CIBA NEWS

Volume 2, No. 4 OCTOBER - DECEMBER 1997

CENTRAL INSTITUTE OF BRACKISHWATER AQUACULTURE, CHENNAI

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FREEZE-DRIED MICRO-PARTICULATE DIET FOR EARLY AND POST-LARVAL STAGES OF TIGER SHRIMP *PENAEUS MONODON*

Micro-particulate feeds for postlarvae of *Penaeus monodon*.

Artificial diet plays an important role in the production of penaeid shrimp seed in the hatcheries. Artificial diets are being increasingly used to supplement the live feeds for feeding early and post-larval stages of shrimp. The digestive system of early and post-larval stages of shrimp requires tender and fresh diet for easier digestion and assimilation. For this reason, live food organisms such as phytoplankton and zooplankton are successfully used for rearing shrimp larvae. The increasing cost of live feeds, especially that of the brine shrimp (*Artemia*) and the uncertainty associated with the mass production of plankton cultures, have led to supplementation with particulate diets. Freeze-drying technique has helped in preserving the freshness and preventing the denaturisation of prepared diet to a larger extent. Freeze-dried diets are, therefore, more successful in rearing larvae than those diets processed otherwise.

Following the success in the preparation and testing of a micro-particulate feed for postlarvae of white shrimp, *Penaeus indicus*, by the Institute, another micro-particulate diet was developed using freeze-drying method and tested on early and post-larval stages of tiger shrimp, *P. monodon*. The diet consisted of indigenous raw materials, namely, fish (anchovy), molluscs (squid and clam), soyflour, wheat flour, egg (duck) and additives such as vitamins, minerals, lecithin, cholesterol, aminoacids, *Spirulina* and yeast. The proximate composition of feed consisted of crude

Advanced postlarvae of tiger shrimp *P. monodon*.

protein (46.13%), lipid (17.7%), carbohydrate (14.4%), crude fibre (0.42%) and ash (10.9%). Fresh meat of anchovy, squid, clam and duck egg were individually freeze-dried at -43°C, powdered separately in a cyclotech mill and sieved through a 45 micron sieve. All other ingredients were similarly powdered and seived.

The diet was tested either alone or in a combination of 1:1 ratio with laboratory cultured unicellular diatoms *(Chaetoceros* sp. and *Skeletonema* sp.) using 25,000 first protozoeal stages of *P. monodon* stocked in a 500 litre tank. The control larvae were fed only with diatom culture @ 40,000 cells per ml. In the case of experimental particulate diet, the larvae were fed @ of 0.08 mg per larva, while the combination diet was given @ 0.04 mg per larva plus a concentration of 20,000 cells of diatoms/ml. The larvae fed with mixed diet attained the post-larva first stage (PL-1) in 8 days with 85% survival compared to 62.5% survival in the case of control diet. Those fed with micro-diet took 9 days to become PL-1 with a survival of 40%.

The same diet with a particulate size of 200 microns was tested for rearing first postlarva (PL-1) to PL-20 stage. Freshly hatched brine shrimp *(Artemia)* nauplii were used as the control diet. The rate of survival for post-larvae fed with micro-diet was 57% at Pl-20 stage, while it was 41.9% in the case of those fed with control diet. The average weight of PL-20 was 14.4 mg in case of miro-diet and 16.6 mg with control diet. The post-larvae in PL-20 stage in both cases were healthy and withstood 150 ppm formalin test without any mortality. Thus, the freeze-dried micro-particulate diet developed indigenously could be successfully used for rearing early and post-larval stages of tiger shrimp. It is hoped that using micro-particulate diets in commercial shrimp hatcheries would work out to be less expensive and greatly reduce the dependence on costly live-feeds.

This article was prepared by Dr.Syed Ahamad Ali, Senior Scientist.

RESEARCH HIGHLIGHTS

Susceptibility/tolerance potential of different aquatic crustaceans to white spot disease virus

Laboratory experiments were conducted on induction of white spot disease in different species of aquatic decapod crustaceans to study their susceptibility and tolerance potential for this virus infection. Results indicated that the mud crabs *Scylla serrata* and *S, tranquebarica* and spiny lobsters *Panulirus ornatus, P. polyphagus* and *P. homarus* were tolerant to the white spot disease virus.

