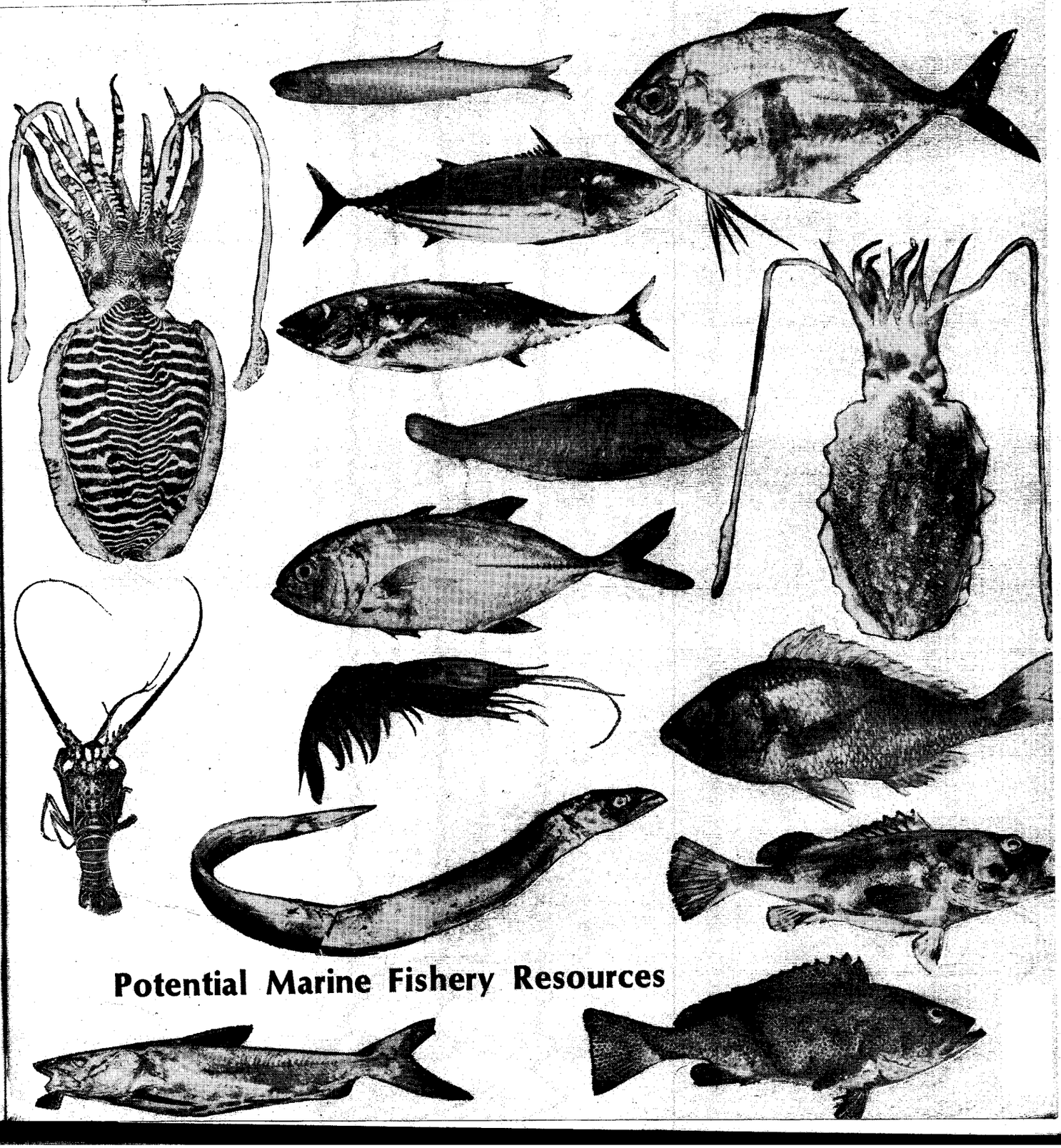
CMFRI newsletter

Number 32

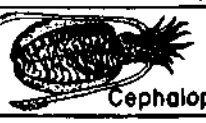
April-June 1986



Potential Marine Fishery Resources

Potential Marine Fishery Resources of Indian Seas

India's marine fish production as estimated by CMFRI touched 1 million tonnes during early seventies and thereafter for 15 years the production was more or less stagnant at 1.4 million tonnes. This is attributed to the fishing effort being mainly concentrated in 0.50m depth zone of the coastal belt. About 40 per cent of the effort is contributed by the artisanal sector. The west coast contributes to two third of the present yield dominated by oil sardine, anchovies, Bombay duck and penaeid prawns. The pelagic stock which accounts for 51.9 per cent of the total yield consists of oil sardine, Bombay duck, anchovies and other sardines. The major demersal stocks comprise prawns, silver bellies and elasmobranchs. Species of medium importance which contribute to the fish production are ribbon fish, mackerel, carangids, pomfrets, seerfish, catfish, perches and now penaeid prawns. The other groups of commercial importance are clupeids, tunas and cephalopods. Most of the resources exploited are characterised by their wide annual fluctuation.

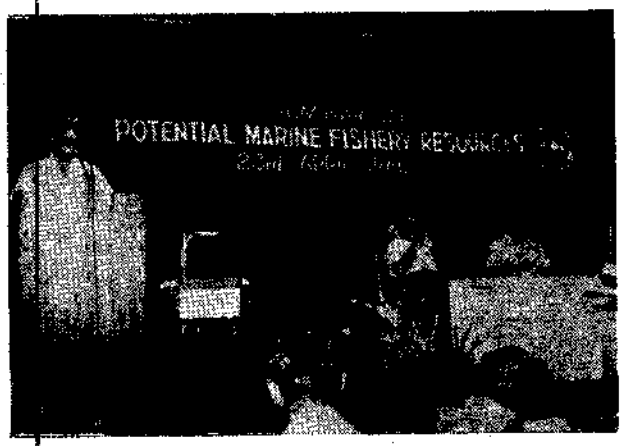
SPECIES / GROUP	PRESENT YIELD	POTENTIAL YIELD
	TONNES	
 Anchovies	92,000	2,40,000
 Coastal tunas	20,000	2,00,000
 Oceanic tunas	—	5,00,000
 Perches	48,000	2,50,000
 Catfishes	58,000	3,10,000
 Carangids	44,000	2,65,000
 Ribbonfishes	50,000	2,70,000
 Deepsea lobsters and prawns	500	12,000
 Cephalopods	15,000	1,80,000

