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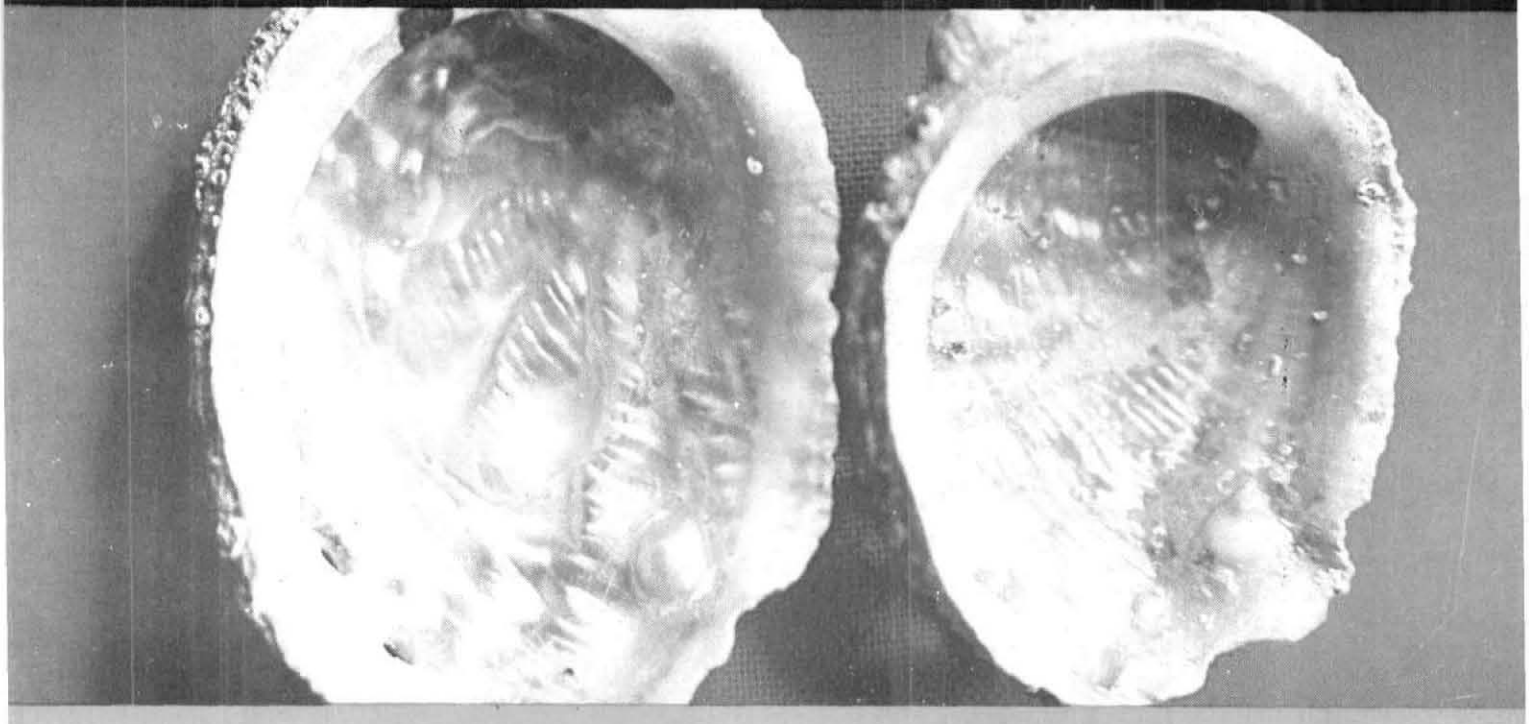

TECHNICAL AND EXTENSION SERIES

CENTRAL MARINE FISHERIES RESEARCH INSTITUTE

COCHIN. INDIA

(INDIAN COUNCIL OF AGRICULTURAL RESEARCH)

