	FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS	FR : BCSP/67/E/39
	ORGANISATION DES NATIONS UNIES POUR L'ALIMENTATION ET L'AGRICULTURE	
	ORGANIZACION DE LAS NACIONES UNIDAS PARA LA AGRICULTURA Y LA ALIMENTACION	

Agenda item 7

Experience Paper

FAO WORLD SCIENTIFIC CONFERENCE
ON THE BIOLOGY AND CULTURE OF SHRIMPS AND PRAWNS

CONFERENCE SCIENTIFIQUE MONDIALE DE LA FAO
SUR LA BIOLOGIE ET L'ELEVAGE DES CREVETTES

CONFERENCIA CIENTIFICA MUNDIAL DE LA FAO
SOBRE BIOLOGIA Y CULTIVO DE CAMARONES Y GAMBAS

Ciudad de México, 12 - 24/6/67

The prawn fishery resources of India

by

S. Jones

Contents

Abstracts, Résumé, Extracto	page 1
1 Introduction	3
2 Prawn catches	3
3 Prawns of commercial importance	5
4 General remarks	11
5 References	12

THE PRAWN FISHERY RESOURCES OF INDIA

by

S. JONES

Central Marine Fisheries Research Institute
Mandapam Camp, India

Abstract

The growth of the prawn fishing industry in India in recent years is reviewed and the increasing value of prawn exports is tabulated. The most important fishery is for various penaeid species on the west coast.

The commercially important species on all Indian coasts are listed, the geographical areas in which they are fished are defined, and notes are given on the maximum size attained by the species, the depths in which they are fished and the nets and boats used. More extensive culturing of prawns is recommended.

Indian prawn stocks are, in general, not overfished, and the fishing effort can be safely increased.

LES RESSOURCES CREVETTIERES DE L'INDE

Résumé

La communication étudie le développement de la pêche de la crevette en Inde ces dernières années, et illustre par des tableaux la valeur croissante des exportations de ce produit. L'exploitation porte surtout sur divers Pénéidés de la côte occidentale.

L'auteur énumère les espèces d'importance commerciale de toutes les côtes indiennes, définit les zones de pêche, et fournit des indications sur la taille maximale des diverses espèces, les profondeurs auxquelles elles sont récoltées, et les filets et bateaux employés. Il préconise une expansion de l'élevage des crevettes.

Dans l'ensemble, les stocks indiens de crevettes ne sont pas surexploités, et l'effort de pêche peut être accru sans danger.

LOS RECURSOS DE LA PESQUERIA DE LANGOSTINOS DE LA INDIA

Extracto

Se examina el crecimiento de la industria pesquera de camarones en la India durante estos años, y se presentan tabulados datos del creciente valor de las exportaciones de camarones. La pesquería más importante es la de varias especies de peneidos en la costa occidental.

Se indican las especies comercialmente importantes en todas las costas de la India, se definen las zonas geográficas en las que se pescan, y se dan notas sobre la talla máxima que obtienen las especies, las profundidades a las que se pescan y las redes y embarcaciones empleadas. Se recomienda un cultivo más extensivo de los camarones.

En general, las poblaciones de camarones indios no se pescan excesivamente, pudiéndose aumentar sin peligro el esfuerzo pesquero.

FR : BCSP/67/E/39

TABLE I

Export of frozen and canned prawns from India
(1953 - 1966)

Year	Frozen prawns		Canned prawns		Total	
	Quantity (1,000 kg)	Value (1,000 Rs)	Quantity (1,000 kg)	Value (1,000 Rs)	Quantity (1,000 kg)	Value (1,000 Rs)
1953	13	58	-	-	13	58
1954	61	273	-	-	61	273
1955	48	294	-	-	48	294
1956	190	1,097	-	-	190	1,097
1957	496	2,134	-	-	496	2,134
1958	780	3,790	-	-	780	3,790
1959	1,050	4,923	373	2,324	1,422	7,247
1960	1,211	5,866	320	1,784	1,531	7,650
1961	1,463	7,367	622	4,223	2,084	11,590
1962	2,238	1,820	970	6,560	3,208	17,380
1963	3,967	21,203	1,231	7,576	5,198	28,779
1964	5,870	31,517	1,074	6,992	6,944	38,509
1965	7,028	41,422	1,148	9,506	8,176	50,928
1966 ^{1/}	8,784	88,792	1,523	18,657	10,407	107,448

TABLE II

Export of prawns and prawn products from India
(1960 - 1966)

