

## CULTIVABLE PRAWN AND FISH SEED RESOURCES OF COCHIN BARMOUTH AREA\*

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### ABSTRACT

Availability of cultivable prawn and fish seed in Cochin Barmouth area was assessed from June 1981 to April 1983 and it was found that postlarvae of *Metapenaeus dobsoni*, *M. monoceros* and *Penaeus indicus* were available almost throughout the year, with the peak during March-September. The maximum number observed was 5,25,024/net/hour in August 1981. *M. dobsoni* (50.80%), *P. indicus* (34.40%), *M. monoceros* (13.50%) and *P. monodon* (1.30%) were the constituent prawn species. *P. indicus* postlarvae were available in the catch in all months except December 1981, March-August showing the peak. *P. monodon* was present in limited quantities during the period February-June, the maximum number recorded being 13,248/net/hour in June 1982. The metapenaeids also showed the maximum numbers during the period March-September. *Liza parva* was the only fish species found in any significant quantity, with a maximum number of 4,860/net/hour in November 1981. Fry and fingerlings of *Chanos chanos* and *Mugil cephalus* were found in appreciable numbers in the shallow inundated areas of the mangrove swamps, along with large numbers of *Liza parva*.

### INTRODUCTION

THE SEED of quality prawns and fishes is the prime requisite in organising large-scale brackishwater fish and prawn farming. The demand for fish and prawn seed in the country has increased considerably with the growing utilisation of coastal areas for brackishwater prawn/fish farming. Till the hatchery production of quality prawn and fish seed is commercialised in the country, brackishwater fish and prawn farming will principally depend upon the natural seed resources. As such an assessment of the seed resources, both qualitative and quantitative, is essential for planning the

development of brackishwater aquaculture in any area.

Almost all the cultivable prawns and fishes are known to breed in the sea and the adjoining estuaries and lagoons are utilised by these species as nursery grounds. Thus, these water-bodies form valuable resources for collecting the seed for farming. Investigations on the availability of prawn seed have been carried out in the backwaters and estuaries of Kerala by George (1962, 1963), Mohamed *et al.* (1968) and Kuttyamma (1975); in Kayamkulam Lake by Kuttyamma and Kurian (1978) and in Korapuzha Estuary by Menon (1980). The present investigation throws further light on the seed availability of cultivable fishes and prawns in Cochin Barmouth area.

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This work was carried out under the All India Co-ordinated Research Project on Brackishwater Fish Farming established in 1976, with the objective of developing suitable technologies for brackishwater fish farming, with research centres distributed both along the east and west coast of India. Vyttila Fisheries Research Station of Kerala Agricultural University was one of the centres of the project. Since the inception, Vyttila Centre was engaged in prospecting shrimp and fish seed in Cochin Barmouth area. The results of the study conducted from June 1981 to April 1983 are presented in this paper.

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#### MATERIAL AND METHODS

Availability of cultivable prawn and fish seed was assessed by operating standard Midnapore type shooting net, hapa net and close meshed drag net in a shallow creek one km north of the barmouth during the high tide at day on the full moon and new moon days or 1st or 2nd day before or after. The shooting net was operated from the onset of the tide until the end of the tidal influx. The hapa net and drag net were operated for 30 minutes each in the shallow areas of the creek during the tidal influx. The seed collected with the three gears were kept separately and analysed later. Numerical estimation of each species of cultivable prawn and fish seed was made and the data was computed as catch/net/hour of each gear.

#### OBSERVATIONS

The monthwise data (catch/net/hour) of cultivable prawn and fish seed collected during the observation period are presented in Tables 1, 2 and 3. The number of postlarvae in the shooting net catch varied from nil in December 1981 to 5,25,024 in August 1981. In general it has been found that the period October-January was the lean period for the prawn seed. The quantity started increasing from February and reached the peak in August and then started declining by September.

The quantity of *Penaeus indicus* fluctuated between nil in December 1981 to 1,60,658 in August 1981. During both the years (1981-82 and 1982-83) the peak was recorded in August. There was a sharp decline in September and the period September-January generally constituted the lean period. The quantity started rising from February and reached the peak in August. However, June 1981 was an exception to this, when the quantity was only negligible.