POTENTIAL RESOURCES

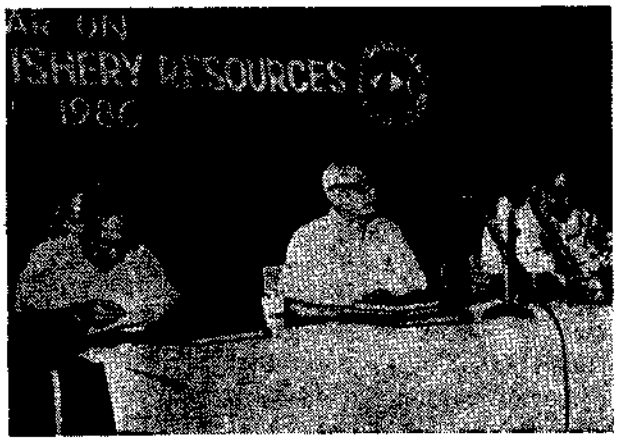
The regionwise potential within 50m depth zone vis-a-vis present level of production offers greater scope for increased production from noth-eastern region as compared to other regions. The potential from the 50-200m depth zone and oceanic waters annually up to 2.2 million tonnes offers vast scope for exploitation.

Potential yield from Indian waters is estimated at 4.47 million tonnes comprising 1.85 million tonnes of pelagic fish, 1.1 million tonnes of demersal fish and the rest made up by crustacean, cephalopods, scianeids and miscellaneous fish. The estimates are based on the surveys of FSI, CIFNET and CMFRI.

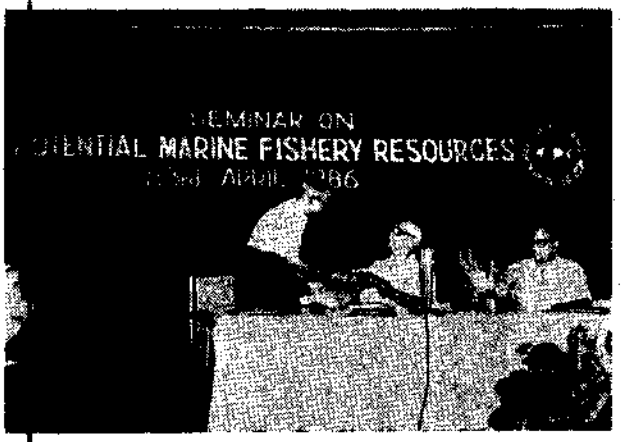
Seminar on Potential Marine Fishery Resources



Dr PSBR James, Director, CMFRI welcoming the gathering



Dr S. Jones, former Director, CMFRI delivering the presidential address



Dr K. Gopalan, Vice Chancellor of Cochin University of Science and Technology who inaugurated the Seminar releasing the publication

A view of the distinguished guests and participants

A seminar on Potential Marine Fishery Resources was organised by the Central Marine Fisheries Research Institute, at Cochin on 23 April to mark the occasion of the Institute moving into its own building which was inaugurated by Sardar Buta Singh, Hon'ble Union Minister for Agriculture and Rural Development on 1 March 1986.

Dr PSBR James, Director, CMFRI, while welcoming the distinguished gathering gave an overview of the achievements made at the Institute in understanding the existing exploited and potential resources and called for necessary inputs needed for future development of fisheries and an action plan for increasing production giving

due consideration for improving the socio-economic status of fishermen.

The Seminar was inaugurated by Dr K. Gopalan, Vice Chancellor of the Cochin University of Science and Technology. In his inaugural address Dr Gopalan drew attention to the wide gap between India's potential marine resources and the present production and stressed the need for intensification of research and development efforts to harness the fishery resources beyond our reach at present.

The Seminar consisted of 4 technical sessions in which 8 papers were presented by eminent scientists, administrators and representatives of the industry on various aspects of the potential resources, their exploitation, utilization and management. About 300 delegates drawn from different organisations participated in the seminar.

The Seminar came out with useful recommendations among which mention may be made of the quantitative information on the resources that may be needed by different maritime states and industry, identification of certain important resources that are immediately available for exploitation, development of medium size crafts capable of operating in depths up to 200m, motorisation of country crafts, developing suitable crafts and gear in keeping with changing trends in fishery, developing infrastructure facilities like berthing, storage, ice production, adequate marketing at the major landing centres and a net work connecting them to the interior places and providing adequate incentives to the industry for diversification and going in for deep sea fishing. The need for a coordinated approach by different research and development organisations and the industry utilizing all the available infrastructure facilities for surveying, assessing and exploitation of the resources was stressed

A Bibliography of the publications of CMFRI staff during 1948-85 compiled by K. Rengarajan, Jancy Jacob and Edwin Joseph was also released at the inaugural session.

General Considerations for Rational Exploitation

* Motorisation of country crafts engaged in fishing in the traditional grounds and beyond will help in augmenting the catches of large pelagic species such coastal tunas, seerfish pomfrets, travallys, sharks etc.

* Regulations on purse siening such as restricting their fishing areas to beyond 30 m depth will help in reducing conflicts between purse seining and traditional fishing and also result in exploitation of resources beyond the scope of traditional sector.

* Rich anchovy resources could be exploited by phased deployment of purse seine and mid water trawls in depth zone between 30-50 m.

* The demersal fishery is primarily shrimp oriented using smaller mesh size, resulting in wasteful utilization of young fish resources. Specific fish trawls for finfish have to be introduced for increasing their production.

* Strict regulation of mesh size, fishing seasons and areas of fishing should be enforced in order to avoid indiscriminate destruction of spawners and young fish.

* The inshore shrimp catches should be stabilized and managed properly for sustaining the present level of production.

