CMFRI newsletter

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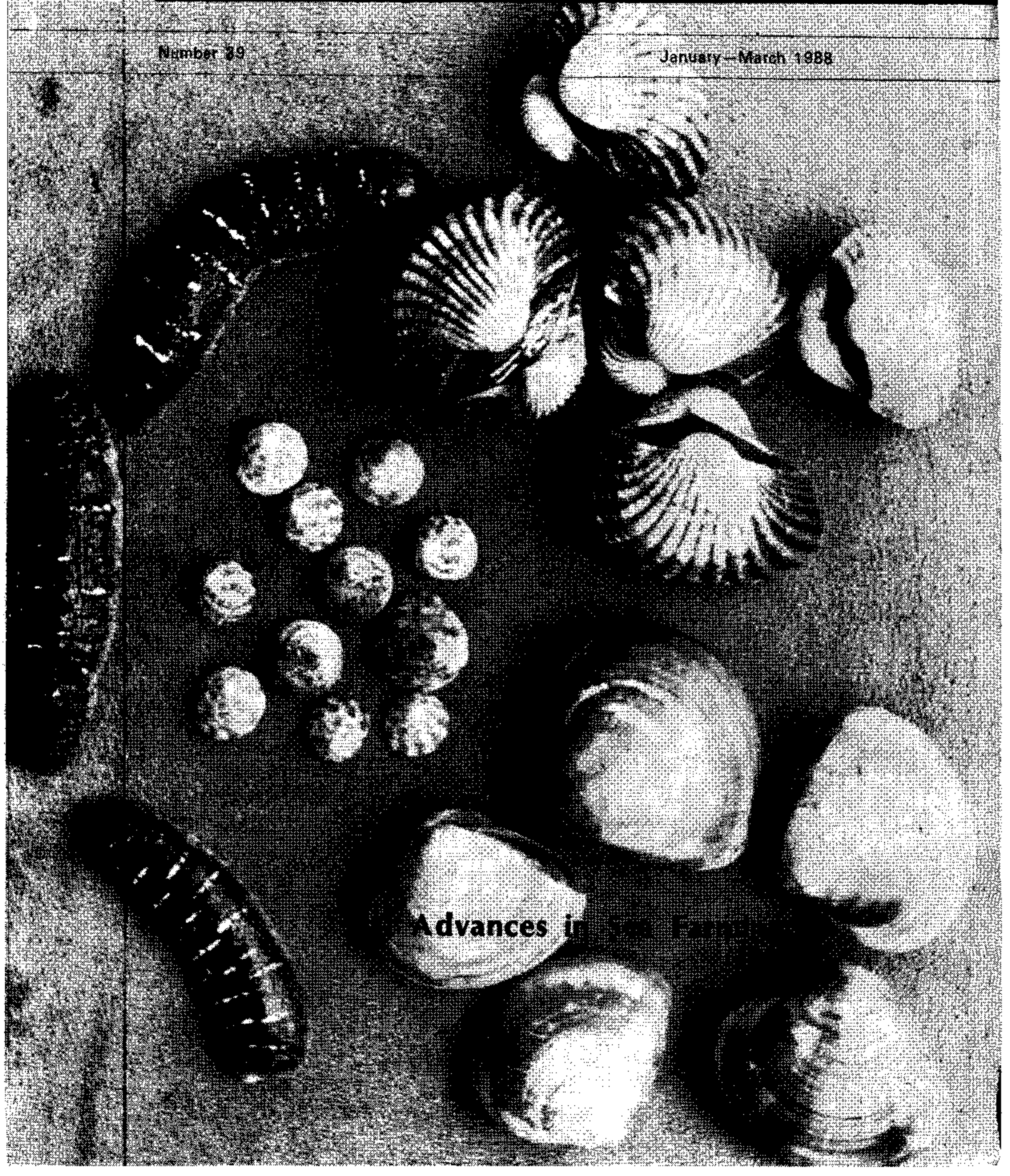