		1960	1961	1962	1963	1964	1965	1966 ^{1/}
1. Frozen Prawns	Q (1,000 kg)	1,211	1,463	2,238	3,967	5,870	7,028	8,784
	V (1,000 Rs)	5,866	7,367	10,820	21,204	31,518	41,422	88,792
2. Canned Prawns	Q (1,000 kg)	320	622	970	1,231	1,074	1,148	1,523
	V (1,000 Rs)	1,784	4,223	6,559	7,576	6,992	9,506	18,657
3. Dried Prawns	Q (1,000 kg)	-	-	-	2,809	3,009	1,702	1,463
	V (1,000 Rs)	-	-	-	9,325	8,997	5,447	5,271
4. Prawn Powder	Q (1,000 kg)	-	-	-	255	511	104	81
	V (1,000 Rs)	-	-	-	84	126	66	53
5. Prawn Pickles	Q (1,000 kg)	-	-	-	-	1	1	2
	V (1,000 Rs)	-	-	-	-	3	3	12
Total	Q (1,000 kg)	1,531	2,085	3,208	8,261	10,465	9,983	11,853
	V (1,000 Rs)	7,650	11,590	17,379	38,189	47,636	56,444	112,785

Q - Quantity V - Value

^{1/} The sudden increase in value registered in 1966 is due partly to the devaluation of the Indian Rupee.

1 INTRODUCTION

Prawns in general form the most economically important constituent in the marine fish landings in India, accounting for an average of over 75,000 tons which comes to about 10 percent of the total landings of marine species. In addition, substantial quantities of prawns of marine origin, amounting to about a third of the above, are caught from the various estuaries, tidal creeks, brackish water lakes and backwaters along the coast. The annual production of marine prawns in the country could therefore be reasonably estimated at about 100,000 tons a year. The typical freshwater species form only a sustenance fishery of minor importance, except in a few isolated areas where some of the large palaemonids form fisheries of local importance.

The prawn industry in the country maintained the age old pattern till the beginning of the fifties of this century, supporting an export trade of dried and semi-dried prawns worth a few million rupees at most. However, rapid and phenomenal transformation has taken place within the last 15 years raising it to the status of an organized industry of considerable importance. All other fisheries are relegated to the background, and a most modern and sophisticated industry of frozen and canned prawns has sprung up, with an export record of over 100 million rupees by 1966 (Table I). These phenomenal changes have raised India to the status of one of the foremost prawn exporting countries in the world. The export figures for prawns and prawn products from the country in recent years are given in Table II.

A combination of favourable factors has contributed to the progressive transformation that has taken place in the industry. The main factor was the steadily increasing demand for frozen and canned shrimps in the western countries, especially in the U.S.A., which led to the exploration and organization of new sources of supply by those interested in the trade. In the meanwhile, governmental activities, including exploratory fishing and research on prawns, mechanization of fishing craft, provision of ice-plant and cold storage facilities, increased attention to the socio-economic conditions of the fishing community, and export promotion incentives created a suitable climate for organizing the industry on modern lines. This encouraged the industrialists, especially of the southern section of the west coast of India, who were the pioneers in the field and whose initiative and enterprise deserve special mention.

2 PRAWN CATCHES

Information on the prawn fisheries of India and on the biology of the economically important species is available in a number of contributions from this Institute, of which the most important ones of a general nature are those by Panikkar and Menon (1956), Jones (in press) and Mohamed (1967). Further, synopses on all the important marine prawns are being presented at this meeting by members of this Institute, and other contributions relate to the biology and fishery of Indian prawns. Only a brief account is therefore attempted here.

The prawn production in the country is given in Table III.

About 80 percent of the marine prawn catches come from the west coast of India, while the east coast accounts for about 20 percent. Along the west coast, the catches are higher in the northern sector, but the southern sector supports the fishery for the larger species, resulting in a concentration of prawn processing industry in this area.

The economically important prawns constituting the major portion of the catches are the penaeids belonging to the genera Penaeus, Metapenaeus, Parapenaeopsis and Solenocera. In addition to the above, non-penaeid species belonging to the genera Palaemon, Hippolytina, and Acetes are also caught. In some sectors, especially in the northern sections of the east and west coasts, they are available in appreciable quantities and form a major sustenance fishery. However, in view of their comparatively smaller size, they do not attract the freezing and canning industry, and therefore they are commercially much less important than the larger forms.