* For exploiting potential resources available in the deeper waters of the shelf and beyond. considerable additional inputs are required. This could be compensated by bulk capture. This measure will require the designing and development of suitable boat and gear combination along with adequate storage facilities for long periods in the vessel. This point merits immediate consideration.

* It is necessary that the Government of India organizations who possess different types of vessels should conduct simulated commercial fishing for the identified potential resources to work out the economic viability of these operations.

* Creation of adequate infrastructure facilities such as berthing, handling, storage, ice production and marketing at the fishing harbours is an essential prerequisite to ensure remunerative price to the producer which alone could be an incentive for additional production. This will also help in diversification of the industry.

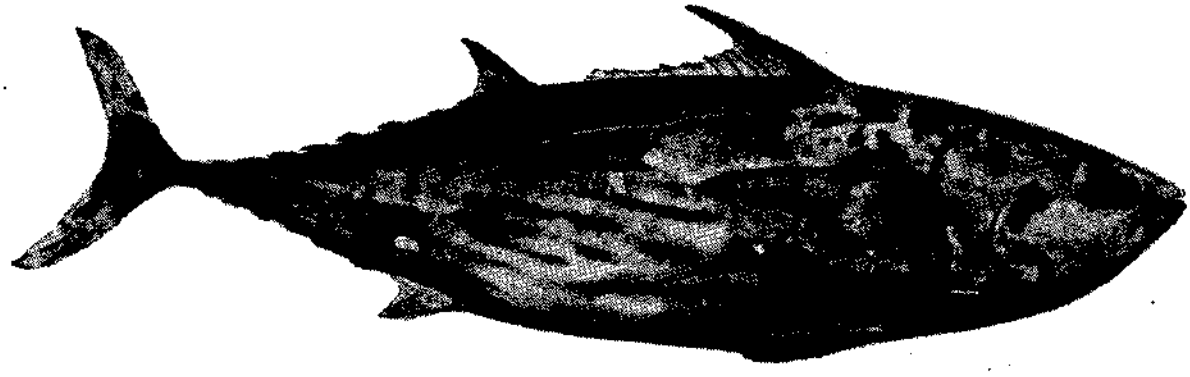
Publication

Tuna Fishery of Exclusive Economic Zone

By far most important among the pelagic resources which offer the maximum potential for exploitation are the oceanic tunas such as yellowfin, skipjack, bigeye, albacore and marlin. Tuna fishery in India is still an artisanal activity with marginal inputs from the commercial sector. Excepting for the long-lining tuna fishery by Japan, Taiwan and the Republic of Korea and purse-seine fishing by Seychelles there is no organised tuna fisheries in the Indian ocean. The major factors contend with this fishery are the complex nature of tuna fishery itself which employs different techniques for harvesting the resource at surface and subsurface combined with the need for greater mobility of the fishing fleets due to highly migratory habit of the resource. Tunas remain to be one of the least exploited resources of the Indian seas. In 1983 it formed only 1% of the total marine fish landings in India. The resource is mainly exploited in Lakshadweep the pole and line surface fishery. For the Indian Ocean areas the projected figure of potential yield for skipjack tuna is 225,000 - 400,000 tonnes and for smaller tunas 100,000 - 200,000 tonnes annually. The recent development of purse-seining by the Republic of Seychells through joint international venture has been a pointer to the resource potential of skipjack that could be exploited from Indian Ocean.

CMFRI, with a view to understanding the status of the fishery resources, performance of various parts of fishery and to estimate the possibilities of expanding tuna fisheries has been collecting historical data and carrying out detailed biological investigations involving species composition, size, age, maturity, spawning, food and feeding habits and other parameters at certain centres at the mainland coast and at Lakshadweep, which could help in regular monitoring of the tuna resources. The results of these investigations have been brought together and published as CMFRI Bulletin 36, Tuna Fisheries of Exclusive Economic Zone edited by Dr E. G. Silas.

The Bulletin contains 21 articles contributed by 13 authors including an introductory statement and a critique on national tuna fishery by Dr E. G. Silas. The concluding article written by Dr E. G. Silas and Dr P. P. Pillai deals with prespectives and management plan for Indian tuna fishery. The prime requirement in planning of tuna fishery development is the maintenance and improvement of production targets with good management measures. This would include (1) the improvement of the traditional small scale fishery sector through the use of drift gillnetting, coastal purse-seining, surface trolling and fish aggregating devices (2) development of medium commercial sector fishery consisting of pole and line fishery and (3) development of large scale commercial fishery sector operating in high seas with adequate infrastructure facilities which would help in augmenting product diversification for the export market.



The Bulletin also gives a series of charts showing linkages and infrastructure facilities involved in the operation of different types of tuna fishery and

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Black Lip Pearl Oyster Bred in the Laboratory

The black-lip pearl oyster *Pinctada margaritifera* has been induced to breed in the laboratory, at the Tuticorin Research Centre of CMFRI where a breakthrough was achieved in mass production of pearl oyster *Pinctada fucata* in 1981.

Four mother oysters of 77-92 mm in dorso-ventral measurements were reared by feeding with mixed phytoplankton, conditioned to 22°C in air-conditioned room and induced to spawn by raising the water temperature to 30° C. Fertilization took place and larvae were reared in fibreglass tanks in filtered sea water having salinity of 32-34.5‰ and water temperature 30.6-33.0° C. The spat set on the twentieth day.

This success made in the hatchery production of seed of *Pinctada margaritifera* is of great significance as the species occurs in appreciable numbers and the potentiality for culture of this species was indicated by CMFRI through its surveys in Andaman and Nicobar Island which was reported in CMFRI Newsletter No. 21. *Pinctada margaritifera* produces black pearls for which there is good demand in the world pearl trade. Now the next step, is to develop the hatchery technique for this species with a view to replenishing the natural resource through searanching.

Success in Artificial Insemination of American prawn

The technique of artificial insemination developed at the Narakkal Prawn Culture Laboratory of the CMFRI has been used successfully by Dr A. Laxminarayana to breed the American species of prawn belonging to the genus Scyonia at Bodega. Dr Laxminarayana had been to the Bodega Marine Laboratory of the University of California, USA during June-September 1985 for training in prawn reproduction. His demonstration of the technique developed at CMFRI was highly acclaimed by Dr Wallis Clarke of the Bodega Marine Laboratory.

