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PENAEID PRAWN RESOURCES AND POTENTIAL FOR PRAWN CULTURE

E. G. SILAS[1], M. S. MUTHU[1] AND M. KATHIRVEL[2]

INTRODUCTION

Our knowledge of the penaeid prawns of Andaman and Nicobar Islands is based on the pioneering works of Wood-Mason (1891, 1893), de Man (1892, 1911), Alcock and Anderson (1899), Alcock (1901, 1905, 1906) and Balss (1925), who reported about 120 species, most of them deep water forms. Recently, Silas and Muthu (1976 *a*, *b*) and Thomas (1977) recorded 12 littoral species for the first time from this region, of which one is new to science. Though data on the landings of penaeid prawns from these islands are available from 1965 onwards, no information is available on the biology of the exploited stock. Basic information on the biology of important prawns n Andaman and Nicobar Islands collected during the survey, along with the data collected earlier are presented here. The potential for prawn culture is indicated.

MATERIAL EXAMINED

Date of collection	*Locality*	*Gear*
10.5.'76	Wright Mayo	Bag nets (stake net)
12.7.'76	Wright Mayo	Boat seine (shallow waters)
20.7.'76	Chauldari	do.
19.12.'76	Diglipur	Drag net (near shore)
3.2.'78	Rangat	Cast net (creeks)
8.2.'78	Mayabunder	Trawl net (40 m depth)
12.2.'78	do.	Bag net (shallow creeks)
14.2.'78	Tennyson Creek in Mayabunder	Cast net
16.3.'78	Bamboo Flat-Port Blair	Bag net
1.4.'78	Campbell Bay	Boat seine
18.4.'78	Janglighat-Port Blair	Bottom-set gillnet

Present address :

[1] CMFRI, Cochin 682 018.

[2] CMFRI, Research Centre, Madras 600 105.

The prawn samples were analysed in detail for species composition, size distribution, sex-ratio and maturity. The samples of prawn seed were obtained by operating a velon screen net measuring 3 m in length and 1 m in breadth in shallow intertidal areas along the sandy beach in the following localities :

Date	*Locality*
10.2.'78 to 18.2.'78	Tennyson creek
17.2.'78	Lakshmipuranalla in Diglipur
24.2.'78	Havelock Island
1.3.'78	Chiriyatapu
2.3.'78	Corbyn's Cove
10.3.'78 to 18.4.'78	Chippighat—Port Blair
18.4.'78	Janglighat—Port Blair
26.3.'78	Wandoor and Burmanalla—Port Blair
29.3.'78	Hut Bay
30.3.'78	Tee Top—Car Nicobar
12.4.'78	Kimios backwater, Passa Bridge, Sawai and Malacca in Car Nicobar
5.4.'78	East Bay, Katchall
4.4.'78	Kakana and jetty—Camorta
3.4.'78	Champin jetty—Nancowry
1.4.'78	Campbell Bay—Great Nicobar

PRESENT STATUS OF EXPLOITATION

Production

Data on penaeid prawn landings in the Andaman and Nicobar Islands for the years 1965-1981 are presented in Fig. 1. (Source : Annual Reports of CMFRI, Anon, 1982). The catch has registered a gradual increase from a minimum of 4 t in 1965 to a maximum of 64 t in 1979, which may be due to the increased effort by both indigenous and mechanised fishing

crafts. The average annual landings during this period is 23.4 t, which formed 2.4% of average total fish catch from these islands. The monthly landings in 1978 (Anon, 1979) indicate that more than 50% of the catch

