CIBA NEWS

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CENTRAL INSTITUTE OF BRACKISHWATER AQUACULTURE, CHENNAI

CONTENTS

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MAJOR ACHIEVEMENTS OF THE INSTITUTE FROM 1987-1998

The Central Institute of Brackishwater Aquaculture has completed a decade of service to the nation. In commemoration of the Golden Jubilee of the Country's Independence, this issue of CIBA NEWS presents the major achievements of the Institute during the period 1987 to 1998.

Broodstock of tiger shrimp, *Penaeus monodon*

RESEARCH ACHIEVEMENTS

In the past ten years since its inception in 1987, the Institute has made significant research contributions in production / hatchery technology for shellfish; broodstock development, breeding and seed production of finfish; shrimp / fish nutrition and feed technology; shrimp / fish disease diagnosis and health management / genetic characterisation; shrimp farm environmental survey and impact assessment of shrimp farming; survey and evaluation of shrimp farming practices and database on brackishwater fishery resources.

A. Production / hatchery technology for shellfish

- Higher production rate (1.2 t/ha/crop) of tiger shrimp *Penaeus monodon* was obtained in tidal-fed extensive culture using feeds developed by the Institute.
- A simplified cost-effective backyard hatchery technology package was developed for the seed production of white shrimp *P. indicus*.
- A technology package was developed for captive broodstock maturation of tiger shrimp *P. monodon*.
- A technology package was developed for the biomass and cyst production of the brine shrimp *Artemia*.
- Mass culture of live feeds such as diatoms (*Chaetoceros* spp. and *Tetraselmis* spp.) and rotifers (*Brachionus plicatilis*) was standardised in indoor and outdoor culture systems.
- Hatchery lay-out and designs were developed for small-scale (2,5 and 10

million capacity) and backyard shrimp hatchery.

- Induced maturation of the mud crabs *Scylla tranquebarica* and *Scylla serrata* was effected through unilateral eyestalk ablation. A total of 14.8 million larvae in the former and 18.0 million larvae in the latter were produced under hatchery conditions.

B. Broodstock development, breeding and seed production of finfish

- The Institute achieved a major breakthrough for the first time in the country in captive broodstock development, induced maturation, breeding and seed production of the Asian seabass *Lates calcarifer*. By induced maturation and breeding using LHRHa (Luteinizing Hormone Releasing Hormone analogue) about 1.4 million hatchlings were produced and reared successfully under hatchery conditions. Fry (25-30 days old) were sold to progressive fish farmers for culture purpose.
- Another breakthrough was achieved in the captive broodstock development and breeding of the grey mullet *Mugil cephalus*. Induced breeding was carried out using HCG (Human Chorionic Gonadotropin) and Ovaprim and about 5.2 lakh hatchlings were obtained.
- A simple technology was developed for the year-round breeding of the pearlspot *Etroplus suratensis* in ponds by salinity regulation.
- A captive broodstock of the grouper *Epinephelus tauvina* (size range 2.0 - 6.5 kg) has also been built up.

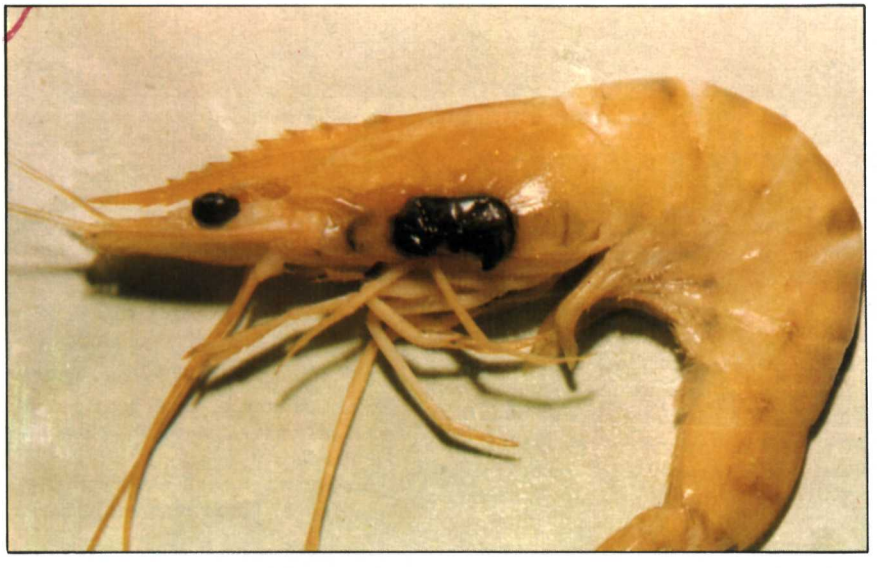
C. Shrimp/fish nutrition and feed technology