Vietnamese Official Trained in Prawn Culture

Mr Le Xan, a Scientist from Vietnam underwent training in prawn culture for a period of about nine months from 14 October 1985 at CMFRI. He was sponsored by the Government of India, Ministry of Education, under the Cultural Exchange programme. Mr LE Xan worked at the Narakkal Prawn Hatchery Laboratory of CMFRI where he was trained in hatchery production and culture of penaeid prawns. He also went on study tour to learn about the mariculture activities of CMFRI at Mandapam Camp, Tuticorin and Madras. At the end of the training Mr Le Xan said that he was greatly benefited from his training programme and that he was confident of managing prawn hatcheries and prawn culture ponds in his country where the conditions were very similar to those obtained in India.

(Contd from page 5)

programmes for data acquisition for stock assessment. The Bulletin which has brought out large amount of information on the tuna resources, in conjunction with the preliminary account of status of tuna fisheries published in 1982 will be an useful reference to the industry as well as the researchers.

Staff Research Council and Project Leaders' meeting

The meetings of the CMFRI Staff Research Council and Research Project Leaders' were held at the headquarters building during 22-26 April under the Chairmanship of Dr PSBR James, Director. Shri A. Noble Scientist S-3 is the present secretary of the S.R.C.

Investigations on Marine Mammals

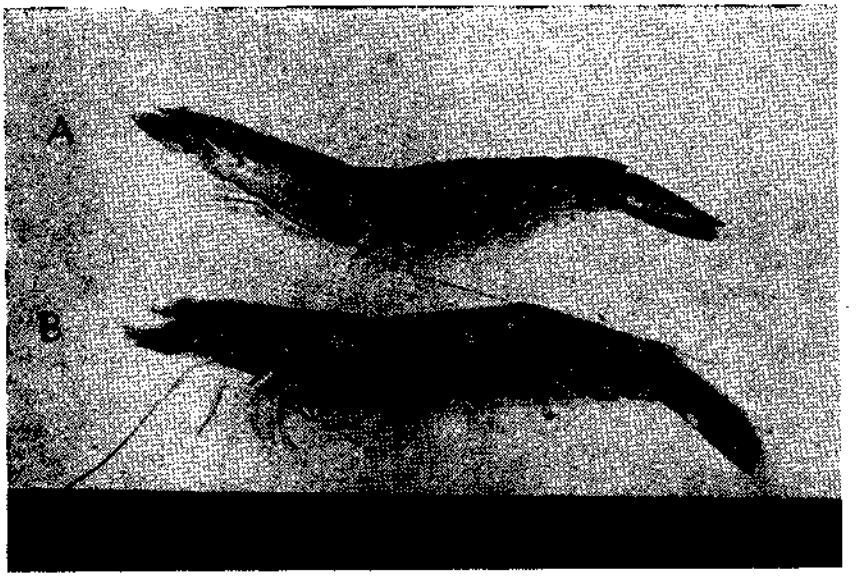
The research project on marine mammals has been strengthened with a view to making extensive observations on whales, dolphins and dugongs. The project through standardised proformae and keys for recording data and by monitoring incidental catches and strandings aims at understanding the behaviour, distribution etc. and creating awareness among the fishermen in an effort to suggest meaningful conservation measures.

TWO MORE SPECIES OF PRAWN SHOW CULTURE POSSIBILITIES

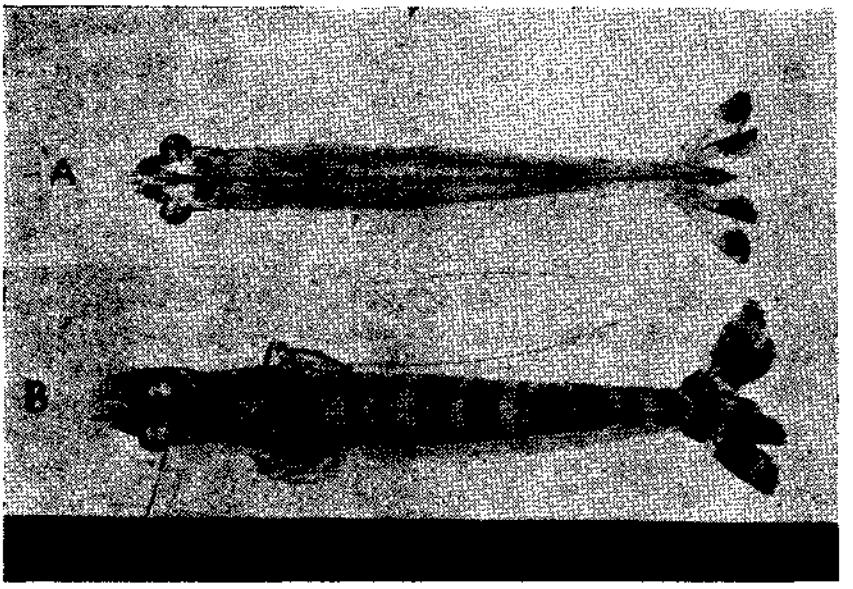
Field culture experiments on the king prawn (*Penaeus latisulcatus* Kishinouye) and the witch prawn (*Penaeus canaliculatus* (Olivier) at Muthukadu farm near Madras have indicated culture possibilities. This is the first time that attempt is being made in India to culture these two species. King prawn has been successfully cultivated in Australia.

In Indian seas these two species occur very rarely in the commercial catches although they have been recorded all along the coast with frequent occurrence in the east coast. These prawns belong to the group of grooved shrimps closely resembling the commercial species of Japan. In the south-west coast *P. canaliculatus* has been reported to occur in small quantities at depths between 30-40 m and are found to have commercial significance.