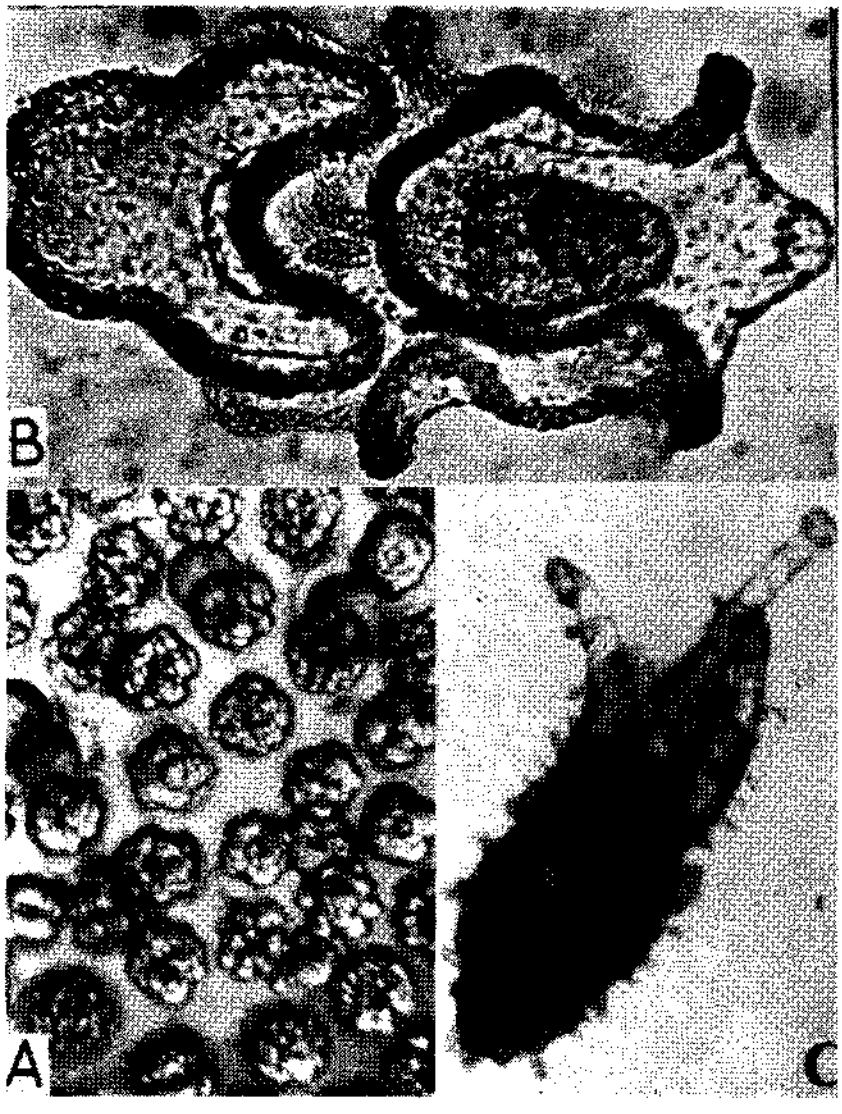
Advances in [illegible]

Advances in Sea Farming

The Central Marine Fisheries Research Institute, Cochin has achieved more breakthroughs in the field of seafarming. The Institute which has developed a number of techniques for culture of commercially important marine animals has also been concentrating on sea ranching programmes for replenishing the natural fishery resources. The research efforts in this direction have culminated in the success, for the first time in India, of laboratory breeding of sea cucumbers, top shell, great clam and the blood clam.

CMFRI has succeeded in the laboratory breeding of sea cucumbers, top shell, great clam and the blood clam, through temperature manipulation, for the first time in India at the Shellfish Hatchery Laboratory at Tuticorin Research Centre.