Nursery and grow-out culture of seabass in farmers' ponds

The following feed back information collected from private fish farmers on nursery and grow-out rearing of hatchery-raised fry of seabass (*Lates calcarifer*) is given below:

- At a stocking density of 1000 nos./cubic metre in cement tanks, fry with an initial size of 9 mm attained a size of 30 mm in 35 days with a survival rate of 82%. During the first 10 days of rearing, *Artemia* nauplii and minced shrimp/fish meat were offered *ad libitum* and during 11-35th day, the daily ration of minced shrimp/fish meat was given @ 20% of stocked biomass
- The nursery-reared fry of 30 mm / 1.25 g, stocked in a 0.4 ha pond, reached a size of 200 g in 100 days. The stocking rate was 5000/ha and trash fish was offered as feed @ 10% of stocked biomass.
- In another trial, in a 0.1 ha pond, with same stocking density and feeding, fry with an initial size of 10 mm have grown to 85 g in 58 days.

VISITORS

The following visited the Muttukadu Experimental Station:

- Dr. A. Purna Chandra Rao, Manager (Rural Department), State Bank of India, Vijayawada, 9 December 1997.
- Dr. Horny Emara, Director, Dr. Fatima Aly Abdel Razek and Dr. Saliman Hamed, Scientists, National Institute of Oceanography and Fisheries, Alexandria, Egypt, 15 December 1997.

ENGAGEMENTS

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

- Colloquium on 'Key issues relating to the fisheries sector' at MPEDA, Kochi, 14-15 October 1997.
- Workshop on Environmental Impact Assessment of Aquaculture Enterprises, organised by Rajiv Gandhi Centre for Aquaculture, at Chennai, 10 December 1997 and presented a paper.
- The National Agricultural Technology Project (NATP) meeting at ICAR, New Delhi, 22 December 1997

Shri S. Srinivasagam, Senior Scientist, visited Puri Research Centre of CIBA, Puri and had discussions with the Secretary, Dept. of Fisheries and Animal Husbandry and the Director, Dept. of Fisheries, Govt. of Orissa, on collaborative research work in shrimp, seabass and mud crab, 26 August to 1 September 1997.

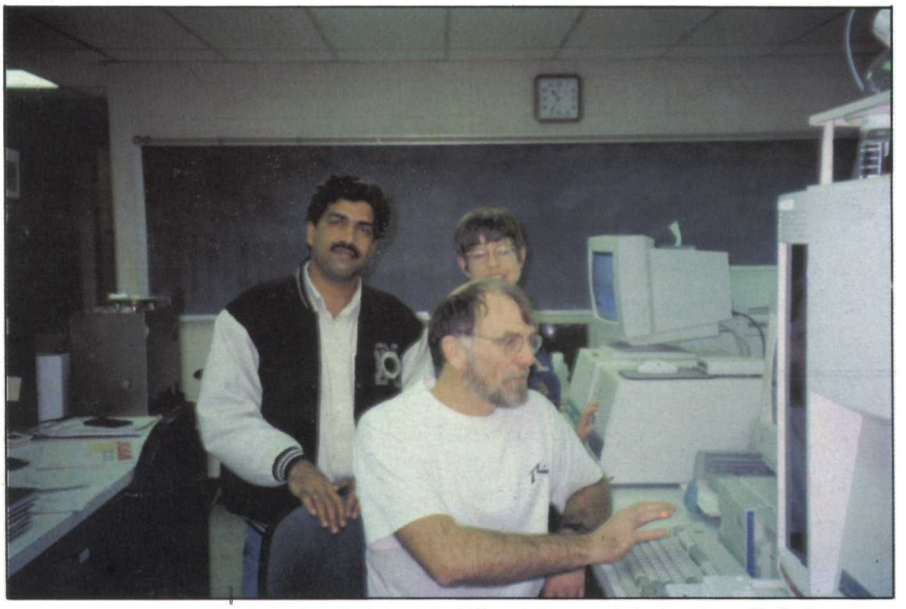
Dr. Mathew Abraham, Senior Scientist, attended the Orientation Workshop of NATP at NAARM, Hyderabad, 25-26 September 1997.

Dr. A. R. Thirunavukkarasu, Senior Scientist, delivered lectures on 'Brackishwater fish farming and fish breeding, at CAS in Marine Biology, Parangipettai, Annamalai University, 17 October 1997. He also attended the NATP Workshop at CAZRI, Jodhpur, 24-25 October 1997.

