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समुद्री मात्स्यिकी सूचना सेवा : समुद्री मात्स्यिकी पर आधारित अनुसंधान परिणामों को आयोजकों, मत्स्य उद्योगों और मत्स्य पालकों के बीच प्रसार करना और तकनोलजी का प्रयोगशाला से श्रमशाला तक हस्तांतरित करना इस तकनीकी और विस्तार अंकावली का लक्ष्य है।

THE MARINE FISHERIES INFORMATION SERVICE : Technical and Extension Series envisages dissemination of information on marine fishery resources based on research results to the planners, industry and fish farmers and transfer of technology from laboratory to field.

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Front cover Photo:

A drift net unit with floats and kerosene lamp operated from country craft along Calicut coast (Ref: Article 1).

मुख्य आवरण फोटो:

कालिकट के तट में देसी नाव में प्लवक व मृदा तैल दीप से परिचालित एक ड्रिफ्ट नेट यूनिट।

Back cover Photo:

Apogon fragilis, a potential tuna live-bait fish and an ornamental fish being maintained in the marine aquarium at the Regional Centre of CMFRI, Mandapam Camp.

पृष्ठ आवरण फोटो:

अपोगोन फ्रागिलिस - सी. एम. एफ. आर. आई. के मण्डपम क्षेत्र केन्द्र के जलजीवालय में अनुरक्षित एक ट्यूना लैव बेट मछली और एक अलंकारिक मछली।

DRIFT NET FISHERY AT CALICUT WITH SPECIAL REFERENCE TO SCOMBROIDS*

Introduction

The drift net fishery at Vellayil, Calicut which is at a fast developing stage, is undergoing many changes too. With the advent of outboard engines and the decline of some of the traditional fisheries like oil sardine and mackerel, more and more fishermen are being attracted to this fishery. Prior to 1986–'87 season, during peak fishing months the average operations per day were below 20 and it never passed beyond 30 on any day. But, during 1986–'88 seasons the average drift net operations per day in peak months crossed 50 and on many days more than 80 units were operated. Under these circumstances an examination of the condition of this fishery is worthwhile. Scombroids, being the major component of the drift net catch, need special attention. Results of the studies made on this fishery, with special reference to scombroids, are presented in this report.

Regular data on catch and effort of drift net fishery as well as 'nethalvala' fishery collected from Vellayil during the seasons from 1981–'88 form the basis of this report.

Gear

Drift nets are made of nylon thread of different thickness (Nos. 5, 6, 8 and 9) with the mesh size varying from 10 to 15 cm. Normally a drift net is having a total length of around 600 m and a depth of 10 m. A plastic rope of about 8 mm thickness is used as head rope. Small round thermocol floats are attached to the head rope at 2.5 m intervals. After each eleventh float there will be a bigger float made of thermocol sheets. Sometimes at both ends of the net, sealed plastic cans are attached as floats (front cover photo). Below every bigger thermocol float at the bottom of the net is attached a granite sinker stone weighing around one kg. During operation a kerosene lamp is kept afloat in the sea using thermocol sheets tied to the head rope at about 40 m from the far end of the net using a rope of 10 m length. This is used mainly as a safety measure to keep other fishing boats away from the net. The head rope is tied to the boat with a plastic rope of about 50 m long and around 30 mm thickness.

Craft

The usual craft used in the drift net fishery are dugout canoes of 9 m length (Fig. 1). In 1984–'85 season the use of outboard engines came into vogue and the country crafts employed in the drift net fishery started using these engines (Fig. 2). Soon this became popular. This facilitated the use of much cheaper plank built flat bottom boats (Fig.3). A good dugout canoe costs about

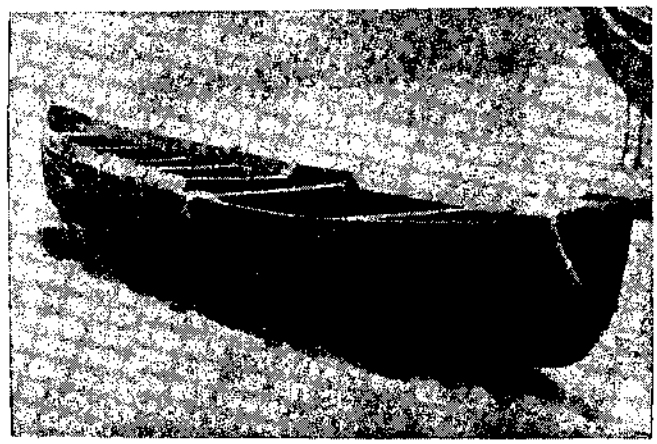


Fig. 1. A dug out canoe used in the drift net fishery.

Rs. 60,000/-, but a plank built boat, locally known as 'kettuvallam' costs about Rs. 15,000 only. The use of outboard engines reduced the man power needed in a drift net unit. Formerly 4–5 persons used to go in a unit. Now the number is reduced to 3.

Operation

Normally the units leave the landing centre by about 1500 hrs and reach the fishing ground at about 35 m depth by 1800 hrs. Prior to the introduction of outboard engines fishing was carried out at 20 – 30 m depth. Concentration of seer fishes and tunas are often spotted visually and the net is spread within 45 minutes. The head rope is tied to the boat with the help of a rope which is about 50 m long. Normally about 25 m only

* Prepared by T.M. Yohannan and K.K. Balasubramanian, Calicut Research Centre of CMFRI, Calicut.

will be released. During rough weather more length of rope is released. The net is then allowed to drift for about 6 hours. The operations are made at the surface during the beginning of the season. As the season advances and the temperature of the water increases, the net is operated below the surface and by April–May the operations take place 15 m below the surface. Landings start by 0600 hrs. Now-a-days, since the fishing is made during night time and at greater depths fishermen invariably use compass for finding direction (Fig. 4).

Catch and effort

On an average at Vellayil 5,224 units of drift nets brought 628 tonnes of fishes annually during the 1981-'88 period. Of this 54.65% of the catch was comprised of scombroid fishes namely tunas (30.03%), seer fishes (23.39%) and mackerel (1.23%). The rest of the catch included cat fishes, pomfrets, sharks and rays, carangids, *etc.*

Fig. 2. An outboard engine fitted to a canoe used for different fishing.

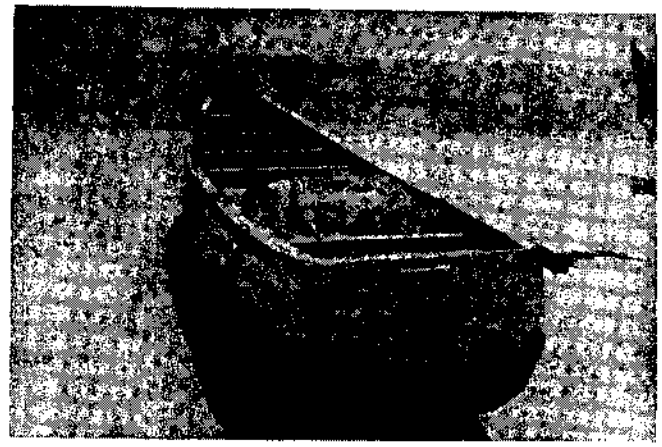


Fig. 3. Plank built canoes which are much cheaper are conveniently used for fitting outboard engines.

Fig. 5 shows the seasonal variation in catch and effort during the period under study. The total drift net catch decreased steadily from 459 t in 1981–'82 to 329 t in 1983-'84. Thereafter fishery showed improvement and in 1986–'87 there was a sharp increase in the catches netting 1,333 t of fishes. The effort was at minimum during 1984–'85 (2,610). In 1986–'87 there was a dramatic increase in effort, reaching a figure of 9,393 operations. The increase in effort and catch can be attributed to the introduction of outboard engines. Though the use of outboard engines began by 1984–'85, cent per cent of the units was mechanised by 1986–'87 only. Prior to 1985–'86 season seer fishes were the dominant species in the catch, but during 1986–'88 tunas became the most dominant species in the drift net catches.

When the relation between seasonal effort and catch was worked out, it was found that total catch had a direct relationship with effort. Tuna catch also showed a direct relationship to effort. Mackerel catch showed an inverse relationship with effort. A study was made on the relationship between seasonal effort and catch per effort. The catch per effort of all the fishes was found to have direct relation. When, only the first five seasons were taken into consideration, the relationship was inverse. This indicated a major change in the characteristics of the fishery with the advent of outboard engines. The relation between catch and effort of tuna was also direct. These indicate that with the increase in effort, tuna catches are bound to increase than that of seer fishes. Mackerel is loosing its relevance in the drift net fishery. On the whole, in the drift net fishery, an increase in effort can result in better returns.