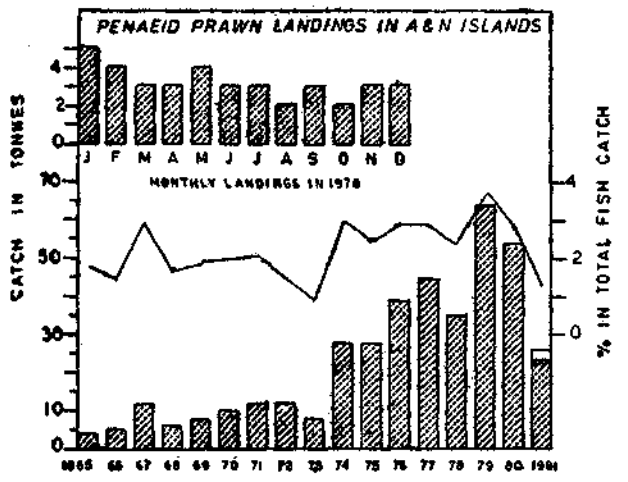

Fig. 1. Annual penaeid prawn landings from Andaman and Nicobar Islands during 1965-1981.

is landed in the first half of the year. The less catch in the second half may be due to the rough seas prevailing during the south-west monsoon, followed by north-east monsoon.

The Exploratory Fisheries Project of the Govt. of India conducted exploratory fishing operations in the Andaman waters during 1971 to 1976 (Sudarsan, 1978). But since the vessels were using only fish trawls which are not suitable for catching prawns, the crustaceans do not figure in their data. Sudarsan (1978) stated that specimens of prawns had often appeared in the trawl catches and as such a special survey for prawn resources will have to be undertaken.

Gear employed

In the early years of settlement of fishermen from the mainland, mostly indigenous gears such as bag net, boat seine, drag net and cast net were employed in fishing for prawns and fishes. In recent years, medium and large mechanised vessels belonging to the local Fisheries Department and Exploratory Fisheries Project of the Govt. of India started operating trawl nets. The indigenous gears were mainly operated by the settled fishermen at Diglipur, Mayabunder, Rangat, places in and around Port Blair, Little Andaman, Car Nicobar, Camorta and Great Nicobar. The penaeid prawns formed a portion of the total catch landed at places mentioned above, except at Little Andaman, Car Nicobar and Camorta, where fishes alone are caught by operating gill net, hook and line and boat seine.

Species composition

Totally 19 species of penaeid prawns belonging to 6 genera were encounered and they are listed below.

1. *Solenocera crassicornis* (H. Milne Edwards 1837)
2. *Penaeus merguiensis* de Man 1888
3. *P. monodon* Fabricius 1798
4. *P. semisulcatus* de Haan 1850
5. *P. canaliculatus* (Olivier 1811)
6. *Metapenaeus dobsoni* (Miers 1878)
7. *M. ensis* (de Haan 1850)
8. *M. affinis* (H. Milne Edwards 1837)
9. *M. moyebi* (Kishinouye, 1896)
10. *M. brevicornis* (H. Milne Edwards 1837)
11. *M. lysianassa* (de Man 1888)
12. *M. elegans* (de Man 1907)
13. *M. krishnatrii* Silas and Muthu 1976
14. *Parapenaeopsis stylifera* (H. Milne Edwards 1837)
15. *P. tenella* (Kishinouye 1900)
16. *Trachypenaeus curvirostris* (Stimpson 1860)
17. *Metapenaeopsis stridulans* (Alcock 1905)
18. *M. hilarula* (de Man 1911)
19. *M. palmensis* (Haswell 1882)

The percentage by number in different gears as well as all gears combined is depicted in Fig. 2. In the overall species composition, *Penaeus merguiensis* is the dominant species accounting for 49% followed by *M. dobsoni* (42%), *M. ensis* (2.5%), *P. monodon* (0.6%) and *P. semisulcatus* (0.5%) and the rest of the species (1.9%). Though *P. merguiensis* dominated in the samples drawn from bag net, boat seine and trawl net, it ranked second in the drag net collections. However, the gill net collection was exclusively constituted by *P. merguiensis*.