Shri M. Kathirvel, Scientist and Shri V. Selvaraj, Technical Assistant who are handling the above experiments report that 400 numbers of king prawns of average size 41.8 mm and 100 numbers of witch prawn of average size 45.0 mm were stocked in a sandy bottom pond in the first half of May. During the first 45 days of rearing the king prawn attained 98.9 mm and the witch prawn 94.8 mm registering a growth of 38.0 mm and 33.2 mm respectively. Further rearing is in progress. The growth recorded in these two species was comparable with that of *P. japonicus*, cultivated at Muttukadu farm earlier.



Cultured *Penaeus latisulcatus* (A) and *Penaeus canaliculatus* (B) — (lateral view)



Cultured *Penaeus latisulcatus* (A) and *Penaeus canaliculatus* (B) — (dorsal view)

Induced Breeding of Fish and Shellfish — Search for Alternative Method

Techniques for induced breeding need to be modified and efforts are on the way to find out alternative methods which will avoid permanent injuries to the animal. Research is already in progress in purification of inhibitory hormones and once purified, monoclonal antibodies can be developed which will block the action of these hormones resulting in fast growing or more fecund specimens.

Majority of the research on neuroendocrine systems and their function was centred on mammals. Now a great deal of information is available on the endocrine control of growth and reproduction in fishes and shell fishes also. The early observations were mainly on the general organization of the neurosecretory system and their morphological and histochemical characteristics in relation to growth and reproduction. Information on many fundamental aspects concerning different functions of the endocrine glands, identity of the hormones released by them, their chemistry, transport and mode of action is still to be understood clearly. In 1950s and early 1960s, the control of moulting in crustaceans by antagonistic principles, Moult Inhibiting (MIH) and Moulting (MH) hormones was deduced from indirect evidence obtained with classical endocrinological techniques. But with the advent of more sophisticated analytical techniques in recent years, scientists were able to show the sites of synthesis of few of the hormones and have isolated and showed their action on specific physiological functions.

A serious thought to the application of neuroendocrine studies in aquaculture was given by Central Marine Fisheries Research Institute in the recent years. The institute has come out with many advances in induced breeding of crustaceans and fishes of commercial importance. The simple unilateral eyestalk ablation technique for induced maturation of prawns has been standardized and the prawn hatchery does not depend upon the wild for their broodstock, and continuous production of seeds is accomplished now. Spiny lobsters were induced to grow fast by the same technique. Juvenile lobsters of ***Panulirus homarus*** were reared to marketable size (200 g) in a period of six months and doubled their weight in another two months. In another fast-growing species, ***P Ornatus***, a net increase in weight of 1.4 kg was obtained in a period of eight months by bilateral eyestalk ablation technique. But these techniques need to be modified and efforts are on the way to find out alternative methods which will avoid permanent injuries to the animal. In fishes, crude pituitory extracts are already in use for inducing the carps to breed in captivity and this has almost revolutionized the seed production. However, attempts in other commercially important cultivable fishes were not very successful. Production of fast growing monosex offsprings was already achieved through manipulation of hormones and attempts to accelerate growth by incorporation of hormones through feed is also on trial.

As already explained, moulting in crustaceans is controlled by two antagonistic hormones, MIH and MH and reproduction by GIH and GH. Isolation and partial purification of some of these hormones were already carried out and their action on specific function was also demonstrated. Research is already inhibitory hormones and once in progress in purification of purified, monoclonal antibodies can be developed which will block the action of these hormones resulting in fast growing or more fecund specimens. Investigations are proceeding on these lines and it may not be far off to get the synthetic analogues of these hormones which will be more potent than the native hormone.

The prospects of application of hormones in controlled breeding of cultivable marine organisms look bright and accelerated research programme on these lines is very essential. In this context, Dr Milton Fingerman's visit to the Centre of Advanced Studies in Mariculture in CMFRI is of great importance. Dr Fingerman had come as an expert consultant in fish and shellfish endocrinology under the FAO/UNDP programme. He is at present a Senior Professor of Biology at Tulane University, New Orleans, USA and has been teaching

crustacean endocrinology for the past thirty years. His main field of interest is hormonal control of colour changes in crustaceans. However, he has carried out lot of studies on moulting and reproduction of many groups of crustaceans and molluscs.

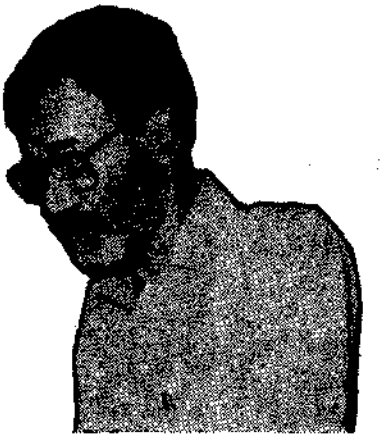
Dr Fingerman is also involved in the publication of many research journals. He is the managing editor of American Zoologist, Member of the executive committee of American Society of Zoologist and Member of the editorial board of the Journal of Crustacean Biology. He is the author of two books and has more than 200 publications.

The five week consultancy programme was planned to give enough opportunity to the scientists and research students to discuss on current problems in endocrinology and acquaint with the analytical methods of isolation, purification and assay of hormones. Shri E.V. Radhakrishnan, Scientist S-2 was nominated as his counterpart for coordinating the programme. Earlier Dr Radhakrishnan was in Dr Fingerman's laboratory for six months for advanced training in lobster culture.

In an interview with the Newsletter Dr Fingerman answered a few questions and the excerpts are given below.

Q. What is the present status of endocrinological research and its applications for the development of aquaculture in the US?

A. Endocrinological research in the USA with respect to aquaculture is proceeding along two main fronts, (i) the hormonal control of reproduction and



Dr Fingerman

The Indian endocrinologists are well-trained. They are aware of the important problems in the field and are definitely capable of making significant contributions to the field. However, the endocrinologists in India are too often handicapped by a lack of the modern equipment that is essential if they are to function at the cutting edge of endocrinological research.