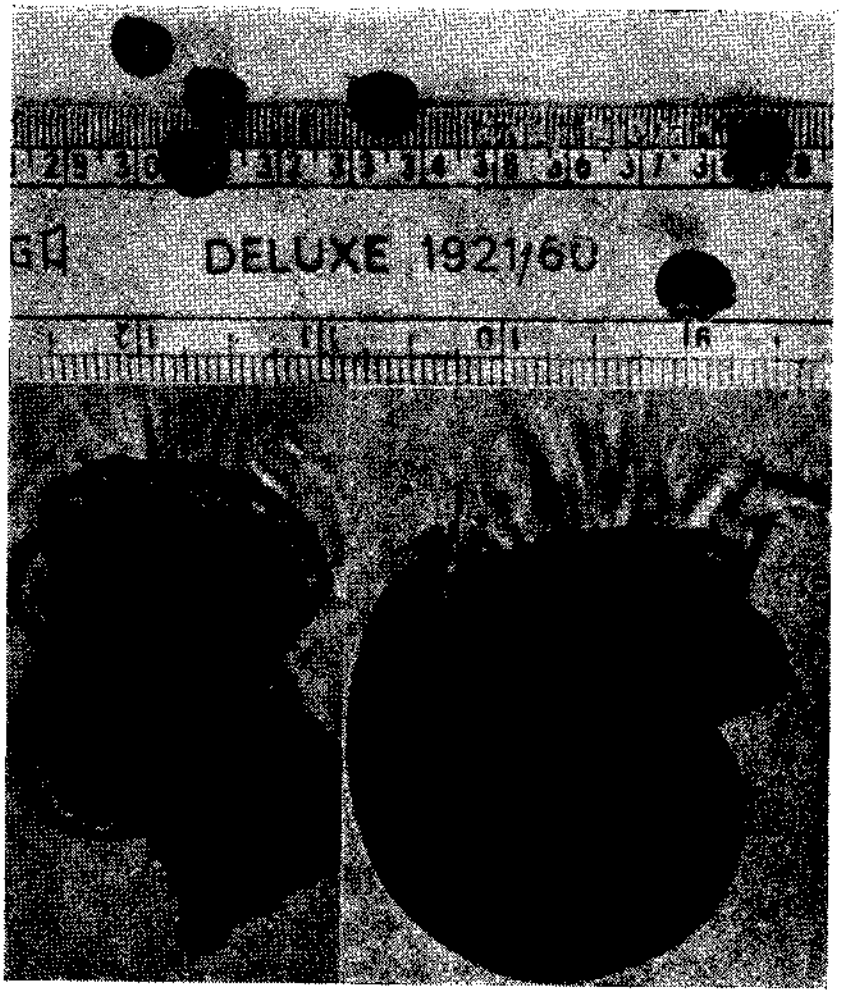
The beche-de-mer prepared from sea cucumber earns a foreign exchange of about Rs. 20 lakhs annually. The major markets for this product are Singapore and Hongkong. In India this commercially important resource is restricted to the Gulf of Mannar and Palk Bay region and there are evidences of over exploitation of the single species (*Holothuria scabra*) contributing to the fishery. Dr D. B. James, Shri M. E. Rajapandian and Dr C. P. Gopinathan, Scientists and Shri B. K. Baskar, Senior Research Fellow of the Institute, developed the technique for laboratory breeding of this animal by temperature manipulations. This achievement can pave way for large-scale culture of the sea cucumbers for further development of the industry and breeding of much larger and more valuable species occurring in the Lakshadweep islands for sea ranching and export.



SEA CUCUMBER (Holothuria)
A. Blastular stage; B. Auricularia stage; C. Pentactula stage

Large specimens of *Holothuria* (Metriatyla) *scabra* (300 - 350 mm in length and 500 - 600 g) were brought to the laboratory in the last week of January, and they were acclamatised to the laboratory conditions. The specimens were induced to spawn in the laboratory by slightly raising the