Size distribution (Figs. 3, 4)

P. merguiensis : The overall size range for the species varied from 66 to 175 mm in total length (from tip of rostrum to tip of telson). Individuals in the size groups from 71-75 mm to 136-140 mm constituted the bulk of the samples from bag net, boat seine and drag net, while prawns above 100 mm formed the major portion in cast net and trawl net samples. Since the samples were collected in different months in different years, no statement could be made on growth pattern for this species, as well as for other species studied.

M. dobsoni : The total length ranged from 51 mm to 100 mm. Two size groups, *viz.* 66-70 mm and 71-75 mm were dominant in the bag net, drag net and boat seine

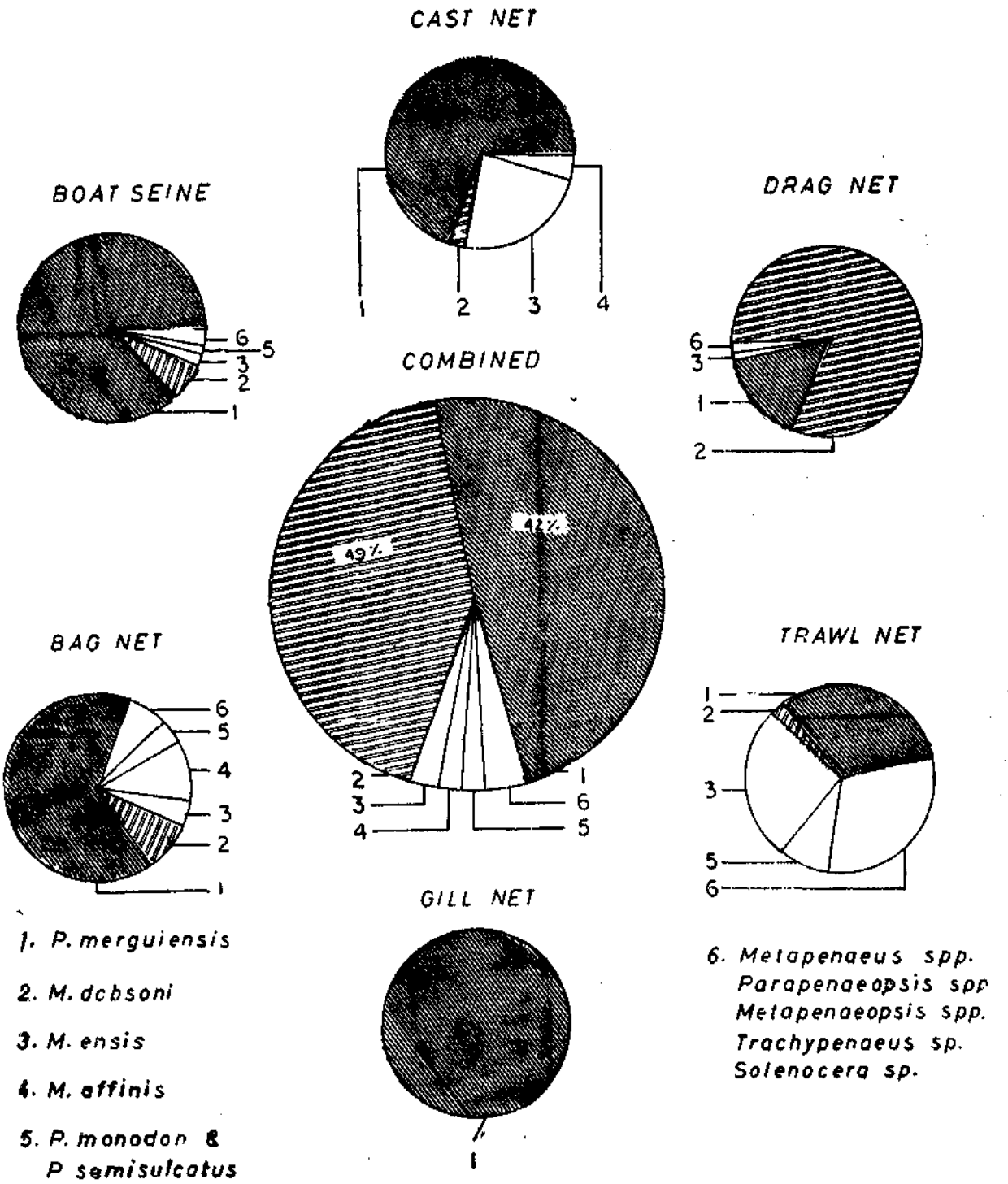

Fig. 2. Gear-wise species composition of penaeid prawns.

