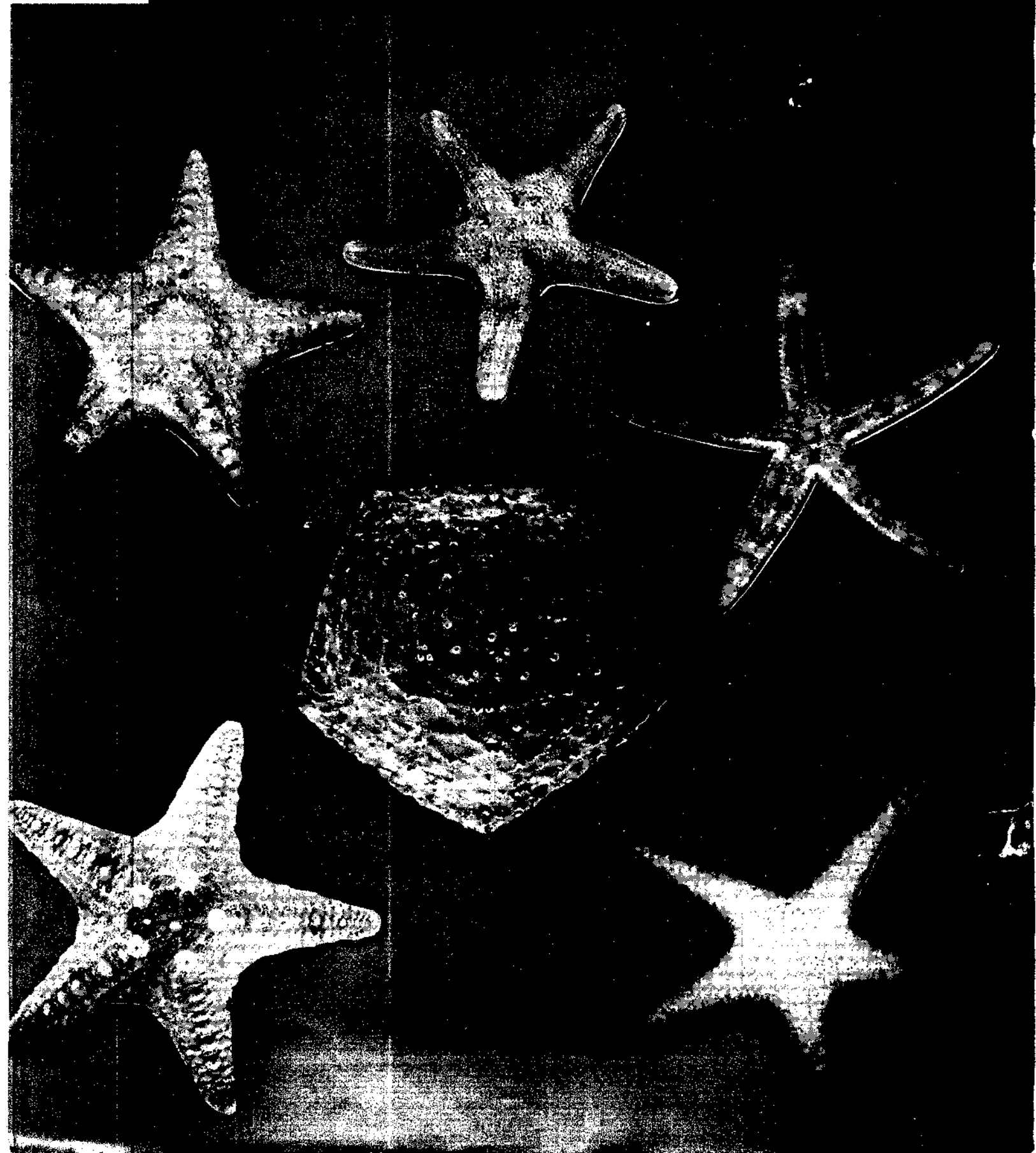




# CMFRI newsletter



## Bioactive Agents From Sea

*The bioactive compounds from the sea are essentially secondary metabolites of certain species of organisms.*

*The upsurge of interest during the last decade in the ocean as potential source of bioactive compounds and new drugs has stimulated a flurry of activity in the research laboratories and clinics throughout the world.*

The bioactive compounds found in marine organisms have drawn the attention of researchers. The bioactive compounds from the sea are essentially secondary metabolites of certain species of organisms. Some of them show a favouring or hindering growth effect on other communities of marine organisms and some others exhibit various pharmacological

properties. The upsurge of interest during the last decade in the ocean as potential source of bioactive compounds and new drugs has stimulated a flurry of activity in the research laboratories and clinics throughout the world.