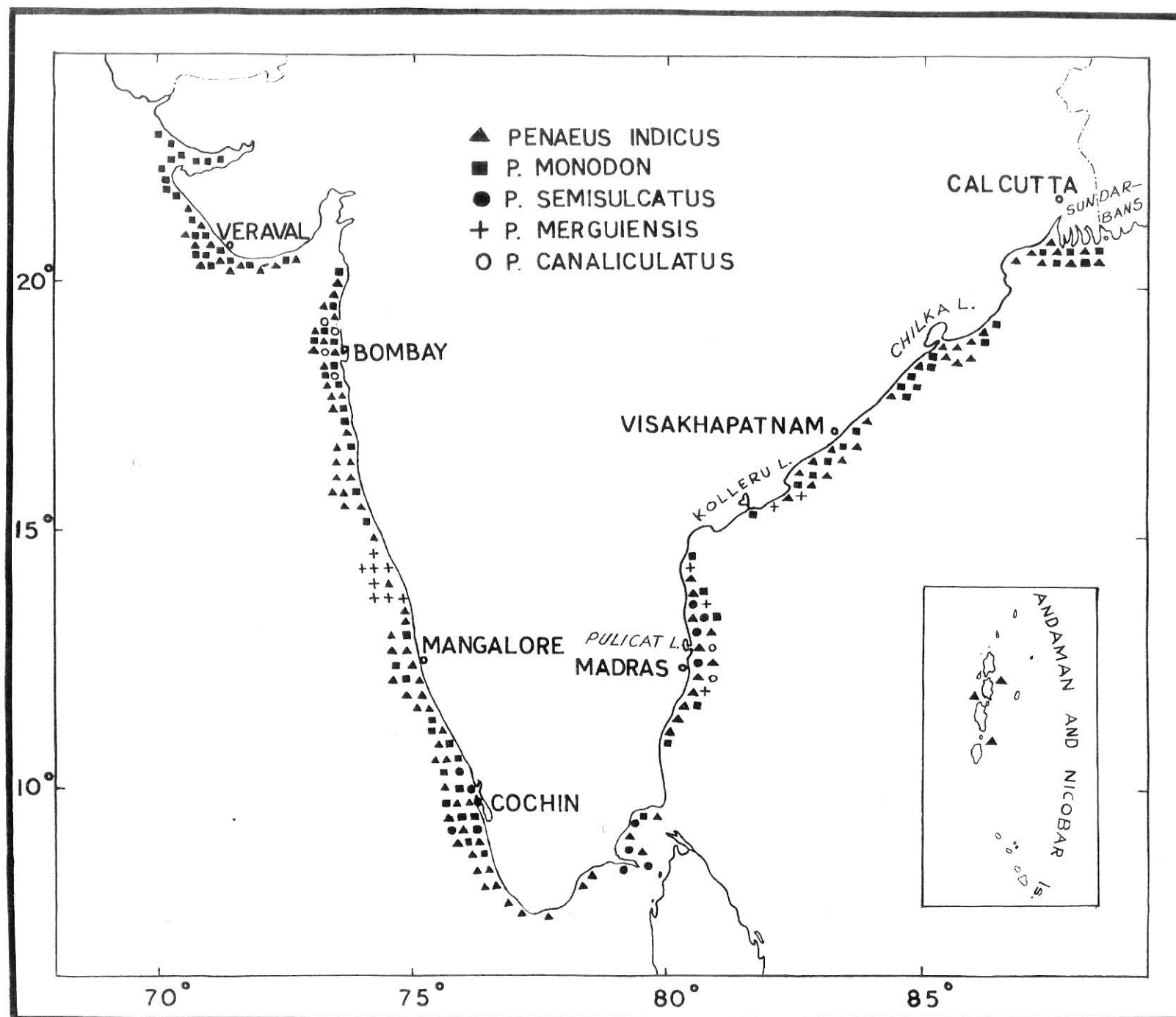


Fig. 1 Distribution of fishery for Penaeus spp.

TABLE III
Estimated landings of prawns in metric tons (1958 - 1966)

Year	West coast			East coast			Combined total for West and East coasts
	Penaeid prawns	Non-penaeid prawns	Total	Penaeid prawns	Non-penaeid prawns	Total	
1958	26,293	53,501	79,794	2,910	2,485	5,396	85,190
1959	23,548	36,775	60,323	4,084	1,030	5,114	65,437
1960	27,503	35,004	62,507	4,256	1,267	5,523	68,030
1961	32,864	22,018	54,882	6,219	1,667	7,886	62,768
1962	42,227	34,576	76,803	6,023	409	6,432	83,235
1963	30,747	39,554	70,301	10,323	969	11,292	81,593
1964	52,018	30,164	82,182	11,369	1,342	12,711	94,893
1965	29,918	41,003	70,921	8,103	412	8,575	79,496
1966	35,109	33,154	68,263	9,287	1,091	10,378	78,641

As stated already, substantial quantities of prawns of marine origin are caught from the numerous estuaries, creeks, brackish water lakes and backwaters along the coasts of India. Of these, the most important estuaries are the Sundarbans (the Gangetic estuarine system) in West Bengal and Godavary in Andhra Pradesh, each accounting for about 1,000 tons a year. Among the brackish water lakes, the Chilka (in Orissa) and the Pulicat (in the States of Madras and Andhra Pradesh) produce annually about 1,000 tons. The Kolleru (Collair) Lake in Andhra Pradesh is another sustaining a good fishery of both penaeid and non-penaeid prawns. The most important backwater, from the prawn fisheries point of view, is the one in the Cochin area of Kerala, with an estimated annual production of over 10,000 tons.

In the less saline areas and the connected freshwater systems of the Cochin backwaters there is a significant commercial fishery for the giant freshwater prawn Macrobrachium rosenbergii. About 400 tons are caught annually.

3 PRAWNS OF COMMERCIAL IMPORTANCE

Notes on different species contributing to the prawn fisheries of India are given below.

