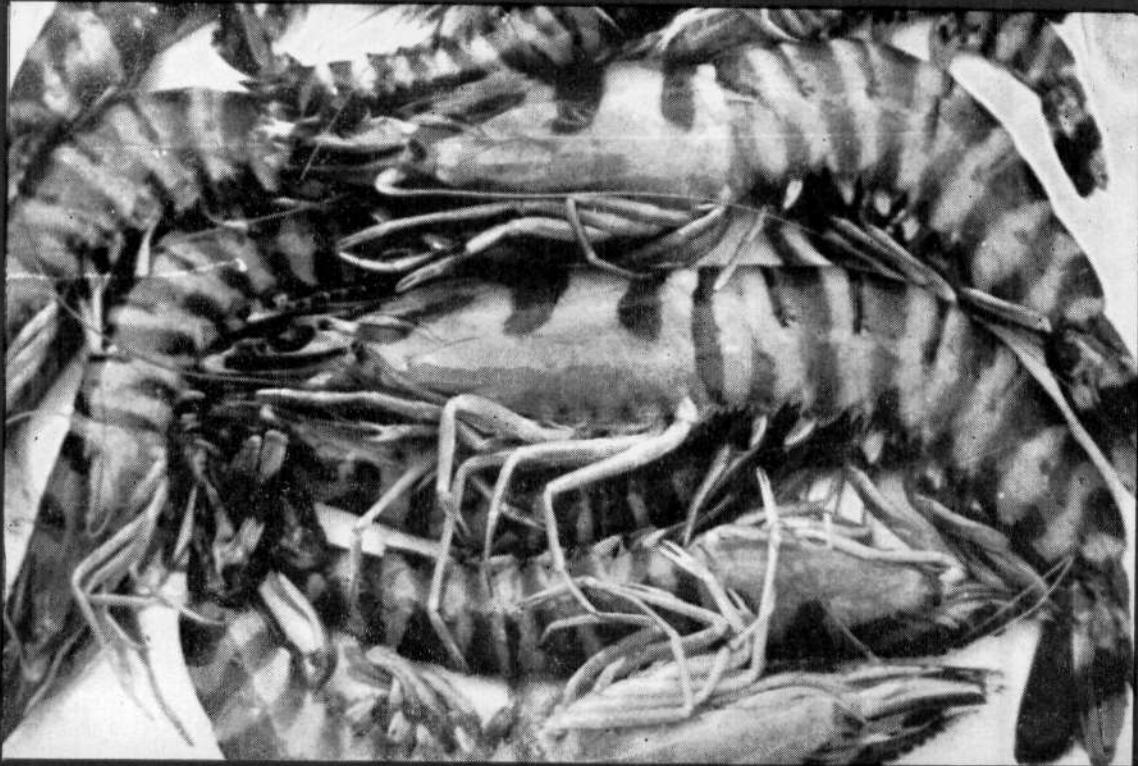




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THE MARINE FISHERIES INFORMATION SERVICE : Technical and Extension Series envisages the rapid dissemination of information on marine and brackish water fishery resources and allied data available with the Fishery Data Centre and the Research Divisions of the Institute, results of proven researches for transfer of technology to the fish farmers and industry and of other relevant information needed for Research and Development efforts in the marine fisheries sector.

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Cover photo: A collection of *Penaeus canaliculatus*, locally known as 'O.B - Zebra'.

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Cover photo: A collection of *Penaeus canaliculatus*, locally known as 'O.B - Zebra'.

SYNOPSIS OF MARINE PRAWN FISHERY OF INDIA - 1980*

Total production

During the year 1980 the total marine prawn production was estimated at 1,70,737 tonnes against 1,77,582 t in the previous year (Table 1), showing a decrease of 6,845 t (3.85%). A comparative study of the production over the past few years indicates that the trend of slight decrease from the maximum in 1975 is maintained over these years. The decrease this year is mostly brought about by reduced catches in Maharashtra State.

Considering the production of the penaeid prawns and nonpenaeid prawns separately, the same trend of slight decrease in 1980 is noticed in both categories (Table 3). During 1980 the penaeid prawn catch recorded a reduction of 1,628 t (1.43%) and the non-penaeids a decrease of 5,217 t (8.16%). The decrease in catches of both nonpenaeids and penaeids in Maharashtra State is to a certain extent compensated by the increased production of penaeids in Kerala State.

In the monthly landings of prawns (Table 4) as in previous year the minimum of 8,361 t is recorded in June and the maximum of 30,868 t in July which is more than double that of July 1979. This is mainly due to the revival of the penaeid prawn fishery of Neendakara area of Kerala coast this year in the monsoon months. During the south-west monsoon months the catches were poor in the states of Maharashtra and Gujarat while Tamil Nadu and Andhra Pradesh showed better catches. The north west coast states landed better catches in the first and last quarters of the year.

The statewide production of prawns this year also shows the maximum of 41.4% in Maharashtra, although much less than the percentage in last year, namely 57.4. The percentage contribution of Kerala State registered considerable increase, showing 31.8% of the total production (Table 1). The statewide and monthwise landings of penaeid and nonpenaeid prawns (Tables 5 and 6) indicate that penaeid prawns contribute to major part of the fishery in Karnataka, Pondicherry, Orissa and Kerala. The entire fishery of Goa and Andamans is contributed by penaeid prawns. Larger portion of the fishery in Tamil Nadu also is contributed by penaeids. In Maharashtra 66.8% of the total catch was nonpenaeid prawns with the maximum in the months of May, January and December. In Andhra Pradesh and Gujarat the nonpenaeid prawns contributed to 43.4% and 22.1% of the catches respectively. Maximum catches of nonpenaeid prawns in Andhra Pradesh are in July and August. In the case of penaeid prawns July, August

registered maximum catches in Kerala and September-November period in Maharashtra. In several states minimum catches of penaeid prawns are landed in the south west monsoon months.

In the overall species composition (Table 2) *Parapenaeopsis stylifera* ranked first (29.8%) as against *Acetes indicus* of the previous year which has been relegated to a second position this year. This was mainly due to the heavy landings of the former species along the coasts of Kerala from where alone an equal amount of the total landings of the species recorded for the previous year was obtained. In the case of the sergestid shrimp, the overall production as well as percentage showed marginal improvement over that of the previous year. The other major species in the order of their abundance were *Metapenaeus dobsoni*, *Nematopalaemon tenuipes*, *Penaeus indicus*, *M. affinis*, *Solenocera crassicornis* and *M. monoceros* which collectively accounted for 31.5% of the total production. While the fishery showed improvement in respect of species such as *M. dobsoni*, *P. indicus* and *M. monoceros* this year, considerable decline in catch was noticed in the case of *N. tenuipes*, *M. affinis* and *S. crassicornis* over that of the previous year. Among the three dominant species mentioned above *P. stylifera* was mostly harvested from the coasts of Kerala, Maharashtra, Gujarat and Karnataka, *A. indicus* from Maharashtra and Gujarat and *M. dobsoni* from Kerala, Karnataka and Tamil Nadu. The annual percentage distribution of important species at different observation centres during 1980 is shown in Table 7.

Gearwise production

Shrimp trawls operated by small and medium sized vessels continued to be the major gear employed for the exploitation of prawns. When compared with the previous year there has been a decline to the tune of about 18% in the total trawler trips operated in the fishery of this year, mainly brought about by the reduced fishing input along the coasts of Maharashtra, Karnataka, Tamil Nadu and Andhra Pradesh. Of the total catch of 1,70,737 t of prawns landed during this year 87,956 t were contributed by the trawlers forming 51.5% and the rest by the indigenous gears such as fixed bag nets, gill-nets, seines and others. While most of the states recorded lower production of prawns in shrimp trawls, Gujarat and Kerala witnessed considerable improvement in the

* Prepared by Crustacean Fisheries Resources team

Table 1. Statewise prawn landings and percentage contributions during 1980 and 1979

Maritime States	Prawn landings in tonnes		Percentage	
	1980	1979	1980	1979
Gujarat	18,590	11,953	10.8	6.7
Maharashtra	70,742	1,01,846	41.4	57.4
Goa	1,853	1,594	1.0	0.9
Karnataka	3,226	4,660	1.8	2.6
Kerala	54,375	29,597	31.8	16.7
Tamil Nadu	10,028	11,119	5.8	6.3
Pondicherry	527	604	0.3	0.3
Andhra Pradesh	10,006	11,814	5.8	6.7
Orissa	1,104	3,017	0.6	1.7
West Bengal	200	571	0.1	0.3
Andamans	54	64	-	-
Larger trawlers	32	743	-	0.4
All India Total	1,70,737	1,77,582	100	100

Table 2. Species wise break-up of prawn landings and percentages during 1980

Species	All India landings in tonnes	Percentage
<i>Solenocera crassicornis</i>	6,388.5	3.7
<i>Penaeus indicus</i>	10,298.2	6.0
<i>P. merguensis</i>	495.9	0.3
<i>P. monodon</i>	2,655.8	1.6
<i>P. semisulcatus</i>	1,712.5	1.0
<i>P. penicillatus</i>	932.8	0.6
<i>Metapenaeus dobsoni</i>	18,998.1	11.1
<i>M. affinis</i>	7,231.7	4.2
<i>M. monoceros</i>	5,607.9	3.3
<i>M. brevicornis</i>	835.7	0.5
<i>M. kutchensis</i>	1,534.9	0.9
<i>Parapenaeopsis stylifera</i>	50,829.0	29.8
<i>P. hardwickii</i>	2,214.0	1.3
<i>Acetes indicus</i>	41,282.4	24.2
<i>Nematopalaemon tenuipes</i>	12,653.7	7.4
<i>Exopalaemon styliferus</i>	1,276.9	0.7
<i>Exhippolysmata ensirostris</i>	3,091.5	1.8
Other species	2,697.5	1.6
Total	1,70,737.0	100.0

Table 3. Statewise penaeid and non-penaeid prawn landings and their percentage for 1980 and 1979

Maritime States	Landings in tonnes and percentage							
	1980				1979			
	Penaeid		Non-penaeid		Penaeid		Non-penaeid	
	Catch	%	Catch	%	Catch	%	Catch	%
Gujarat	14,481	12.9	4,109	7.0	8,606	7.6	3,347	5.2
Maharashtra	23,433	20.9	47,309	80.5	45,638	40.2	56,208	87.9
Goa	1,853	1.6	-	-	1,594	1.4	-	-
Karnataka	3,098	2.7	128	0.2	4,654	4.1	6	-
Kerala	52,633	46.9	1,742	2.9	29,522	26.0	75	0.1
Tamil Nadu	9,082	8.1	946	1.6	10,222	9.0	897	1.4
Pondicherry	485	0.4	42	-	532	0.5	72	0.1
Andhra Pradesh	5,660	5.0	4,346	7.4	8,697	7.6	3,117	4.9
Orissa	1,074	0.9	30	-	2,983	2.6	34	-
West Bengal	152	0.1	48	-	410	0.4	161	0.3
Andamans	54	-	-	-	64	-	-	-
Larger Trawlers	32	-	-	-	743	0.6	-	-
All India total	1,12,037	100	58,700	100	1,13,665	100	63,917	100

catches over those of the previous year. A noteworthy feature observed in the fishery of Kerala is that although the trawl fishery suffered a set back in the previous year as a result of low production of 'Karikkadi' (*Parapeneopsis stylifera*) at Neendakara (Sakthikulangara) it revived considerably this year with nearly two-fold increase in the landings brought about by the successful monsoon fishery of this centre. The statewise percentage contributions of the annual trawler catch of this year as well as the previous year (in parenthesis) were: Kerala - 52.4 (30.3), Maharashtra - 17.1 (37.1), Gujarat - 11.7 (6.5), Tamil Nadu - 7.3 (9.4), Andhra Pradesh - 4.4 (6.1), Karnataka - 3.4 (4.9), Goa - 2.0 (1.8), Orissa - 1.0 (2.5) and Pondicherry - 0.4 (0.5).