The biological significance of these bioactive compounds are many. They play an im-

portant role in catching prey, in defence mechanisms and as a highly repellent material to predators. The nematocyst toxins in sea anemones and jellyfish, cephalo-toxins in the salivary glands of octopods, sting toxins in cone shells, venomous toxins of spines and skins of certain fishes and toxic secretions of opisthobranch molluscs without shells are examples.



*Bohadschia marmorata* Jalger — highly toxic echinoderm — source of sapanin, Holothorin A

The toxins produced by corals or sponges have protective function against predators and against the settling and encrustation by the larval forms of sessile animals which adversely affect biosynthetic activity in the symbiotic zooxanthellae. The various antibiotics and terpenoids present in corals or sponges serve as defensive agents. Some of the bioactive compounds have physiological significance. Fishes which undergo vertical migration contain large amounts of wax esters and lipids instead of glyceride in other fishes. Toxic substances like tetrodotoxin in tetradontid fish eggs, wax esters in mullet roe and dinogonellin in ichthyotoxic fish serve a physiological function for embryonic development.

Certain marine organisms which are normally eaten safely by humans suddenly become poisonous and produce toxic reactions which sometimes may even be fatal. Some organisms in a particular area become toxic under certain ecological conditions at a particular time of the year which may become concentrated in a higher organism in the food chain and these when consumed cause toxic reactions and death in the humans. The marine animals may also accumulate the toxic substances released into the environment by either dead or live organisms, by taking up the organic compounds from water. Variability of toxicity in a given



*Bioassay experiment being conducted on mouse*

species depends on seasonal, ecological or physiological factors. Many species of shellfishes are filter feeders and have to feed on a diet in their vicinity without choice and they alternate toxins in their digestive glands without any harm to themselves but to those who ingest them.

The food poisoning caused by consumption of fish associated with coral reefs in the tropical and subtropical waters has interfered with the fishing activity. The blooming of red tides and other toxic dinoflagellates during certain seasons and in some areas of marine environment has produced toxicity and other bioactivity. Many people who go to the sea for recreation and fishing are affected by strings of sea urchins, jelly fishes, sting rays, cone shells and by dermatitis caus-

ed by the blue green algae. The knowledge of the bioactive agents is thus of great public health significance.