3.1 Penaeids

Though essentially marine, most of the species are able to live in brackish waters of very low salinity. The distribution of the fishery of commercially important prawns of India is given in Fig. 1 to 3.

Penaeus indicus Milne Edwards. The species attains a maximum length of 20 to 23 cm. Because it is widely available in the coastal waters, estuaries and backwaters of India, and because it is a relatively large prawn, this is the most important species. The young ones come to the backwaters and estuaries where they grow to about 12 to 13 cm. Breeding takes place in the sea. The species is important in the backwater fisheries and the paddy field prawn fishery of Kerala.

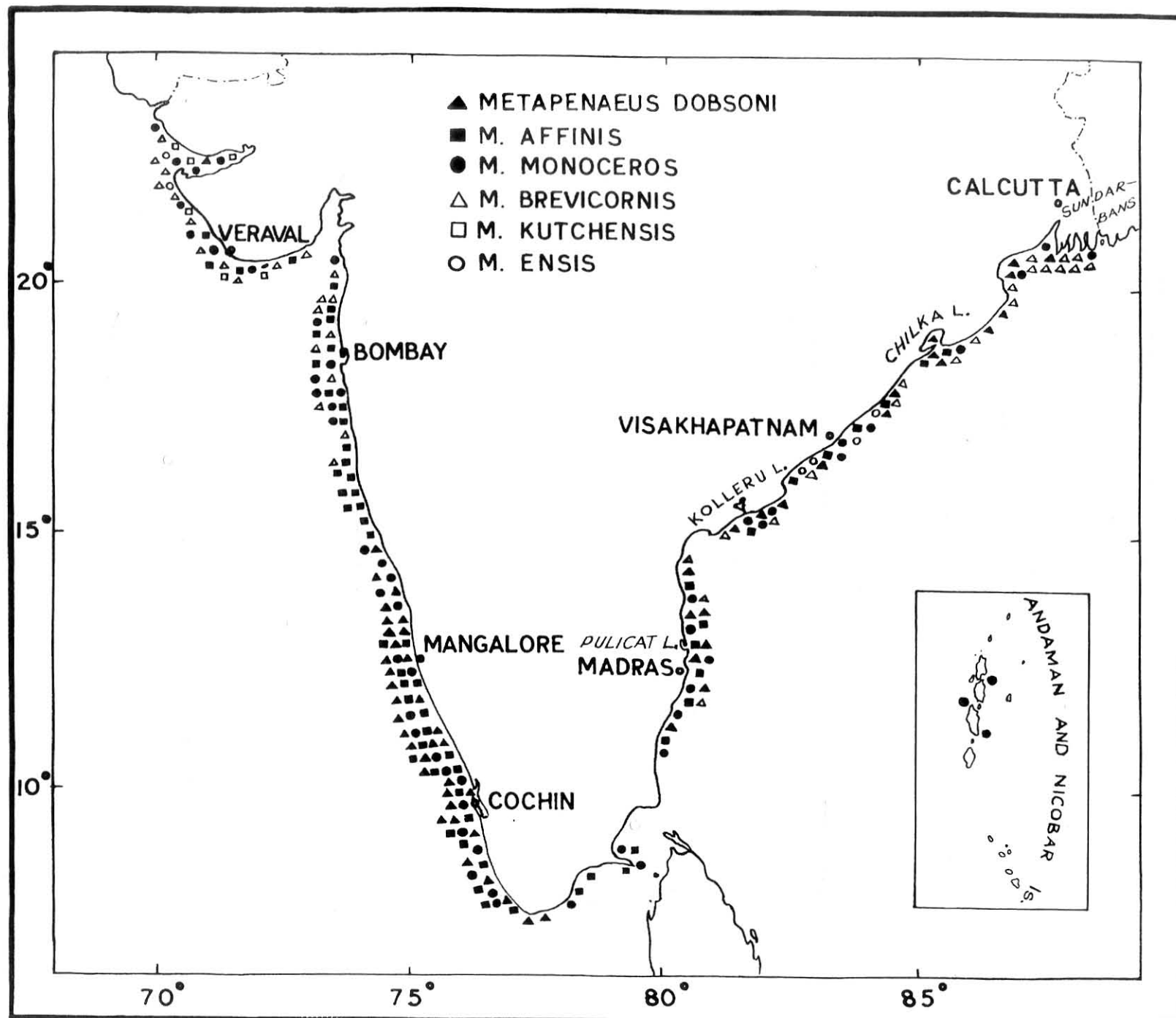


Fig. 2 Distribution of fishery for Metapenaeus spp.