temperature of seawater. First the male spawned and this stimulated the females to release eggs. One female released nearly one million eggs. After fertilisation the eggs transformed, undergoing several changes into a stage known as auricularia on the second day. The eggs were sperical, white and were visible to the naked eye and they were floating. The auricularia transformed into another stage known as doliolaria. Doliolaria is barrel-shaped with five bands and with two tentacles projecting out. They move fast in the anterior direction. The posterior portion is slightly tapering. On each side there are five round structures with distinct opening at the posterior end. There are five groups of hair-like structures on either side. The larvae are fed on micro-algal cultures maintained at the Research Centre. On the thirteenth day some of the doliolaria transformed into pentactula stage. The body of pentactula is tubular with five tentacles at the anterior end and one short stumpy tubefoot at the posterior end. The colour is greenish-brown. The tentacles have a web in between them. Later one more tubefoot developes and they become elongated. The tentacles and tubefeet develop small calcareous particles known as spicules. These give rigidity to the body. The pentactula have the habit of moving to the edge of the tank and remaining just below the surface of the water. They settle down to the bottom of the tank as miniature *holothurians*. They are fed with algal powder mixed with sand or mud.

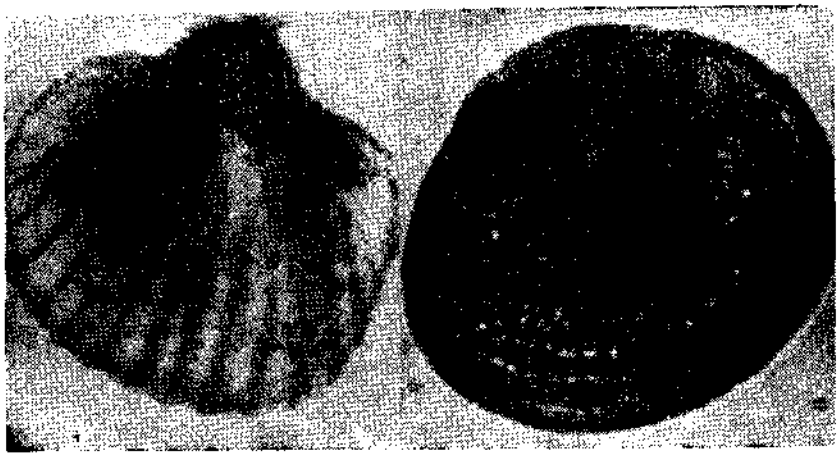


TOP SHELL (Trochus radiatus)
Top — 3 month-old shells
Bottom Left: *Late trochophore — 3 hours after fertilization (250 μ)* Right: *Typical veliger — 4 hours after fertilization (300 μ)*

The top shell (*Trochus niloticus*) is in great demand in shell craft industry. To establish techniques for breeding and larval rearing methods of this group of animals, experiments were conducted at the Shellfish Hatchery Laboratory of the Institute with the candidate species *Trochus radiatus*. The fully matured animals kept in clean filtered seawater spawned and hatched out and developed into young animals.

These animals attained full growth within three months. *Isochrysis* and soft agal filaments were given as feed. S/Shri K. Ramdoss and S. Mahadevan, Scientists and T. Rajan, Technical Assistant achieved this success. Based on these results commercially important species of top shells available in Andaman and Lakshadweep regions could also be bred using the same technique.

GREAT CLAM — Meretrix meretrix
Top: Adult clams; Bottom Left: Straight stage; 2 days old
Bottom Right: Spat 22 days (461 μ)



BLOOD CLAM — Anadara granosa
[redacted]: Spat — 27th day (417 μ); [redacted]: Umbo — 10th day (155 μ)

Clams which play a very important role in coastal rural economy belong to the group of animals which are suitable for farming. Clam is an efficient converter of primary production into food suitable for human consumption, thus contributing to low cost nutritious food material. The shell, rich in calcium carbonate is used in lime, cement, fertilizer, sugar and shell craft industries and as a feed for prawn and poultry. It also has a place in the export market and clam meat worth Rs. 1 crore is being exported annualy to Japan. The present breakthrough obtained in the laboratory breeding by temperature manipulation and production of seed of the great clam (*Meretrix meretrix*) and blood clam (*Anadara granosa*) would help in transplanting seed in suitable areas where a production of 40 tonnes per hactare can be obtained in a period of six months. This success was achieved by a team of scientists consisting of Dr K. A. Narasimham, Shri P. Muthiah and Dr C. P. Gopinathan. There is scope for taking up clam farming on a large scale in the coastal and brackish-water areas of the country for increasing production and employment opportunities.