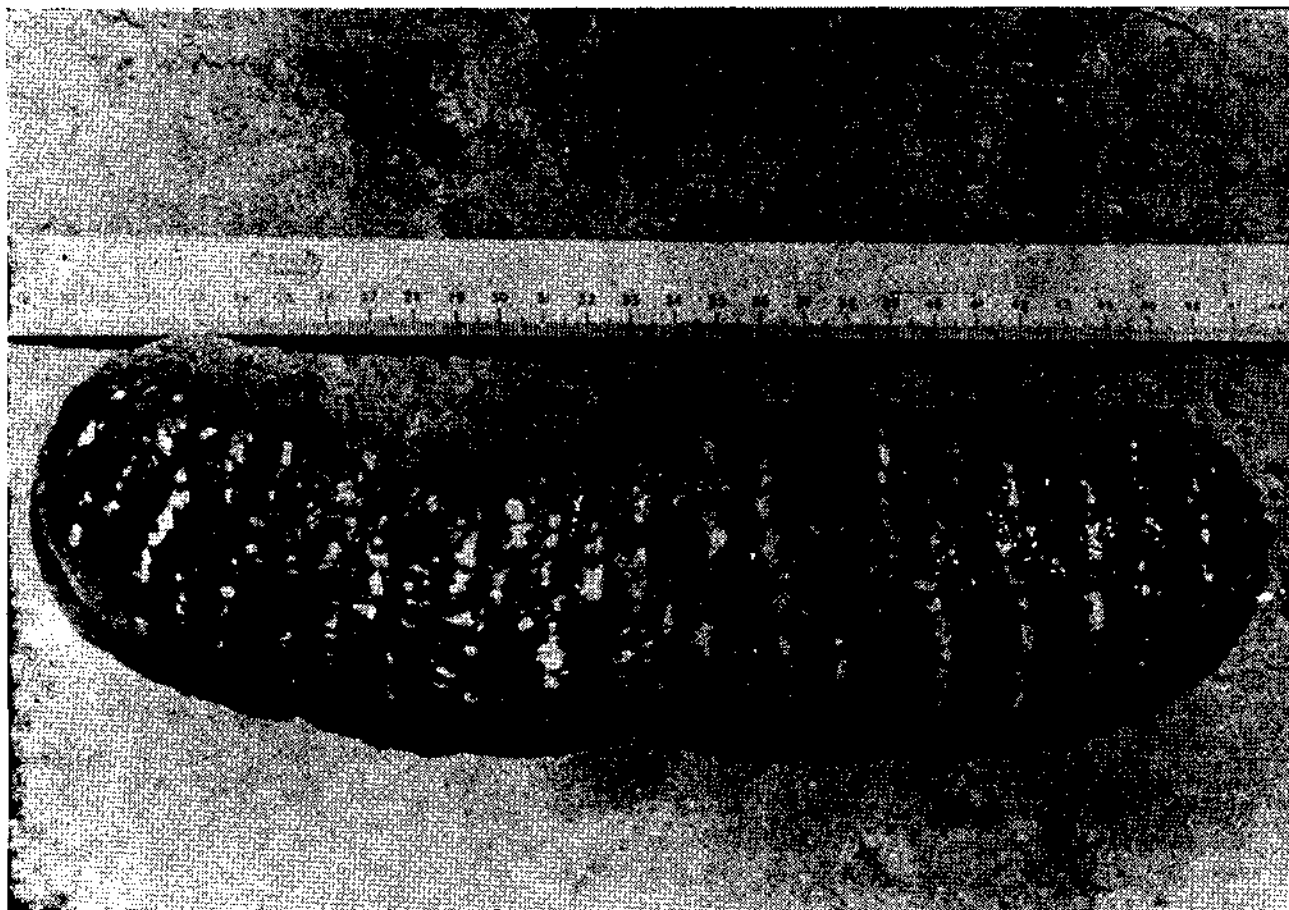
In recent years numerous scientific articles have been published on the biomedical aspects of the marine organisms. sea". Many chemotherapeutic products have been isolated from various organisms. It is now known that marine organisms are sources of bioactive compounds such as antibiotics, antitumour, anticoagulants, antiviral, antiulcer, haemolytics, analgesic, antilipemic and cardioinhibitory agents, stimulants, depressants, fungicides, insecticides and pharmaceutical adjuvants and stabilizers.

The chemical reactions, interactions and transformations of these metabolites cause

certain peculiar changes in the marine environment. Many algae contain extracellular metabolites which have toxic or microbial activity of varying degrees. Such marine algae can keep the ecosystems free of microbes and parasites which will be of great advantage to the mariculture of commercially important marine animals free from disease. Some of the toxins from echinoderms may also find use in eradicating the predators from culture farms. The growth-promoting bioactive substances can be used in mariculture and agriculture for increasing the yield.

In view of the significant role, the bio-compounds a research project on bioactive agents from marine organisms has been taken also at the Central Marine Fisheries Research Institute under the leadership of Shri D. S. Rao. Under this study 168 marine organisms belonging to corals, alcyonarians, molluscs, echinoderms, unicellular and higher algae have been subjected to bioassays. The bioassays conducted are lethality and toxicity tests on mice, fingerlings of *Chanos*, *Thilapia* *Nemolytic* and antimicrobial activities are tested in other fishes. The latter are carried

out against *Vibrio alginolyticus*, *V. parahaemolyticus*, *Bacillus*, *Staphylococcus aureus* and *Salmonella typhi*. The investigations on the isolation and characterisation of the various chemical compounds from the bioactive marine organisms that are available in quality are carried out. Further studies on the distribution of prostaglandin and its related compounds (PGRC) in the gorgonians and sponges and the utilisation of prostaglandin endoperoxide (PGEP) in mariculture are also in progress. The results of the above studies are being published elsewhere.