*P. monodon*, though not in abundance, was collected during the period February-June during both the years, with a maximum of 13,248 nos/net/hour in June 1982. The quantity of *M. monoceros* fluctuated between nil and 96,734. This also showed more or less the same trend of seasonality as in the case of *P. indicus*, with the quantity increasing from March, reaching the peak in June-August and then declining by September, with October-February forming the lean period. *M. dobsoni* was not available during November-December 1981, while its quantity ranged from 48 (January 1982) to 3,36,540 (August, 1981). The seasonal pattern was very much similar to that described in the case of *P. indicus* and *M. monoceros* with the maximum quantity recorded in August during both the years. The period March-September generally showed its abundance, while October-February showed comparatively poor quantity.

The average number of prawn postlarvae/net/hour was 69,437 in 1981-82, while it was 79,727 in 1982-83. Except for *M. monoceros* which decreased from 12,207 in the 1st year to 8,309 in the second year all the other prawns dominated the catch, followed by *P. indicus*, *M. monoceros* and *P. monodon* in that order. The percentage composition of the catch was 5.275, 29.14, 17.58 and 0.53 in the first year, while it was 50.80, 34.40, 13.50 and 1.30 in

TABLE 1. Number of prawn seed (catch/net/hour) in standard Midnapore type shooting net collections during June 1981 to April 1983

Month	<i>P. indicus</i>	<i>P. monodon</i>	<i>M. monoceros</i>	<i>M. dobsoni</i>	Total
June 1981 ..	103	1	354	6880	7388
July ..	22322	—	96734	66968	186024
August ..	160658	—	27826	336540	525024
September ..	749	—	2246	15725	18720
October ..	1552	—	332	888	2772
November ..	18547	—	4637	—	23184
December ..	—	—	—	—	—
January 1982 ..	180	—	12	48	240
February ..	3584	179	179	538	4480
March ..	6144	2764	3380	3072	15360
April ..	8970	1104	2070	1656	13800
May ..	19965	363	8712	7260	36300
Average ..	20231	368	12207	36631	69437
% ..	29.14	0.53	17.58	52.75	100.00
June 1982 ..	52992	13248	39744	158976	264960
July ..	47174	—	3932	14414	65520
August ..	110160	—	36720	220320	367200
September ..	2880	—	4032	4608	11520
October ..	777	—	111	1332	2220
November ..	2010	—	402	1608	4020
December ..	3306	—	992	1212	5510
January 1983 ..	378	—	126	756	1260
February ..	4816	149	296	2149	7410
March ..	46588	3106	2485	9939	62118
April ..	76734	1705	2558	4263	85260
Average ..	31620	1655	8309	38143	79727
% ..	39.66	2.08	10.42	47.84	100.00

showed an increase in the second year, which was significant in the case of *P. monodon* and *P. indicus*. These two species increased respectively from 368 and 20,231 to 1655 and 31,620. During both the years *M. dobsoni*

the second year, respectively for *M. dobsoni*, *P. indicus*, *M. monoceros* and *P. monodon*.

The quantity of prawn seed collected by the hapa net fluctuated between 126 and 74,290.

The respective ranges of fluctuation for the peak in July, while *M. monoceros* did not *P. indicus*, *P. monodon*, *M. monoceros* and show any clear seasonal trend. There was a *M. dobsoni* were between nil and 23996 and sharp decline in the catch from 9579 in the nil and 17, nil and 8395 and 52 and 41899. 1st year to 935 in the second year and all the

TABLE 2. Number of prawn and fish seed (catch/net/hour) in hapa net collections during June 1981 to April 1983

Month	<i>P. indicus</i>	<i>P. monodon</i>	<i>M. monoceros</i>	<i>M. dobsoni</i>	Total prawn	Fish
June 1981	283	8	79	15344	15714	24
July	610	17	129	3396	4152	66
August	23996	—	8395	41899	74290	30
September	65	3	143	1175	1386	66
October	12	—	102	78	192	—
November	36	—	—	90	126	4860
December	192	—	276	42	510	—
January 1982	1556	—	530	1334	3420	—
February	4458	—	1486	1306	7250	36
March	2522	—	1256	1412	5190	48
April	675	—	430	905	2010	—
May	71	13	450	180	714	90
Average	2873	3	1106	5597	9579	435
%	29.99	0.03	11.55	58.43	100.00	—
June 1982	120	—	156	84	360	—
July	1590	—	155	799	2544	60
August	30	—	198	60	288	708
September	43	—	102	503	648	184
October	—	—	352	338	690	432
November	17	—	927	364	1308	—
December	48	—	372	132	552	—
January 1983	84	—	108	576	768	—
February	115	—	877	52	1044	—
March	216	—	918	618	1752	—
April	59	—	188	83	330	72
Average	211	—	395	328	935	132
%	22.57	—	42.35	35.08	100.00	—