A well established shell fish hatchery laboratory having running water and algal culture facilities with proper illumination, temperature control and dust-free atmosphere have contributed remarkably for achieving success in the induced breeding techniques.

Mini Prawn Hatchery for Fishermen Families

The Central Marine Fisheries Research Institute, Cochin, has developed a totally indigenous technology for prawn seed production. Locally available equipment and material are used. The technology differs from those used in other parts of the world in two main respects : (1) Mixed diatom cultures developed by fertilizing raw sea water with plant nutrients are used to feed the larval stages instead of pure algal cultures and (2) Simple particulate feed is used for postlarval stages, instead of brine shrimp nauplii. The larval rearing procedures have been so simplified that even unskilled workers with a bit of training can take up this work.

It is a modular type of hatchery and the capacity of the hatchery could be increased or decreased by changing the size and number of larval rearing containers to suit the financial resources available. The prawn hatchery technology developed by the CMFRI has been taken by the states of Kerala and Karnataka to set up large prawn hatcheries at Cannanore and Kumta Bay, respectively. The technical know-how is being provided by the CMFRI for these hatcheries.

The technology developed by the CMFRI is so simple and versatile that while it is being utilized by the maritime states to construct large hatcheries, it has been scaled down to meet the requirements of even fishermen families by S/Shri M. S. Muthu, N. N. Pillai and K. V. George.

Fishermen families living on the shore can make use of the their homesteads to produce prawn seed and earn additional income in their leisure time. The fishermen who go out for fishing everyday can help in bringing the spawners and the women and children in the family can take care of the larvae in their leisure hours. The procedures are so simple that the family members can learn them by attending short training courses at the Krishi Vigyan Kendra of CMFRI at Narakkal

Requirements

The total investment is only Rs. 3000 which could be easily obtained as a loan from nationalised banks. The equipment used are only plastic bins, basins and buckets and small aquarium aerators for aerating the water. These containers can be kept on the verandah of the fishermen's house. There should be electricity available in the house to operate the aerators. Clear seawater with salinity of 28-34 ppt should be available on the beach for atleast 8 months in a year. The seawater for rearing the larvae can be collected in plastic buckets from the beach by the family members. The chemicals used for developing diatom cultures for feeding the larvae are cheap and easily available.

The hatchery phase ends at post larvae-5 stage and the fisher men should sell them at the this stage. The fisherman cannot keep the post-larvae for a longer period in the small containers. They need more space for good survival.

The fisherman can sell the PL5 to the seed banks being set up by the MPEDA in all the maritime states. These seed banks can rear them in their facilities for about 15 days before selling them to prawn farmers for stocking in ponds.

Alternatively, fishermen can sell the postlarvae to marginal farmers with small brackishwater pond holdings (less than one acre) where they can be directly stocked if the ponds are cleared of all unwanted organisms by application of mahua oil cake, crushed seeds of *Croton twiglium* (Neervalam) or ammonia. The PL5 are quite sturdy and can withstand an abrupt change of salinity from 30 to 20 ppt.

CMFRI to Collaborate in Matsyafed's Hatchery Project

Utilising the hatchery technology for prawn seed production developed by CMFRI Matsyafed has taken up a tripartite venture for setting up a prawn hatchery at Molpa Bay, Cannanore. The foundation stone of the hatchery was laid on 28 January by Shri T. K. Ramakrishnan, Minister for Fisheries, Kerala. The hatchery is being built up with the technical collaboration of CMFRI and financial assistance from MPEDA. The hatchery will produce 10 million seed (PL 20) per year. Shri M. S. Muthu, Scientist S-3 represented CMFRI at the function and offered felicitations.