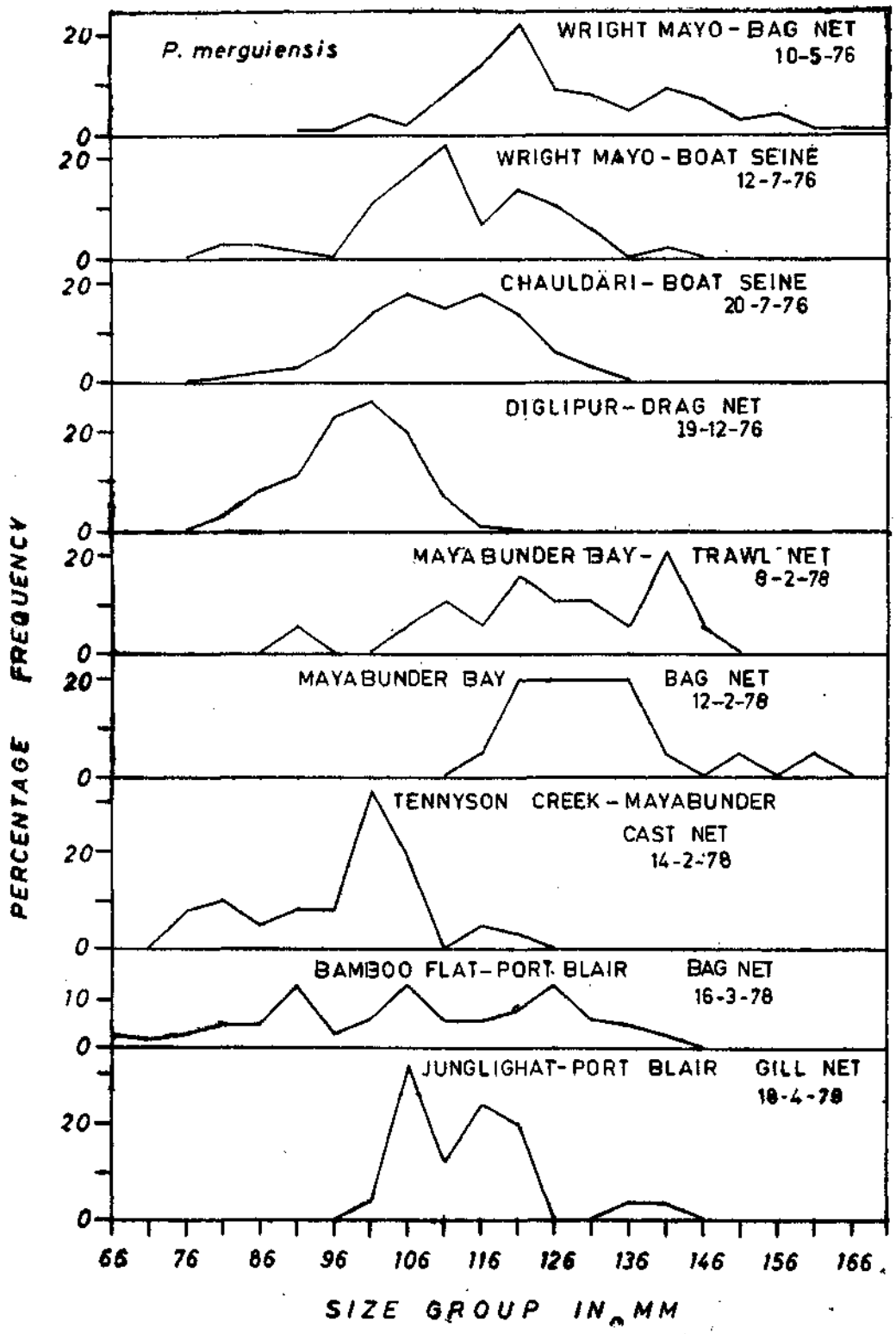

Fig. 3. Size distribution of *P. merguiensis* in different gears.