(ii) the hormonal control of growth. With respect to reproduction, two neurohormones are involved, the gonad inhibiting hormone (GIH) and the gonad stimulating hormone (GH). Efforts are being expended to determine the modes of action of these hormones, to identify the neuro regulators that control the release of these hormones and to purify and determine their chemical structure. With respect to the control of growth, major efforts are being expended to purify and determine the chemical structure of the moult-inhibiting hormone from the eyestalk. When a crustacean sheds its exoskeletal covering, it is then able to expand in body size. The moult-inhibiting hormone suppresses this shedding. Once we obtain the structure of this hormone we should be able to produce chemical substances that will compete with it and prevent its acting, which would result in faster growing specimens.

Q. When the Central Marine Fisheries Research Institute achieved a breakthrough in induced growth of spiny-lobster through eyestalk ablation there were lot of discussions and controversies and the media said that blind-folding of lobster was an act of cruelty. Did you come across any such problem in your country and if so how did you solve them?

A. In the USA we have antivivisectionists who are opposed to use of animals in experimentation. Most of their protests, however, have been against use of warm-blooded organisms (mammals and birds). Nevertheless, we scientists as responsible moral human beings, must be as humane as possible no matter what animal we are using. However, it is impossible to do certain types of experiments without using an animal. For example, if you want to learn what controls the growth of a lobster, you must study lobsters. But, the studies should be conducted in such a manner as to inflict a minimum of discomfort and pain.

Q. What are your impressions about the endocrinological research in India and what suggestions do you have for the improvement of it?

A. The Indian endocrinologists are well-trained. They are aware of the important problems in

Dr PSBR James, Director, CMFRI. Planting the Tree for Peace.

the field and are definitely capable of making significant contributions to our field. However, the endocrinologists in India are too often handicapped by a lack of the modern equipment that is essential if they are to function at the cutting edge of endocrinological research.

Q. You are involved in the publication of journals in a big way, as seen from your biodata. What are your feelings regarding the utilization of this medium by the scientists in your country as well as abroad for communication of research results?

Publication of scientific papers in primary journals is essential. The data obtained in the field and in the laboratory need to be published as they can be tested and evaluated by the scientific community. Too often, all over the world, experiments are done but for some reason or other the investigator neglets to publish the results. This obviously not only slows down scientific progress, but also results in needless duplication of efforts. In my opinion, and I tell this to all my students, a project is not complete until the data have been analysed, written up and published. O

KVK — TTC

Training was given to 77 farm women and 35 farm men in Scientific farming of prawn and finfish through six training courses of five-day duration. Ninety three farm men and 64 farm women were trained in different aspects of integrated farming through 10 day courses.

Lab-to-Land Programme

Under the phase IV of the Lab-to-land Programme 50 farm families belonging to Narakkal, Elamkunnapuzha and Manakunnam villages have been adopted. Pre-monsoon prawn culture taken up in five ponds belonging to these families have yielded encouraging results with a catch rate of 100 kg per acre in two months. These ponds are at present stocked with milkfish seed at the rate of 100 per acre.

Tree for Peace planted

To mark the World Environment day on 5 June, the 'Tree For Peace' was planted in the CMFRI campus by Dr P S B R James, Director.

Sea erosion in Azhikode and Chavakkad

The coastal area between Chavakkad and Azhikode in Trichur district in the Kerala coast experienced severe coastal erosion. As a result there was practically no fishing in these areas during May-June as reported by the team consisting Shri K. Balan, Scientist and Shri U. K. Satyavan, Field Officer of the Fishery Resources Assessment Division who visited some of the areas. At Attupuram fishing village 0.75 km from the coast where erosion was most severe, seventy fishermen huts were damaged and 65 families were evacuated and

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Training programme on board FORV Sagar Sampada

A training programme on oceanography, fishing operations and instrumentation was conducted for the international participants of the workshop on 'Ocean engineering and its interface with ocean science in Indian region' held at Indian Institute of Technology, Madras under the auspices of IOC/UNESCO/DOD, on 26, March, 1986 off Madras coast on board FORV *Sagar Sampada* S/Shri K. G. Girijavallabhan, M. Srinath and M. M. Meiyappan, Scientists, CMFRI explained the various activities and facilities on board to the participants.

The photo shows some of the participants.

Dr Fanos AM, Egypt; Mr Esham Bin Salam, Malaysia; Dr Nik Mohammed KNH, Malaysia; Mr Sudersan K, India; Mr Ongkasongo OSR, Indonesia; Mr Rahman MK, Pakistan; Mr Kahawita BS, Sri Lanka; Dr Kukher A, Turkey; Dr Bannazadeh Mahani, Iran; Mr Sodusta J, Philippines; Mr Supaparasin Kasem Surya, Thailand; Mr Luiza KMM Tanzania; Mr Kayer CZ, Tanzania; Mr Ratamahenia ORJ, Malagache; Mr Ragoondere, Mauritus; Prof G. Cluass, W. Germany; Dr CP Vendhan, India.

Private Entrepreneures Trained in Seaweed culture

A 15 days-training in different aspects of seaweed resources, their culture and utilisation was held at Mandapam during 12-26 May. Five private enterpreneures were trained under the programme.

Mandapam Fishermen take up Pen Culture

The fishermen of Valayarvadi village near Mandapam Camp have initiated milk fish culture in pens. A group of 12 fishermen has joined together and have enclosed an area of 4 ha in Pillaimadam lagoon at Mandapam with 20 mm mesh HDPE webbing. They have stocked these enclosures with fingerlings of chanos measuring 60-80 mm collected from the lagoon, according to Dr. R. S. Lal Mohan who has been conducting experiments on pen culture. Each fisherman has availed a loan of Rs. 6000/- from the Indian Overseas Bank, Uclupulli under IRDP Scheme. Shri Sasi Sekhar, IAS, Project Officer and Additional District Collector, Ramnad, who has seen the pen harvest at CMFRI has taken initiative in the implementation of this programme. It is reported that more fishermen have expressed their desire to start pen culture in low lying areas.

VISITORS

Karwar

Shri Rathinath Roy, Director, Catalyst Group Development Environmental Planners, Madras.

Tuticorin

Shri A.K.D.B. Gopalakrishna Raja, District Governor, Rotary Club District, 321, Rajapalayam.

Mr Lexan, Institute of Marine Products, 170, Lelai, Hai Phang City, Vietnam.