*Holothurin A (Metriatyla) Scabra Jalger — Another toxic echinoderm — source of sapanins*

## SUMMER INSTITUTE ON FISH NUTRITION

A summer Institute in Recent Advances in Finfish and Shellfish Nutrition was organised at CMFRI during 11-30 May. In aquaculture, nutrition plays a vital role and substantial increase in production can be achieved in aqua-farming by adopting scientific culture practices involving optimal stocking, fertilization and feeding. Intensive research carried out at CMFRI through mission oriented projects and Ph.D. and M.Sc. programmes of the UN-DP/FAO/ICAR Project 'Centre of Advanced Studies in Mariculture' provided a great deal of information on the nutritional requirements of a few species of finfish and prawns. Based on this information, compounded feeds using indigenous raw materials as well as techniques for mass-culture of live-food organisms have been developed. CMFRI has good laboratory facilities to carry out advanced research in finfish and shell fish nutrition and a team of well trained scientists to undertake research in this area. Nutrition is also offered as a specialised course and thesis programme for Ph.D. and as a part of the curriculum for M.Sc. Mariculture at the Centre for Postgraduate studies in Mariculture (formerly CAS in Mariculture).

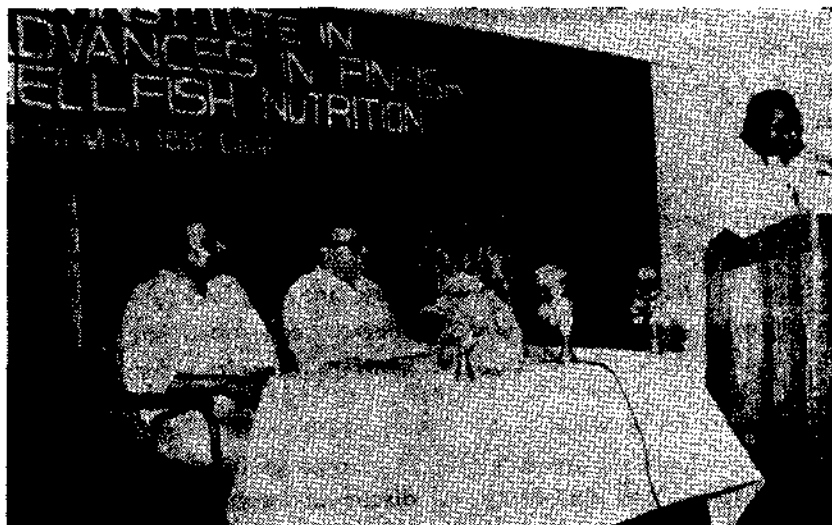
This is the first summer institute to be conducted in the country in this specialised area in which 29 persons, from Jammu & Kashmir, Punjab, Rajasthan, Uttar Pradesh, Orissa, Maharashtra, Andhra Pradesh, Karnataka, Kerala, Tamil Nadu

and Union Territory of Pondicherry participated.

The Institute consisted of lectures, practicals / demonstrations and discussions covering latest developments in aquaculture nutrition. Three special lectures were given on the present status of the culture of finfish, crustaceans and bivalves in India. Demonstrations relating to the nutritional requirements, feed development and live-food culture and utilization were also given. The quantitative and qualitative dietary requirements for proteins, amino acids, lipids, fatty acids, carbohydrates, carotenoids, vitamins and minerals by various species of finfish and crustaceans were discussed. Great emphasis was laid on the inter-relationship between nutrients and the factors which can influence the requirements with particular reference to their biological availability.

Lectures on bioenergetics, digestion of food and digestibility were directed towards the basic concepts involved in food intake, assimilation, metabolism and excretion, and to suggest the usefulness of such studies in feed development for finfish and crustaceans.

With a view to identifying raw materials for formulating practical feeds, a lecture was given on the characteristics of various classes of feed ingredients and their potential nutritive value with reference to their contents of proteins, lipids, carbohydrates, crude fibre, ash, essential amino acids profile, fatty acids profile, minerals and vitamins. While utilizing the ingredients the need for ascertaining the presence of anti-nutritional factors such as protease inhibitors, haemagglutinins, gossypol, aflatoxins etc. were indicated. The participants



*Impressions about the Summer Institute  
by Dr K. Gopal Rao*

were also provided with a series of criteria to evaluate the feed ingredients available in their areas of work.

Feed formulation methods including the linear programming procedure using computer were discussed. In the manufacture of feeds, the facilities required and the need for specific forms of diets for different stages and species was discussed. The special requirements of larvae and the recent developments in artificial diets such as microencapsulated and microparticulated diets were discussed.

The importance of including growth promoting substances, binders, antioxidants and mould inhibitors, for the effective utilization of feeds, was discussed.

Since the larvae of most species rely on live-food organisms, the culture methods for laboratory and large scale of selected phyto and zooplankton were given.