- Nutritional requirements of candidate species of shrimp *P. monodon* and *P. indicus* were drawn up and shrimp feeds were formulated using indigenous feed ingredients. Field testing of feeds in farmers ponds gave a feed conversion ratio of 1.76:1.
- A technology package was developed for shrimp feed processing and production using a nutritionally balanced feed formulation.
- A technology package was developed for production of micro-particulate feed for the post-larvae of shrimp *P. indicus*.
- Freeze-dried microparticulate feed technology was developed for rearing larvae and postlarvae of tiger shrimp *P. monodon*.
- The availability of marine protein resources was assessed in different maritime states for use in aquaculture feeds.
- Digestive and gut microbial enzymes were identified in shrimp *P. monodon* and grey mullet *M. cephalus* and their activity levels studied.
- Studies on the digestibility of dietary protein in shrimp *P. indicus* revealed that low protein feeds (upto 30% protein level) are environment friendly as they minimize the excretion of waste nitrogen into the culture system.
- Maturation feeds were formulated for the broodstock of the grey mullet *M. cephalus*.

Berried mud crab Scylla *tranquebarica*

D. Shrimp / fish disease diagnosis and health management / genetic characterisation

- The Institute has made significant progress in shrimp disease investigations. Extensive investigations were conducted on the bacterial and viral diseases of shrimp and a comprehensive database on shrimp diseases has been built up.
- The major disease which struck shrimp farms diagnosed as the white spot disease has been the focus of studies. The causative agent was identified to be a virus, the White Spot Syndrome Virus (WSSV) . Other important diseases investigated were Monodon Baculovirus (MBV), Infectious Hepatopancreatic and Lymphoid Organ Necrosis, Vibriosis, luminescent bacterial disease, larval mycosis, mixed bacterial infection, black gill disease, bacterial septicaemia and soft shell disease.
- A simple and rapid DNA - based diagnostic test was developed for the diagnosis of White Spot Syndrome Virus (WSSV) infection in tiger shrimp *P. monodon* using the eyestalk of shrimp as an indicator organ.
- Another simple and efficient diagnostic method was developed for the diagnosis of WSSV infection in shrimp, based on the sequential histopathological analysis of sub-cuticular ectodermal layer of eyestalk.



Bacterial septicaemia disease in cultured tiger shrimp *Penaeus monodon*

Seabass (*L. calcarifer*) : a brood fish.

- The white spot disease was experimentally induced under laboratory conditions in several decapod crustaceans like shrimp, crab, lobster and freshwater prawn in order to study the epidemiology of the virus and to develop control measures. The study showed that mud crabs and lobsters can act as asymptomatic / carrier hosts of this virus.
- Genetic characterisation of *P. monodon* was carried out by DNA finger-printing and RFLP studies.

E. Shrimp farm environmental survey and impact assessment of shrimp farming

- Extensive investigations were conducted on shrimp farm environment and comprehensive impact assessment of shrimp farming. A significant database has been built up on the physical, chemical and biological parameters of shrimp culture systems in the coastal districts of Andhra Pradesh and Tamil Nadu. The socio-economic conditions of people in coastal areas was studied.
- Monitoring / advisory services on soil/water quality and maintenance of hygienic pond environment of farmers ponds were rendered by the Institute and this has contributed much in prevention of diseases and raising of productivity levels.