samples. In the drag net collection, prawns below 60 mm were also caught.

M. ensis : Total length varied from 46 mm to 130 mm. The dominant size group found in the cast net samples was 56-60 mm, while a larger size group (71-75 mm) formed the major portion in the bag net collections. In the trawler catches, sizes above 100 mm were encountered in lesser numbers.

M. affinis : The minimum and maximum size recorded was 66 mm and 116 mm respectively. The dominant size group in the bag net samples was 96-100 mm.

Other species : Since only a few specimens of the following species were available their size ranges recorded in samples from different gears are given below:

Species	*Gear*	*Size range (mm)*
P. semisulcatus	Bag net	62-80
	Boat seine	66-83
	Trawl	150-206
P. monodon	Bag net	90-172
M. brevicornis	Boat seine	65-94
	Drag net	56-83
M. lysianassa	Bag net	37-48
	Trawl	42-55
M. moeybi	Boat seine	50-65
	Trawl	58-73

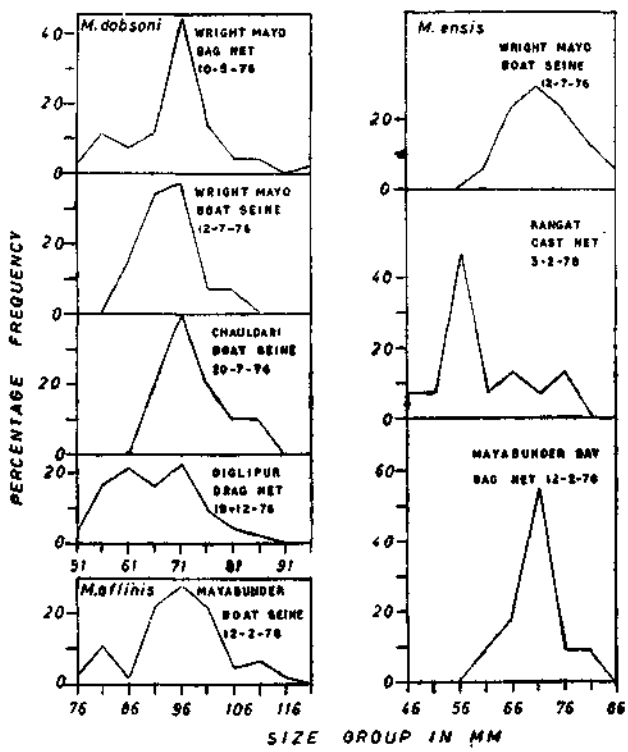

Fig. 4. Size distribution of *M. dobsoni*, *M. affinis* and *M. ensis* in the indigenous gears.

Sex ratio

	Male : Female
P. merguiensis ..	64 : 36
P. monodon ..	71 : 29
P. semisulcatus ..	50 : 50
M. dobsoni ..	40 : 60
M. ensis ..	46 : 54
M. brevicornis ..	20 : 80
M. affinis ..	53 : 47

Maturity

In *P. merguiensis*, stages I and II in ovary development were more common in May and July 1976 samples, while stage I was dominant in December samples of the same year. In 1978 samples, stages I and II were more prevalent. In *M. dobsoni*, stages I and II formed 20 to 100%, while stages III and IV were below 20% in the samples in 1976.