P. indicus is caught in various types of seine net operated from indigenous craft in inshore waters and in shrimp trawls operated from powered boats in deeper areas. It is occasionally caught in shore seines. In the backwaters and estuaries, stake nets, dip nets, cast nets and traps are the most important gear employed in the fishery for this species. In the Chilka Lake, large quantities are caught by trapping. In the Kerala backwaters, the picturesque fixed dip nets (cheena-vala) catch appreciable quantities of these prawns along with other species. The same fishing methods apply for all the other species of penaeid prawns. The species is available in the estuaries and backwaters almost throughout the year although the sizes available differ with the season. In the sea, it is commonly fished during the post-monsoon months.

Penaeus monodon Fabricius. This is probably the largest Indian marine prawn, attaining a maximum length of about 30 cm, but it does not form a dominant fishery anywhere. It is more common along the east coast, especially the northern section (Bengal and Orissa) where it is fished mostly in the months following the monsoon. On the west coast, it is caught in very small numbers, mostly in the northern section. As in the previous species, breeding takes place in the sea and the juveniles enter estuaries and lakes.

Penaeus semisulcatus de Haan. This species is also more common on the east coast, although not as important as P. monodon. It grows to nearly the same size. It contributes very little to the fishery on the west coast.

Penaeus merguensis de Man. Till recently this was considered as a variety of P. indicus, and has been confused with it in several localities. It has now been found to contribute substantially to the commercial fishery along the Karwar coast (north of Mangalore) where it is fished with other species. The maximum length is about 20 cm.

Penaeus canaliculatus Olivier. This prawn makes a small contribution to the fishery along the Madras coast, especially in Pulicat Lake, and occurs in small numbers in Bombay and other places. It attains a maximum size of 12 to 15 cm. Like P. monodon and P. semisulcatus it occurs in the east coast fishery mainly in the post-monsoon months.

Metapenaeus dobsoni (Miers). This is one of the major species contributing to both the inshore fishery and the trawl fishery of the southwest coast of India extending to the Karwar coast. It is also common on the east coast, especially in Pulicat Lake and adjacent areas. It grows to a maximum length of 12 to 13 cm. The paddy field prawn fishery in the backwaters of Kerala is mostly dependant on the species; it breeds in the sea almost throughout the year and the postlarvae enter the backwaters, which serve as extensive nursery grounds, where it grows to about 6 to 7 cm. In the backwaters, estuaries and sea this species is caught throughout the year though the catch varies from month to month. In the monsoon period this species largely supports the fishery in the mud bank areas of the west coast.

Metapenaeus affinis (Milne Edwards). This is the most important commercial species of Metapenaeus, because of its occurrence along the entire west coast and the southern region of the east coast and because of its comparatively large size (maximum length 16 to 18 cm). Juveniles are caught in small numbers from backwaters, creeks and estuaries. The adult prawns are caught mainly during the post-monsoon months, the peak season being October to December along the southwest coast. The immature prawns are fished almost throughout the year.

Metapenaeus monoceros (Fabricius). The maximum length is 17 to 19 cm. The contribution of this species to the fishery of each locality is comparatively small, but it is perhaps the only species of Metapenaeus occurring in the commercial fishery along the entire coast line of India. It also contributes to the estuaries and backwater fishery, where it attains a length of 10 to 11 cm. Breeding takes place in the offshore waters. As in M. affinis, the post-monsoon period is the best fishing season for this species. The immature prawns occur in varying quantities in all months of the year in the backwater and estuaries.