Shri G. P. Agarwal, 10 B, Kasthurba Gandhi Marg, New Delhi.

Shri M. Sakthivel, MPEDA, Cochin.

Shri A. Sathyanarayana, Member, Income-tax Appellate Tribunal, Cochin.

Wg Cdr G. S. Madan, Air Headquarter, New Delhi.

Shri N. K. Vasudevan, Principal, Fisheries Staff Training Institute, Madras with nine Departmental trainees.

Mandapam

Shri N. Shanmugham, Education Officer, Kendriya Vidyalaya Sangathan, Madras.

Dr V. Rajeshwaran, Member of Parliament, Ramanathapuram Constituency.

Shri R. Rajamani, Additional Secretary, Cabinet Secretariate, New Delhi.

Engagements

Dr P.S.B.R. James, Director attended the following meetings:

World Conference on Trade in Froglegs vis-a-vis Environmental Considerations organised by MPEDA in association with CIFRI at Calcutta, 10-11 April.

Seminar on Futurology on the theme 'Toward sthe 21 Century' at Trivandrum, 3 May.

The meeting of the Standing Committee at the level of Ministry of Agriculture to co-ordinate the functions of the fisheries institutes under the Department of Agriculture and ICAR at New Delhi, 28 May.

Meeting of the Project Implementation Committee in respect of EFC Memo of CMFRI at Krishi Bhavan, New Delhi, 11 June.

Dr P.S.B.R. James, Director, CMFRI to serve as :

Honorary Vice President in the Institute of Fish and Nutrition (Indian Federation of United Nations Associations), New Delhi.

Member, High Power Committee (Committee on Management of Marine Fishery Resources) of the Ministry of Agriculture.

Member in the ICAR Regional Committee No. 8.

ICAR Representative in the Academic Council of Cochin University of Science and Technology.

Convener in the AFDC 27/P1 Panel for Fish Seed of the Indian Standards Institute, New Delhi.

Member in the Board of Studies in Industrial Fisheries of the Cochin University of Science and Technology.

Chairman in the Board of Studies in Mariculture of the Cochin University of Science and Technology.

Member in the Faculty of Marine Science of the Cochin University of Science and Technology.

Member in the Committee to review the areas of responsibilities requiring delineation of functions and for more appropriate planning of research projects in Fisheries Institute under the ICAR.

Member in the Commitee for identifying priority areas for Fisheries Research.

Dr P.S.B.R. James, Director and Scientists of CMFRI attended the Seminar on Problems and Prospects of Fish Processing in Karnataka organised by the Forum for Fishery Professionals and presented papers. Dr James chaired one of the sessions.

Dr K. Radhakrishna, Scientist S-3 and Shri G. Sudhakara Rao, Scientist S-2 attended the meeting organised by Technical Committee on Factual Position of Prawns held at Fishery Survey of India under the chairmanship of Shri K. M. Joseph, Joint Commissioner (Fisheries) Ministry of Agriculture, 9 April.

Dr K. Satyanarayana Rao, Scientist S-3 has been nominated as a member of the committee constituted by MPEDA to study the present exploitation of cephalopod in Visakhapatnam and Veraval areas and off Kerala coasts and suggest steps for increasing the cephalopod catches.

Shri B. S. Ramachandrudu, Farm Engineer, attended the workshop on Sedimentation Problems in Coastal Aquaculture Farm Planning and presented a paper on problems in aquacultural environment with reference to some engineering works, 12-13 February.

Dr G. Luther, Scientist S-3 attended 8th meeting of the consultative group of Visakhapatnam base of Fishery Survey of India at Visakhapatnam, 30 April.

Dr D. B. James, Scientist S-2 has been recognised as research guide by the Madras and Andhra Universities.

Dr D. B. James, has also been nominated to serve as a membe representing CMFRI in reconstituted Bachede-mer Committee.

Shri M. H. Dhulkhed, Scientist S-3 attended the meeting on antipollution measures concerning caustic soda factory, Binage at Karwar, 24 May.

Shri M. Kumaran, Scientist S-3 and Dr R. S. Lalmohan, Scientist S-2 participated in the Brainstorming Workshop held by the state committee on Science, Technology and Environment, Kerala for the regional development of Kozhikode district, 18-19 June.

Shri M. Kumaran, Scientist S-3 has been nominated by Go-

vernment of Kerala as a member of the Task Force, Project for Opportunity Profiles in Science and Technology in Kozhikode district.

Dr S. Ramamurty, Scientist S-3 attended the conference on Fisheries Development through Institutional Finance convened by NABARD at Madras, 29-30 April.

Dr Ramamurty also attended the meeting of expert committee on assessment of fluctuations in penaeid prawn landings convened by the Ministry of Food and Agriculture at Madras, 6 June.

Deputation and Training

Dr K. Alagarswamy, Scientist S 3 was deputed to undergo Post-Experience Fisheries Planning and Management Course at Humberside College, UK, for 3 months from 7 April.

Shri Syed Ahamadali, Scientist S-2 has been deputed to undergo training in Biochemistry of Steroids at the Zoological Laboratory of the University of Utrecht, Netherlands for 6 months from 7 April.

Dr E. G. Silas, Officer on Special Duty at Central Institute of Brackishwater Aquaculture was deputed to attend workshop on conservation of Mangrove Areas for Aquaculture at Iloilo, Philippines, 22-29 April.

Dr E. G. Silas also participated in the specialised discussions on the Management of Fisheries and Aquaculture in Mangrove Ecosystems to be followed immediately after 3rd session of the Indo-Pacific Fisheries Council (IPFC) Working Party of Experts on Inland Fisheries held in Indonesia, 19-25 June.

Appointments

Dr M. Peer Mohamed as Scientist S-3 at Cochin, 4 June.

Shri N. Kalaimani as Scientist S-2 at Cochin on transfer from C.I.F.T., 25 June.

Shri Manas Kumar Bandhyopadhyay as Scientist S-1 at Cochin, 2 April.

Shri P. K. Asokan as Scientist S-1 at Cochin, 11 April.

Shri Renjith Singh as Scientist S-1 at Cochin, 11 April.