F. Survey and evaluation of shrimp farming practices

- Survey and evaluation of different shrimp farming practices were carried out in several maritime states *viz.*, Maharashtra, Goa, Gujarat, West Bengal, Orissa, Andhra Pradesh, Tamil Nadu, Kerala, Karnataka and Union Territory of Pondicherry. An economic analysis of different production systems has been worked out.

G. Database on brackishwater fishery resources

- A computerised database information system was developed on brackishwater fishery resources and brackishwater aquaculture.
- An Agricultural Research Information System (ARIS) laboratory has been set up at the Muttukadu Experimental Station. The Web site of the Institute was launched on the National Informatics Centre server at New Delhi (Web site address: http://www.nic.in/ciba).

TRANSFER OF TECHNOLOGY

- Several training programmes were conducted on brackishwater aquaculture of shrimp / fish, backyard hatchery / small-scale hatchery technology for shrimp *P. indicus*, *Artemia* biomass and cyst production, seabass *Lates calcarifer* breeding and seed production, soil and water quality management in shrimp ponds, environmental impact assessment of shrimp farming, disease diagnosis and health management of shrimp / fish, shrimp nutrition and feed technology etc. for the benefit of State Dept. officials / BFDAs and farmers / entrepreneurs.
- Farmers meets / demonstrations / exhibitions were conducted from time to time.
- Extension brochures and bulletins were published on several aspects of brackishwater aquaculture.

CONSULTANCY

The Institute has undertaken consultancy services for a Number of government / non-government agencies. The major consultancy offer taken up by the Institute is the Consultancy for Environmental Monitoring Programme under the World Bank assisted Shrimp and Fish Culture Project of the Dept. of Agriculture and Cooperation, Ministry of Agriculture. The total cost of the consultancy is Rs 68,40,334/-.

During this Golden Jubilee year of India's Independence, the Institute places on record its gratitude to Dr. R. S. Paroda, Secretary, DARE, Govt. of India and Director General, ICAR, Prof. V. L. Chopra, (Former Director General, ICAR) Dr. P. V. Dehadrai, Former Deputy Director General (Fy.), ICAR; Dr. K. Gopakumar, Deputy Director General, ICAR; Dr. K. Radhakrishna, Former Asst. Director General (M.Fy.), ICAR and Dr. R. A. Selvakumar, Asst. Director General (M.Fy.), ICAR, for their encouragement and support. The Institute is grateful to the pioneering efforts of Dr. E. G. Silas (Officer-on-Special Duty from December 1985 to August 1987), Dr. K. Raman, Scientist-S3 (Officiating Director from 17 August to 30 October 1987) and Dr. T. Rajyalakshmi, Scientist-S4, Officiating Director from 31 October 1987 to 10 April 1988) in the building up of the Institute's R & D programmes and infrastructure development. The Institute-building and management efforts of Dr. K. Alagarswami (Former Director, CIBA from April 1988 to March 1997) are gratefully acknowledged. The research and management support given by Shri. M. S. Muthu, Dr. K. V. Ramakrishna, Shri. A. V. P. Rao, Shri. K. N. Krishnamurthy and Dr. R. D. Prasadam (Retired Principal Scientists) and the contributions of all other Scientists, Technical, Administrative and Supporting staff are thankfully acknowledged.