Specific nutritional needs of broodstock and the paucity of information in this area was emphasized.

The need for evolving proper feeding schedules, ration levels, feed form, feed dispensing methods for specific species and size groups were discussed so that the feeds are effective-



*The participants with the Director and the members of faculty, CMFRI (Name list on the back cover)*

ly used by the cultured organisms.

In the practicals emphasis was laid on the design of experiments; adopting standardized experimental procedures, diet formulation and preparation; composition analysis of feeds; determining digestibility coefficients, energy budgets, live-food culture and statistical analysis of data to arrive at valid conclusions.

Some of the participants came forward with specific problems faced by them in their work and the faculty members offered suggestions to enable them to carry out their work.

Some of the participants discussed about the recent growth in aquaculture operations in the States they belong to and the farmer's keenness in

preparing feeds for finfish and prawns.

A questionnaire was provided to the participants to ascertain their future programmes in aquaculture nutrition. Most of them are interested in taking up research in nutrition in species found in their regions.

In view of the emerging importance of aquaculture to augment the fish and shellfish production in the country, there is an urgent need for developing appropriate feeds for the different stages of various cultured species.

The Summer Institute was inaugurated by Prof. C.A. Abdussalam, Pro-Vice Chancellor of the Cochin University of Science and Technology on 11

May 1987. In his inaugural address Prof. Abdussalam highlighted the importance of non-formal education programmes, such as the Summer Institutes, in improving the quality of teaching and research.

Dr. P. S. B. R. James, Director, CMFRI and Director of the Summer Institute, in his presidential address, stressed the need for intensification of research in nutrition and diet development in the country for maximising production through aquaculture. He also spoke about the scope and programmes of the Summer Institute.

The valedictory function was held on 30 May. Dr. M. Sakthivel, Director, MPEDA, Cochin, delivered the valedictory address and distributed certificates to the participants. In his valedictory address, he spoke about the importance of nutrition and feed development in augmenting fish and prawn production, citing examples from Taiwan, Thailand, Japan and other countries.

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#### **Training in Hatchery Management**

Dr. S. Radhakrishna and Shri S. Srinivasagam, Scientists of Central Institute of Brackish-water Aquaculture were extended facilities at the Tuticorin

Research Centre to study the hatchery system management.

#### **Marine Nature Camp**

A Marine Nature Camp was organized by the World Life Fund India, Tamil Nadu Branch in association with CMFRI during 4-8 April at the Regional Centre of CMFRI at Mandapam. It was the first of this kind to be held in the country by the branch of World Wild Life Fund — India in which by 17 persons from different walks of life participated. The main objective of the camp was to educate the people about the environment and to create and sustain interest in nature and an urge to protect them.

The camp was inaugurated by Shri Preston Ahimaz, State Organiser of the World Life Fund-India, Tamil Nadu branch. Speaking on the occasion he observed that it would be a new experience to the subscribers and would provide an insight into the fascinating fauna and flora inhabiting the nearshore waters, their life, exploitation and the need for preservation and conservation of valuable resources. The programme of the camp included a morning walk along the beach observing the shore fauna and flora, observation of marine life in the in-shore sea, a lecture on a subject of topical interest and film show on marine life. The participants also visited Krusadi

island to observe the corals and other marine life.

#### **Heavy landings of Threadfin Breams**

Mechanised trawlers landed and *N. mesoprion* at Sassoon huge quantities of threadfin bream, *Nemipterus aponicus* Dock and New Ferry Wharf in Bombay during May. Shri J.P. Karbhari, Field Officer who made the observation reported that the total catch at these centres during this period was about 800 tonnes with CPUE of 790 Kg which was unprecedented.

The fresh fish was sold at Rs. 2-3 per kg and the iced ones were sent to other states such as Gujarat, Karnataka, Kerala, Tamil Nadu, Andhra Pradesh and West Bengal.

#### **Oyster Seed supplied to Gujarat**

The Tuticorin Research Centre of CMFRI supplied 10,300 pearl oyster seed of 10-20 mm size and 5,000 edible oyster seed of 20-30 mm size to the Gujarat Fisheries Department on 19 May. The consignment was airlifted from Trivandrum to Jamnagar via Bombay. The seed withstood the transport well with the mortality of less than 20%. This was a part of fulfilment of the objective of the Institute to help expand the area of pearl and oyster culture.