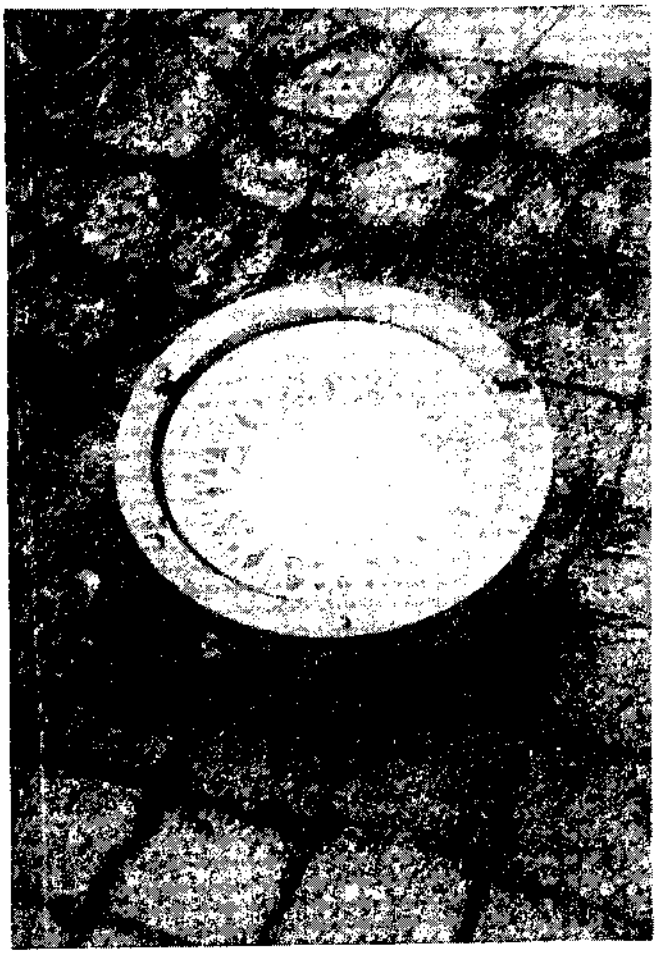


Fig. 4. A compass usually used by the fishermen. Smaller and cheaper types are also available.

Seasonal variations in catch and effort

Fig. 6B shows the average catch and effort in different months from 1981–'87. The figure shows the peak period of drift net fishery as October, when catch and effort were at the peak. The maximum catches of tunas and seer fishes came in this month. The secondary peak was in April. Fig. 6A shows the average monthly catch during the 1981–'88 period. Here the picture is slightly different and the secondary peak in catches is in July. This change was effected by the peculiarity of the fishery in 1987–'88 as shown in Fig. 6C. In this season the highest effort and catches were made in July. During the second half of July the weather was good without the usual monsoon conditions. This was the reason for the unusual increase in effort. In general it can be seen that tunas dominated the catch from April to July, October and March. In other months seer fishes dominated the catch.

The relation between catch and effort during July was direct. The indication was that July might perhaps be the month when the availability of different fishes contributing to drift net fishery, especially tunas, is better. But, generally bad weather conditions due to monsoon restrict the increase of effort in July.

The relationship between drift net and 'nethalvala' catches

The drift net catches mainly include carnivorous fishes. Their main food items are small fishes like anchovies and young ones of fishes like sardine, mackerel *etc*. These small fishes are caught here by 'nethalvala', which is a boat seine like 'pattenkolli' but with smaller meshes. An attempt is made to study the relation between the abundance of these small fishes and drift net catches. A study on the relation between catch and effort of 'nethalvala' and drift net indicated a direct relation except during the year 1986–'87.

Fig. 7 shows the monthly average each in drift net and 'nethalvala' during different periods such as 1981-'88 and 1981-'87. From the figure it can be seen

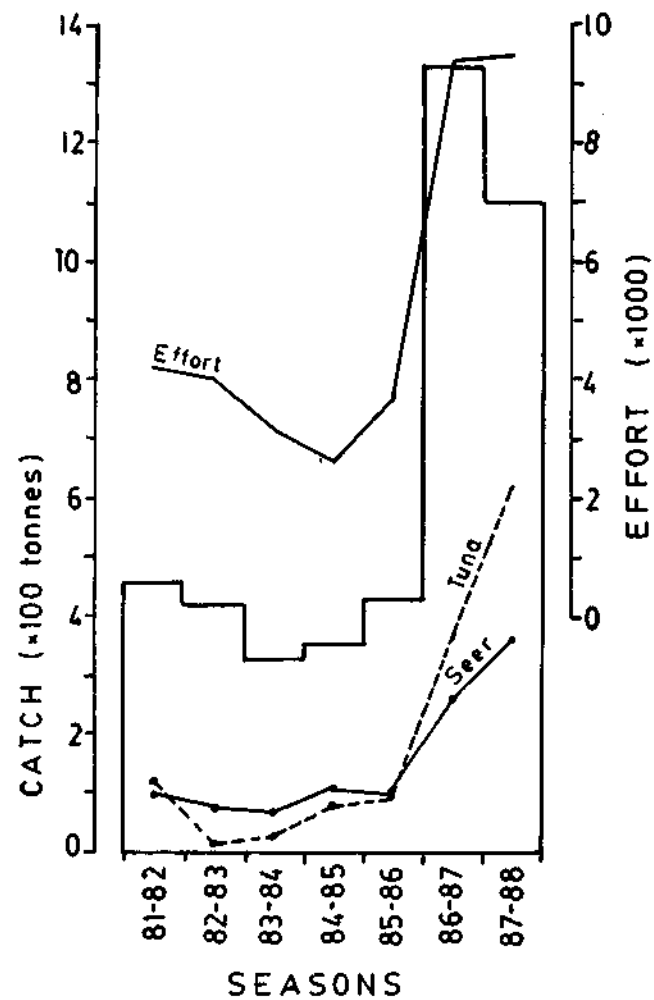


Fig. 5A. Seasonal catch and effort.

that peak catches of 'nethalvala' as well as drift net came in October. The secondary peak in 'nethalvala' catch was in July. The average monthly drift net catch during the period from 1981–'88 showed a secondary peak in July. But this peak disappeared when the averages from 1981–'87 were plotted. This is due to the peculiar situation in July, 1987 as described earlier. Hence, the availability of small fishes, perhaps, played an important role in the success of drift net fishery. The peak catches of small fishes in July again indicated the possibility of better availability of fishes, coming in drift net. The peak drift net catches during July '87 was an indication of this possibility.

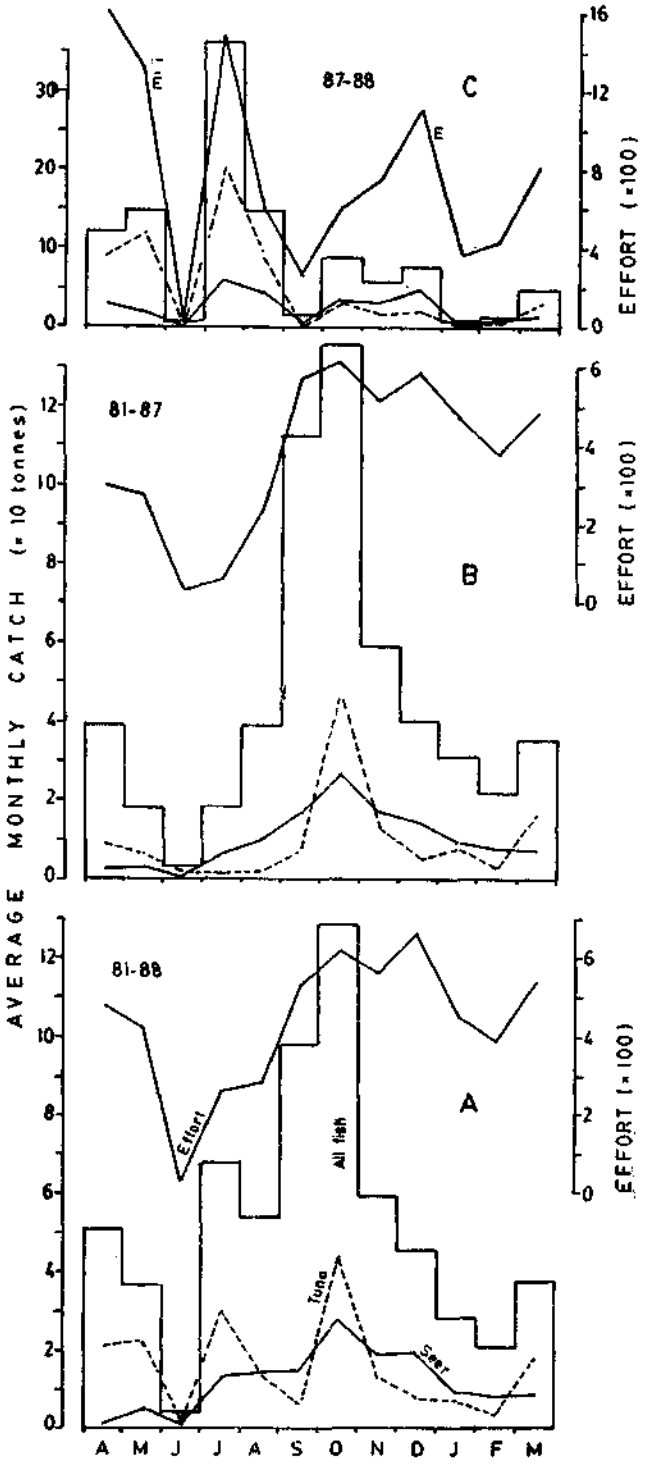


Fig. 6. Average monthly catch and effort during different periods.