PRODUCTION CAPACITY OF MINI PRAWN HATCHERY

1. Nauplii stocked in 4 bins (each 100 litre capacity) @ 7500 nauplii per bin	...	30,000 nos.
2. PL 5 obtained after 13 - 15 days per run (av. survival rate 50%)	...	15,000 nos.
3. In 8 months of operation 15 runs can be made (15,000 x 15)	...	2.25 lakhs PL5
∴ Capacity of the hatchery per year	...	2.25 lakhs PL5

ECONOMICS OF MINI PRAWN HATCHERY

Investment :

I. Capital on hatchery equipment :		
i. 100 l plastic bin (4 nos. for larval rearing and 2 nos. for seawater storage) — 6 nos.	...	Rs. 1,380
ii. 50 l plastic bin, white colour, (for transportation of spawners and culture of phytoplankton) — 2 nos.	...	Rs. 210
III. 25 l plastic bucket/pot (for seawater collection)— 4 nos.	...	Rs. 120
iv. Aquarium aerators — 8 nos.	...	Rs. 440
v. Aeration tube (½ roll), Aeration stones bolting silk — 2 m, seive for water changing — siphoning tube (3 m)	...	Rs. 200
		Rs. 2,350
II Operational cost : (Spread over 3 years)		
vi. Chemicals	...	Rs. 200
vii. Artificial feed	...	Rs. 30
viii. Electricity and other miscellaneous	...	Rs. 420
		Rs. 650
III. Total Investment : Rs. 2,350 + 650	...	Rs. 3,000
IV. Annual recurring expenditure		
i. Depreciation	...	Rs. 1,000
ii. Interest @ 12%	...	Rs. 360
		Rs. 1,360
V. Income at the rate of Rs. 15/- per 1000 seed		
i. Income from 15 runs in 8 months (15,000 seed per run)	...	Rs. 3,375
ii. Net profit per year 3,375 — 13,60	...	Rs. 2,015
iii. Profit % on capital investment (Rs. 2,015/3000)	...	68%
iv. Net income for 3 years : 2015 x 3	...	Rs. 6,345

Black marlin landed

A large specimen of black marlin identified as *Makaira indica* (Cuvier 1832) was caught by a gillnet at Veraval on 22 February. The total length of the animal was 325 cm and the weight was 150 kg.

Two black porpoises (*Neophocaena phacoenoides*) were landed at the Old Light House landing centre at Veraval on 7 and 8 March. The specimens were caught by gillnets and were 96 cm and 107 cm respectively in length and 18.5 kg and 25 kg in weight.

Baleen whale stranded

Stranding of a ballen whale (*Balaenoptera borealis*) measuring 12m in length was reported from Tuticorin on 27 February for the first time from that area.

Whale sharks landed

Forty whale sharks of the species *Rhineodon typus* were caught by Veraval fishermen during the first half of March.

Incidental catch of dolphin

A dolphin (*Stenella longirostris*) was caught incidentally at Veraval on 29 March. It was 148 cm in length and weighed 32 kg.

Oyster spat airlifted

At the request of the State Department of Fisheries, Gujarat, a consignment of 15,000 edible oyster spat produced at the Hatchery Laboratory at the Tuticorin Research Centre of CMFRI was airlifted to Jamnagar on 9 March.

KVK-TTC

Training Programmes

Four training courses of 5 days duration on scientific farming of prawn fish was organized. Two courses were conducted within the KVK campus and one each were conducted at Cumbalam and Chathamma of Ernakulam district. Thirty three farmers and 14 farm women were trained under this programme.

Seventeen farm women were trained in one-day training course on integrated farming of prawn and poultry.

Two training programmes on preparation of prawn and fish pickles and wafers were organised for the benefit of 40 rural women.

A one-day awareness programme on nutrition and health care was organized in which 18 farm women participated.

A 15-day training programme on scientific farming of prawn and fish was organized for the benefit of 16 farm men and 9 farm women under the special component plan of the Department of Fisheries, Kerala.

Two training programmes, one on hatchery production of marine prawn seed and another on fish processing technology were organized in which 10 officials of the Fisheries Departments of Gujarat, Tamil Nadu and Kerala and an official from Tata Chemicals were trained. The training programmes were of 15 days duration.

The low-cost technique for the production of commercially important marine prawns were demonstrated in the KVK campus. An attempt was made to culture the hatchery-produced seed of *M. affinis* by stocking 12,000 numbers of seed in grow-out system in KVK. The growth rate obtained has been satisfactory.