The trend of prawn landings by commercial shrimp trawlers which accounted for the bulk of the penaeid

prawns of the country, in relation to effort and the total prawn catch, is depicted in Fig. 1. In the total prawn landings these nets accounted for the major share in Karnataka (94.7%), Goa (92.1%), Kerala (84.8%), Pondicherry (81.4%), Orissa (76.3%), Tamil Nadu (64.1%) and Gujarat (55.4%). Their contributions in Maharashtra (21.3%) and Andhra Pradesh (38.8%) were relatively very low. The peak landings were recorded during February in Goa, March in Orissa, May and August in Andhra Pradesh, June in Tamil Nadu and Pondicherry, July and August in Kerala, September in Karnataka and October in Gujarat and Maharashtra. Landings by the indigenous gears accounted for the bulk of the prawn catch in Maharashtra (Fixed bag nets) and Andhra Pradesh (Seines).

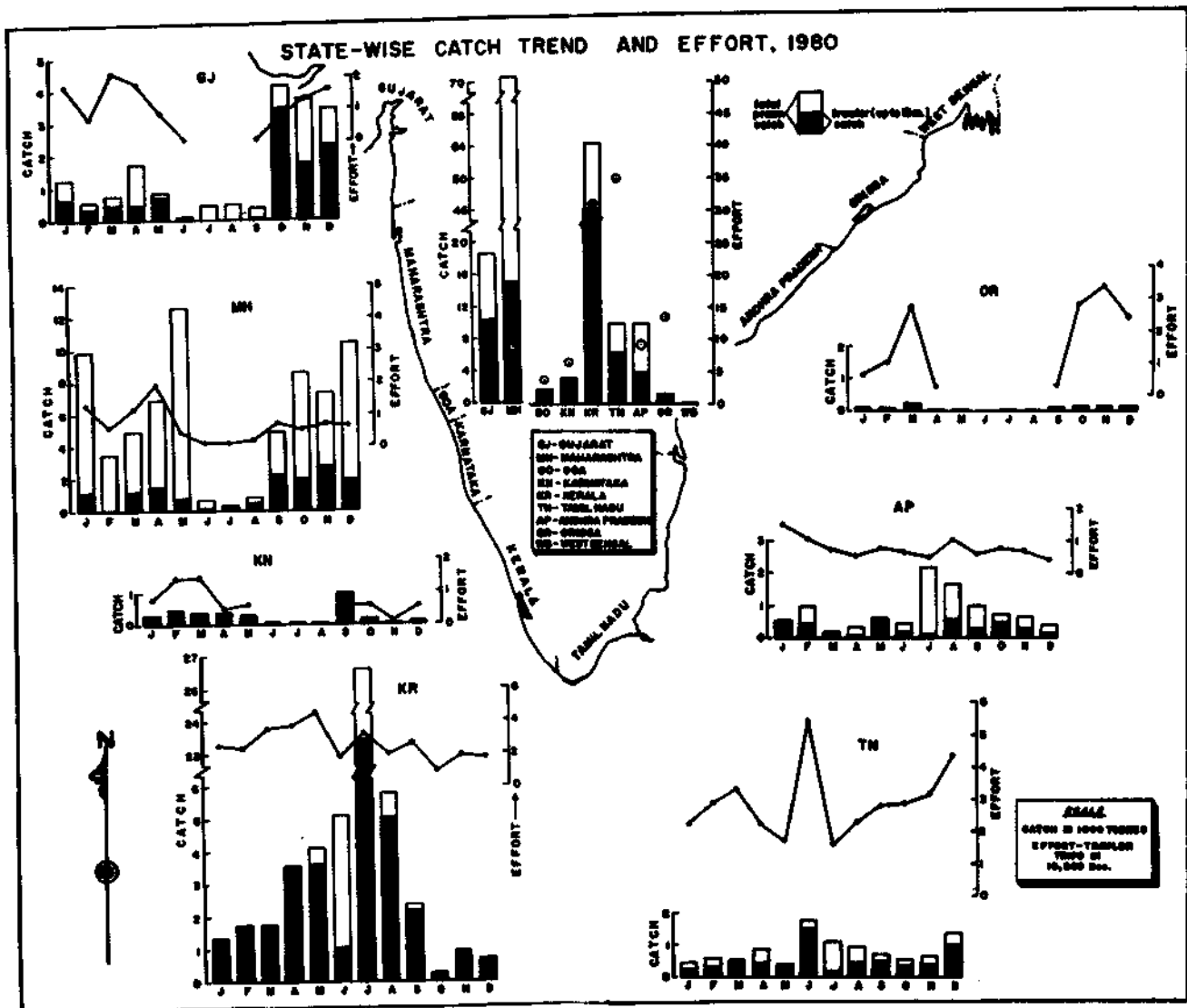


Fig. 1. Prawn landings by commercial shrimp trawlers in relation to the total prawn catch and the fishing effort during 1980.

Table 4. Monthly prawn landings in different maritime states during 1980

Maritime States	Prawn catch in tonnes												EFP/ Larger Trawlers	Total for 1980
	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
Gujarat	1,269	611	738	2,039	839	127	486	484	422	4,206	3,818	3,552	-	18,590
Maharashtra	9,895	3,548	4,887	6,886	12,551	654	366	831	4,866	8,574	7,325	10,359	-	70,742
Goa	245	546	258	169	166	8	1	111	80	74	40	155	-	1,853
Karnataka	312	472	389	337	302	24	24	41	988	180	24	131	2	3,226
Kerala	1,376	1,752	1,740	3,592	4,103	5,138	26,599	5,803	2,348	285	944	695	-	54,375
Tamil Nadu	434	635	562	849	416	1,725	1,159	979	734	544	640	1,351	-	10,028
Pondicherry	22	42	38	5	39	254	12	18	27	10	23	37	-	527
Andhra Pradesh	554	1,028	205	388	663	427	2,197	1,648	1,000	751	631	394	120	10,006
Orissa	92	115	262	37	40	-	20	2	105	132	160	139	-	1,104
West Bengal	188	-	12	-	-	-	-	-	-	-	-	-	-	200
Andamans	4	5	7	4	5	4	4	4	5	4	4	4	-	54
Larger trawlers	-	-	-	-	-	-	-	-	-	-	-	-	32	32
All India total	14,391	8,754	9,098	14,306	19,124	8,361	30,868	9,921	10,575	14,759	13,609	16,817	154	1,70,737
Month wise percentage	8.4	5.1	5.3	8.3	11.2	4.9	18.0	5.8	6.2	8.6	7.9	9.8		

Table 5. Penaeid prawn landings in different maritime states during 1980

Maritime states	Prawn catch in tonnes												EFP/ Larger Trawlers	Total for 1980
	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
Gujarat	712	581	514	854	523	122	410	484	371	3,846	3,461	2,603	-	14,481
Maharashtra	1,659	1,121	1,557	2,482	1,002	110	196	704	4,003	4,054	3,859	2,686	-	23,433
Goa	245	546	258	169	166	8	1	111	80	74	40	155	-	1,853
Karnataka	312	367	389	336	286	24	24	41	984	179	24	131	1	3,098
Kerala	1,373	1,737	1,729	3,526	4,103	4,762	25,376	5,770	2,348	285	944	680	-	52,633
Tamil Nadu	424	632	506	797	381	1,687	542	964	721	508	586	1,334	-	9,082
Pondicherry	22	42	24	5	31	251	12	18	27	10	23	20	-	485
Andhra Pradesh	518	968	175	104	411	299	278	772	682	622	321	390	120	5,660
Orissa	90	99	260	27	40	-	20	2	105	132	160	139	-	1,074
West Bengal	152	-	-	-	-	-	-	-	-	-	-	-	-	152
Andamans	4	5	7	4	5	4	4	4	5	4	4	4	-	54
Larger Trawlers	-	-	-	-	-	-	-	-	-	-	-	-	32	32
All India total	5,511	6,098	5,419	8,304	6,948	7,267	26,863	8,870	9,326	9,714	9,422	8,142	153	1,12,037
Month wise percentage	4.9	5.4	4.8	7.4	6.2	6.5	23.9	7.9	8.3	8.7	8.4	7.3		

Table 6. Non-penaeid prawn landings in different maritime states during 1980

Maritime States	Prawn catch in tonnes												EFP/ Larger Trawlers	Total for 1980
	Jan.	Feb.	Mar.	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.		
Gujarat	557	30	224	1,185	316	5	76	-	51	359	357	949	-	4,109
Maharashtra	8,236	2,427	3,330	4,404	11,549	544	170	127	863	4,520	3,466	7,673	-	47,309
Goa	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Karnataka	-	105	-	1	16	-	-	-	4	1	-	-	1	128
Kerala	3	15	11	66	-	376	1,223	33	-	-	-	15	-	1,742
Tamil Nadu	10	3	56	52	35	38	617	15	13	36	54	17	-	946
Pondicherry	-	-	14	-	8	3	-	-	-	-	-	17	-	42
Andhra Pradesh	36	60	30	284	252	128	1,919	876	318	219	310	4	-	4,346
Orissa	2	16	2	10	-	-	-	-	-	-	-	-	-	30
West Bengal	36	-	12	-	-	-	-	-	-	-	-	-	-	48
Andamans	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Larger Trawlers	-	-	-	-	-	-	-	-	-	-	-	-	-	-
All India total	8,880	2,656	3,679	6,002	12,176	1,094	4,005	1,051	1,249	5,045	4,187	8,675	1	58,700
Month wise percentage	15.1	4.5	6.2	10.2	20.7	1.8	6.8	1.8	2.1	8.5	7.1	14.8		