Since trawling operation started during the sixties, penaeid shrimps, crabs and stomatopods formed the major part of the crustacean fishery, in trawl catches off Mangalore coast with non-penaeids and lobsters to a minor extent. In penaeid shrimp fishery, species belonging to the genera *Parapenaeopsis, Metapenaeus and Penaeus* contributed almost to the entire fishery along the coast for a long time. Species composition of the penaeid shrimp catch for 1989-1990 showed that 99% of the catch was contributed by *Metapenaeus dobsoni, Parapenaeopsis stylifera, M. affinis, M. monoceros and Penaeus indicus.* The multiday trawling introduced during early 90s increased the catch of bigger varieties of shrimps like *M. monoceros* and *Penaeus* spp. Intensified multiday trawling operations changed the species composition of penaeids along this coast with *Solenocera* spp., *Trachypenaeus* spp., *Penaeus canaliculatus and P. semisulcatus* becoming dominant.

Impact of multiday trawling : The effect of night trawling on penaeid shrimp fishery and the subsequent emergence of new shrimp resources have been studied in detail by earlier workers. In a single day trawling the species like *P. stylifera, M. dobsoni* were dominant. *M. affinis and P. indicus* were available in smaller quantities and *M. monoceros* occured in stray numbers. After the introduction of multiday trawling *M. monoceros* became one of the dominant species while *Solenocera* spp. and *Trachypenaeus* spp. which were not encountered in the single day trawling started gaining dominance. In the case of crab also change in species composition was noticed. In earlier years the edible crabs *Portunus sanguinolentus* and *P. pelagicus* were forming the bulk of fishery but after the introduction of multiday trawling, *Charybdis feriata* also has emerged as an important constituent.

While analysing the trawl catch, effort data of Mangalore for the past two decades, 1981-1991 and 1991-2001, the change in trawl operation and the changes in species composition of shrimps were obvious (Fig. 1). It is clearly seen that species composition of shrimps changed a lot since mutiday trawling operation started.

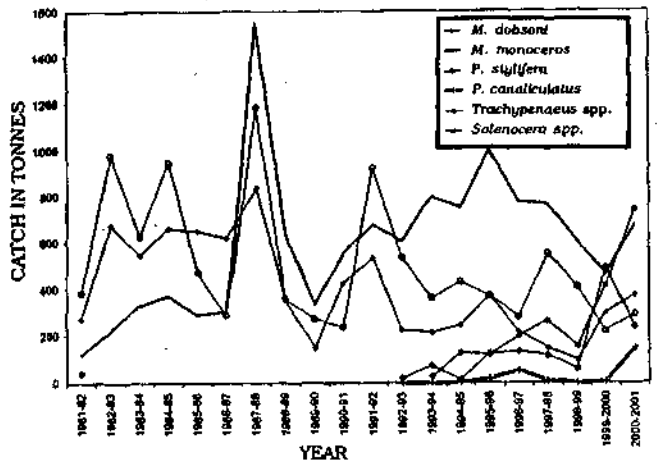

Fig.1 Changes in species composition of penaeid shrimp landing at Mangalore during1981-2001

It is seen that the major change occured in the last decade, 1991-2001 and the comparison of the data during 1989-'90 and 1999-2000 showed the magnitude of change in the trawling operation and the species composition in penaeid shrimps. The data on catch by trawlers of Mangalore landing centre during 1989-1990 and 1999-2000, showed that single day operations are slowly decreasing whereas, multiday operations are on the increase (Table-1). The year 1989-1990 represents the period of maximum exploitation of marine resources of the coastal waters up to a depth of 30m. But decrease in the catch from this zone, forced fishermen to extend their activities to deeper waters up to 150m for exploiting mainly cuttle fishes, squids and fishes. In ten years, the additional effort (units) increase was only 13%, but the fishing hours increased by 213%. During 1989-90, the average fishing hour was 10.90 per unit, whereas in 1999-2000 average hours of fishing rose to 30.05 (Table 1). The year 1999-2000 is again a point of transition, when the trawling operations from the depth zone up to 150 m also not found to be giving satisfactory economic returns which forced the fishermen to venture into deeper waters.

TABLE 1. The trawler operation pattern at Mangalore fisheries harbour during 1989-1990 and 1999-2000.