Dr. G. R. M. Rao
Director

RESEARCH HIGHLIGHTS

Eco-friendly shrimp feeds

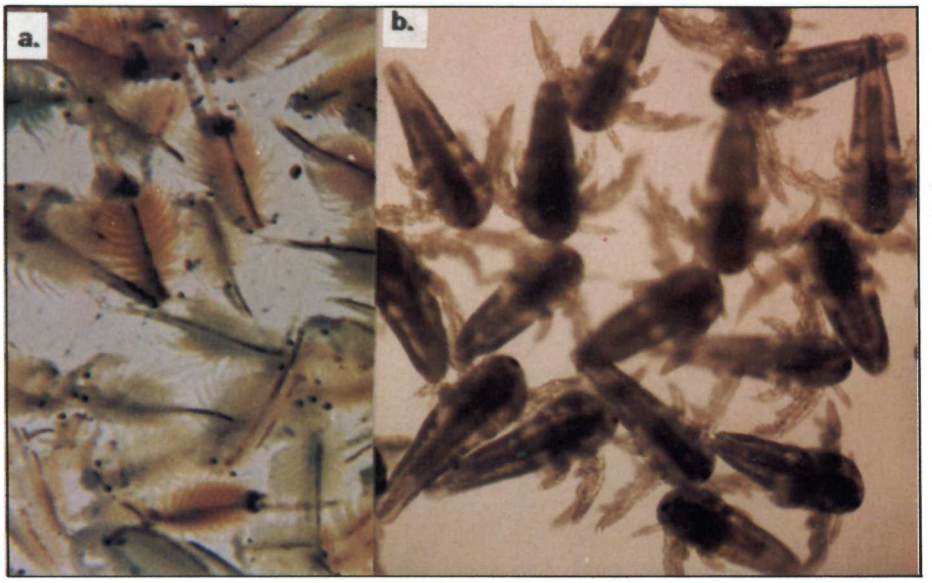
The digestibility of dietary protein was studied *in vitro* in the shrimp (*Penaeus indicus*) using feeds containing crude protein levels ranging from 21.3 to 40.3%. Results indicated that feeds containing upto 30% of crude protein were easily digested and assimilated by the experimental shrimp, while feeds with higher percentages (above 30%) of crude protein were not digested efficiently. The usage of feeds with low protein levels may be considered eco-friendly for shrimp farming.

VISITOR

Shri R. K. Bhujabal, Vice-Chancellor, Orissa State University of Agriculture and Technology, visited the Muttukadu Experimental Station, 17 August 1998.

ENGAGEMENTS

Dr. G. R. M. Rao, Director, attended the following Meetings / Workshops / Seminars:

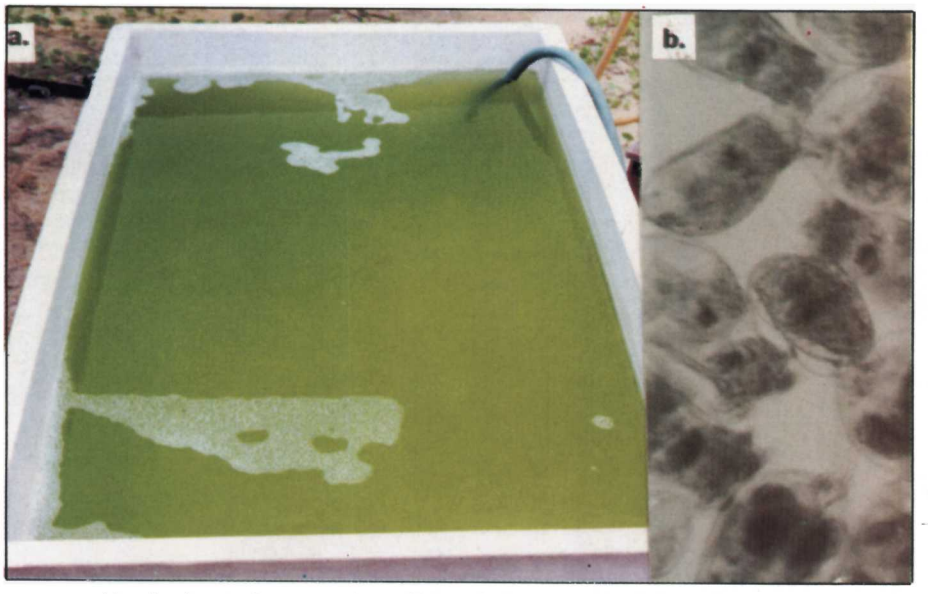


The brine shrimp : a. Adults and b. Nauplii.