## VISITORS

### Cochin

Dr. S. Z. Qasim, Secretary to the Government of India, Department of Ocean Development visited CMFRI, Cochin on 6 June and had discussions with the Director and senior scientists on the research programmes of the Institute and visited the laboratories. He also met the members of the *Sagar Sampada* Management Committee.

### Vizhinjam

Dr. V. A. Pai Panadicker, Director, Centre for Policy Research, New Delhi and Member of ICAR Review Committee, 28 May.

### Madras

Dr. D. Sudarshan, Deputy Director General, Fishery Survey of India, 2 April.

### Mandapam

Shri Ajay Battachariya, District Collector, Ramanathapuram

Shri U. S. Natarajan, IAS, Member, Tamil Nadu Public Service Commission.

### Engagements

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

Scientific Panel Meeting for Fisheries and Meeting to identify priority areas in fisheries Delhi, 13-14 April.



*Dr S. Z. Qasim is being introduced to senior members of the staff.*

ICAR Co-ordination Committee Meeting to discuss and approve annual cruise programmes of *Sagar Sampada* for April 1987 to March 1988 at Delhi, 15 April.

The Symposium on Revereine Fisheries and presented the paper entitled 'Inland Water Resources of Kerala in Relation to Fisheries Development', at Barrackpore, 26-27 April.

The Seminar on Fisheries Research and Development in Kerala organised by the University of Kerala and to deliver Keynote address, at Trivandrum, 28-29 April.

The meeting convened by the Hon'ble Union Minister of

State for Agriculture regarding Fisheries, at Delhi, 7 May.

The meeting to brief Honorable Minister for Agriculture and Director General, ICAR about gains to country from the visit abroad (FAO Expert Consultation from 4-8 December 1986 at Colombo, Sri Lanka).

Twentyfirst meeting of the Technical Committee of MPE-DA at Madras, 25 May.

Shri G. P. Kumaraswamy Achari, Scientist S-2 attended the National seminar on estuarine management and presented a paper entitled problems in formulating strategies for estuarine resource management at Trivandrum, 4 June.



## Appointments

Shri Naresh Kumar Verma as Scientist S-1 at Cochin, 27 June.

Shri U. Alagumalai, Deckhand (T-1) as Bosun (T-II-3) at Visakhapatnam, 6 April.

Shri T. K. Sudhakaran, Deckhand Senior (T-2) as Bosun (T-II-3) at Mandapam Camp, 29 April.

Shri S. Mohamed Sethakathullah as Field Assistant (T-1) at Tuticorin, 12 May.

Shri N. Jesuraj as Skin Diver (T-2) at Tuticorin, 8 May.

Shri Titti Nageswara Rao, Field Assistant (T-1) at Kakinada, 25 May.

The following Technical Assistants have been appointed

Shri A. Kanakkan, as Technical Assistants (T-II-3)

Shri S. Haja Najeemuddin

Shri C. J. Prasad

Smt. P. L. Ammini

Shri D. Vincent

Smt. A. Kanakam

Dr. K. Muniyandi

Dr. R. Thangavelu

Dr. V. Selvaraj

Shri A. Deivendra Gandhi

Shri S. Palanisamy

Shri N. P. Chandra Kumar as Field Assistant (T-1) at Visakhapatnam, 25 May.

Shri V. M. Dhadeshwar as Field Assistant (T-1) at Karwar 15 June.

Shri S. Chandrasekar as Field Assistant (T-1) at Visakhapatnam, 1 June.

Shri P. V. Sankaran Unni as Superintendent on deputation basis at Cochin, 1 April.

Smt. T. Madhavi, Assistant on ad-hoc basis at Cochin reverted to the post of Senior Clerk, 7 April.

Shri I. Ravindran as SS Grade I (Fieldman), 11 May.

Shri V. K. Aravindakshan as SS Grade I (Fieldman), 22 May.

Shri T. A. John, SS Grade III (Khalasi) as SS Grade IV (Khalasi) 22 May.

Shri P. A. Vasu, SS Grade III (Fieldman) as SS Grade IV (Fieldman) 21 May.

Shri A. Francis, SS Grade III (Lab. Attendant) as SS Grade IV (Lab. Attendant), 25 May.

Shri J. Ansalam, SS Grade III (Lab. Attendant) as SS Grade IV (Watchman), 27 May.

Shri P. Acharya, SS Grade I (Watchman) as SS Grade II (Watchman) 20 June.