Year	Trawler effort (units)	Fishing effort (hour)	Single day units	Percentage of SDU	Multiday units	Percentage of MDU	Fishing hour per unit
1989-1990	30086	327851	18916	62.87	11170	37.13	10.90
1999-2000	33995	1021658	18014	52.99	15981	47.01	30.05
Difference	3909	693807	-902	-9.88	4811	9.88	19.15

TABLE 2 Comparison of penaeid shrimp landings (in tonnes) by trawlers at Mangalore fisheries harbour during 1989-1990 and 1999-2000.

Species		1989-1990	1999-2000	
Metapenaeus dobsoni	%	148.4 (19.14)	295.5 (15.41)	147.1
M. affinis	%	8.5 (0.34)	6.6 (0.43)	-1.9
M. monoceros	%	329.1 (42.45)	464.6 (24.23)	135.5
Parapenaeopsis stylifera	%	270.5 (34.89)	218.5 (11.39)	-52.0
Penaeus indicus	%	14.7 (1.90)	10.6 (0.55)	-4.1
P. monodon	%	4 (0.52)	4.6 (0.24)	-0.6
P. semisulcatus	%	0	7.3 (0.38)	7.3
P. canaliculatus	%	0	4.1 (0.21)	4.1
Trachypenaeus spp.	%	0	491.8 (25.61)	491.8
Solenocera spp.	%	0	414.5 (21.61)	414.5
Total		775.2	1917.8	1142.6

In the species composition also the emergence of new species and decline of the others is evident. (Table 2)

Impact of deep sea trawling : At Mangalore deep sea trawling was attempted for the first time during April 2000. The deep sea trawling operation at a depth of 500 m is targeted mainly for shrimps and lobsters. During April-December 2000 an estimated 463 multiday trawlers extended their activity to deeper waters up to 500m. and landed about 259. 35 t. of crustaceans apart from other fishes and cephalopods (Table 3). The deep sea shrimps were represented by *Aristeus* spp., Heterocarpus spp., Solenocera spp., *Plesionika* spp., *Parapandulus* spp., and lobsters by *Pureupus swelli, Nephrosis stewarti.*

TABLE 3. The Crustacean resources landed (in tonnes.) by the multiday trawl units during 2000 at Mangalore fisheries harbour.

Month	Units/ Species	*Solenocera* spp.	*Aristeus* spp.	*Heterocarpus* spp.	Parapenaeus spp.	Peuruhus sewelli	Nephropsis *stewarti*	Total
April	8	25.9	0.9	-	-	-	-	26.8
May	105	9.5	64.3	25.3	-		-	99.1
November	130	21.5	30.3	8.6	9.6	24.7	-	94.7
December	220	-	34.6	3.5	-	0.6	2.0	38.7
Total	463	56.9	130.1	37.4	9.6	25.3	2.0	259.3

Depth wise distribution of penaeid shrimps: Based on the analysis of data of crustacean landings of Mangalore fisheries harbour from the time of introduction of trawlers till date, depth wise distribution of shrimp resources along the Karnataka coast can be made. As per the exploitation pattern, the distinct zones that can be identified are the near shore water zone up to 50m depth, 50 to 150 m depth zone and the depth zone of 150 m and above. In the first zone, single day and multi day units are in operation and multi day trawlers mainly in the second zone In the third zone the trawling operation is up to 500 meter depth zone, which is at present exploited by large multiday trawlers of more than 56 feet OAL, equipped with facilities for deep sea operation.

The major reason for the extension of activity was that the income from the conventional trawling operation is not adequate to meet the increase in operation cost. During first year of operation the result of deep sea trawling was encouraging and more and more fishermen modifying their trawlers to equip for deep sea trawling started operations. According to recent trend the deep sea trawlers from Mangalore are landing their catch in fishing harbours in Kerala, as the rate for the deep sea crustaceans are more and competitive. Another reason is that most of the of deep sea trawlers are operating in the ground south off Mangalore and off Kerala coast and they are finding the harbours in Kerala nearer to land their catch in fresh condition.

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