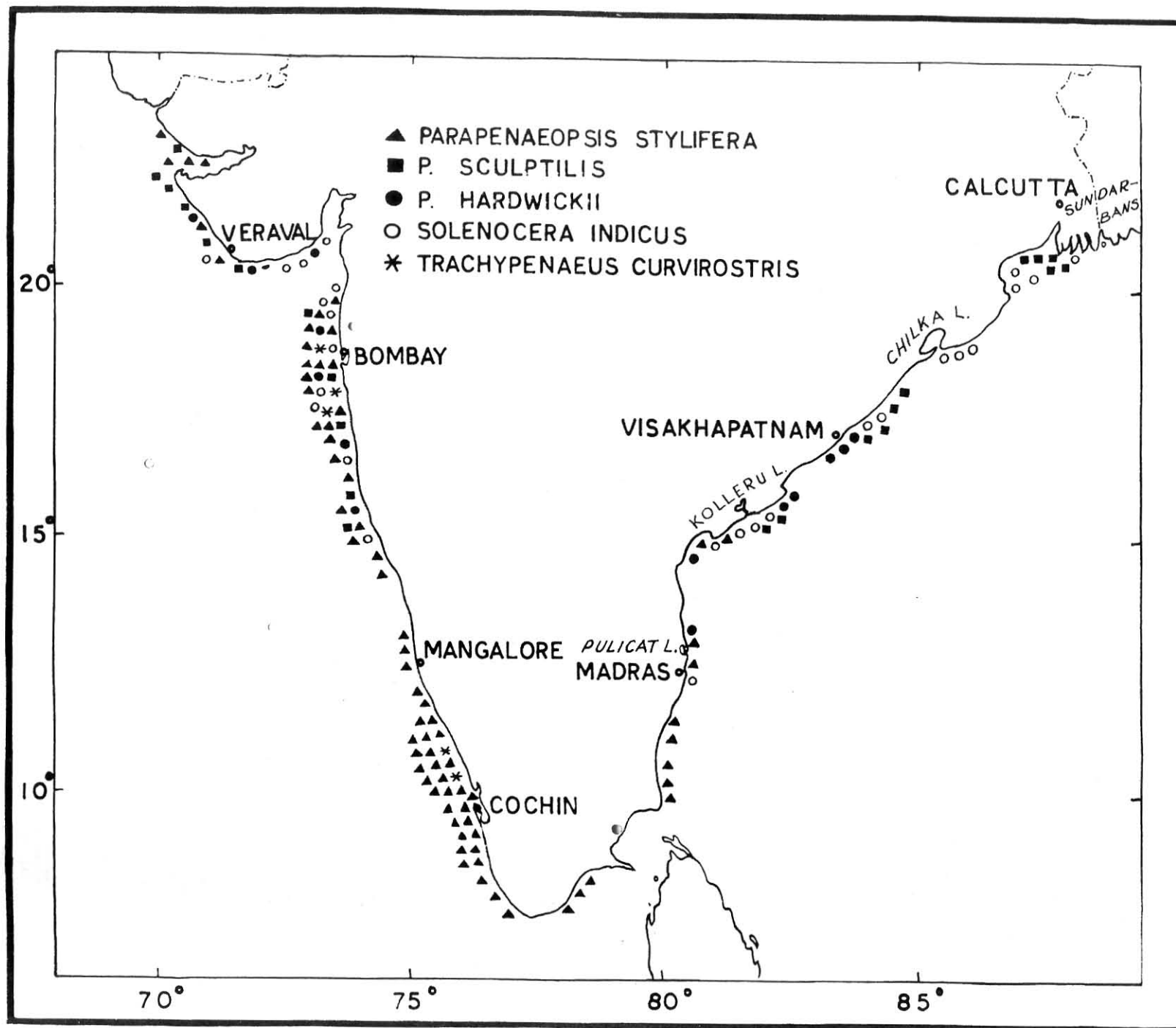


Fig. 3 Distribution of fishery for Parapenaeopsis, Solenocera and Trachypenaeus

Metapenaeus brevicornis (Milne Edwards). This is one of the commonest penaeid prawns of Bengal, inhabiting marine to almost freshwater zones throughout the year. It is common in the northern region of the west coast also, but does not occur in the southern region of either west or east coasts. The maximum length is about 13 cm. Spawning occurs in inshore waters. The larger individuals are taken from the inshore waters during the winter.

Metapenaeus kutchensis George et al. This prawn attains a maximum length of 14 to 15 cm and contributes a good percentage of the fishery in the Gulf of Kutch area.

Parapenaeopsis stylifera (Milne Edwards). Unlike other species, this prawn is confined to the sea, and does not migrate to estuaries and backwaters. It is most common on the west coast, particularly in Bombay waters. Along the east coast, the species occurs in the southern region. It grows to about 14 cm and is caught throughout the year. It forms one of the main species in the inshore fishery.

Parapenaeopsis sculptilis (Heller). This species occurs in the marine fishery of the Hooghly (W. Bengal) in certain months, especially during winter, and in Bombay waters throughout the year, although it accounts for only about 4 percent of the catch in the latter area. It grows to a maximum length of about 15 cm, but the sizes obtained at Bombay are generally small. The larger specimens are generally caught in the inshore waters.

Parapenaeopsis hardwickii (Miers). This species, which grows to about 13 cm, is also present in Bombay waters, and is caught in small quantities along with other prawns.

Solenocera indica Nataraj. This is of commercial importance only in the inshore waters of Bombay, where it supplies about 10 percent of the catches. It grows to about 14 cm in length.

Trachypenaeus curvirostris (Stimpson). This is also caught in small numbers from Bombay waters. Small numbers of this species were also caught from further south during the exploratory and research cruises of R.V. VARUNA. The maximum length attained is about 10 to 12 cm.

3.2 Sergestids

Acetes indicus Milne Edwards. This is the largest among the commercially important sergestids and attains a maximum size of 3 to 4 cm. It occurs in vast shoals, either in midwater or near the surface, in the inshore waters near estuaries and backwaters. It makes a fairly large contribution to the fishery in the inshore waters of Bombay in certain months, and is also fished along the Bengal and Madras coasts.

Acetes erythraeus Nobili and A. serrulatus (Krøyer) are two other species of commercial importance, especially along the Madras and Malabar coasts. Besides providing an important fishery, shoals of these Acetes spp. form an important food for larger fishes.

3.3 Palaemonids

Most of the species inhabit fresh water but are capable of tolerating brackish water or even marine environments. The distribution of the fishery of important palaemonids of India is given in Fig.4.