Shri T. Sreedharan, SS Grade I (Messenger) as SS Grade II (Messenger), 15 June.

Shri N. K. Shanmughan, SS Grade I (Messenger) as SS Grade II (Messenger), 16 June.

Shri Laxman M. Waghala, SS Grade I (Watchman) as SS Grade II (Watchman), 22 June.

Shri A. Abubin Mehsan, SS Grade I (Watchman) as SS Grade II (Watchman), 22 June

Shri Ramanna Sapaliga, SS Grade I (Watchman) as SS Grade II (Watchman), 18 June.

Shri M. B. Kotharkar, SS Grade I (Watchman) as SS Grade II (Watchman) 22 June.

Shri P. A. Naik, Superintendent as Assistant Administrative Officer on ad-hoc basis, 6 June.

Shri M. Selvadhas, Assistant as Superintendent on ad-hoc basis, 9 June.

Shri M. Velu, Senior Clerk as Assistant on ad-hoc basis, 9 June.

Smt. Alice Valooran, Junior Clerk as Senior Clerk on ad-hoc basis, 1 May.

Smt. K. C. Girija, Junior Clerk as Senior Clerk on ad-hoc basis, 15 May.

## Transfers

Shri M. Bose, Junior Technical Assistant (T-2) from Kovalam to Mandapam Camp.

Shri S. Sankaralingam, Field Assistant (T-1) from Mandapam Camp to Kovalam.

Shri George Augustine, Bosun (T-4) from Cochin to Madras.

Shri L. Jeyasankaran, Technical Assistant (T-1-3) from Cuddalore to Madras.

Shri T. Dhandapani, Junior Technical Assistant (T-2) from Madras to Cuddalore.

Shri M. Alwaris, Deckhand (T-2) from Tuticorin to Cochin.

Shri K. Ramadoss Gandhi, Junior Technical Assistant (T-2) from Bombay to Cochin.

#### Relief

Shri M. Chellathurai, SS Grade I (Binder) on resignation 13 April.

#### Retirement

Shri C. John, SS Grade III (Fieldman) on attaining of superannuation, 31 May.

#### Weddings

Kumari M. Parvathy, Senior Clerk at Madras married Shri G. Karunanidhi at Madras, 3 June.

Shri K. Vijayakumaran married Kumari Malarvizhi at Palghat, 10 May.

Shri P. S. Salvi, SS Grade I (Messenger) married Kumari Valsala at Bombay, 14 May.

Shri C. N. Joglekar, SS Gr. I (Messenger) married Kumari Giriya at Sirli, 19 April.

#### Retirements

Shri C. John, SS Grade III (Fieldman) on attaining the age of Superannuation 31 May.

Shri R. Ayyakannu, SS Gr. III (Lab. Attendant) on attaining the age of superannuation, 30 June.

Shri A. Ammoru, SS Grade IV (Fieldman) on attaining the age of superannuation, 30 June.

#### Obituary

Shri M. R. Anjalo, SS Gr. I (Watchman) expired on, 29 May.

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#### From page 6 — Participants in the Summer Institute

(From left)

#### 1st Row

Shri M. Abdulhassan  
Dr S. Sambasivam  
Shri V. Rengaswami  
Dr S. Krishnan  
Dr M. S. Pillai  
Dr O. P. Sharma  
Dr S. N. Mohanty  
Dr C. P. Rangaswamy  
Shri Parveen Rattan  
Shri M. C. Nandeeshan  
Dr K. Premkumar  
Shri A. K. V. Nasser  
Dr R. K. Rath

#### 2nd Row

Shri V. S. Khabade  
Kum. Shiranee Pereira  
Dr (Smt.) Shyama Misra  
Kum. Rajathy  
Smt. Venkubayamma  
Smt. Lizy Behanan  
Dr Manpal Kaur  
Dr P. T. Mathew  
Dr Sambasiva Rao  
Shri Ratish Menon  
Shri J. M. Narayanan  
Shri V. Jayananan

#### Sitting

Shri Noor Mohammad Bhat  
Dr K. Gopal Rao  
Dr A. G. Ponniah (Faculty)  
Shri D.C.V. Easterson (Faculty)  
Dr P.S.B.R. James (Director)  
Shri T. Jacob (Faculty)  
Dr R. Paul Raj (Faculty)  
Shri V. Dogra  
Shri R. Mohan