Table 7. Annual percentage distribution of important species in the prawn landings at different centres during 1980

Centres	Penaeids											
	<i>S. crassi-</i> <i>cornis</i>	<i>P. indicus</i>	<i>P. mono-</i> <i>don</i>	<i>P. semi-</i> <i>sulcatus</i>	<i>P. merg-</i> <i>uensis</i>	<i>M. dobsoni</i>	<i>M. affinis</i>	<i>M. mono-</i> <i>ceros</i>	<i>M. breui-</i> <i>cornis</i>	<i>M. kutch-</i> <i>ensis</i>	<i>P. styli-</i> <i>fera</i>	<i>P. hard-</i> <i>wickii</i>
Veraval	17.4	-	-	-	-	-	4.6	5.1	-	10.6	44.7	10.4
Bombay	15.3	-	-	-	-	-	21.6	5.6	1.0	-	51.2	2.8
Karwar	-	1.9	-	-	-	25.4	6.0	20.4	-	-	46.2	-
Mangalore	-	7.8	0.7	-	-	49.4	6.1	6.1	-	-	29.8	-
Calicut	-	14.9	-	-	-	25.8	-	2.9	-	-	56.3	-
Cochin	-	18.1	-	-	-	59.6	0.7	-	-	-	21.6	-
Neendakara	-	3.3	-	-	-	3.2	1.2	0.9	-	-	91.0	-
Madras	-	29.8	20.2	17.9	-	16.6	-	15.5	-	-	-	-
Kakinada	-	9.4	7.9	-	-	12.8	7.8	15.5	10.3	-	10.6	-
Puri	-	30.1	-	-	57.8	-	12.1	-	-	-	-	-
Non-penaeids												
	<i>A. indicus</i>			<i>E. styliferus</i>			<i>N. tenuipes</i>			<i>E. ensirostris</i>		
Veraval	67.2			-			23.1			9.7		
Bombay	73.4			-			22.9			3.7		
Kakinada	24.6			36.4			14.7			24.3		

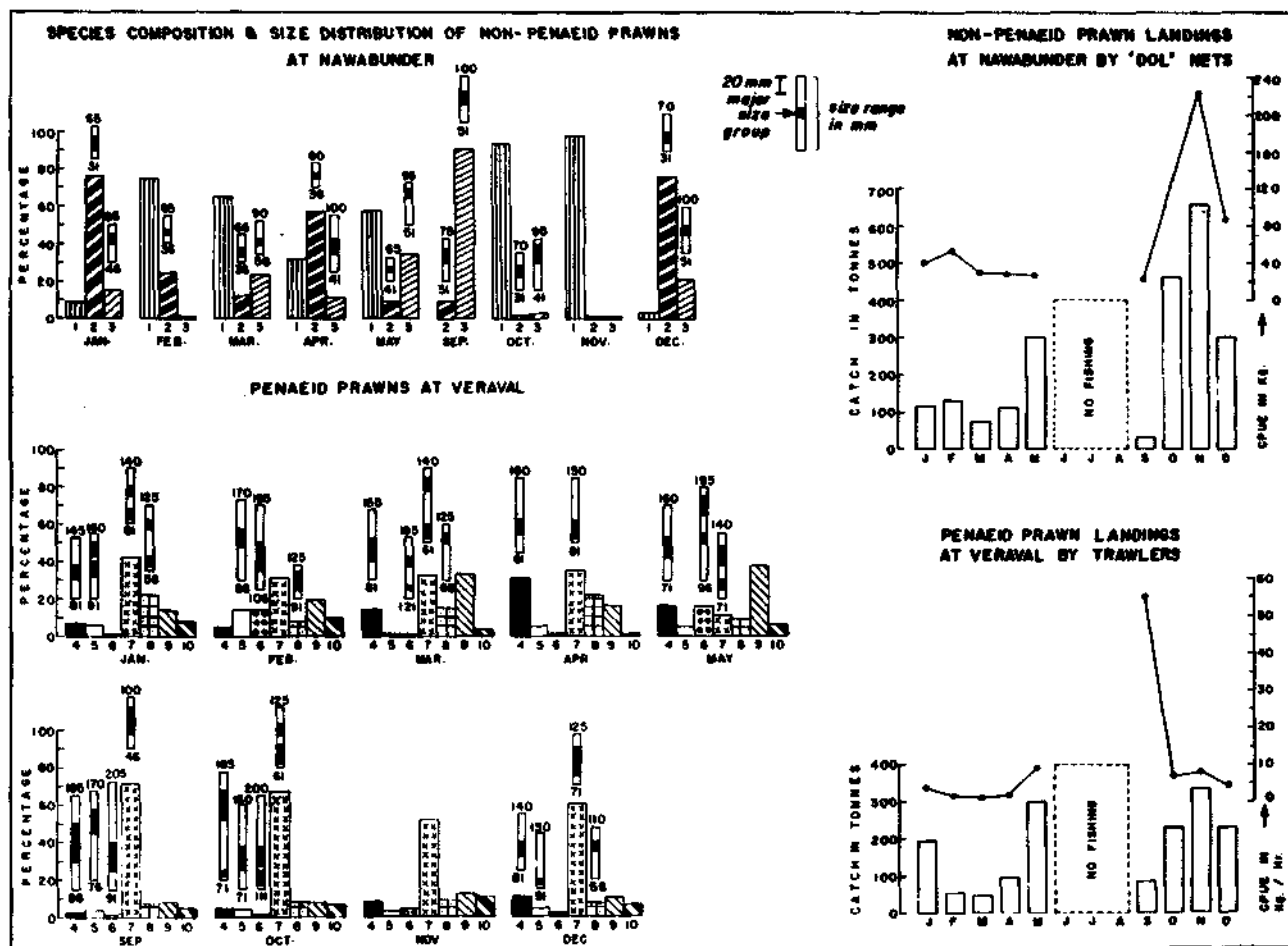


Fig. 2. Catch trend, species composition and size distribution of important species of prawns at Veraval during 1980.

1. *A. indicus*, 2. *N. tenuipes*, 3. *E. ensirostris*, 4. *M. kutchensis*, 5. *M. affinis*, 6. *M. monoceros*, 7. *P. stylifera*, 8. *P. hardwickii*, 9. *S. crassicornis*, 10. Others.

Biological aspects at selected centres

Veraval (Fig. 2)

With an estimated production of 1,590 t of penaeid prawns, shrimp trawling at this centre was active throughout the non-monsoon period. The annual average catch/hour worked out to 4.39 kg, with maximum abundance in May and October–December period. In September, an unusually higher rate of yield was recorded for a few days. *Parapenaeopsis stylifera* (44.7%), *Solenocera crassicornis* (17.4%), *P. hardwickii* (10.4%), *Metapenaeus kutchensis* (10.0%), *M. monoceros* (5.1%), *M. affinis* (4.6%) and *Penaeus penicillatus* (2.6%) were the major species that contributed to the fishery. *S. crassicornis* was landed in enormous quantities during May and this was mainly responsible for the higher catch rates recorded in that month. The major size groups in the catches were 66–120 mm for *P. stylifera*, 61–70 mm and 91–120 mm for *P. hardwickii*, 141–195 mm for *P. penicillatus* and 91–135 mm for *M. kutchensis*. The mean sizes of *M. monoceros* and *M. affinis* ranged from 129.7 mm to 164.5 mm and

105.5 mm to 136.3 mm respectively. For most of the species peak spawning activities were noticed during January–May (Fig. 10).

The non-penaeid prawn fishery, as observed at Nawabunder, was also active throughout the non-monsoon period. An estimated quantity of 1,971 t of these prawns caught by 'Dol' nets at an average CPUE of 77.55 kg was composed of *Acetes indicus* (67.2%), *Nematopalaemon tenuipes* (23.1%) and *Exhippolysmata ensirostris* (9.7%). Peak landings were recorded during October–December.

Bombay (Fig. 3)

At New Ferry Wharf (previously Kasara Bunder) the trawler landings of penaeid prawns amounted to 6,431 t at an average catch rate of 319.5 kg/unit as against 358.8 kg of the previous year. The monthly production exceeded 1,000 t during September–December with a maximum of 1,400 t in November when the catch rate worked out to 609.2 kg. *P. stylifera* (51.2%) and *M. affinis* (21.6%) accounted for the bulk of the landings. *S.*

crassicornis (15.3%), which ranked third in abundance, dominated in the fishery from March to July. *M. monoceros* (5.6%), *P. hardwickii* (2.8%) and *M. brevicornis* (1.0%) were the other components in the catches. The major size groups of important species were 71-115 mm for *P. stylifera*, 111-145 mm for *M. affinis* and 61-110 mm for *S. crassicornis*. Peak spawning activities for the former two species were observed during January and November-December.

The 'Dol' net fishery, which accounts for the major portion of non-penaeid prawn landings of the region, was active throughout the year at Sassoon Dock and only during the non-monsoon period at Versova. An estimated quantity of 4,645 t of non-penaeid prawns landed at these two centres was considerably less than the production of the previous year (5,894 t). While the annual average CPUE did not show any change over that of the previous year at Versova, the same for Sassoon Dock registered a sharp decline from 135.4 kg to 69.3 kg

this year. *Acetes indicus* contributed 73.4% at Sassoon Dock and 63.7% at Versova, followed by *Nematopalaemon tenuipes* and *Exhippolysmata ensirostris* in the order of their abundance. Peak breeding activities were noticed during July for *N. tenuipes* and August & May for *E. ensirostris*.

Karwar (Fig. 4)

With an estimated catch of 562.4 t the prawn fishery at Karwar indicated an improvement over the fishery of previous year in which the total catch was 495.3 t. The fishery was sustained mainly by trawlers, contributing nearly 98.6% of the total prawn catch and was continuous till May when the peak landing of 192.6 t and catch per hour of 36.7 kg was recorded.