Macrobrachium rosenbergii (de Man). This is the giant freshwater prawn, growing to a maximum length of 30 to 32 cm. It is common in most of the lakes and estuaries in India. Spawning takes place in the gradient zones of the estuaries. The young post-larvae ascend the rivers and the juveniles are caught mostly in the freshwater zones. The species contributes to a fairly large freezing industry in the Kerala backwaters,

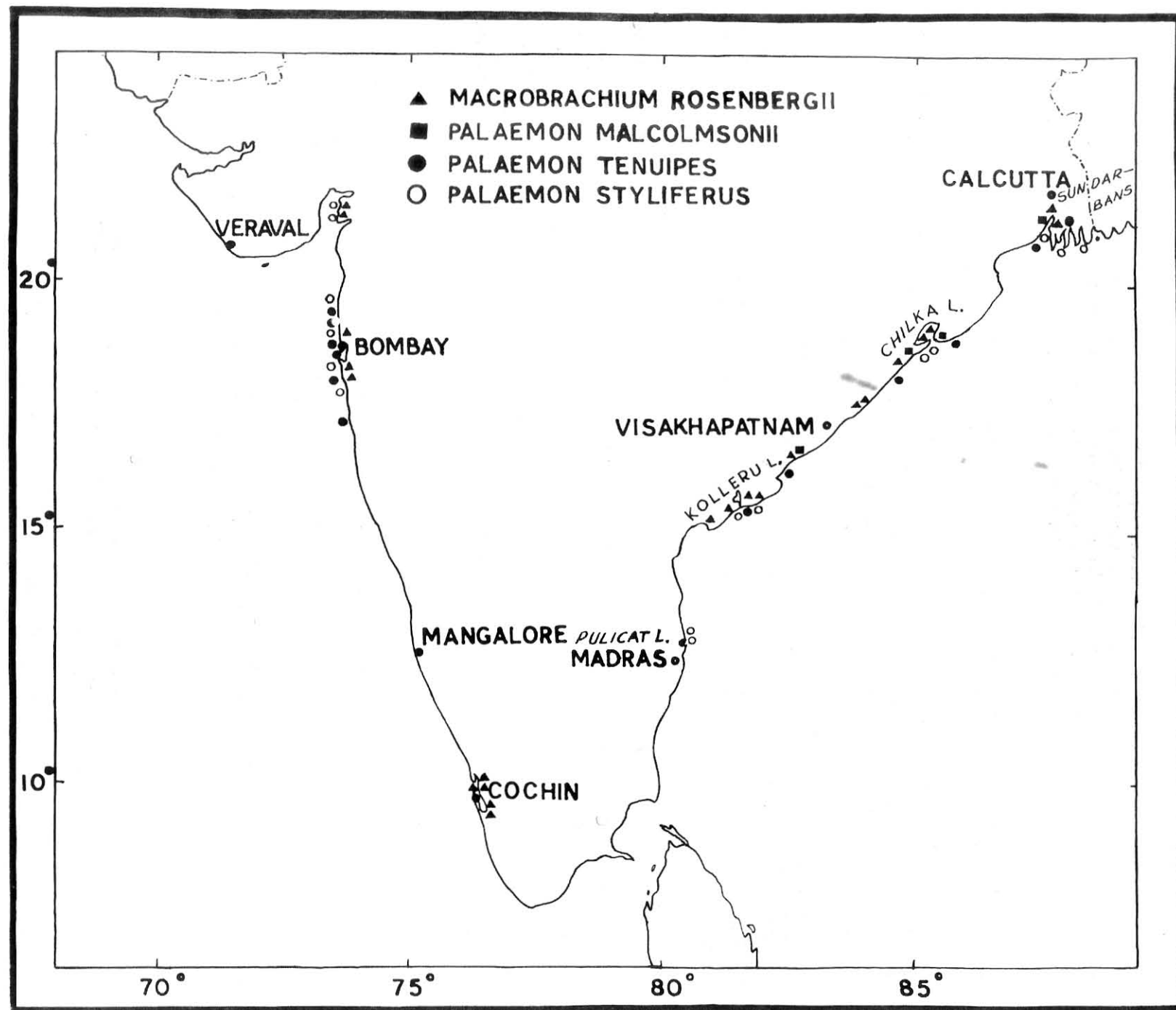


Fig. 4 Distribution of fishery for palaemonida

during the monsoon and post-monsoon period. Along the east coast, the species is fished from December to July in the gradient zone, while the immature prawns are caught during other months from freshwater.

Macrobrachium malcolmsonii (Milne Edwards). This is a smaller species; females grow to 20 to 22 cm and males attain a considerably larger size. It is most common in the estuaries and lakes of Madras and Andhra and also in Chilka Lake. Habits are similar to those of the previous species. The limited fishery is during the monsoon months.