General remarks

The study has indicated a general increase in the efficiency of drift net with reduced man power. With

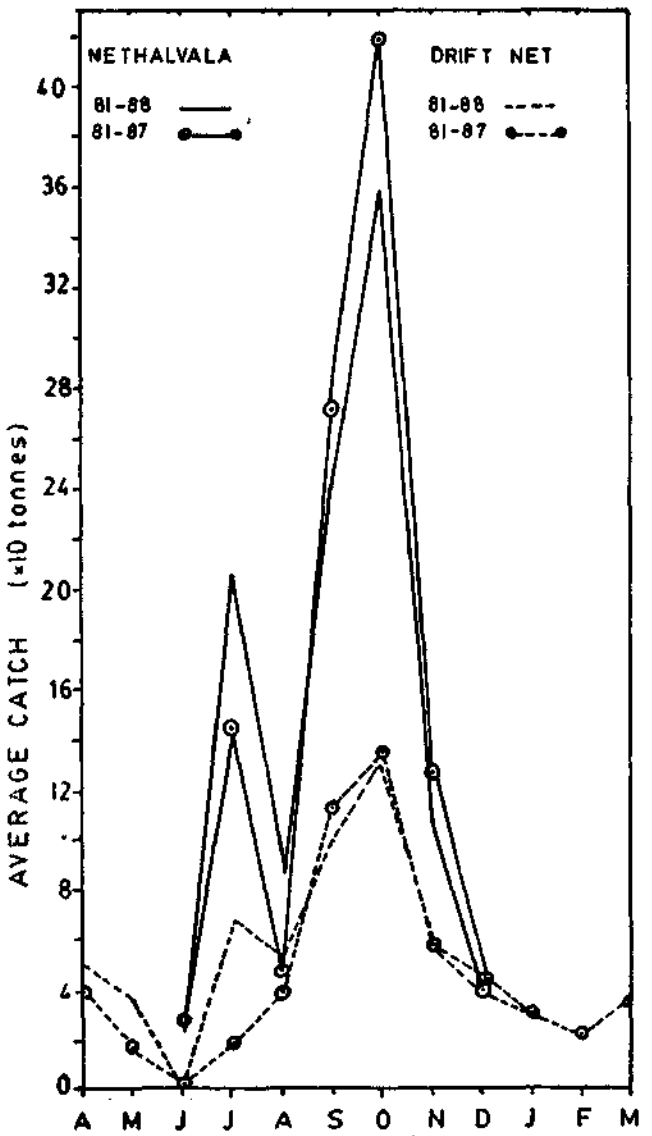


Fig. 7. Average monthly catch of drift net and 'nethalvala'.

the introduction of cheaper plank built boats the capital needed for purchasing an outboard engine has been neutralised as the plank built boat plus an outboard engine will cost less than a good dug-out canoe. Reduction in the manpower needed and physical labour involved have increased the availability of labour. The use of compass (Fig. 4) and safer 'kettuvallams' (Fig. 3) have made the fishermen more confident to go to deeper areas for fishing in the night even in rough weather. All these developments with recent increase in C/E are sure to take the drift net effort to new heights in the coming years. Further, the general decline of the major traditional pelagic fisheries like oil sardine and mackerel will attract more effort into drift net fishery.

At present there are no indications of any adverse effects on the fishery due to an increase in the effort. The total catch and tuna catch are bound to increase with increase in effort. Only in the seer fish catches a stagnation is felt. This can perhaps, be due to change in the area of fishing. Anyhow, the future of drift net fishery at Calicut will mainly depend on the demand for tunas.

But, of late the local fishermen are becoming aware of the ill effects caused by the use of outboard engines. According to them these engines create tremendous noise pollution in the water. The mussel pickers who dive underwater for picking mussels support this view. Fishermen say that the pelagic fishes, especially oil sardine, are very sensitive to underwater noise. This observations has to be investigated in detail.

Unlike dug-out canoes the longevity of the plank built 'kettuvallams' is limited and constant repairs are necessary to keep it in good condition. The repairs of the outboard engines are also costly. These are some of the aspects which may perhaps control the increase in effort. The drift net fishery at Calicut demands a close watch in the coming years.

ON SEASONAL ABUNDANCE OF THREADFIN BREAMS OFF VISAKHAPATNAM COAST*

During 1982–'87 almost in every year heavy catches of *Nemipterus mesoprion* used to occur for short periods, the bulk of the catches being in January–April.

Fishery

Nemipterids contributed 10–12% of total catches of private mechanised boats which operated shrimp trawls off Visakhapatnam and the catches were landed at the Visakhapatnam Fisheries Harbour. *Nemipterus japonicus, N. mesoprion, N. delagoae, N. luteus* and *N. tolu* were the species caught. Out of these, *N. mesoprion* and *N. japonicus* contributed 51 and 45% of total nemipterid catches respectively.

Seasonal abundance of different species of nemipterids is shown in Fig. 1. It is seen that during the period January–April, *N. mesoprion* dominated in

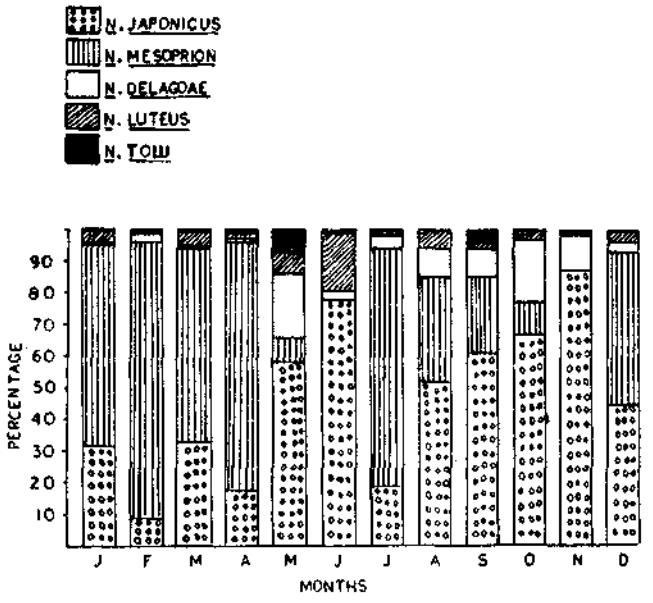


Fig. 1. Seasonal abundance of different species of nemipterids for the period 1984–'86.

* Prepared by T. Appa Rao and K.V. Narayana Rao, Visakhapatnam Research Centre of CMFRI, Visakhapatnam.

the catches contributing to more than 50% of nemipterid catches and *N. japonicus* was second in importance.

The average catch per hour of nemipterids is shown in Fig. 2. During January–April, the CPH values increased from 3.11 to 10.53 kg/hr but decreased to 7.55 kg/hr in May. During June–September, the values fluctuated from 0.48 to 1.82 kg/hr but from October to December the values increased from 1.35 to 2.26 kg/hr.

Biological observations

The total length of *N. mesoprion* varied from 40 to 170 mm with more than 50% of fish measuring 100–150 mm. Stomach analysis of the samples revealed that on an average 16% of the guts were full, 18% were 3/4 full,. 21% half full and the remaining 44% were 1/4 full. The major food items were, bony fishes, prawns shrimps and crabs.

Maturity studies indicated that the ovaries were in matue and ripe condition during January–April. The percentage of males was more than that of the females.

Remarks

N. mesoprion was a major contributer to the demersal catches of private trawlers (Fig. 3). The seasonal abundance of *N. mesoprion,* which coincided with that of *Decapterus russelli* and *Psenes indicus* during March–April, suggests that the species enters the fishing grounds during the period of upwelling and the shoals later move away from the fishing grounds.

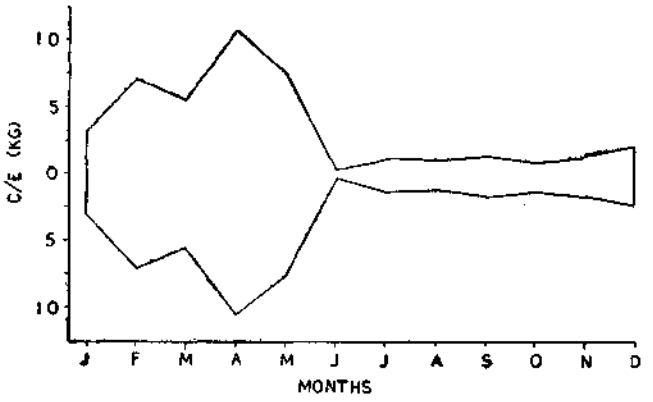


Fig. 2. The monthly catch per hour values of nemipterids for the period 1982–'86.

Fig. 3. Heaps of Threadfin breams landed at Visakhapatnam Fisheries Harbour.