P. stylifera, in sizes ranging between 51-130 mm in females and 71-115 mm in males was dominating in the catch in percentage of 46.2 contrasting the status of the fishery for the previous year, when *M. dobsoni*

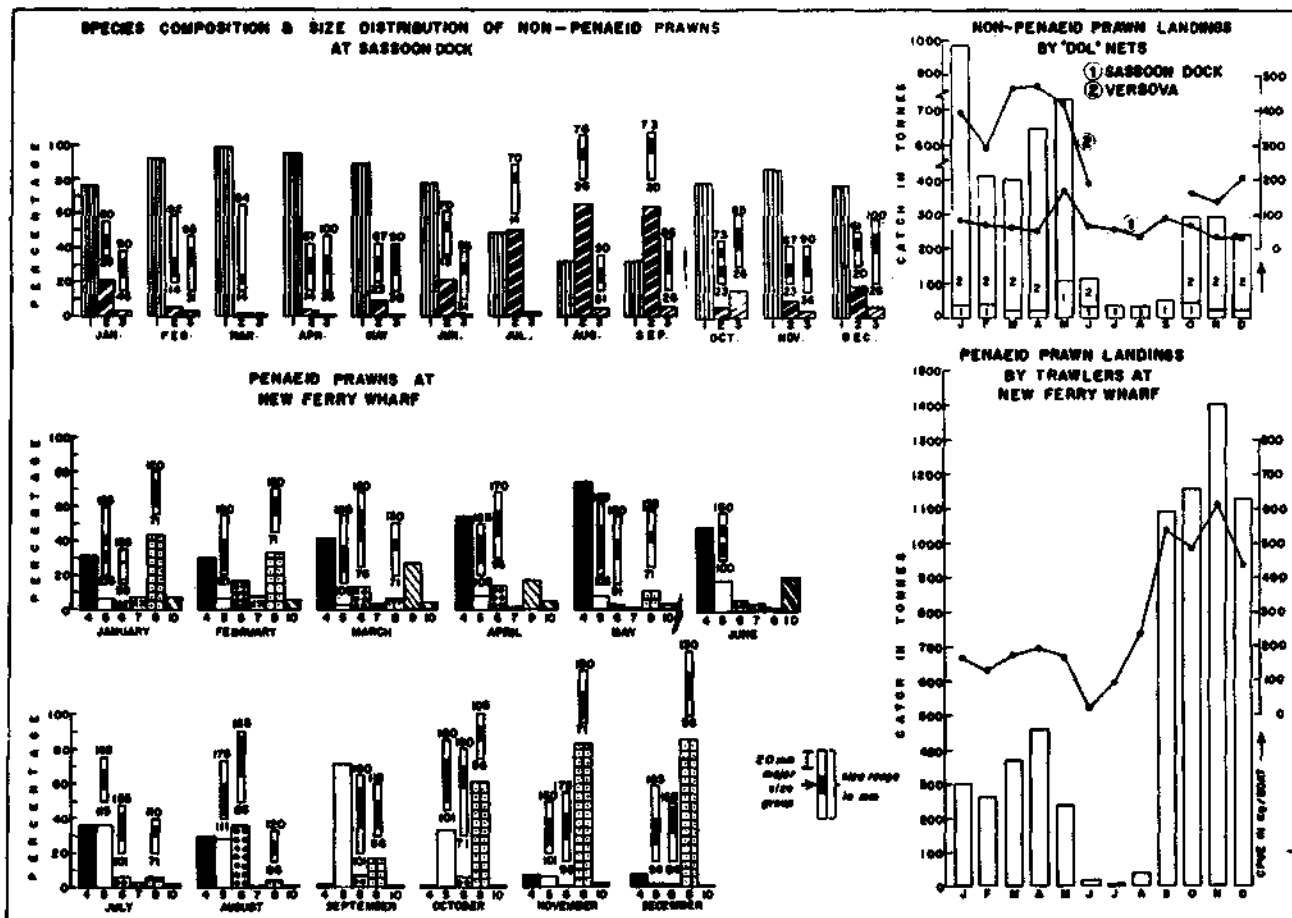


Fig. 3. Catch trend, species composition and size distribution of important species of prawns at Bombay during 1980.

1. *A. indicus*, 2. *N. tenuipes*, 3. *E. ensirostris*, 4. *S. crassicornis*, 5. *M. affinis*, 6. *M. monoceros*, 7. *M. brevicornis*, 8. *P. stylifera*, 9. *P. hardwickii*, 10. Other penaeids.

constituted the bulk of the catch by a percentage of nearly 36.0. In case of *P. stylifera*, the principal modes were at 51-55 mm, 71-75 mm and 86-90 mm in females and 71-75 mm and 86-90 mm for males. *M. dobsoni*, *M.*

monoceros and *M. affinis* were the next important species in order of abundance in percentages of 25.4, 20.4 and 6.4 respectively.

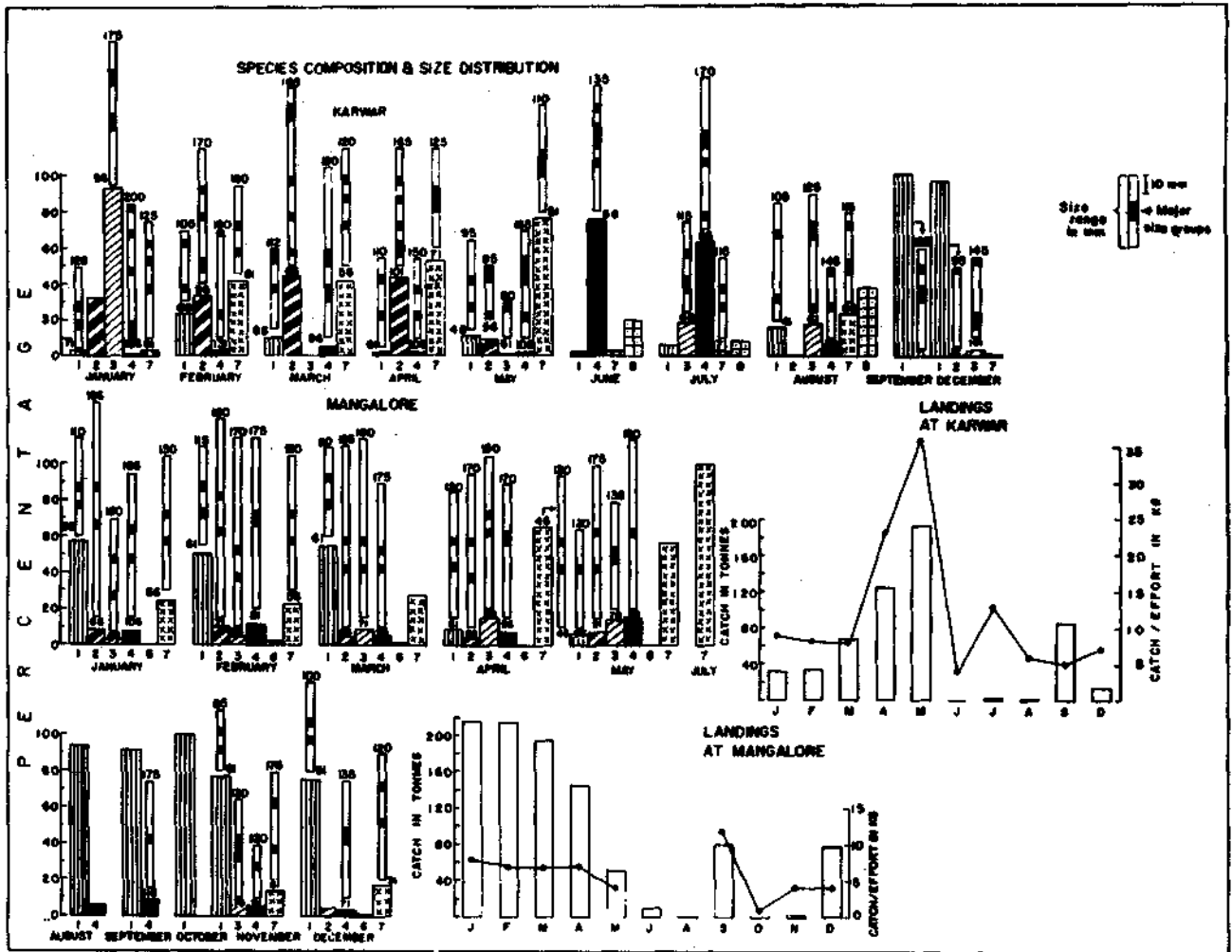


Fig. 4. Catch trend, species composition and size distribution of important species of prawns at Karwar and Mangalore during 1980.

1. *M. dobsoni*, 2. *M. monoceros*, 3. *M. affinis*, 4. *P. indicus*, 6. *P. monodon*, 7. *P. stylifera*.

The monsoon prawn fishery contributed mainly by the shore-seine, 'Yendi', accounted for a total catch of 5.8 t, of which *P. indicus* alone constituted nearly 44.0 percent.

Mangalore (Fig. 4)

The trawl fishery declined marginally during the year with an estimated annual landing of 979.7 t and catch per hour of 6.9 kg against the total catch of 1297.4 t and CPUE of 7.5 kg of the previous year. The maximum yield of 216.6 t was recorded during January having catch rate at 8.1 kg per hour. The CPUE was at the highest rate of 12.6 kg during September. The post monsoon fishery declined to such an extent during October and November when total yield came to only 0.2 t and 2.2 t respectively.

M. dobsoni constituted the dominating species in the catch forming nearly 49.4 percent. *P. stylifera* was the next species in order of abundance, constituting 30.0% of the total catch. *P. indicus* contributed to the fishery in a lesser percentage of 7.8 and *M. affinis* and *M.*

monoceros in 6.1% each. In *M. dobsoni* the sizes were ranging between 51-120 mm, with modes in 71-75 mm and 96-100 mm groups for males and females respectively.

Calicut (Fig. 5)

As in the previous year the prawn fishery by trawls continued in the same magnitude for the first half of the year with a revival for short period of December and long break of about five months from July to November. The estimated total catch was recorded at 355.0 t and the catch per hour as 6.8 kg as against the total catch of 338.0 t of the previous year. When April recorded the maximum catch of 111.5 t, the highest rate of catch per hour of 43.3 kg was noted in June. The monsoon prawn fishery by indigenous gears yielded the maximum catch in July with an estimated total catch of 13.6 t and this mainly consisted of *M. dobsoni* (96.0 percent).