Macrobrachium rude (Heller). Though caught in small numbers in most of the lakes and estuaries, this species is of commercial importance mostly in Bengal, Orissa and Andhra. The fishery season is from August to November. It attains a maximum length of about 12 to 13 cm, males being larger than females. In Bengal, the species occurs from August to October, in Chilka Lake it is fairly common from September to November. Young individuals are generally found during February and March.

Macrobrachium idae (Heller). This prawn attains a maximum length of 10 to 11 cm and is represented in the catches during September to December in the Kerala backwater areas and other regions.

Macrobrachium scabriculum (Heller), M. mirabile (Kemp) and M. lamarrei (Milne Edwards) are other species of this genus caught in small numbers in various estuaries and freshwater areas.

Palaemon styliferus Milne Edwards. This is one of the smaller palaemonids of commercial importance. It attains a maximum length of about 10 cm in both sexes and is very common in the Gangetic delta and also in Bombay waters, occurring in the tidal and gradient zones. Spawning occurs in the more saline areas and juveniles migrate to the estuary.

Palaemon tenuipes (Henderson). This species is fished along with the previous species in more or less the same areas. It grows to a maximum of 7 to 8 cm.

Leptocarpus fluminicola (Kemp). This is an endemic species inhabiting the brackishwater areas of the Gangetic delta. It grows to about 4 to 5 cm and is caught in very large numbers.

3.4 Hippolytids

Hippolyasmata ensirostris Kemp. This is a small species (maximum length 8 to 9 cm) which is common in the Gangetic delta and the northern section of the west coast.

4 GENERAL REMARKS

In spite of the mechanization that has taken place in recent years, most of the prawn fishing in the sea is still conducted by the traditional methods, using indigenous gear and craft which vary from place to place. The most extensively used nets are boat seines and stake-nets, operated with the help of dugout canoes and carvel-built boats. However, the fishermen have realized the advantage of mechanization and shrimp trawling has come to stay. Quite a large number of boats, 7 to 11 m long, powered by 10 to 45 hp engines, are operating shrimp trawls, especially along the west coast. In the Bombay area, the indigenous craft have been fitted with in-board engines, and this has enabled the stake-net fishermen to transport their catches more quickly so that the prawns arrive at the landing and marketing centres in better condition than before and realize better returns. Mechanization has also enabled the fishermen to reach more distant and deeper areas than previously. In addition to the smaller vessels which go daily on fishing cruises, there are a few larger vessels, capable of staying out for longer periods, operating from Cochin.

FR : BCSP/67/E/39

Most of the fishing is now carried out within the 20 fm (36 m) line. There appears to be scope for extending the fishing with advantage beyond this region. Preliminary exploratory fishing has shown the presence of a few species of deep water prawns, such as Aristaeus semidentatus, Penaeopsis rectacuta, Metapenaeopsis andamanensis, Heterocarpus woodmasoni, H. gibbosus, Parapandalus spinipes, and Plesionika martia, in depths between 100 and 200 fm (180 to 360 m) off the west coast. The potentialities of these from the commercial fisheries point of view remain to be studied.

At present the main fishing grounds are along the west coast. However, the existence of potential shrimp beds along the east coast, especially off large river mouths and brackish water lakes, cannot be ruled out. Exploratory work in this area remains to be carried out.

Another line of work which might help to augment the resources is by extension of prawn cultural practices in suitable areas. India has between 5,000 and 8,000 km² of estuarine and other brackish water areas, and at least a third of this could be converted with advantage for fish and prawn culture. Compatible fish and prawn species could be cultivated together.

Culture of the giant freshwater prawn Macrobrachium rosenbergii and its transplantation to suitable areas where it is not known to occur at present, could also be attempted.

A word may be said regarding the present trend in catches, and the fear that has been raised in some quarters as to whether any decline in prawn catches has resulted from the increased fishing activity in recent years. In any fishery, fluctuations in catches are bound to be encountered, even with the same level of catch effort. The variations in catches noticed in recent years are probably only natural fluctuations, as there is no evidence to indicate any definite decline due to over fishing. It is felt that there is still scope to increase the fishing effort to reach the optimum level of exploitation. Though precise data on the longevity of marine prawns are not available, those of tropical waters in general do not have a long life span. Most of the species live for between one and two years, within which time they grow and spawn. The fishery for each year-class must also be during this comparatively short period, as whatever is not caught will only perish. So long as sufficient brood stocks are left to ensure enough progeny for recruitment for the next season, there is no cause for fear of any over fishing. The situation is being carefully watched.

5 REFERENCES

- Jones, S., The Crustacean Fishery Resources of India. Symp. Crustacea, mar. biol. Ass. (in press) India, Abstracts p. 69: Proceedings Part 4
- Mohamed, K.H., Recent trends in the Prawn Fisheries of India. In 20th Anniversary 1967 Souvenir: Mandapam Camp, Central Marine Fisheries Research Institute, 75-81
- Panikkar, N.K. and M.K. Menon, Prawn fisheries of India. Proc. Indo-Pacif. Fish. Coun., 1956 6(3):328-36

* * * * *