Demonstration of mini prawn hatchery to fisherwomen

Science Week Celebrated

CMFRI celebrated National Science Day and Science Week during 28 February - 4 March. It was on 28 February 1928 that Sir C. V. Raman made his Nobel Prize-winning discovery, the Raman Effect and to commemorate the week Govt. of India decided to celebrate the week commencing from or culminating on February 28 as Science Week. The celebration was organised at Kandakkadavu, a fishing village in Cochin, jointly by the Fishery Economics and Extension Division and Krishi Vigyan Kendra of CMFRI, with the aim of providing an opportunity to the fishermen to see and understand the R & D activities in fisheries. The Science Day and the Science Week

Women attending a lecture cum demonstration in fish processing

was inaugurated by Rev. Father Paul Arakkal of St. Francis Xavier's Church, Kandakkadavu. Dr Dr P. S. B. R. James, Director, CMFRI chaired the meeting. Dr V Balakrishnan, Scientist formerly with CMFRI offered felicitations. Dr M. M. Thomas, Officer-in-Charge, KVK welcomed the gathering and Shri D. B. S. Sehara, Head of Fishery Economics and Extension Division proposed a vote of thanks.

Dr PSBR James, Director, CMFRI delivering the presidential address. Seated are Sri DBS Sehara, Dr V Balakrishnan, Rev Fr Paul Arackal and Dr MM Thomas

The programme started with a seminar on R & D activities in fisheries in which CMFRI, CIBA, CIFT, MPEDA, local C. D. Block and fisherfolk participated. The small-scale prawn hatchery technique, preparation of pickle, cutlets and wafers from fish and the mobile laboratory facility of CMFRI were demonstrated and films of fisheries interest were screened on the following days. An exhibition highlighting the activities of CMFRI was also organized on the occasion.

Fishermen's Forum formed at Chalakkadavu

As a part of the research project in extension 'Planned Change in a Coastal Village — A Model for First-line Extension System' a fishermen's forum was formed at Chalakkadavu, a hamlet in the Kandakkadavu fishing village in Chellanam Panchayat in Cochin. In this connection a meeting of the surveyed fishermen family members was called in which Smt. Jancy Jacob and Smt Krishna Srinath, Scientists involved in the project briefed the fishermen about the future activities to be taken up by the Institute for the benefit of the fisherfolk in that area. The meeting was followed up by a community discussion where a future plan of action was drawn up based on the felt needs of the fishermen. A forum was formed by electing office bearers to strengthen the people's participation.

Visitors
Cochin

Students from the following institutions visited the CMFRI Headquarters.

CIFE, Bombay; Sacred Heart College, Thevara; M. R. College, Vizhianagaram; University College, Trivandrum; Bhavan's College, Bombay; St. Xavier's College, Palayamkottai; Department of Botany, University of Madras; Dayanand College of Arts & Science, Solapur; Government Regional Fisheries Technical School Beypore; D. K. M. College for Women, Vellore; Jamal Mohamed College, Trichy; Fisheries College, Tuticorin; Layola Academy, Secunderabad.

Mandapam

Shri Dullep Mathai, Member, Wildlife Board of India; Vice Admiral Johnson, Indian Navy.

Tuticorin

Students from 29 colleges from various parts of India.

Karwar

Dr Arjunwadkar, Dept. of Zoology, Furgusson College, Pune; Professor S. L. Patil, Department ment of Zoology, R. L. S. T., Belgaum.

Veraval

Mr Tony Sandres, Fish Technologist, Overseas Development Administration, U.K.

Six trainees from State Fisheries Department.

The quarterly meeting of the Joint Official Language Implementation Committee of CMFRI and CIFT was held at Veraval on 14 March.

Engagements

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

Mid-term review of the VII Five Year Plan Meeting at ICAR Headquarters, 20-21 January.

ICAR Co-ordination Committee Meeting to finalize Annual Cruise Programmes for FORV Sagar Sampada at New Delhi, 19 February.