Dr. S. S. Mishra and Shri M. Shashi Shekhar, Scientists, presented papers in the National Workshop on Fish and Shellfish Health Management, at CIFA, Bhubaneswar, 18-19 November 1997.

Dr. K. O. Joseph, Senior Scientist, presented a paper in the Workshop on Environmental Impact Assessment of Aquaculture Enterprises at Chennai, 10 December 1997.

Dr. M. Muralidhar, Scientist, attended the Workshop on Identification and Assessment of Acid Sulphate Soils and their Impacts on Shrimp Production in India, at College of Fisheries, Mangalore, 10-12 December 1997.



Dr. K. K. Vijayan, Scientist (S. S.), at Gulf Coast Research Laboratory, U. S. A.

MEETINGS

The meeting on the Institute's Consultancy Proposal for transfer of technology in culture of mud crab and seabass to Rajiv Gandhi Centre for Aquaculture (RGCA), Mayiladuthurai, Tamil Nadu, was held at CIBA, Chennai, 24 October 1997. Shri K. B. Pillai, Chairman, Shri V. Venkatesan, Director, Dr. Santhanakrishnan, Joint Director, MPEDA and Shri R. Ganapathy, Project Director, RGCA, attended the meeting. Dr. G. R. M. Rao, Director, Dr. Mathew Abraham, S/Shri M. Kathirvel, S. Srinivasagam and Dr. S. Kulasekarapandian, Senior Scientists, participated in the discussions.

In collaboration with CIBA, the National Research Centre on Oilpalm, Kolleru, Andhra Pradesh, organised a Workshop for Planning and Preparation of Project Proposals under NATP, at TANUVAS, Chennai, on 27 October 1997. Dr. G. R. M. Rao, Director, CIBA, Dr. P. Rethinam, Director, NRC on Oilpalm, Dr. K. L. Kaul, Officer on Special Duty, NATP, ICAR, Principal Investigators and Co- principal Investigators of different ICAR Institutes and State Agricultural Universities participated.

A meeting of Principal Investigators and Co-principal Investigators of ICAR Institutes and State Agricultural Universities for the preparation of project proposals under NATP Programme, on fish/shrimp broodstock development and breeding under captive conditions and shrimp/fish health management, was held at CIBA, Chennai, 15 November 1997.

Dr. G. R. M. Rao, Director, Dr. Mathew Abraham, Dr. Syed Ahamad Ali and Dr. K. Gopinathan, Senior Scientists, participated in the discussions on the Institute's research programmes and activities with Mr. Imtiaz Ahamed, Senior Project Officer and Resident Representative from Dhaka, Bangladesh and Mr. Benson Ateng, Economist, South East Region of Bay of Bengal Programme, Chennai, 7 November 1997.

NATP Workshop: Left to right Dr. K. L. Kaul, Officer on Special duty, NATP, Dr. G.R.M. Rao, Director, CIBA and Dr. P. Rethinam, Director, NRC on Oil Palm.

HUMAN RESOURCE DEVELOPMENT

Dr. P. Kishore Chandra, Scientist, attended a training programme on Computerised Project Management, organised by NATP Monitoring Unit at IASRI, New Delhi, 20-25 October 1997.

Dr. K. K. Vijayan, Scientist (S.S), completed a one year advanced training programme, sponsored by Dept. of Biotechnology, Govt. of India, at Gulf Coast Research Laboratory, USA and joined the Institute on 29 December 1997.