SURVIVAL OF HATCHERY PRODUCED GREEN MUSSEL SEED IN DIFFERENT SALINITIES

Salinity tolerance of the seed of the green mussel *Perna viridis* (Linnaeus), produced in the Kovalam Field Centre of Central Marine Fisheries Research Institute, was tested in different salinity gradients for understanding the capacity of the hatchery produced seed to tolerate the changes in the salinity in the culture site, on transplantation. The seed were to be transplanted to Muttukadu Farm of C.M.F.R.I., where the salinity gradient ranged from freshwater conditions during monsoon months to about 50‰ during summer months. The range in salinity tested varied between 5‰ and freshwater. For comparison purposes, seed of similar size were brought from the natural bed at Ennore and were also tested in the same salinities simultaneously. Seed from hatchery and from natural bed, were grouped into two size groups namely below 10 mm and 10–19 mm.

Prepared by P.V. Sreenivasan, K. Satyanarayana Rao and P. Poovannan, Madras Research Centre of CMFRI, Madras -600105.

Percentage of survival of seed of *P. viridis*, from hatchery and from natural bed in different salinities are presented in Fig. 1. All the mussel seed survived in the control for the entire period of 10 days. In fresh water all specimens in both the size groups died by the fourth day. 80% of them died even on the second day. In 5 and 10‰, smaller size group survived only for 3 days, but larger ones till 4 days. In all the above three salinities, the seed were observed to be totally inactive from the time of introduction till death. In salinity 15‰, mortality to the extent of 30–40% was noticed among the smaller ones on the second and third days. In larger individuals, 30% of the hatchery seed were dead by third day. In 20‰, mortality was observed only among the smaller seed on the 5th day, to the extent of 20% among the hatchery produced and 10% among the natural bed seed. There was 100% survival among the larger seed in this salinity. There was totally no mortality in the salinities of 25, 30 and 40‰. In 45‰, mortality was noticed on the fourth day to the extent of 40% and 30% among the hatchery produced seed alone. At 50‰, mortality occurred in all the size groups *viz.*, 50 and 60% among the hatchery seed and 30 and 10% among the natural bed seed.

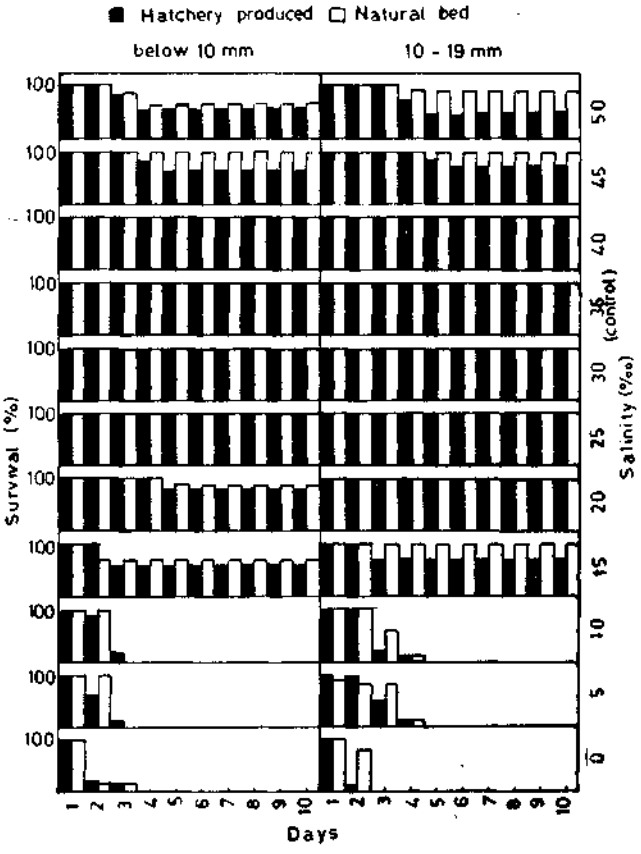


Fig. 1. Survival (in percentage) of the seed of *P. Viridis* in different salinities.

These observations indicate that the green mussel seed can survive in salinities from 15 to 50‰. Since there was no mortality in the salinity range of 25 to 20‰, this can be considered as ideal range for the mussel to live in. In 15, 20, 45 and 50‰ the seed survived in spite of some mortality. These can be considered as tolerance range, where the mussel gradually acclimatizes by itself. Salinities of 10‰ and below, are lethal to the mussel, since there was total mortality.

The seed from the natural bed are observed to be more tolerant than the hatchery produced. From the above observations, it can be inferred that the green mussel seed can be transplanted directly, if the salinity at the culture site is between 25 and 40‰. Acclimatization has to be done, if they are to be transplanted in salinities of 15, 20, 45 and 50‰. Another point of significance was that, mortality, if there was any, took place almost within five days, which means that the seed get acclimatised by that period or succumb to the adverse conditions.

At Muttukadu Farm, the salinity drops to low levels during November-December. By January, the salinity invariably reaches 20‰ and gradually rises to 45‰ and above during June-July. Therefore seeding has to be done in January, when the conditions are almost favourable. The mussel can be allowed to grow till June, when conditions are ideal for their survival. Harvest can be done in June/July itself, so that adverse effects of high saline conditions in the subsequent months can be avoided. Same pattern of seeding can be adopted, wherever similar conditions exist.

ON A BUMPER CATCH OF CAT FISH, 'MANTHAN KELARU' LANDED AT VERKOTTIL CENTRE, RAMESWARAM ISLAND*

Arius caelatus locally known as'Mantha n kelaru' in Tamil occurs in small quantities in trawl net and pair trawl net operations off Rameswaram–Mandapam region almost throughout the year. In February and March, 1988, a bumper catch of this species was obtained in the high opening pair trawl net operated in the Palk Bay off the Verkottil centre in the Rameswaram Island at 10 to 12 metres depth range. An unprecedent catch of 37.7 tonnes was landed by 10 units operating in the fishing area 9/79–3C on 26–2–1988. In the subsequent days of operation, however, the catch rate decreased, fluctuating between 0.2 and 5.5 tonnes. The fishery disappeared from the area by 23–3–88.

The size of *Arius caelatus* landed during this period ranged from 300 to 640 mm in total length. The dominant size of the population was at 450–540 mm. The gut content analysis of 10 specimens revealed the remnants of crabs, bivalve shells and brittle stars. The examination of the maturity condition of the fishes showed that most of them were in advanced stage of maturity with ripe ovaries. A few specimens carried eggs in the mouth.

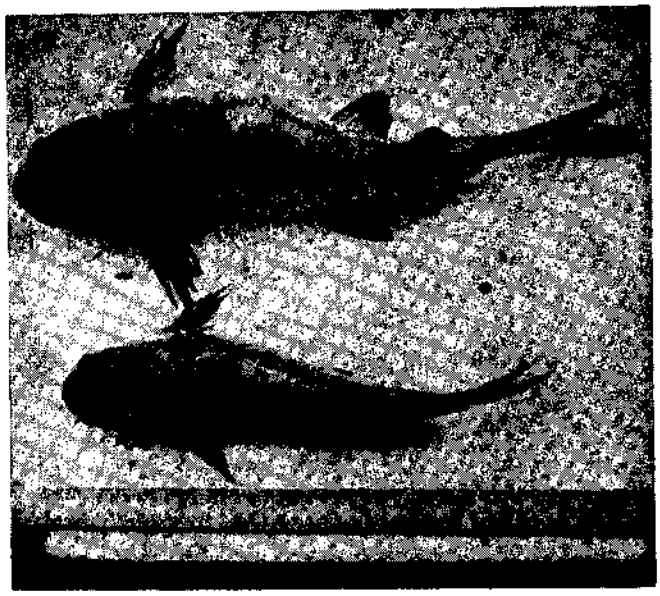


Fig. 1. 'Manthan kelaru' a species of cat fish.

* Reported by C. Kasinathan and M. Bose, Regional Centre of CMFRI, Mandapam Camp.

INSTANCE OF HEAVY CATCHES OF *METAPENAEUS DOBSONI* ALONG THE MADRAS COAST*

Unusually heavy catches of *Metapenaeus dobsoni* were made from the inshore waters during 12th to 18th July, 1988 at the fishing villages of Perianeelangarai kuppam, Panayur kuppam and Kanathur-reddi kuppam. The catches were made using Edavalai, a type of bag net which requires 4 catamarans and 20 men to operate. On 16th July, 6 units landed 3,048 kg of prawn which was sold for Rs. 68,508. On the same day about 2,000 kg of *M. dobsoni* was landed at Periyaneelangarai kuppam. At Kanathur-reddi kuppam 2,500 kg of prawn fished with *Kavalavalai* were landed.

The length range of the prawns landed was between 78 and 102 mm and dominant size group (31.4%) was 90–94 mm.

* Reported by S. Sankaralingam, Madras Research Centre of CMFRI, Madras.

ON A LEATHERBACK TURTLE CAUGHT FROM PALK BAY, OFF MANDAPAM*

On 3-7-1988, one live leatherback turtle *Dermochelys coriacea,* popularly known as 'Eluvarai aamai' or 'Dhoni aamai' in Tamil, got entangled in gill net ('Choodai valai') operated by one of theme chanised indigenous boats in the fishing ground, 12 km northwest of Mandapam in the Palk Bay, was brought ashore at the Mandapam fish landing centre near the fish farm of the Regional Centre. The depth of the fishing ground where the gill net was operated, was about 12 m.