Shri Ravi Kumar Fotedar as Scientist S-1 at Cochin, 26 May.

Smt. Rani Palaniswamy as Scientist S--1 at Cochin, 25 June.

Shri K. P. Said Koya as Scientist S-1 at Cochin, 27 June.

Shri Divakar Ambrose as Scientist S-1 at Cochin, 30 June.

Shri A. Santhanam, SS Grade IV has been reverted to SS Grade III (Lab. Attendant) as per the option exercised by him, 3 July.

Transfers

Shri D.V.C. Easterson, Scientist S-2 from Cochin to Tuticorin.

Shri V.A. Surendran, SS Grade III (Khalasi) from Mandapam Camp to Cochin.

Shri M. D. Suresh, SS Grade I (Fieldman) from Calicut to Cochin.

Shri P. Dassan, SS Grade I (Fieldman) from Cochin to Calicut.

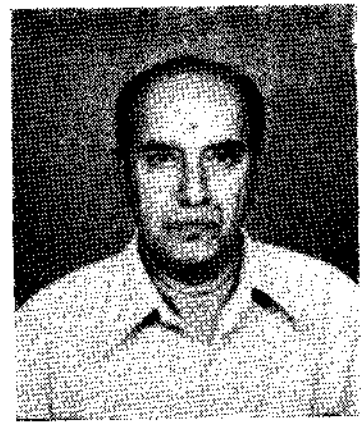
Reliefs

Shri K. J. Joseph, Scientist S-1 on resignation, 25 February.

Dr Shyamal Banik, Scientist S-1 on transfer to JTRL, Calcutta, 31 May.

Shri G. Yerininda Rao, Cook (Boat) T-1 on resignation, 3 February.

Retirements

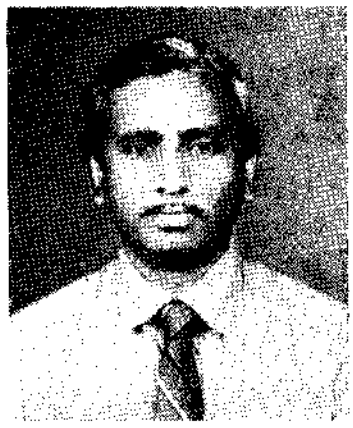


Shri K. Rengarajan, Scientist S-3 retired on 30 June. Shri Rengarajan was the officer-in-charge of Madras Research Centre for some time.

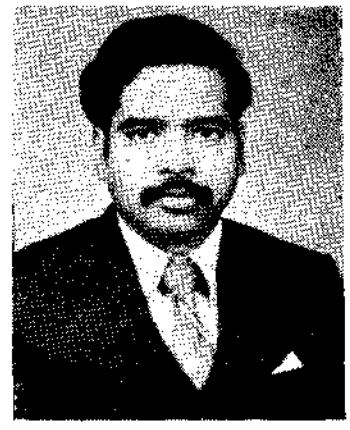
After graduating from Annamalai University in 1946 Shri Rengarajan was awarded M.Sc. degree in Zoology by Annamalai University for his thesis on fish embryology. After his service in the university in various capacities in the faculty of zoology, during which period he played a prominent role in developing the Marine Biological Station at Porto Novo, he joined CMFRI as a Research Assistant in 1960. During his service in Andaman Islands (1964-'71) he has conducted extensive survey on the fishery resources of the Islands. His studies have helped to increase our knowledge about the fish fauna of the Islands. During his service in Madras Research Centre from 1972 he took keen interest in organising the maricultural research activities of the Institute. Due to his untiring efforts the Institute was able to establish a mariculture farm at Muthukadu and a field laboratory at Kovalam for the production of fish-prawn seeds. He is a seasoned field worker and has participated in various

Ph.D. Awarded

Shri C. Suseelan, Scientist S-2 has been awarded Ph.D by the Cochin University of Science and Technology for his thesis on the deep-sea prawns off south-west coast of India. Shri Suseelan worked under the supervision of Dr E. G. Silas, former Director of CMFRI.



Shri V. Selvaraj, Technical Assistant (T-I-3) at Madras has been award Ph.D. degree by the Madras University for his thesis 'Community structure in the coastal ecosystem with special reference to the green mussel *Perna viridis*'.



Shri A. Silas Ebenezar, Senior Research Fellow at the CAS in Mariculture has been awarded Ph.D. by the Cochin University of Science and Technology for his studies on the ecology and productivity of saline lagoons. Shri Ebenezar worked under the guidance of Dr P. Parameswaran Pillai, Scientist at CMFRI.

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research cruises along the east and west coasts of our country.

He has published about 40 research papers in various journals dealing with embryology, biology and systematics of fishes and polychaetes.

As the officer-in-charge of the Madras Research Centre he has coordinated the centre and built up the infra-structural facilities for research.

He is a keen cricketeer and has captained the Annamalai University cricket team. His hobby is photography. O

Shri R. Perumal, SS Grade III (Fieldman), 30 April.
30 April.

Shri M. Raman, SS Grade II (Safaiwala), 30 June.

Shri C. H. Kunhiraman, S.S. Grade III (Lab. Attendant), on retirement, 30 June.

Shri C. H. Kunhiraman

Weddings

Kumari P. Thangaleela, Junior Clerk at Madras married Shri N. Jeyaraj, 5 May.

Shri V.K. Kharaliya, SS Grade I (Sweeper) at Bombay married Kumari Mithlesh Shankar Walmiki, 25 May.

Kumari N. Gomathi, Junior Stenographer at Mandapam. married Shri R. Subramanian, 29 May.

Shri G. Kathirvelrajan, Pump Driver at Mandapam, married Kumari Gangadevi at Pathiratharavai village, 25 June.

Obituary

Shri P. R. Mathai, SS Grade I (Watchman) at Cochin expired on 14 May.

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sheltered in the nearby fishermen school. At Perinjanam Panchayat, about 2.5 km of coastline was also severely affected. Number of coconut trees also fell down.

At Kadapuram fishing village foundation laid for the sea-wall was almost destroyed. The team recommends the completion of sea wall construction which would reduce such damages considerably.

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