P. stylifera dominated in the trawl catch (56.3 percent), with size ranges of 46-130 mm. *M. dobsoni*, in

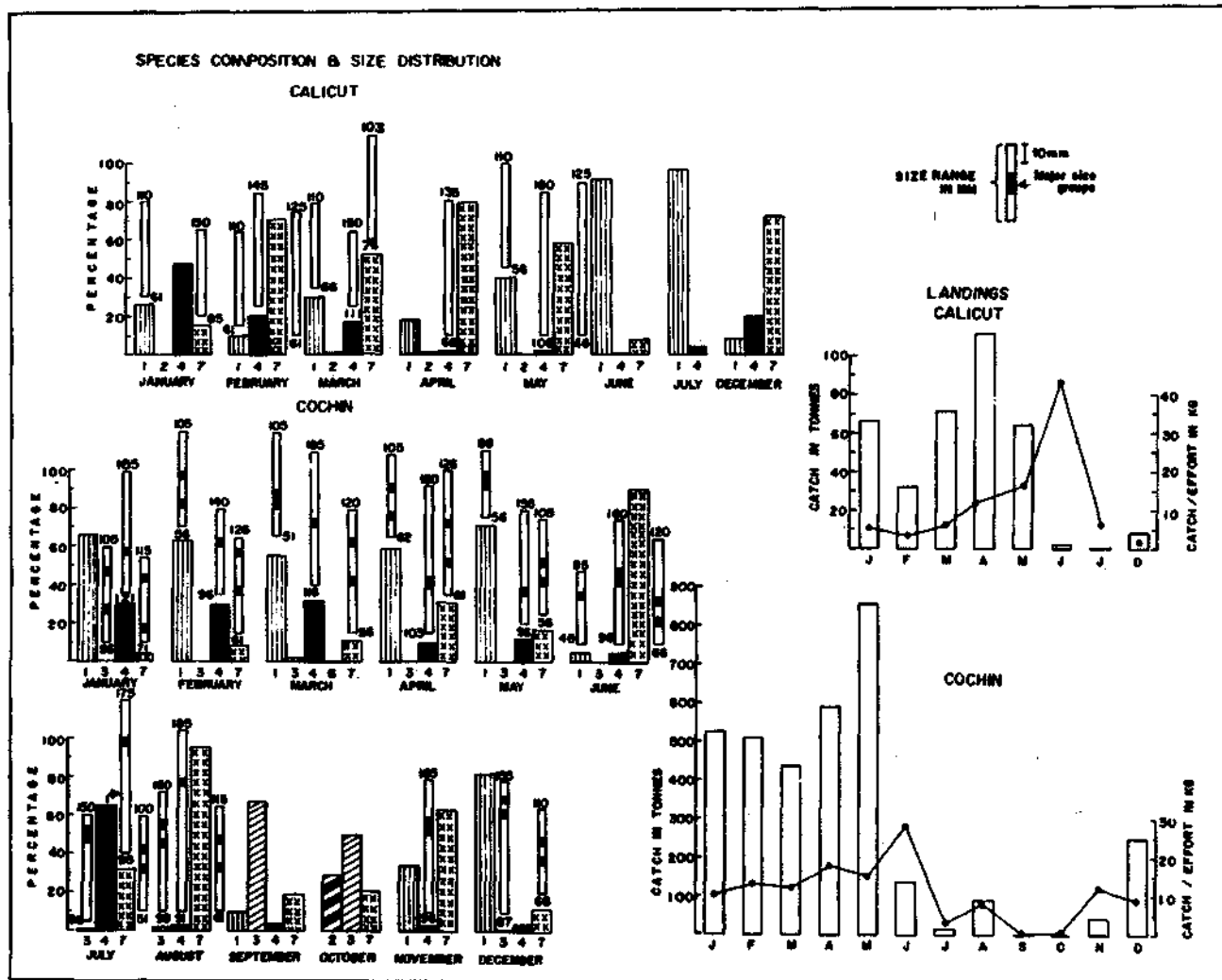


Fig. 5. Catch trend, species composition and size distribution of important species of prawns at Calicut and Cochin during 1980.
1. *M. dobsoni*, 2. *M. monoceros*, 3. *M. affinis*, 4. *P. indicus*, 6. *P. semisulcatus*, 7. *P. stylifera*.

length range of 56–110 mm was the second dominant species in the catch in percentage of 25.8. *P. indicus* were present in the catch in a lesser percentage of 15.0 in which sizes ranged from 66 to 180 mm.

Cochin (Fig. 5)

The annual estimated prawn catch at Cochin amounted to 3465.7 t with a CPUE of 12.9 kg per fishing hour as compared to the total landings of 3369.8 t and catch rate of 12.6 kg in previous year. May recorded the maximum catch of 855.6 t of which *M. dobsoni* alone constituted nearly 71.0 percent. During the monsoon prawn fishery, the peak landing of 137.2 t has been recorded during June with the highest catch rate of 28.0 kg for the year. The post-monsoon prawn fishery suffered a setback to such an extent that the total yield came down to even 0.3 t during October and reviving to a fairly good status with a total yield of 249.6 t in December.

M. dobsoni in size range of 46–105 mm with

principal modes at 71–75 mm and 81–85 mm for males and females respectively was the dominating species for most of the period. They were dominating in percentages of 66.3, 58.5, 70.9 and 82.4 during January, April, May and December respectively. However, during monsoon *P. stylifera* constituted the bulk of the catch in percentages of 89.8 in June and 95.0 in August. The size ranges were 51–120 mm with modes at 81–85 mm and 96–100 mm for males and females respectively of the same species. *P. indicus* was occurring in fairly good percentages of 29.6, 28.6 and 32.0 during January, February and March respectively. In *P. indicus* length frequencies varied between 91–185 mm with modes at 131–135 mm for males and 151–155 mm for females.

Neendakara (Fig. 6)

The total prawn landings at Neendakara (Sakthikulangara) was estimated at 36,557.9 t with an annual catch rate of 43.1 kg as against the estimated total catch of 14,582.0 t and CPUE of 20.1 kg of the previous year. As

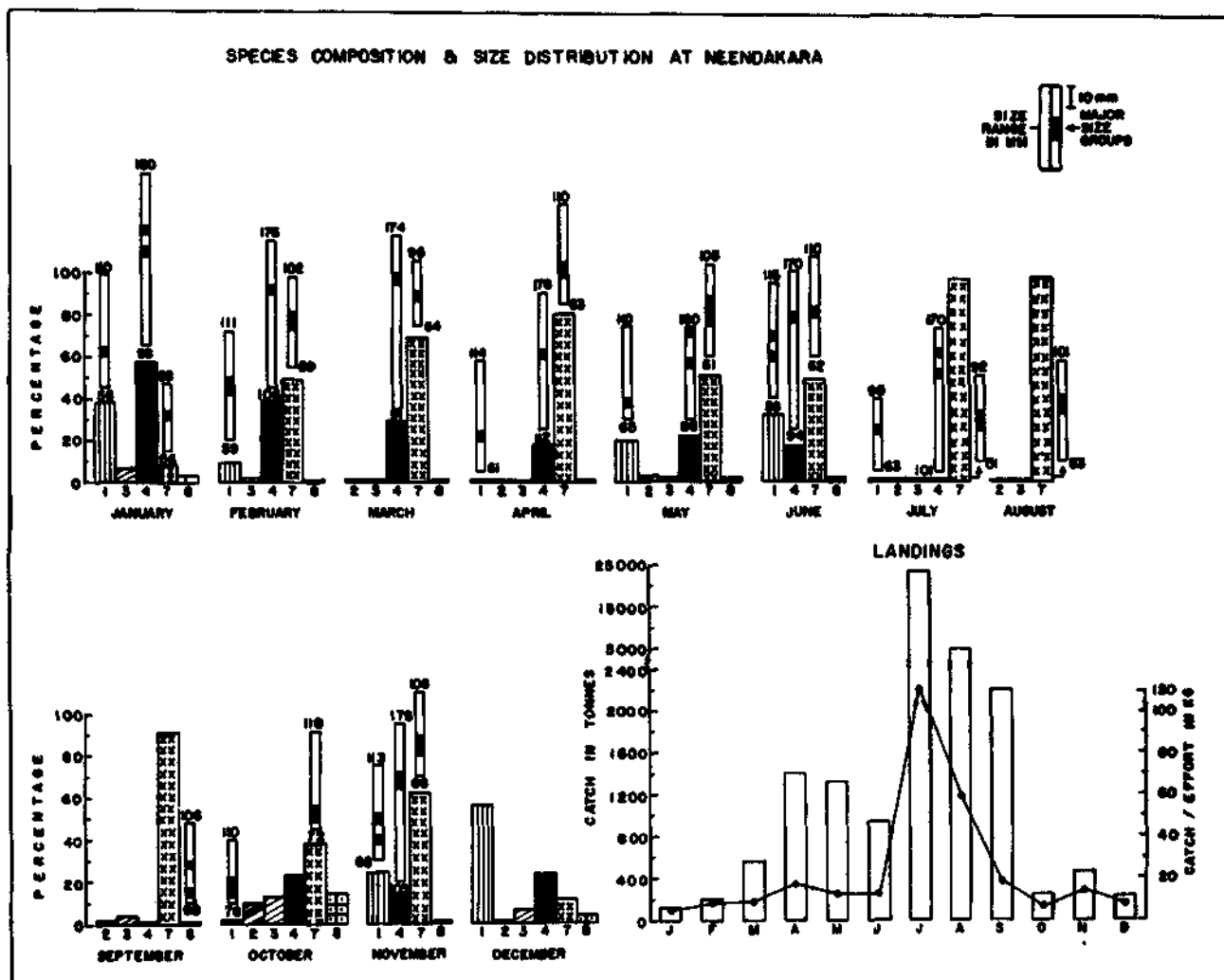


Fig. 6. Catch trend, species composition and size distribution of important species of prawns at Neendakara during 1980.
1. *M. dobsoni*, 2. *M. monoceros*, 3. *M. affinis*, 4. *P. indicus*, 7. *P. stylifera*, 8. Others.

in the previous year the fishery was at its peak during monsoon, in the month of July, when the total yield was estimated at 23,900.8 t of which *P. stylifera* alone contributed to 23,228.8 t. The highest rate of catch of 151.24 kg also had been noted during the month of July. The lowest catch rate of 5.7 kg and 5.3 kg were noted during October and January respectively.

P. stylifera occurring in size ranges of 51–118 mm with common modes at 71–75 mm for both the sexes was dominating in the catch in a percentage of 91.0. *P. indicus* and *M. dobsoni* were the next important species in percentages of 3.3 and 3.0 respectively. *P. indicus* occurred in size ranges of 94–180 mm with dominant size groups in 151–155 mm for both the sexes. In the case of *M. dobsoni*, 56–115 mm was the range in sizes and modes were at 81–85 mm for males and 86–90 mm for females.

Tuticorin

The prawn fishery was better during the period under report than that of the previous year. The catch

from January to October was 1014 t as against 404 t of the previous year. This was due to the landings of mechanised boats operated off Manapad at the Tuticorin Fishing Harbour. The average catch per hour was nearly double (3.23 kg/hr) than that of the previous year, the maximum being in July (5.43 kg/hr) during which period maximum number of boats also operated. The lowest catch per hour was in February.