Abundance and Distribution of Prawn Seed

During the visit in 1978, survey on the abundance and distribution of penaeid prawn seed was conducted and the number of seed obtained in each haul from

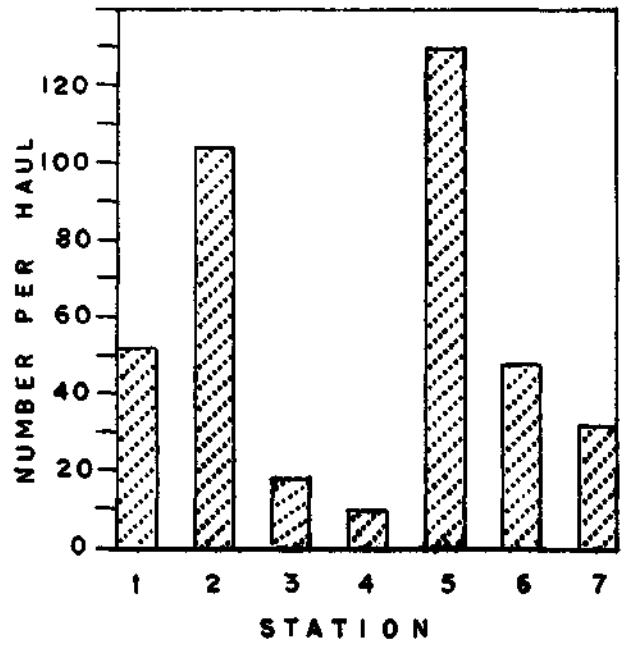

Fig. 5. Haul-wise number of prawn seed obtained from different observation centres. 1. Diglipur ; 2. Mayabunder ; 3. Havelock Island ; 4. Chiriyatapu; 5. Chippighat ; 6. Janglighat ; 7. Corbyn's cove.

Diglipur, Mayabunder, Havelock Island, Chiriyatapu, Chippighat, Janglighat and Corbyn's cove are shown in Fig. 5 and the percentage species composition indicated in Fig. 6. Among the penaeid prawn seed collected from different centres, *P. merguiensis* formed 43%, followed by *M. ensis* (30%), *M. dobsoni* (26%) and *M. brevicornis* (1%). Though *P. merguiensis* occurred in good numbers in Havelock Island and Chippighat, *M. ensis* dominated in the rest of the areas where seed was collected. Seed of *M. dobsoni* was caught in

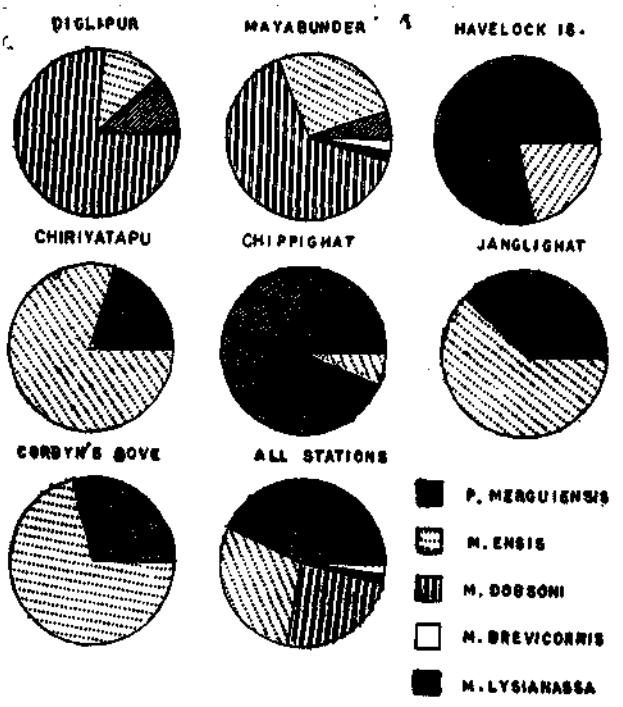

Fig. 6. Composition by number of principal species in the prawn seed collections at different centres.

considerable numbers at the northern centres namely Diglipur and Mayabunder and that of *M. brevicornis* at Mayabunder. The size range of the prawn seed is given below species-wise.