It was a male specimen, measuring 152 cm carapace length. The other morphometric measurements of the specimen are given in Table 1. As could be seen from the table, the specimen on hand appears to be relatively narrow bodied compared to the female specimens reported earlier.

Table 1. *The morphometric measurements (in cm) of the Leatherback turtle*

Year reported	1988
Carapace length	152
Carapace width	81
Plastron length	144.5
Plastron width	83
Length of anterior flipper	96
Length of posterior flipper	58
Weight (kg)	260 (estimated)
Sex	Male

* Reported by P. Vedavyasa Rao, A.A. Jayaprakash and M. Ramamoorthy, Mandapam Regional Centre of CMFRI, Mandapam Camp.

ON OLIVE RIDLEY TURTLES LANDED ALONG RATNAGIRI COAST*

Three turtles of the species *Lepiodochelys olivacea* caught in gill net off Ratnagiri coast were landed at Mirkarsada (1 No.) and Bagavati Bunder (2 Nos.) in the morning of 18th and 19th April, 1988 respectively. The body measurements of one of the turtles landed at Bagavati Bunder are given below:

Carapace length	:	60 cm
Carapace width	:	57 cm
Total weight	:	25.5 kg

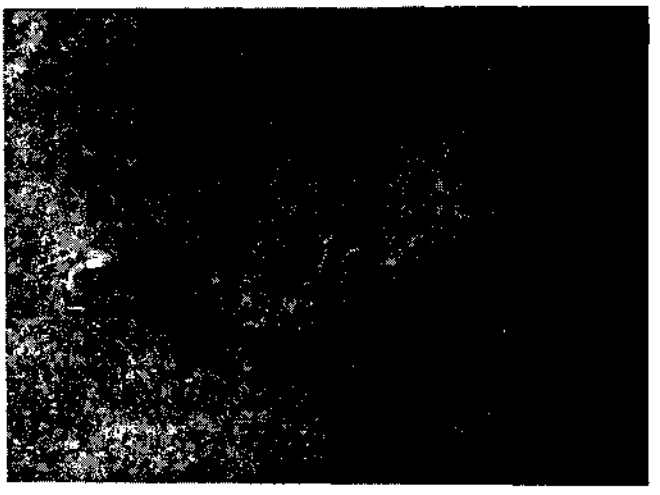


Fig. 1. An Olive ridley turtle landed at Bagavati Bunder.

* Reported by B.N. Katkar, Ratnagiri Field Centre of CMFRI, Ratnagiri.

A REPORT ON THE WHALES SIGHTED OFF MANDAPAM ON THE PALK BAY SIDE ON 5th JULY, 1988*

On 5-7-1988, at about 1030 hrs, Mr. T.S. Balasubramanian, the Deputy Commander, Coast Guard Station, Mandapam, informed that a couple of whales were seen swimming in the Mandapam Bay in front of the Coast Guard Station, and that the Station could arrange a boat trip for-on-the spot observation by the Scientists of the Regional Centre of the Central Marine Fisheries Research Institute, Mandapam Camp.

The surfacing of whales at frequent intervals was seen in the Bay, at about 2.5-3 km away from the shore. Observations at a closer distance onboard revealed the presence of three whales, one larger and two smaller. The blowing behaviour was observed only a couple of times; the blow was rather feeble and only of a moderate height. During surfacing, the body appeared to be slender, overall colour of the exposed upper surface being black. The fin appeared to be narrow, concave on its outer margin and tapering. The tail fluke was with concave margin. Often two animals were seen swimming close together. They surfaced only for a short duration of less than a minute. The eye estimation of the size of the larger whale was about 4-5 m and that of the smaller ones, 2.5-3 m.

During the observation period between 1100 and 1200 hrs, the whales were seen in relatively shallower waters (5-6 m depth), nearer the shore, but later, they were found gradually moving to deeper areas and away from the shore.

It was reported that the whales were first sighted in the area on 4-7-1988 afternoon, and they remained in this area until the afternoon of 5-7-'88. According to fishermen fishing in the area, there were four whales.

On the basis of the observed characteristics such as the body form, colour, nature of the fin, fluke and general surfacing and diving behaviour, it was inferred that the present whales might belong to the species *Pseudorca crassidens* Owen, popularly known as False killer whale.

Although the species is oceanic in habit and moves in shoals, it is known that these whales, on several occasions, move to shallow areas and get stranded or trapped. In the present case also, it appears that a few specimens might have got separated from the main shoal and moved to the shallow waters of the Bay.

From the Indian waters, *P. crassidens* (False killer whale) is reported from Calicut, Trivandrum, Pozhikara (Kanyakumari District), Cape Comorin, Tiruchendur and Madras. The present sighting of this species off Mandapam in the Palk Bay is the first report.

The great interest evinced by the Officers and staff of the Coast Guard Station, Mandapam and the excellent facilities afforded by the Station to the scientists to make the above observation are gratefully acknowledged.

* Reported by P. Vedavyasa Rao, P. Livingston and Atmaram Misra, Mandapam Regional Centre of CMFRI, Mandapam Camp.

ON A SPERM WHALE STRANDED AT MADRAS*

On the evening of 8-3-1988, at about 1800 hrs, the fishermen at Kasimedu near Madras observed a whale struggling hard near to their fishing area in the coastal waters. The whale was alive till 2000 hrs and died later and stranded near the shore on the same day night.

The stranded whale was found to be a young female measuring 3.90 m, estimated to be one year old and weighing about 3 tonnes (Fig. 1). The head of the whale measured approximately 1/3 of its body length and behind it the body tappered to the tail fluke. The characteristic massive barrel like head had an abruptly blunt snout. The size of the animal and the nature of the under developed teeth on the jaws led to the inference that it was a young specimen. The lower jaw was very narrow and did not reach the end of the snout.

* Reported by P. Nammalwar, S. Srinivasarangan and S. Mohan, Madras Research Centre of CMFRI, Madras.

Table 1. *Morphometric charactors*

Particulars	Measurements (cm)
Total length (snout to notch of caudal flukes)	390
Tip of snout to anterior insertion of flipper	84
Tip of snout to centre of anus	278
Notch of the fluke to centre of anus	130
Length of the fluke on the outer curvature	43
Length of the fluke on the inner curvature	34
Distance between the extremities of flukes	20
Width at insertion of fluke	13
Length of dorsal fin base	3
Vertical height of dorsal fin	11
Length of flipper from anterior insertion to tip (from the base of flipper to caudal tip)	220
Depth of body at anal region	643
Depth of body at origin of flipper	703
Depth of body at the origin of dorsal	80
Depth of body in the region of eye	85
Tip of the lower jaw to the centre of anus	233
Length of upper jaw	64
Length of lower jaw	40
Diameter of the eye	1
Distance between the genitial opening and anus	28
Total number of teeth (15 nos. in one side)	30 nos.
Estimated weight	3 tonnes (approx.)

Fig. 1. The sperm whale landed at Madras.

From the morphometric characters, enormous size of the head and tiny lower jaw, the animal was identified as a sperm whale belonging to the sub order *Odontoceti*, under the order cetacea, family physeteridae and species *Physeter macrocephalus* which is a synonym of *Physeter catoden*. The external body measurements of the specimen are given in Table 1.

ON A BALEEN WHALE LANDED AT PUDUMANAIKUPPAM, MADRAS DISTRICT*

A female Baleen whale of the species *Balaenoptera physalus* was landed at Pudumanaikuppam along the Tamil Nadu coast on 15–6–1988 by a 10 m long mechanised fishing boat. The catch was made at 40 m depth. The body measurements of the whale (in cm) are given below:

* Reported by S. Subramani, Madras Research Centre of CMFRI, Madras.

Fig. 1. Dorso-lateral view of the Baleen whale landed at Madras.

Fig. 2. Anterior portion of the whale showing the throat grooves extending upto the umbilicus.

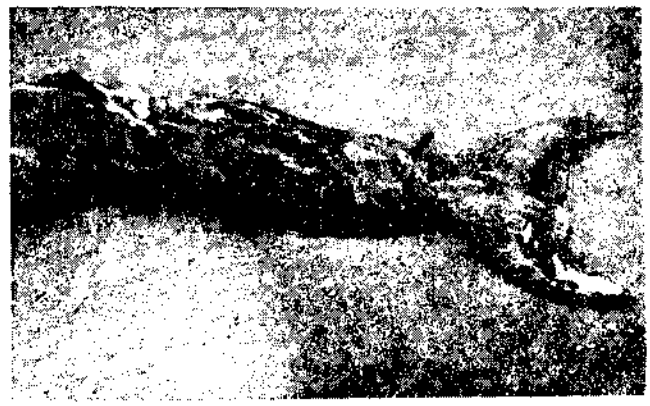
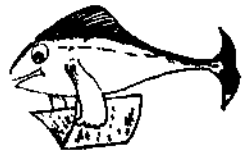


Fig. 3. Posterior portion of the whale showing the caudal flukes.