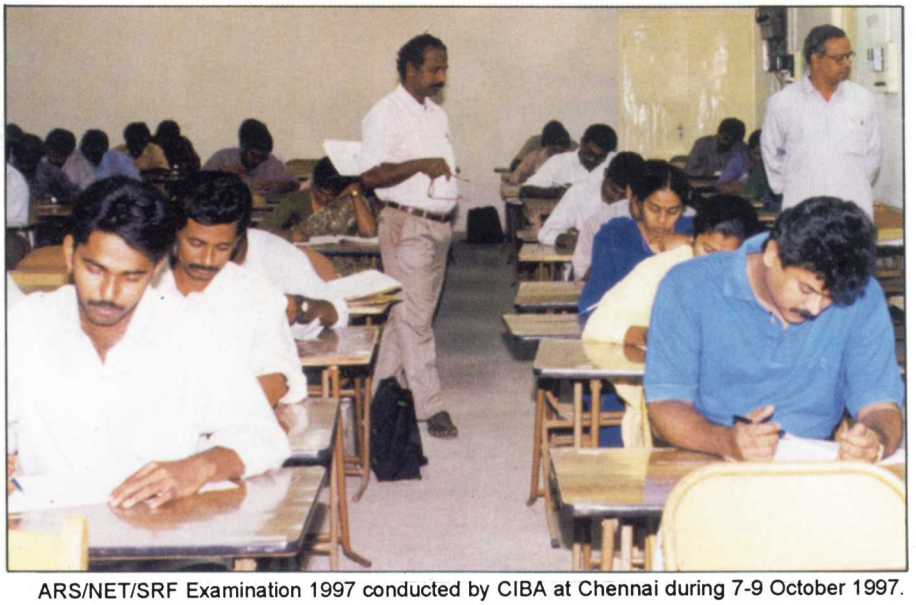
TRAINING

Lectures and demonstrations were arranged for the following at the Muttukadu Experimental Station:

- 21 Trainees from Fisheries Staff Training Institute, Dept. of Fisheries, Govt. of Tamil Nadu, on the breeding of seabass, 18 September 1997.
- 8 M.Sc. (Aquaculture) students from Govt. Arts College, Nandanam, Chennai, on shrimp hatchery operation, 18 October 1997.
- 14 trainees from the Fisheries Staff Training Institute, Dept. of Fisheries, Govt. of Tamil Nadu, on shrimp/fish/crab breeding, artificial feed preparation, environmental monitoring and shellfish/finfish health management, 15 December 1997.
- 6 students from Dept. of Applied Aquaculture, Barkatulah University, Bhopal, on Institute's research activities, 22 December 1997.
- 37 students from Konkan Krishi Vidyapath Fisheries College, Ratnagiri, on shellfish/finfish hatchery, feed preparation and health management, 26 December 1997.

ARS/NET/SRF EXAMINATION

The Institute conducted the ARS/NET/SRF Examination, 1997, at Chennai during 7-9 October 1997.



ARS/NET/SRF Examination 1997 conducted by CIBA at Chennai during 7-9 October 1997.

STAFF NEWS

Appointment

- Miss P. Nila Rekha, as Scientist (Soil & Water Conservation Engineering), at Chennai, 3 December 1997.
- Shri K. Ambasankar, as Scientist (Animal Nutrition), at Chennai, 4 December 1997.

Promotion

- Shri R. Elangovan, T-4 as T-5 from 13 December 1995.
- Shri S. Sivagnanam, T-II-3 as T-4 from 14 February 1995.
- Shri D. Rajababu, T-II-3 as T-4 from 13 March 1995.
- Shri N. Ramesh, T-1 as T-2 from 6 August 1995.
- Shri S. Saminathan, T-1 as T-2 from 18 January 1996.

Transfer

Shri P. M. Abdul Kadir, T-5, from Headquarters, Chennai to Narakkal Research Centre, relieved on 14 August 1997.

Retirement

Shri K. Rajasekaran Nair, Senior Clerk, retired on superannuation, on 31 October 1997.

Participation in Sports - ICAR Inter-Institutional Zone III Tournament 1997

3 scientific (S/Shri D. Narayanaswamy, V. Chellapandian and K. Ponnusamy), 10 technical (S/Shri R. Elangovan, A. Vasanthakumar Charles, S. Rajkumar, Joseph Sahayarajan, Marella Ravi, A. Nagavel, Ashok Kumar, K. Paranthaman, N. Ramesh and N. Jagan Mohan Raj), 5 administrative (S/Shri P. K. Manimandiram, R. Kandamani, S. Pari, A. Manoharan and P. Srikanth) and 12 supporting (S/Shri T. V. Shaji, M. D. Suresh, V. Kumar, E. Manoharan, C. Saravanan, R. Kumaresan, S. Selvababu, D. Senthil Kumar, C. Reghu, A. Paul Peter, R. Indirakumar and Kanaka Prasad), personnel took part in ICAR Inter-Institutional Sports Meet (III Zone), at Coimbatore, during 4-10 November 1997. Shri R. Kumaresan received two prizes from Shri B. K. Chauhan, Secretary, ICAR, for finishing third in 100 metre race and long jump events.

Shri R. Kumaresan, Supporting Staff - SS Gr. I, receiving the certificate from Shri B.K. Chauhan, Secretary, ICAR, for finishing in third position in 100 metre race and long jump events.