Species		*Size range in mm*
P. merguiensis	..	11-41
M. ensis	..	14-38
M. dobsoni	..	17-30
M. brevicornis	..	21-33

No penaeid prawn seed could be collected from the following centres : Wandoor and Burmanalla near Port Blair in South Andaman, Hut Bay in Little Andaman, Arang, Kimios backwater, Sawaii, Passa Bridge and Malacca in Car Nicobar, South Bay in Katchall, Kakana in Camorta, Champin Jetty in Nancowry and Campbell Bay in Great Nicobar. This may perhaps be due to dense growth of live coral and rocky bottom prevailing in the above mentioned stations, which are normally not preferred by the young prawns. Only in Kimios backwater and Passa Bridge in Car Nicobar, plenty of early juveniles of the fresh water caridean prawn, *Macrobrachium equidens* Dana were collected (size range 20-30 mm).

General Remarks on the Exploited Prawn Fishery

Like many other areas along the mainland coast, the prawn fishery of Andaman and Nicobar Islands is supported by more than a dozen species. However, *P. merguiensis* and *M. ensis* emerge as the major contributors to the penaeid prawn catch landed from these Islands. Strangely, *P. indicus* and *M. monoceros* which are important commercial species on the mainland are conspicuous by their absence in the Andamans. The prawn fishery is not well developed in the islands and there is scope for increasing the fishing effort by indigenous gear as well as by trawling. It is also necessary to conduct intensive exploratory trawling on the continental shelf. Based on a study of the relative abundance of penaeid larvae, Paulinose and George (1976) remarked that the areas around Andaman and Nicobar Islands appear to have one of the highly potential fishing grounds for penaeid prawns in the Indian Ocean.

Potential for Prawn Culture

The presence of a number of creeks and protected bays bordered by mangrove swamps, the high tidal amplitude and the ready availability of seed of commercially important penaeid prawns such as *P. merguiensis*, *M. ensis* and *M. dobsoni* in many places in the Andamans augurs well for the establishment of extensive prawn farms similar to the Singapore prawn ponds described by Hall (1962) and Tham Ah Kow (1968). Suitably located creeks and small embayments can be converted into prawn ponds by constructing bunds across the narrowest part of the mouth and fixing appropriate sluices which can be used for stocking the ponds with the naturally occurring prawn seeds during high tides and for periodic harvesting of the grown prawns during the full moon and new moon phases as practised in Singapore. Semi-intensive culture of prawns by selective stocking of the seed of fast growing species such as *P. merguiensis*, in smaller conventional coastal ponds built in suitable areas can also be taken up in the Andamans. The low-lying marshy areas on the way to Wandoor from Port Blair can be developed into prawn farms. While considering the mangrove areas for prawn culture operations care should be taken to see that the mangrove ecosystem is managed judi-

ciously without destroying it. In Indonesia the mangroves have been used with advantage in the construction of the 'tambaks'. Mangrove vegetation on the seaward side of the ponds serve as wind breakers and the roots of mangroves growing on the bunds bind the soil and prevent their erosion. A more detailed survey should be undertaken to select sites suitable for extensive and semi-intensive culture of penaeid prawns.

Apart from collecting prawn seed from the wild, hatcheries for large scale production of the seed of *P. merguiensis* can be started at Port Blair and other places in the vicinity of the proposed prawn farms, as excellent seawater eminently suited for rearing of prawn larvae is available all along the Andaman coast. The CMFRI has already developed low-cost technology for breeding penaeid prawns in captivity and for hatchery production of prawn seed. Hence, there will be no difficulty in starting such a programme in the Andamans to supply the necessary seed to stock the ponds that are likely to come up. The prospects for starting integrated prawn farms in the Andamans are, indeed, very encouraging.

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