The constituent species in the fishery were *P. indicus* (42.68%), *P. semisulcatus* (39.07%) and *M. dobsoni* (8.15%). Peak landings of *P. indicus* was in July and that of *P. semisulcatus* in August.

The common sizes encountered in the fishery in the case of *P. indicus* was 96–185 mm in males and 110–230 mm in females. The dominant size in males was 126–170 mm while it was 121–200 mm in females. In *P. semisulcatus* the size ranges in males and females were 81–180 mm and 81–220 mm, respectively. The modal sizes were 111–150 mm in males and 121–191 mm in females.

During the first quarter, immature prawns dominated the catches denoting the recruitment period of both the species.

The majority of females of *P. indicus* were mature during January, September and October, indicating peak spawning activities. In *P. semisulcatus* more than 50% of the females were mature throughout the year, with peak spawning activity in August to October.

Mandapam

The prawn landing at Mandapam was less (25.02 t) during the first two months of the year than that of the corresponding period of previous year (34.08 t). The mechanized boats operated in the night. About 62% of the prawn landed was *P. semisulcatus*, the rest being *M. affinis*. *P. merguensis* appeared sporadically in the catches. During the third quarter of the year fishing operations were done only in Palk Bay, although in the last quarter about 50% of the boats operated in the Gulf of

Mannar also. The estimated landings during the second half was 176.7 t with catch per unit of 12.86 kg. The percentage of *P. semisulcatus* in the catches varied from 90 in the third quarter to 55 in the last quarter.

During the first quarter the females of *P. semisulcatus* exhibited a size range of 91-175 mm with modes at larger sizes of 151 mm to 170 mm. In males the size variation was from 91-151 mm, the dominant size being 121-151 mm. The larger sizes in the last quarter were 106-181. The size range in *M. affinis* was 106-140 mm in the last quarter.

Mature females of *P. semisulcatus* dominated the catches in the first and last quarters. But, the females of *M. affinis* were mostly immature.

Madras (Fig. 7)

The prawn catch was less (183.02 t) during the year than that of the previous year (283.34 t). The most

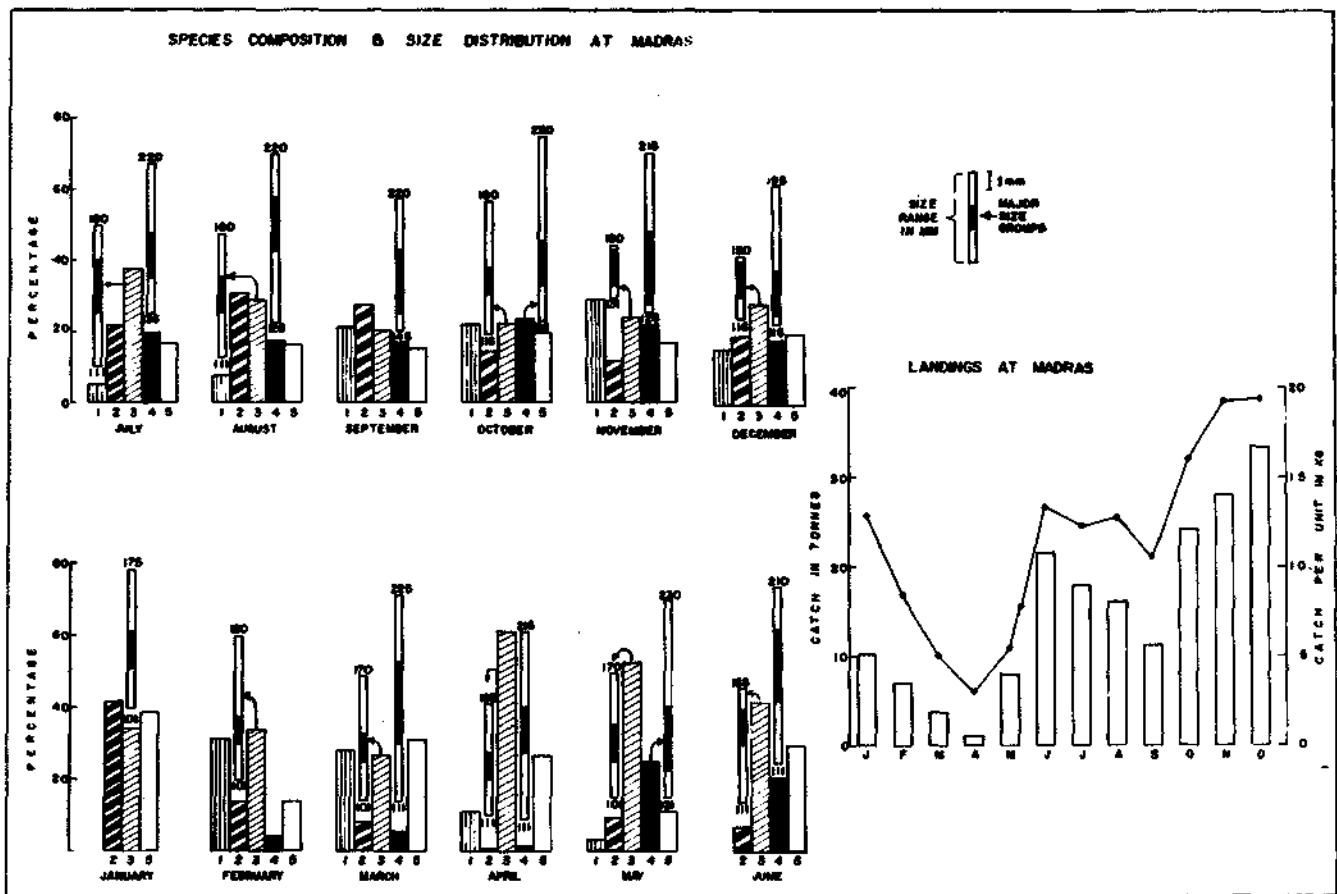


Fig. 7. Catch trend species composition and size distribution of important species of prawns at Madras during 1980.

1. *M. dobsoni*, 2. *M. monoceros*, 3. *P. indicus*, 4. *P. semisulcatus*, 5. *P. monodon*.

important constituent of the fishery was *P. indicus* (30%) followed by *P. monodon*, *P. semisulcatus*, *M. dobsoni* and *M. monoceros* in the order of abundance. The effort expended during 1980 was more (14,583 units) than that of the previous year (11,815 units). Thus the catch per unit was less (12.55 kg) than that of 1979 (23.98 kg).

In *P. indicus* the size range was from 101 mm to 190 mm, the modes being 121 mm to 175 mm. The total length varied in *P. semisulcatus* between 111 mm and 230 mm, with modes at 131 mm to 200 mm. In *P. monodon* the smallest sizes encountered in the catches were 106 mm while the largest were 270 mm. The size variation in *M. monoceros* was from 96 mm to 191 mm, the modes being 121 mm to 161 mm. The percentage of mature females in *P. indicus* varied from 30 in August to 100 in April and November. In *P. monodon* females ranging from 50 to 100% were mature. In *P. semisulcatus* also the mature females were 50 to 100%. In *M. monoceros* it was 66 to 93% during the various months of the year.

Kakinada (Fig. 8)

The prawn landings during the year was better during the present year than that of the previous year.

The total landings amounted to 2,579.9 t this year as against 2,396.1 t of the previous year. This was mainly due to the increase in the catch during September to December. The total landings of penaeid prawns amounted to 1,972.2 t with an annual catch per unit of 48.9 kg. The maximum catch per unit in penaeid prawns was in July (104.7 kg) while it was least during April (18.4 kg). The maximum effort was put in February (3,759 units/39,097 hr) with catch per unit of 45.2 kg.

The species which contributed to the prawn fishery were *M. monoceros*, *M. dobsoni*, *P. stylifera*, *M. lysianassa*, *M. brevicornis*, *P. indicus*, *P. monodon* & *M. affinis* in the order of abundance. The catch of all these penaeid species was more during this year than that of the previous year except in *M. lysianassa*.

The size ranged from 56 to 110 mm in *M. dobsoni* with modal size of 76-90 mm. In *M. monoceros* the size variation was between 41 mm and 190 mm while the dominant groups were of the size 81 to 145 mm. The total length in *P. indicus* varied from 71 mm to 195 mm with dominant size of 116 to 155 mm.