National Science Week Celebrations and Seminar on Fisheries Development at Kandakkadavu, 28 February.

Standing Finance Committee and Governing Body Meeting of ICAR Society at New Delhi, 8 & 9 March.

Annual General Body Meeting of the ICAR Society at New Delhi, 10 March.

Dr James joined the delegation to Sri Lanka to assess and identify the areas of projects and schemes for rehabilitation and reconstruction work, 14 - 21 March.

Dr M. M. Thomas, Scientist S-3, Shri S. Kalaimani, Scientist S-2, Krishna Srinath and Jancy Jacob, Scientists S-1 and the technical staff of KVK attended the workshop on Gainful Employment for Women jointly organised by Department of Science and Technology and CIFT at Cochin and presented papers.

Dr M. M. Thomas, attended the Rural Programme Advisory Committee Meeting of All India Radio, Trichur. He also participated in the monthly T&V workshop of the agricultural extension programme of Kerala State Agricultural Department.

An interview with Dr Thomas on collection of prawn seed was broadcast over All India Radio, Trichur.

Scientific and technical staff of KVK participated in the Regional Workshop-cum-training programme for KVK/TTC staff at Mitra Niketan, Trivandrum, 31 December to 3 January.

Dr V. S. Kakati, Scientist S-2 attended the Managing Committee and Technical Committee meetings of the Brackishwater Fisheries Development Agency of Karnataka State Fisheries Department.

Appointments

Shri A. R. Misra as Scientist S-2, 19 February.

Shri V. Ravindranathan as Scientist S-2, 2 March.

Shri I. Gupta, Scientist S-1 on inter-institutional transfer from CARI, Port Blair, 2 February.

The following have been appointed as Field Assistants T-1

Shri Pandurangachar at Karwar, 11 January.

Shri Ganesh Bhatkal at Mangalore, 11 January.

Shri Bharamu S. Melinmani at Mangalore, 11 January.

Smt K. P. Salini at Cochin, 9 March.

Shri P. K. Baby at Cochin, 10 March.

Shri K. M. Venugopalan at Cochin, 10 March.

Shri K. Soloman at Cochin, 14 March.

Shri Manickaraja, Technical Assistant (T-1-3) as Technical Assistant (T-II-3) at Tuticorin, 8 February..

Smt. P. J. Sheela as Hindi Officer at Cochin, 9 March.

Shri Benny Mathew as Junior Clerk at Cochin, 21 March.

Shri T. N. P. Kurup, Junior Clerk as Senior Clerk at Cochin, 21 January.

Shri P. K. Suresh Babu as SS Grade I (Watchman) at Cochin, 21 January.

Shri S. Pitchai, SS Grade I (Daftry) as SS Grade II (Daftry) at Mandapam Camp, 3 Febraury.

Shri P. Muthumalai, SS Grade I (Watchman) as SS Grade II (watchman) at Tuticorin, 7 January.

Retirements

Shri T. Jacob, Scientist S-3 on superannuation, 31 March.

Shri R. Thankappan, Senior Clerk on superannuation, 28 Febraury.

Reliefs

Shri Manaskumar Bandhopadhaya, Scientist S-1 on inter-institutional transfer to CIFA, Bhubaneswar, 29 February.

Dr Ranjit Singh, Scientist S-1 on inter-institutional transfer to CIFA, Bhubaneswar, 10 March.

Degree Awarded

The following Senior Research Fellows of the Postgraduate Programme in Mariculture have been awarded Ph.D. degree.

Kumari T. N. Sarasu for her studies on larval biology of spiny lobsters of the genus *Panulirus*. Kumari Sarasu worked under the guidance of Dr M. J. George.

Shri Gopal Prasad Mahobia for his studies on Indian Cichilds. Shri Mahobia worked under the supervision of Dr K. C. George.

Eight Junior Research Fellows of M.Sc. Mariculture (6th Batch)) passed in first class the final semester examination conducted by the Cochin University of Science and Technology.

Obituary

Shri Vikram K. Kharaliya, SS Grade I (Safaiwala) expired, 26 February.

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