- 7th Meeting of Aquaculture Authority, at New Delhi, 1-2 July, 1998.
- College Day Function at College of Fisheries, Acharya N. G. Ranga Agricultural University, Muthukur, Nellore, Andhra Pradesh, 14-15 July 1998.
- Workshop on Inland Fisheries Development, organised by State Planning Commission, Govt. of Tamil Nadu, at Chennai, 23 July 1998 and presented a paper entitled 'Coastal Aquaculture - Resources and Manage ment'.
- Seventh meeting of Planning Board of TANUVAS, at Chennai, 6 August 1998.
- Second meeting of National Committee on Introdution of Exotic Species in Indian Waters, at Dept. of Animal Husbandry and Dairying, Ministry of Agriculture, New Delhi, 3 September 1998.
- Meeting with the Minister for Fisheries and Director of Fisheries, Govt. of West Bengal, at Digha, West Bengal, 4-9 September 1998.
- Meeting of the Directors' of ICAR Fisheries Institutes, at CMFRI / CIFT, Kochi, 9-10 September 1998.
- 8th Meeting of Aquaculture Authority, at Goa, 11-12 September 1998.
- Meeting of National Agricultural Technology Project (NATP), at ICAR, New Delhi, 17-18 September 1998.
- Dr. B. P. Gupta, Senior Scientist, attended the National Seminar on 'Bharatiya Krishi Ka Bhair Swaroop', organised by IARI & Indian Society of Agricultural Sciences, New Delhi, 11-13 August 1998.

Dr. S. M. Pillai, Senior Scientist, Dr. M. Muralidhar and Shri K. Ponnusamy, Scientists, participated in the National Seminar on Frontiers of Research and its Application in Coastal Agriculture, at Navsari, Gujarat, 16-20 September 1998 and presented 4 papers.

Shri K. Ponnusamy, Scientist, participated in the Farmers' Meet, organised by MPEDA at Bilimora, Navsari district, Gujarat, on 21 September, 1998.



Live feed organisms : a. algae (*Tetraselmis* sp.) and b. rotifers *(B. plicatilis)*.

MEETINGS

- The 8th meeting of the Institute's Joint Staff Council (IJSC) was held at the Headquarters on 22 July 1998.
- The 16th meeting of the Institute Management Committee (IMC) was held at the Headquarters on 4 September 1998.

HUMAN RESOURCE DEVELOPMENT

- Dr. P. Kishore Chandra, Scientist, attended a training course on 'Recent Developments in Biotechnology applied to Aquaculture' at CIFE, Mumbai, 14 July to 3rd August 1998.
- Dr. C. P. Balasubramanian, Scientist, was deputed to SEAFDEC, Iloilo, the Philippines, to undergo 2 months training in Coastal Aquaculture and Resource Management (under Third Country Training Programme), from 3 August 1998.

TRAINING

Lectures and demonstrations were arranged for:

- 9 Inspectors of Fisheries from Tamil Nadu State Fisheries Staff Training Institute, Chennai, on 11 August 1998.
- 39 B.F.Sc. students from College of Fisheries, Mangalore, Karnataka, 25 August 1998.

STAFF NEWS

Nomination

Shri P. K. Manimandram, Administrative Officer, was nominated as the Insitute's Vigilance Officer.

Relief

Shri M. Shashi Sekhar, Scientist, was relieved on 3-year study leave for Ph.D. programme in Indian Institute of Technology, Mumbai, 10 July 1998.

Dr. K. V. Rajendran, Scientist, was relieved on 31 July 1998 to take up the appointment as Senior Scientist at CIFE, Mumbai.