All the species except *P. monodon* showed the maximum quantity during August in the 1st year. During the second year *P. indicus* and *M. dobsoni* and the total prawn showed species showed the same trend. The average percentage composition in the catch for the two year was 26.28, 26.95 and 46.75 respectively for *P. indicus*, *M. monoceros* and

*M. dobsoni*. In the first year *M. dobsoni* showed the maximum quantity, while it was *M. monoceros* in the second year. quantity of total prawn varied from 42 to 62118/net/hour, while it varied from nil to 46588 ; nil to 3106, 12 to 6380 and 18 to 9939 respectively

TABLE 3. Number of prawn and fish seed (catch/net/hour) in drag net collections during the period June 1981 to April 1983

Month	<i>P. indicus</i>	<i>P. monodon</i>	<i>M. monoceros</i>	<i>M. dobsoni</i>	Total prawn	Fish
June 1981	2237	41	1028	4920	8226	36
July	636	32	413	1205	2286	354
August	40	—	239	777	1056	36
September	86	23	2480	1323	3912	126
October	12	—	582	414	1008	30
November	12	—	12	18	42	—
December	262	—	1481	195	1938	—
January 1982	349	—	693	4094	5136	72
February	488	—	2562	3050	6100	15
March	1675	—	6380	6645	14700	—
April	992	—	2435	1583	5010	12
May	102	7	768	83	960	66
Average	574	9	1589	2026	4198	62
%	13.67	0.21	37.86	48.26	100.00	—
June 1982	857	—	862	303	2022	120
July	312	—	523	773	1608	84
August	272	—	143	671	1086	—
September	38	—	708	1354	2100	—
October	—	—	571	287	858	84
November	22	—	502	214	738	—
December	144	—	498	210	852	—
January 1983	119	—	238	1131	1488	—
February	145	—	2128	145	2418	—
March	46588	3106	2485	9939	62118	—
April	70	—	456	176	702	60
Average	4415	282	829	1382	6908	32
%	63.91	4.08	12.00	20.01	100.00	—

The pattern of distribution and percentage composition of the drag net catch was significantly different from that of the hapa net. The pattern of distribution and percentage composition for *P. indicus*, *P. monodon*, *M. monoceros* and *M. dobsoni*. Except for *P. indicus* which showed the maximum quantity in the first year in June,

all the species showed the maximum in March during both the years. Unlike in the case of hapa net, the catch showed an increase from 4198 in the 1st year to 6,908 in the second year and this was basically brought about by *P. indicus*, which increased from 574 in the 1st year to 4,415 in the second year. *P. monodon* also showed a significant increase from 9 in the 1st year to 282 in the second year, while *M. monoceros* and *M. dobsoni* showed a sharp decline during the second year.

Among the fish seed, *Liza parsta* was the only cultivable variety available at the collection area. Its quantity varied from nil to 4860/net/hour in hapa net and nil to 354/net/hour in drag net collections. The mullet did not show a clear seasonal trend. In general, it was found to be in more numbers during the period April-November. The average catch was 62 and 435 in the year 1981-82, while it was 32 and 132 in the year 1982-83, respectively with hapa net and drag net. Although not available in the collection site, the fry and fingerlings of *Chanos chanos* and *Mugil cephalus* were found in appreciable numbers, along with large numbers of *L. parsta*, in the shallow inundated areas of the mangrove swamps in Pudukkottai. *C. chanos* fingerlings were usually available during April-May, while *M. cephalus* fingerlings were available during June-August.