Total length	469
Length from tip of snout to centre of eye	67
Length from tip of upper jaw to anterior insertion of flipper	111
Length from tip of upper jaw to origin of dorsal fin	275
Length of flipper	52
Length of upper jaw	69
Length of lower jaw	8
Distance between the extremities of caudal flukes	71
Depth of body near flipper	95
Approximate weight	1 tonne



ON THE STRANDING OF SEI WHALE *BALAENOPTERA BOREALIS* ALONG GULF OF MANNAR COAST*

An incidence of stranding of Sei whale *Balaenoptera borealis* has been observed on 18-5-1988 at Kayalpatnam in Gulf of Mannar. This region appears to be known for such occurrences as seen from the earlier records. Gulf of Mannar is being frequented by different whales such as Blue whale, Sperm whale, Rorqual whale, Sei whale *etc.*, on their migration towards the Indian and Sri Lankan coasts for the purpose of breeding.

The medium sized female Sei whale measured 10.02 m in total length, 2.25 m in height and weighed about 5.5 t. The local fishermen noticed the whale floating in the shallow waters on the previous day during their regular fishing operations. On hearing this news, some of the residents engaged five Tuticorin type of motorized boats and brought the whale ashore and exhibited it for the public on 18th May, 1988.

The morphometric measurements obtained are given in Table 1. Figs. 1 and 2 show the dorsal and

* Prepared by H. Mohamed Kasim and T.S. Balasubramanian, Tuticorin Research Centre of CMFRI, Tuticorin.

frontal view of the stranded whale. Figs. 3 and 4 show the throat grooves and one of the baleen plates respectively.

Fig. 1. Dorsal view of the Baleen whale *(B. borealis)* stranded off Kayalpatnam.

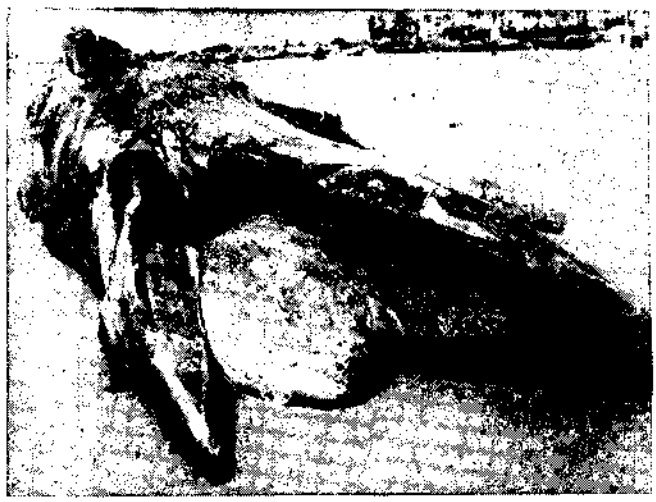


Fig. 2. Frontal view of the Baleen whale.

Fig. 3. Throat grooves of the Baleen whale.

Fig. 4. A baleen plate of the Baleen whale.

Table 1. *Details of morphometric measurements of* Balaenoptera borealis *stranded off Kayalpatnam on 18th May,* 1988

Details	Measurements in cm
Tip of upper jaw to deepest part of fluke notch	1002
Tip of upper jaw to centre of anus	649
Tip of upper jaw to end of genital slit	624
Tip of upper jaw to centre of umblicus	504
Tip of upper jaw to top of dorsal fin	695
Tip of upper jaw to anterior insertion of flipper (left)	300
Tip of upper jaw to centre of blow hole	139
Tip of upper jaw to centre of eye (left)	216
Tip of upper jaw to angle of gape	170
Projection of lower jaw beyond upper	72
Length of eye (left)	15
Centre of eye to angle of gape	46
Blow hole length	33
Blow hole width	16
Flipper length : tip to anterior insertion (left)	120
Dorsal fin height	58
Dorsal fin base	52
Fluke span	220
Notch of flukes to centre of anus	320
Girth at flippers	252
Baleen plate length	178
Baleen plate breadth	30
Other details:	
Baleen counts	312 nos.
Stomach length	95
Liver length	117
Intestine length	4408
Ventral grooves	56 nos.

Prior to this incidence a specimen of the same species was washed ashore in Tuticorin port area on 26th February, 1988. This was identified as male and the morphometric measurements of this specimen is given in Table 2 (Venkataramanujam *et al.*, pers. communication). On earlier two occasions also the same

Table 2. *Morphometric measurements (in cm) of Sei whale* Balaenoptera borealis *stranded at Tuticorin on 26th February*, 1988, (*Venkataramanujam et al., Pers. communication)*

Details	Measurements in cm.
Total length	1200
Weight	1000
Tip of lower jaw to flipper origin	136
Breadth at the base of flipper	32
Tongue length (4 rows of frills in the tongue noted)	134
Tip of lower jaw to origin of dorsal fin	778
Length of dorsal fin base	56
Height of dorsal fin base	24
Baleen plate length	20
Length of lower jaw	232
Number of grooves	48 nos.
Blow hole breadth	19
Blow hole length	33
Eye length	07
Single caudal length	137
Single caudal breadth	77
Maximum girth	45
Total number of baleen plates in each row	365 nos.

species was reported by others from Naduvattom in Kerala coast and from Dhanushkodi Island.

The males of *B. borealis* attain maturity when they measure on an average 13.7 m. From the total length of the presently reported two whales it is seen that they were young ones and stranding might not have occurred due to breeding run. Further, it was observed by Venkataramanujam *et al.*, (per. communication) that the stomach of the male was full with *Sardinella* spp., which indicates that this specimen was in good health and it might have stranded when it strayed into shallow water in search of the shoals of sardines. The stomach of the female was empty and this suggests that this specimen might have had a poor health for there was no dearth for food as the sardine fishery was in its peak at the time of stranding.

MARKED 'BLACKTIP SHARK' LANDED AT CALICUT*

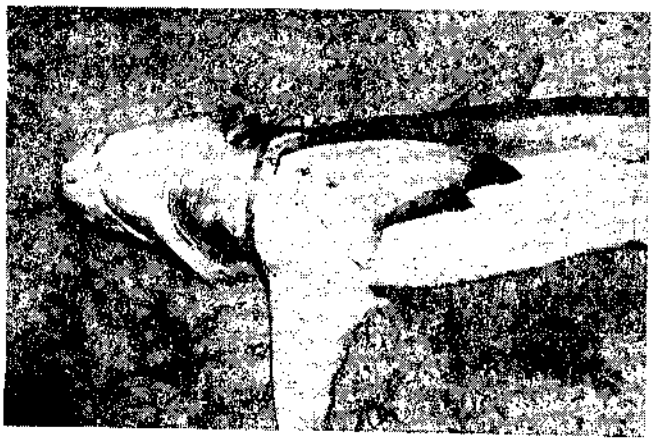


Fig. 1. A close view of the shark *C. limbatus* with the strap and the two perforations on the pectoral fins.

Fig. 2. Long lines and the hooks used for shark fishing at Elathur, Calicut.

On 12th May, 1988 a marked 'Blacktip shark' *Carcharhinus limbatus* measuring 200 cm was landed at Elathur, about 14 km north of Calicut. The shark was caught by long lines with large hooks. Tuna meat was used as bait. It was captured northwest of Elathur at about 35 m depth. A blue coloured high density polyethylene strap was found encircled around the girth of the body just in front of the pectoral fins. The two ends of the strap were seen melted and jointed with no mark of any metal punching. There was no infor-

*Reported by M. Ferozkhan and K. Nandakumaran, Calicut Research Centre of CMFRI, Calicut. Photographs by Dr. P.S. Kuriakose.

mation written or engraved on the strap. However, there were two visible perforations 3 cm apart on the left pectoral fin, not completely penetrating the fin but connected to each other by a shallow groove. It is quite possible that a label or tag was tied on the left pectoral fin which might have been lost when the shark struggled on hooking.

The blue coloured synthetic strap was 84.5 cm long and 1.5 cm wide. When encircled it had a diameter of 26 cm. The detailed measurements, the strap as well as the jaw of the shark are kept in Calicut Research Centre of CMFRI.

On 19th May, 1988 another 'Blacktip shark' was landed with a similar strap at Elathur. But in this specimen there was no sign of any tag attached to the pectoral fin or any other part.

ANNOUNCEMENT

A meeting of Commission C2 of the International Institute of Refrigeration (IIR) on "Chilling and Freezing of New Fish Products" will be held in Aberdeen, Scotland from 18-20 September, 1990. It is being organised by Torry Research Station, Aberdeen, the UK Government Centre for research/fish technology. The meeting of Commission C2, which is concerned with Food Science and Technology will in addition to covering chilled and frozen storage of fish generally, give prominence to the more recent developments in 'surimi' technology, fish and shellfish farming and packaging. It is hoped that the papers presented will cover the following topics.

a) Chilled fish and shellfish
b) Frozen fish and shellfish
c) Farmed fish and shellfish
d) Fish gel products ('surimi'/'kamaboko')
e) Pre-cooked and microwaveable products
f) Legislation, labelling and regulatory aspects

For further information contact:

Dr. I. MACKIE, IIR Organising Committee, Torry Research Station, P. O. Box 31, 135 Abbey Road, Aberdeen AB9 8DG, Scotland, UK.