Mature females of *M. monoceros* were abundant

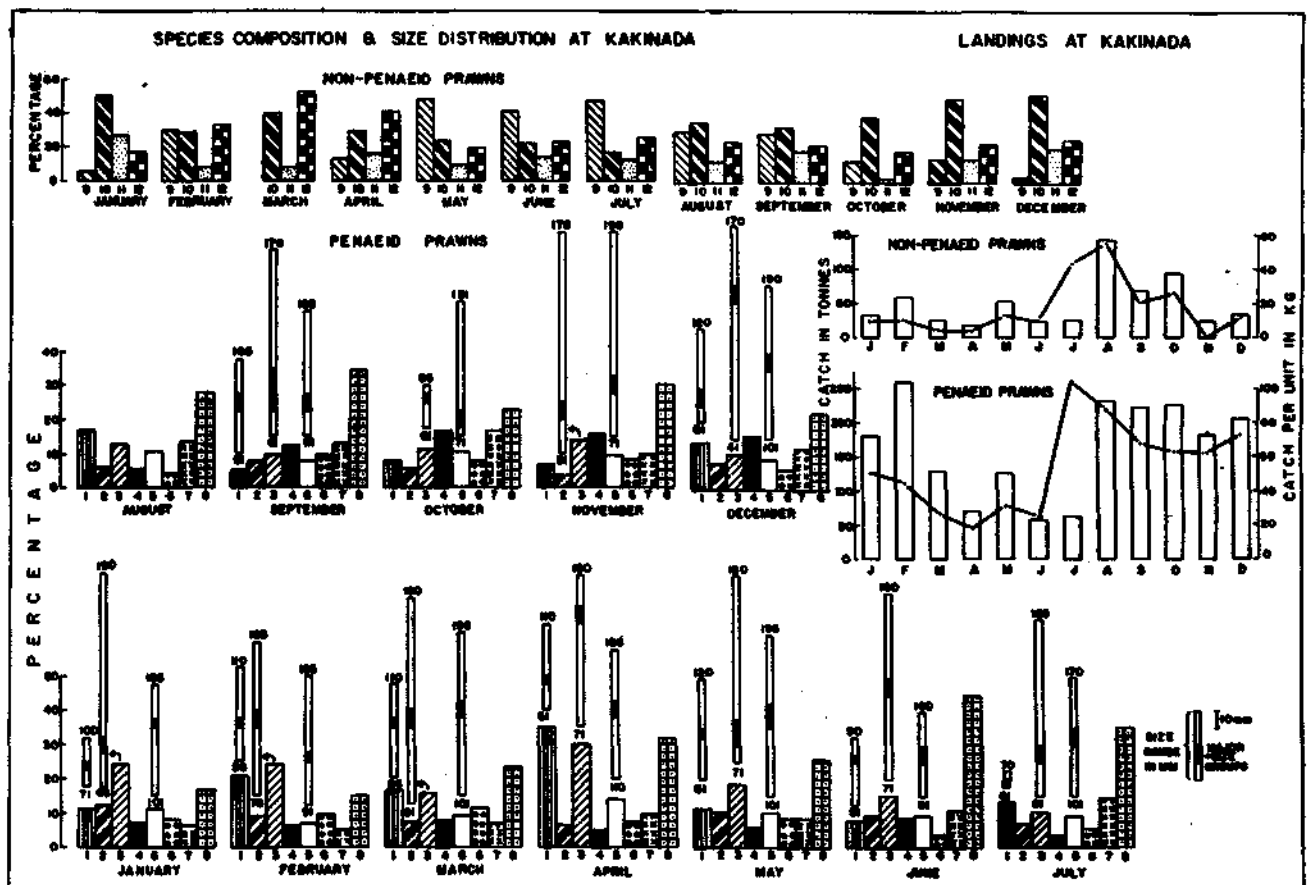


Fig. 8. Catch trend, species composition and size distribution of important species of prawns at Kakinada during 1980. 1. *M. dobsoni*, 2. *M. affinis*, 3. *M. monoceros*, 4. *M. brevicornis*, 5. *P. indicus*, 6. *P. monodon*, 7. *P. stylifera*, 8. Other penaeids, 9. *Acetes* spp. 10. *E. styliferus*, 11. *N. tenuipes*, 12. *E. ensirostris*.

during January to July. In *M. dobsoni* catches, this trend was observed during the first half of the year. Majority of female specimens were mature during February to October in *P. indicus* (Fig. 9). But, in *M. brevicornis* higher percentages of mature females were encountered during the later half of the year.

The total quantity of non-penaeid prawns caught during the year under report was 607.6 t as against 745.3 t of previous year. The catch per unit was 15.1 kg during this period while it was less (13.9 kg) during the previous year.

The major non-penaeid prawn species contributing to the fishery were *Exopalaemon styliferus* (220.7 t); *Acetes* spp. (148.5 t); *Exhippolysmata ensirostris* (147.0 t) and *Nematopalaemon tenuipes* (89.6 t).

Waltair

The fishery was good during the first quarter during which period 186.49 t of prawns were landed. The catch per hour was 4.5 kg in February which was less than that of the corresponding period of previous year. But in March the CPUE decreased considerably to 1.1 kg per

hr. This reduction in the catch was noticed in the previous year also. *P. indicus* was not caught in February and March. The most important species of the fishery was *M. monoceros* forming 70.8% of the total prawn landings. This was followed by *P. indicus* (17.8%) and *P. monodon* (4.4%).

The larger size range in *M. monoceros* was 160-180 mm. Ripe females of this species was occurring throughout the period.

Puri (Fig. 9)

The prawn fishery was better during the current year than that of the previous year. The total prawn landings amounted to 56.18 t in this year while it was only 52.07 t in the previous year. *P. merguensis* was the most important constituent of the fishery, forming 57.81% of the total prawn landings. The next dominant species are *P. indicus* (30.77%) followed by *M. affinis* (12.1%). *P. merguensis* was not occurring in the catches during January to May. *P. monodon* was caught in small quantities in January only.

The size range in *P. merguensis* was from 126 to 210

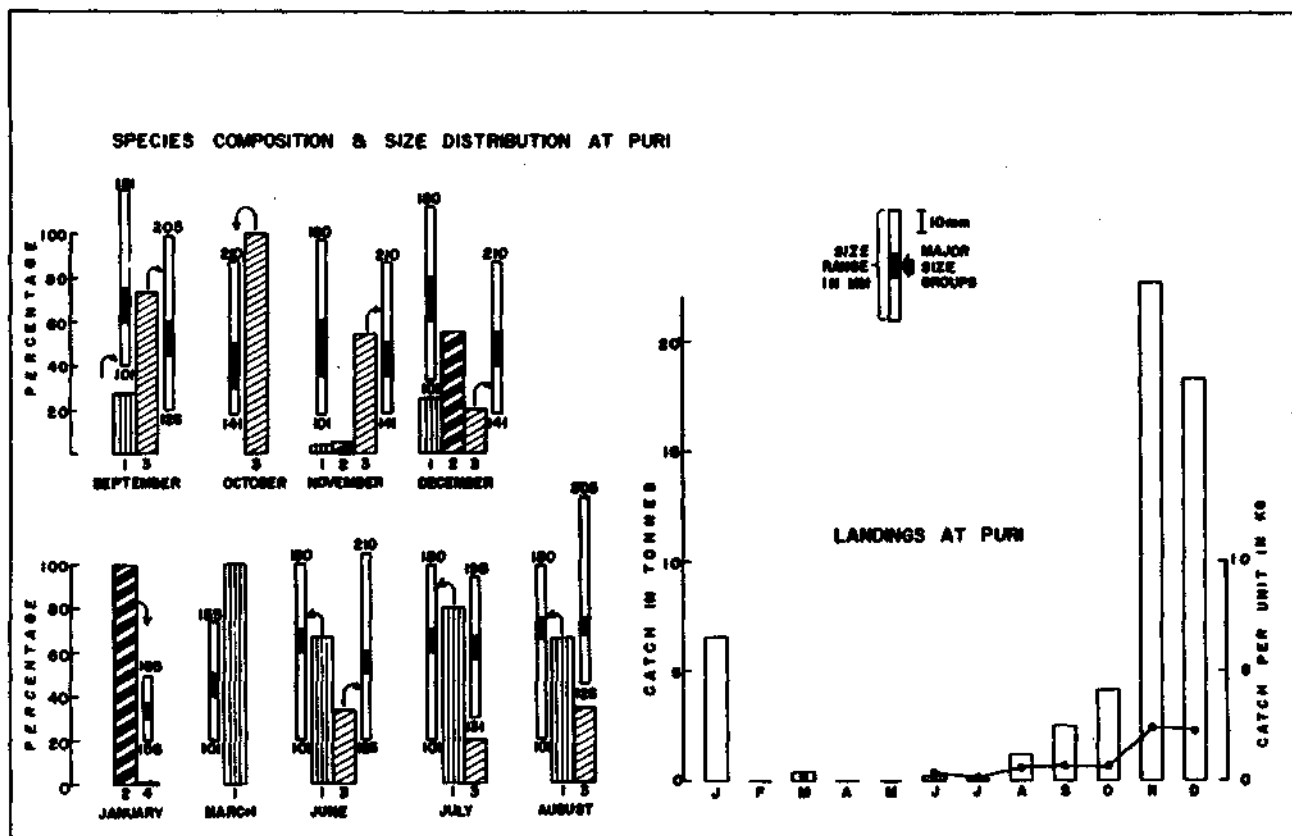


Fig. 9. Catch trend, species composition and size distribution of important species of prawns at Puri during 1990.

1. *M. affinis*, 2. *P. indicus*, 3. *P. merguensis*, 4. *P. monodon*.

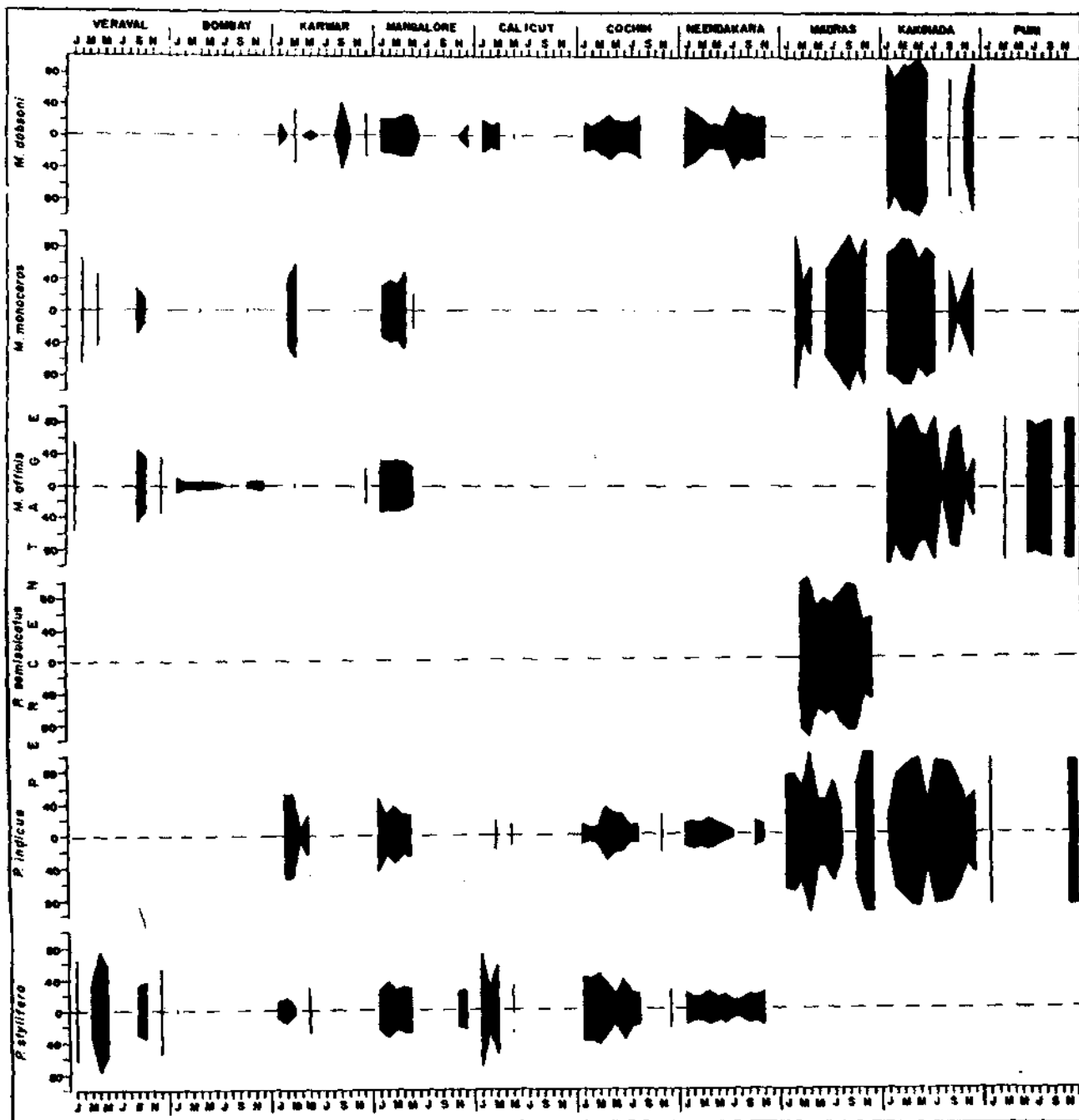


Fig. 10. Distribution of the spawning population of important species at selected centres during 1980.

mm with modal size of 151-161 mm. In *P. indicus* the length varied from 141 to 210 mm with 161-171 mm size forming the dominant groups. *M. affinis* ranged in size from 101 to 180 mm, the modal sizes being 126-160 mm.