#### DISCUSSION

Investigations on the relative abundance of prawns and prawn seed in Cochin Backwater have been carried out by quite a few earlier workers. Kuttyamma and Antony (1975) reported the occurrence of *M. dobsoni*, *M. monoceros*, *P. indicus*, *M. affinis*, *Parapenaeopsis stylifera* and *Penaeus monodon* in the order of abundance in the commercial prawn catch, the last three in insignificant numbers only. They found that at Vypeen *M. dobsoni* accounted for 73.0% of the prawn catch in 1972 and

80.8% in 1973 with *M. monoceros* contributing to 16.2% in 1973. The percentage of *P. indicus* was lower than that of *M. monoceros*.

According to Kuttyamma (1975) the post-larvae of different species showed considerable seasonal fluctuations in abundance. Those of *M. dobsoni*, *M. monoceros* and *P. indicus* were present almost throughout the year and the largest numbers were found during March-June and October-December. The postlarvae of *M. dobsoni* dominated over the others throughout the year and formed 67% in 1972 and 78% in 1973. *M. monoceros* formed 21% in 1972 and 12.5% in 1973. *P. indicus* contributed 12% and 8.5% of the larval collections in 1972 and 1973 respectively. The present observations show a significant change in the percentage composition of these species. *M. dobsoni*, although dominating the catch, has shown a significant decline, the average for the two years being 50.8%. *P. indicus* took the second position with a share of 34.4%, while *M. monoceros* was relegated to the third place with only 13.5%. Thus, the share of *P. indicus* among the prawn seed had shown a tremendous increase, when compared with that of 1972-73. Kuttyamma observed the periods March-June and October-December as the peak periods of postlarval availability, whereas in the present study March-September has been found to be the peak availability period and October-January as the lean period.

George (1962) reported that postlarvae of *P. indicus* enter Cochin Backwater in all the months of the year except June to September, the peak recruitment being in November-December and February-April. However, the present observations showed the period February-August as the peak recruitment period, with October-January showing comparatively poor quantity. This more or less is in agreement with the finding of Subramanyam and Rao (1968) in Pulicat Lake where the postlarval incursions of *P. indicus*,

showed two peaks, one during January-April and the other during June-September.

It was observed by George (1969) that postlarvae of *M. dobsoni* were present in Cochin Backwater almost throughout the year with two peaks — one in June-August and the other in November. Kuttamma (1975) also recorded the occurrence of its postlarvae throughout the year with peak abundance during March-May. In the present study the postlarvae were available almost throughout the year. The period March-September was the peak availability period, while October-February was the lean season.

According to George (1962) *M. monoceros* occurred in Cochin Backwater predominantly during July-August and November-December. In the present case, this species was observed to show the peak abundance during March-September, while it showed comparatively poor numbers during October-February. Rao (1973) recorded its abundance in Pulicat Lake during January-April and July-October.

The occurrence of postlarvae of the Tiger prawn in Cochin Backwater has not been reported by the earlier workers. However, its occurrence in limited numbers during January-April, with the peak in April, has been reported recently (Anon., 1981). In the present observations the postlarvae were found in appreciable numbers during February-June, while they were absent during rest of the months. In Pulicat Lake rich incursions of this species were noted during January-April and August-November by Subramanyam and Rao (1968).

From a comparison between the catch efficiency of the three gears used the shooting net has been found to be the most effective gear for collecting the prawn seed. The average catch/net/hour for the two years was 74,582 with shooting net, while it was 5,257 and 5,553 respectively with hapa net drag net. A similar observation has been reported from Goa Coast (Anon., 1981).

The fry of *Liza parsia*, the only abundant fish species, was more available during April-November. Hapa net and drag net were found to be suitable gears to collect the mullet fry and fingerlings and between these hapa net was more efficient. The mangrove swamps in Pudukkottai have been found to be a potential area for the collection of brackishwater fish seed. Fry and fingerlings of *L. parsia* were abundant in this area, especially during April-November, while that of *M. cephalus* were available in small numbers during June-August. The fry and fingerlings of *M. cephalus* are reported to be available along the creeks of Mandapam region throughout the year with peak in June-December (Rajyalakshmi, 1980). Fry and fingerlings of *C. chanos* were recorded from Kakinada Coast in two seasons, one during March-June and the second from September to December (Anon., 1983). Along the coast of Goa milkfish seed has been reported to be available from February to May with peak in April-May (Anon., 1981). The occurrence of *Chanos chanos* seed in the mangrove swamps of Pudukkottai during April-June corresponds with these observations.

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