स्कोम्ब्रोइड्स (SCOMBROIDS) के विशेष प्रसंग में कालिकट की अपवाही जाल मात्स्यिकी *

प्रस्तावना

कालिकट के वेल्लायिल में अपवाही जाल मात्स्यिकी के त्वरित विकास के साथ अनेक परिवर्तन भी हो रहे हैं। बाहरी यंत्रों के आगमन और तारली, बाँगडे आदि परंपरागत मछलियों की घटती, धीवरों को इस मात्स्यिकी की ओर आकृष्ट कर देते हैं। 1986-87 के उच्च मत्स्यन के महीनों में प्रतिदिन का औसत आपरेशन कभी भी 30 से अधिक नहीं पहुँचा था। लेकिन 1986-88 के उच्च मत्स्यन के महीनों में अपवाही जाल का औसत आपरेशन प्रतिदिन 50 से अधिक था। अपवाही जाल की पकड में मुख्य घटक होने के कारण स्कोम्ब्रोइड्स मात्स्यिकी पर ध्यान देना आवश्यक है।

पकड सामग्री

अपवाही जाल, विविध मोटाई के नाइलोन सूत्र से बनाये जाते हैं। इनके जालाक्षियों का आकार 10 से 15 सी. एम. के अन्तर में है। साधारणतया इसकी लंबाई 600 मी. होता है और गहराई 10 मी.।

आनाय

1984-85 में बाहरी यंत्रों को अधिक प्रचार मिला और अपवाही जालों के स्थानीय आनायों में इसका प्रयोग करने लगा। इन यंत्रों ने कम कीमत की फलक से निर्मित यानों का प्रयोग सुगम बना दिया। जब एक अच्छा नौका का दाम लगभग 60,000 रुपया है तब फलक से निर्मित यान जिसका स्थानीय नाम है "केट्टुवल्लम" सिर्फ 15,000 रुपये में मिलता है। इसके अलावा नौकाओं में बाहरी यन्त्रों का प्रयोग अपवाही जाल एकक में मानव शक्ति को घटा कर दिया है।

परिचालन

साधारणतया मत्स्यन यान 15.00 घण्टे को स्थलन केन्द्र से जाता है और 18.00 घण्टे को 35 मी. गहराई में पहुँचता है। सुरमई और ट्यूना मछलियों पर अधिक ध्यान देते हुए जाल 45 मिनटों में बिखेरकर रस्सी यान से बाँधता है। साधारत: 25 मीटर से अधिक लंबाई तक रस्सी नहीं छोड देती पर प्रक्षुब्ध मौसम में रस्सी अधिक लंबाई में छोड देती है। इसके बाद जाल 6 घण्टे तक बहने देता है। 06.00 घण्टे को स्थलन शुरू होता है। दिशा की जानकारी केलिये आजकल मछुए दिक्सूचक (कम्पास) का उपयोग करते हैं।

पकड और पकड-श्रम

1981-88 के दौरान वेल्लायिल में अपवाही जाल के 5224 एककों के ज़रिए 624 टन मछली पकडी गयी। इसके 54.65% स्कोम्ब्राइड जाति के ट्यूना (30.03%) सुरमई (23.39%) और बाँगडे (1.23%) आदि थीं। इसके अलावा शिंगटीयाँ, पाम्फ्रेट्स, सुरा, रे, करैंजिडस आदि भी पकडी गयी थी। 1983-84 में कुल अपवाही जाल पकड में घटती नज़र आयी तो 1986-87 में 1333 टन की भारी बढती हुई। 1984-85 में पकड श्रम काफी कम था। 1986-87 में शत प्रतिशत एकक यंत्रीकृत किया गया। 1985-86 की मुख्य पकड सुरमई थी और 1986-88 के दौरान अपवाही जाल की पकड में ट्यूना पहला आ गया। कुल पकड और पकड श्रम के साथ सीधा संबन्ध है। अपवाही जाल मात्स्यिकी में प्रयास बढाने से काफी अच्छा फल मिलने की संभावना है।

पकड और पकड श्रम में मौसमी अन्तर

अपवाही जाल मात्स्यिकी की उच्चतम पकड समय अक्तूबर है। ट्यूना एवं सुरमई का ज्यादा से ज्यादा पकड इस अवधि में मिलती है। दूसरी उच्चतम पकड अप्रैल में प्राप्त होती है। जुलाई में मौसम काफी अच्छा होता है और इसलिए पकड श्रम बढाता है। अप्रैल से जुलाई तक और अक्तूबर से मार्च तक ट्यूना की बहुलता है।

*टी. एम. योहन्नान और के. के. बालसुब्रह्मण्यन, सी. एम. एफ. आर. आई. का कालिकट अनुसंधान केन्द्र।

विशाखपट्टनम के प्रतितटों में ग्रेडफिन ब्रीमों का ऋतु-कालिक स्थलन*

1982 से लेकर 1987 के वर्षों में नेमीप्टेरस मीसोप्रियोन की पकड में भारी अधिकता हुई। जनवरी से लेकर अप्रैल तक के महीनों में पकड अधिक हुई। विशाखपट्टणम के अपतटों में चिंगट आनाय से परिचालित निजी यंत्रीकृत यानों की कुल पकड में 10-12% नेमीप्टिडस था। इसका स्थलन विशाखपट्टनम मात्स्यिकी बन्दरगाह में हुआ था। कुल नेमिप्टिड पकड में एन. मीसोप्रियोन और एन. अैपोनिकस का देन यथाक्रम 51% और 45% था।

जनवरी-अप्रैल में नेमीप्टिडस का प्रति घण्टे की पकड की वृद्धि 3.11 से 10.53 कि.ग्रा. थी। मई में इसकी घटती हुई। जून-सितंबर में इसमें उतार चढाव देखने लगा और फिर से बढती हुई।

*डी. अप्पाराव और के. वी. नारायणराव, विशाखपट्टनम अनुसन्धान केन्द्र सि. एम. एफ. आर. आई. द्वारा तैयार किया गया।

जैविकीय निरीक्षण

एन. मिसोप्रियोन का कुल लंबाई 40 से 170 मि. मी. के बीच बदलती रही। 50% से अधिक मत्स्यों की लंबायी 100 से 150 मि.मी. थी। मुख्य आहार झींगे, मैन्टिस, चिंगट और कर्कट थे।

प्रौढावस्था के अध्ययन से पता चला कि जनवरी-अप्रैल के दौरान अण्डाशय पूर्णतया विकसित अवस्था में था। पुरुषजाति का प्रतिशत स्त्रीजाति से काफी अधिक था।

टिप्पणी

प्राईवेट आनायकों से प्राप्त तलमज्जी पकड में एन. मीसोप्रिओन मुख्य था। एन मिसोप्रिओन का डाक्टरेस रस्सेली और सीनस इन्डिकस के सामयिक अधिकता से ऐसा मालूम पडता है कि ये उत्स्रवण के समय में मत्स्यन क्षेत्र में प्रवेश करते हैं और झुण्डों में बाहर लौट जाते हैं। फिर छिछले थल की ओर बढते हैं।

विविध लवणीयता में हैचरी में उत्पादित हरित मसलों का अतिजीविता*

केन्द्रीय समुद्री मात्स्यकी अनुसंधान संस्थान के कोवलम क्षेत्र केन्द्र में उत्पादित हरित मसल पेरना वरडिस के बीज की लवणीय सहयता पर निरीक्षण किया गया। कोवलम में उत्पादित बीजों को सी. एम. एफ. आर. आई. के मुत्तुकाड फार्म में पुनर्रोपण करना है। इस फार्म का पानी मानसून के दौरान स्वच्छ जल के समान और ग्रीष्म ऋतु में लवणीयता बढकर 50‰ हो जाने का लक्षण दिखाता है। इस दृष्टि से उत्पादित बीजों को लवणीयता विविध प्रवणता के पानी में डालकर उसकी लवणीय अतिजीविता पर अध्ययन करना अनिवार्य हो गया।

निरीक्षणों से मालुम हुआ कि 15‰ से 50‰ की लवणीयता हरित मसल अतिजीवित कर सकता है। 25‰ से 40‰ के बीच की लवणीयता में इसका मृत्यु संख्या नहीं के बराबर था जो यह व्यक्त करता है कि यही इसकेलिये सबसे अनुयोज्य लवणीयता है। इसलिये इस लवणीयता में सीधे हरित मसल का पुनर्रोपण कर सकता है।

मुत्तुकाड फार्म में नवंबर-दिसंबर के दौरान लवणीयता कम हो जाती है। जनवरी में 20‰ हो जाती है और धीरे धीरे बढकर जून-जुलाई के दौरान 45‰ हो जाती है। इसलिये बीजन, जनवरी में जब वातावरण सारी दृष्टि से अच्छा होता है, करना चाहिये। जून तक मसलों को बढाना चाहिये और जून-जुलाई में लवणीयता बढने से पहले मसलों का संग्रहण करना चाहिए।