The percentage of mature females in the catches varied from 75.0 to 91 in *P. merguensis* during the second half of the year. In *P. indicus* the range was 90-92% during this period and 78 to 90% in *M. affinis*.



A POTENTIAL NEW RESOURCE OF PRAWNS FROM NEENDAKARA AREA IN KERALA COAST*

In recent years Neendakara - Sakthikulangara area in Kerala has emerged as a prominent prawn fishery centre of the country. In view of the importance of this trawl fishery the Central Marine Fisheries Research Institute has been monitoring the resource with reference to species composition, catch potential and biological parameters of the fishery for the past several years. The main fishing season in this area is the monsoon months June - August when an average of about 35,000 tonnes of prawns are landed, most of which (76%) are contributed by the species *Parapenaeopsis stylifera* locally known as 'Karikadi'. This is a species growing to a small size upto about 130 mm. The bigger species *Penaeus indicus* ('Naran') contributes to a lesser percentage. Species like *P. monodon* ('Ocean Black - Tiger') and *P. semisulcatus* ('Ocean Black - Flower') are also found in the catches occasionally.

It is reported that night trawling in the sea off Sakthikulangara and other neighbouring centres is forbidden by Government order. However, every year some trawlers owned by the local people operate occasionally during night in the usual shrimp trawling grounds (upto about 25 m depth) for 2-3 months after the monsoon fishery is over. In 1981 it was noticed that soon after the main season for 'Karikadi' was over in August - September about 80-100 trawlers started going for night fishing from October onwards. About 50% of these boats operating in slightly deeper areas outside the conventional trawling grounds landed on an average 56 kg of prawns each. The catch details on certain observation days are given in Table 1, the total catch of prawns for one night being estimated at an average of 2,520 kg. The most striking feature of these catches is that they are constituted by a group of species entirely different from those commonly occurring in the monsoon fishery of this area. The species *Penaeus canaliculatus* (Fig. 1), termed by the industry as 'Ocean Black - Zebra', ranging from 150 to 200 mm in total length, contributed to 35% (19.6 kg/boat) of these catches. The remaining portion mostly consists of smaller unconventional species such as *Trachypenaeus curvirostris*, *T. sedili*, *Metapenaeopsis mogiensis* and *Solenocera choprai* (Fig. 2). Out of the estimated catch per night of 2,520 kg, *P. canaliculatus* accounted for 882 kg. These prawns were particularly more during the nights of bright moon light as told by the fishermen.

P. canaliculatus similar to the tiger prawn is especially attractive to the industry in view of the

large size, numbering 22/kg ('head on') for females and 29/kg for males. It fetches about Rs 75 to 100/- per kilogram to the fishermen. Analysis of samples showed that female prawns, of which 83% had ovaries in the late-maturing or matured condition, dominated in the catch and the sex ratio was 56:44.



Fig. 1. *Penaeus canaliculatus*



Fig. 2. A sorted out sample of prawn catch. a - *Penaeus canaliculatus*, b - *Trachypenaeus curvirostris* and *T. sedili*, c - *Metapenaeopsis mogiensis*, d - *Solenocera choprai*

*Prepared by C. Suseelan, M. M. Thomas, N. S. Kurup and K. N. Gopalakrishnan with the guidance of M. J. George.

Although juveniles of *P. canaliculatus* have been found to occur in small numbers in the Cochin backwaters and Ashtamudi Lake in recent years, it has never been recorded to form such sizable portion of the fishery anywhere in the coastal waters of India. It would appear as though the new resource has been recognised as a result of the change in the time of fishing.

Unfortunately this fishery did not last long since there was strong protest from the indigenous fishermen who operate gill-nets and hooks and lines in the offshore waters during night as they complained that their gears were being damaged by these operations and also from the fishermen who operate trawl nets during day time in the usual shrimp trawling grounds fearing disturbance to the fishing ground and consequent reduction of their catch in the morning. Thus by about the middle of November, 1981 the night trawling was stopped by the intervention of the Government.

In order to confirm whether similar concentrations of these unconventional species occur in the neighbouring areas of the same depths, a few experimental shrimp trawling was conducted off Cochin during January and February, 1982. Trawl hauls were taken at 10,20,30 and 40 m depth during night and day time. The results indicated that while smaller species occurring in the conventional fishery of the area were present in abundance in the hauls taken at 10 and 20 m depth they were very scarce in the catches from 30 and 40 m depth region. At the same time the hauls from greater depths yielded larger species like *P. semisulcatus*, *P. monodon* and *Metapenaeus monoceros* in relatively more numbers during day time while in the night the catches from the same depth region were dominated by the unconventional

species like *P. canaliculatus* and *Trachypenaeus* spp, noticed in the night fishery of Sakthikulangara area mentioned earlier. This would indicate that the resource of the above species are probably available all along this coast in slightly deeper regions in varying concentrations for exploitation during night, depending on the behaviour of the species. However, further detailed experimental fishing and monitoring are necessary to establish the magnitude and distribution pattern of these resources for which the Institute has already initiated action.

The points for consideration in the exploitation of this valuable potential resource are: 1) For quite some time now, ever since juveniles of *P. canaliculatus* started appearing in the fishery during certain seasons; first in the Cochin backwaters and later in the Ashtamudi Lake, the scientists of CMFRI were on the look out for the adult population giving rise to these younger generations. The location of these concentrations of large size prawns has come as an answer to their search. As long as these juvenile prawns of the species are found in the inside waters it is an indirect indication that the adult population would be occurring somewhere outside.

2) The peculiar behaviour of these prawns is such that they are available in the fishery during nights only and not seen anywhere in the nearby areas in the conventional day time fishery except for rare specimens. So, if at all this resource is to be made use of, night fishing has to be resorted to.

3) At the same time night fishing is resisted by the indigenous fishermen for reasons mentioned earlier. A compromise has to be worked out for exploitation of the new resource taking into consideration all the economic factors and the conflicts involved.

Table 1: Details of night catch of prawns in shrimp trawlers operated at about 30-35 m depth off Neendakara

Serial No. of units examined at random	Landings in kg					
	24.10.1981			10.11.1981		
	<i>P. canaliculatus</i>	Other species	Total prawns	<i>P. canaliculatus</i>	Other species	Total prawns
1	18	45	63	15	28	43
2	27	50	77	12	30	42
3	35	35	70	8	25	33
4	36	45	81	10	25	35
5	20	68	88	2	6	8
6	27	35	62	-	-	-
7	26	50	76	-	-	-

4) The specimens of *P. canaliculatus* caught in the night fishery reported are quite large and constitute adult population of the species. If this population is not exploited from the area at the right time the fishery will be only lost every year due to natural mortality.

5) The indications at the moment are that the occurrence of the resource here is seasonal, and that

after the main Karikadi fishing season of the area. Whether it is strictly seasonal or available throughout the year or for an extended period in the year needs to be investigated.

We are deeply grateful to Dr. E. G. Silas, Director, CMFRI for constant encouragement in the pursuit of this study.

BOOKS

Fishes of the Laccadive Archipelago. By S. Jones and M. Kumaran. Nature Conservation and Aquatic Sciences Service, Trivandrum, pp 760, 1980.

This is one of the most important ichthyological work from Indian Ocean region. The faunistic study is first of its kind from the Laccadive area in view of the fact that there is no reference to any fish from the Laccadives or the Lakshadweep, as known in Malayalam, in the *Fishes of India* by Francis Day or in the *Catalogue of the Fishes of the British Museum* by Albert Günther. Till recently our knowledge of the ichthyofauna of this area was limited to about three dozen species, mostly bathypelagic, from the collections made by R.I.M.S. Investigator towards the end of the last century.

The Lakshadweep group of islands are located off the south west coast of India and consists of 10 inhabited islands viz., Agathi, Ameni, Androth, Bitra, Chetlat, Kadamat, Kalpeni, Kavarathi, Kiltan and Minicoy and a dozen uninhabited islands, many of them adjacent to the main islands connected by submerged reefs and is separated from the Maldiv Islands in the south by the eight degree channel. Exposed and surf ridden reefs and sand mounds of varying magnitude occur in between some islands. The greatest depth of the sea in between the islands may be anything upto 1500 meters. All the inhabited islands except Androth are protected by shallow lagoons and the outer reefs around the lagoons. The extensive coral reefs, lagoons and abysses around are the abode of an extremely rich and varied fish fauna due to the wide diversity of ecological niches created by the various constructive and destructive agencies in the environment.

This book deals with 603 species of fishes based on

the critical examination and study of about 14,000 specimens collected for the purpose from the area. Among the species described, about 150 species were not known from the seas around India before the initiation of the work. The descriptive account of the fishes along with the diagrams and the simple keys have been prepared with the main objective of enabling the layman and the scientist to identify and study any fish occurring in the area. The descriptions are mostly based on study of actual specimens, the descriptions of only 38 species being taken from other publications.

The distribution of the species indicates that the fish fauna in general is typical of the fishes inhabiting the Indo-west Pacific. The oceanic and bathypelagic fishes occurring in the western Indian Ocean and Lakshadweep area are similar and predominated by equatorial species. The majority of species including the rare ones found in the Lakshadweep are dominant in the western Indian Ocean. But there are significant differences in the composition of the littoral fish fauna. From the pattern of distribution the authors suggest that the western Indian Ocean, Red Sea, West coast of India and Ceylon including Laccadive and Maldiv Archipelagoes fall within the Western Indian Ocean ichthyofaunistic zoogeographic division.

This is a useful reference work and will be a valuable source of information for a long time to come in view of the scientific accuracy of the drawings, nomenclature and other details concerning the fishes of this area. It would also stimulate similar works from other parts of India. It will be a most welcome addition to libraries both inside and outside the country and most useful for students, researchers and naturalists.



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