*मद्रास अनुसंधान केन्द्र के पी. बी. श्रीनिवासन, के. सत्यनारायण राव और पी. पूवन्नान द्वारा तैयारित।

रामेश्वरम द्वीप के वेरकोट्टिल केन्द्र में शिंगटी 'मन्तन केलरु' की भारी पकड*

एरियस सेलाटस का तमिल स्थानीय नाम है 'मन्तन केलरु'। वर्ष 1988 के फरवरी और मार्च महीनों में इस जाती की बंपर पकड युगल ट्रालरों के ज़रिए रामेश्वरम द्वीप के वेरकोट्टिल केन्द्र से प्राप्त हुई। 26-2-88 को 37.7 टन का अभूत पूर्व पकड मिली। इसके बाद के दिनों में पकड दर में घटती दीख पडी और 23-3-88 से प्रस्तुत मात्स्यिकी गायब हो गयी। पकडे गये एरियन सेलाटस में अधिकांश 450-540 मि. मी. लंबाई के थे और प्रौढावस्था के अग्रगत अवस्था में थे।

* मण्डपम क्षेत्रीय केन्द्र के सी. काशिनाथन और एम. बोस द्वारा तैयारित रिपोर्ट।

मद्रास तट पर मेटापेनियस डोबसोनी की भारी पकड*

मद्रास के वेरियनीलन्गरै कुप्पम, पनयूर कुप्पम और कनस्तूर रेड्डी कुप्पम आदि गाँव से 1988 जुलाई 12 से 18 तक मेटापेनियस डोबसोनी की भारी पकड इडावलै के जरिए प्राप्त हुई। पकडे गये झींगे की लंबाई 78 से 102 मि. मीटर के बीच की थी और इसमें 31.4% की लंबाई 90-94 मि. मी. थी।

* मद्रास अनुसंधान केन्द्र के श्री. एस. शंकरलिंगम द्वारा रिपोर्ट की गयी ब्यौरा।

मण्डपम से दूर पाक खाडी में समुद्री कच्छप-लेथरबाक की पकड*

मण्डपम कैम्प के 12. कि. मी. उत्तर पश्चिमी भाग में पाक खाडी में पुरुष जाति का एक समुद्री कच्छप, डेर्मोकेलिस कोरिएसिया अपवाही जाल के ज़रिए 12 मी. गहराई से पकडा गया। इसकी पृष्ठवर्म लंबाई 152 सी. एम. थी। तमिल में इसे "एलुवरै आमै" या थोनी आमै" पुकारा जाता है।

* सी. ए. एफ. अर. आइ. के मण्डप क्षेत्रीय केन्द्र से पी. वेदव्यासरॉव, ए. ए. जयप्रकाश और एम. राममूर्ती द्वारा तैयारित रिपोर्ट।

रत्नगिरी तट पर कछुओं का स्थलन*

रत्नगिरी के अपतट से अपवाही जाल से लिपिडोशीलिस ऑलिवेसिया जाति के 3 कछुओं को अप्रैल 1988 को पकडा गया। एक कछुआ की नाप इस प्रकार है। पृष्ठवर्म-लंबाई: 60 सी. एम. पृष्ठवर्म-चौडाई: 57 सी. एम., कुल भार - 25.5 कि. ग्रा.

* रत्नगिरी क्षेत्र केन्द्र के बी. एन. काटकर द्वारा रिपोर्ट की गयी ब्यौरा।

मण्डपम से काफी दूर पाक खाडी के निकट 5 जुलाई 1988 को दिखाये पडे तिमिंगलों परएक रिपोर्ट*

कोस्ट गार्ड स्टेशन के सामने मण्डपम खाडी में 5 जुलाइ 1988 के पूर्वाह्न में तीन तिमिंगलें दिखाये पडे। एक बडा और दो छोटे। बडा तिमिंगल लगभग 4-5 मी. का था और छोटा 2,5 से 3 मी. का। निरीक्षण किये गये एक घण्टे की अवधि में ये 5-6 मी. गहराई में दीर्घ पडे और फिर और गहराई में अप्रत्यक्ष हो गये।

* मण्डपम क्षेत्रीय केन्द्र के पी. वेदव्यास राव, पी. लिविंगस्टन और आत्माराम मिश्रा द्वारा तैयारित।

मद्रास में घँसा हुआ वसा तिमी या स्पर्म ह्वेल*

मद्रास के निकट काशिमेडु में 8-3-88 को साँच छः बजे के समय तटीय जल में एक तिमी को तडपते हुये देखा। रात आठ बजे तक वह जीवित रहा और फिर मर गया। यह तिमी एक वर्ष आयु की स्त्रीजाति की थी। इसकी लंबाई 3,90 मी. तथा भार 1 टन प्राक्कलित किया था। सिर का बृहत आकार छोटा अधोहनु आदि आकृतिमान लक्षणों से निर्णय लिया कि यह सिटेसिया वर्ग के उपगण ओडोन्टोसेटाइ का वसा तिमी है इसका स्पीशीज़ नाम फाइसेटर मैक्रोसेफैलस है जो फोइसेटर कैटोडेन का सहनाम है।

* मद्रास केन्द्र के पी. नम्मलवार, एस. श्रीनिवासरंगन और एस. मोहन द्वारा रिपोर्ट की गयी ब्यौरा।

मद्रास जिले के पुतुमनैकुप्पम में एक तिमि श्रृंगास्थि का स्थलन*

बैलिनोप्टेरा फाइसैल्स स्पीशीज़ की एक स्त्रीजाति तीमि-श्रृंगास्थि का स्थलन 15-6-88 को तमिलनाडु के पुतुमनैकुप्पम में हुआ। 10 मी. लंबाई के यंत्रीकृत यान के जरिए 40 मी. गहराई से इसे पकडा था। इसका भार लगभग एक टन था।

* मद्रास अनुसंधान केन्द्र के श्री. एस. सुब्रह्मणी द्वारा रिपोर्ट की गयी ब्यौरा।

मान्नार खाडी में तिमिंगल बलिनोप्टीरा बोरियालिस का उत्कूलन*

मान्नार खाडी के कायलपटनम में 18-6-88 को तिमिंगल, बलिनोप्टीरा बारियालिस उत्कूलित हुआ। मान्नार खाडी विविध वर्गों के तिमिंगलें के उत्कूलन केलिए मशहूर है। यह स्त्री तिमिंगल की लंबाई 10.02 मी. और ऊँचाई 2,25 मी. थी जबकि इसका भार 5.5. टन था। साधारणतः इस वर्ग के तिमिंगल 13.7 मी. की लंबाई प्राप्त करने पर प्रौढ हो जाते है इस से अनुमान किया जाता है कि प्रजनन केलिए यह तट की ओर नहीं आया है। इसका पेट शून्य था जो इसका बुरा तबीयत का प्रमाण है।

इसके पहले फरवरी में टूटिकोरिन में इस वर्ग के पुरुष जाति के एक तिमिंगल का उत्कूलन हुआ। इसके पेट में दिखाये गये खाद्यावशिष्टों से पता चला कि इसका तबीयत अच्छा हो सकता है और शायद इसने आहार की खोज में तट की ओर प्रवास किया है।

* टूटिकोरिन अनुसंधान केन्द्र के एच. मोहम्मद कासिम और टी. एस. बालासुब्रह्मण्यन द्वारा तैयारित।

कालिकट में स्थलित "ब्लैकटिप" सुरा*

कालिकट से 14 कि. मी. उत्तर एलात्तूर में मई 12,1988 को एक ब्लैकटिप सुरा का स्थलन हुआ। वडिश रज्जु से इसे पकडा गया था। विलोभक के रूप में ट्यूना माँस का उपयोग किया गया था। इसे एलात्तूर के उत्तर-पश्चिमी भाग से लगभग 35 मी. गहराई से पकडा था। इसमें टैगिंग का चिह्न दिखायी पडी।

एलात्तूर में मई 19, 1988 को और एक ब्लैकटिप सुरा दिखायी पडी। लेकिन इस में टैगिंग का कोई चिह्न नहीं था।

* एम. फिरोज़खान और के. नन्दकुमार, कालिकट अनुसंधान केन्द्र सी. एम. एफ. आर. आइ. द्वारा तैयार किया गया।

GUIDE TO CONTRIBUTORS

The articles intended for publication in the MFIS should be based on actual research findings on long-term or short-term projects of the CMFRI and should be in a language comprehensible to the layman. Elaborate perspectives, material and methods, taxonomy, keys to species and genera, statistical methods and models, elaborate tables, references and such, being only useful to specialists, are to be avoided. Field keys that may be of help to fishermen or industry are acceptable. Self-speaking photographs may be profusely included, but histograms should be carefully selected for easy understanding to the non-technical eye. The write-up should not be in the format of a scientific paper. Unlike in journals, suggestions and advices based on tested research results intended for fishing industry, fishery managers and planners can be given in definitive terms. Whereas only cost benefit ratios and indices worked out based on observed costs and values are acceptable in a journal, the observed costs and values, inspite of their transitionality, are more appropriate for MFIS. Any article intended for MFIS should not exceed 15 pages typed in double space on foolscap paper.

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