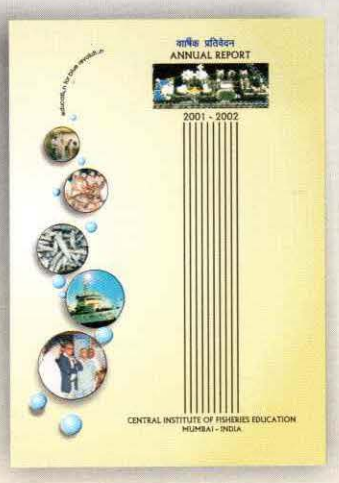
education for blue revolution

# वार्षिक प्रतिवेदन
# ANNUAL REPORT

## 2001 - 2002

CENTRAL INSTITUTE OF FISHERIES EDUCATION
(DEEMED UNIVERSITY - ICAR)
MUMBAI - INDIA

# Credits

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# Contents

# 1 Preface

Central Institute of Fisheries Education, the National Fisheries University of the country, is the Flagship of the Indian Council of Agricultural Research in the field of HRD in fisheries. The year saw completion of four decades of dedicated service by the Institute and new dimensions in its programmes and activities.

Along with initiation of new disciplines of fisheries science in ARS by the ICAR, Post-graduate programmes at the Institute saw new disciplines in Fish Genetics and Biotechnology, Nutrition and Biochemistry, Pathology and Microbiology at M.F.Sc. level and post-harvest technology in Ph.D. Ground work is complete for the M.F.Sc. course in Fisheries Business Management starting in 2002, that would be the only course of its kind in the country, in line with the National Agricultural Policy emphasizing agri-business and self-employment ventures. Comprehensive revision of courses and syllabi of the degree programmes to meet the changing needs of the sector was a major effort during the year. Diploma programmes in Inland and Marine Fisheries Management, HRD programmes in marine and coastal biodiversity management and molecular biology in fisheries supported by Department of Biotechnology, Govt. of India, intensive short-term training programmes in different aspects of fisheries and aquaculture, ICAR-sponsored Summer School and Indo-Israel Programme on Aquaculture were the other highlights of the year in this direction.

Research Projects were prioritized with reference to sectoral needs as well as programmes being carried out elsewhere in the country, also addressing them through different mechanisms of staff research, students' research and externally funded projects, in conjunction with contract research and consultancy services. In this context, collaborative efforts were emphasized through MoUs, project proposals and joint guidance of students' research programmes.

CIFE effectively played its role of a Policy Centre in Fisheries through organization of important interactions in terms of brainstorming sessions, workshops, consultations, seminars, symposia and round table relating to Fisheries Economics, Mahseer Breeding and Culture, Basic Sciences in Fisheries, Scientific manpower planning in ICAR Fisheries Institutes, Selection in Prawns, GIS and Remote Sensing, Post graduate Fisheries Programmes, Fish for Nutritional Security, Women in Fisheries, Agri-Business Ventures, Wastewater Treatment Systems, WTO and Fisheries, Fisheries regulations, Women in Agriculture, HRD in Fisheries and Aquaculture for Eastern and North-eastern India, Government-Industry Partnership in Fisheries and a number of farmer's meets across the country. Participation in international fora with regard to research priortisation for South and West Asia, Intensification of food production in LIFDCs through aquaculture, Aquaculture Education Consortium in Asia and serving as a Nodal centre for HRD in fisheries for Myanmar and Sri Lanka as also contributing to UNDP's Mission and ICLARM Board showed the growing stature of the Institute on the international scene.

Consolidation of efforts in research and education, streamlined mechanisms of monitoring and evaluation, information dissemination through structured publications and meets were emphasized through the year. The views of different stakeholders were incorporated into the programmes through regular meetings of all the bodies of the

Institute, including QRT evaluation and steps towards accreditation. Infrastructure development received due emphasis in terms of steps for development of new campus at Mumbai and renovation of different facilities like Library, Extension facility, Gymnasium, Guest house, hostel, repairs of seagoing vessels as also facilities at centres, particularly at Kolkata and Rohtak. Being at the doorstep of the Tenth Plan, detailed projections were made for the next five years in different aspects of education, research, training, extension, publication and infrastructure development. The Perspective Plan document of the Institute, Vision-2020 was also revised to address the emerging needs of the sector.

The efforts brought recognitions to CIFE in different forms. Three endowments of Dr. Hiralal Chaudhuri, Tata Trusts and Late Dr. D.R. Jahilal provided for acknowledging the academic and research achievements not only of staff and students of the Institute, but also instituting awards at the national level. Tata and NACA facilitated overseas training of outstanding students of the University in Thailand for the first time in the history of Indian Fisheries Education and the Institute awards for staff members in different categories were instituted during the year.

I take this opportunity to place on record our gratitude to Dr. Panjab Singh, Secretary, DARE, Govt. of India and Director General, ICAR; Dr. K. Gopakumar, Deputy Director General (Fisheries), ICAR; Dr. J.C. Katyal, Deputy Director General (Education), ICAR; Dr. B.N. Singh, Assistant Director General (Inland Fisheries), ICAR; and Dr. A.D. Diwan, Assistant Director General (Marine Fisheries), ICAR; for their guidance and support. The interest and cooperation of several agencies like Department of Biotechnology, Department of Atomic Energy, Department of Ocean Development, Department of Science and Technology, Department of Environment and Forest, Council of Scientific and Industrial Research, Bhabha Atomic Research Centre, National Institute of Oceanography, Indian National Centre for Ocean Information Sciences, National Bank for Agriculture and Rural Development, ICAR Fisheries Research Institutes, Fisheries Colleges, State Agricultural Universities and a host of other organizations including INRA, NORAD, ACIAR, ICLARM, DFID, NACA, AKVAFORSK, SARDI and well wishers of this Deemed University in its endeavours are gratefully acknowledged. I would like to thank Dr. S.C. Mukherjee, Joint Director for his contributions in managing different aspects of the Institute. I compliment all Scientific, Technical, Administrative and Supporting Staff members as well as Students and Research Scholars of CIFE for their contributions to the Institute and the fisheries sector. Thanks are due to the Documentation Cell and other associates for their efforts in bringing out this Annual Report.

The Annual Report of CIFE, 2001-2002, is being presented as a record of the programmes and activities of the year, as also a document for greater interactions with all stakeholders in the country and abroad in the years to come.

Mumbai
30 June, 2002

*(S. AYYAPPAN)*
Director

# 2 Executive summary

The academic programmes at Masters' and Doctoral levels, offered by the Institute at its Head quarters and Centres, as also the Central Marine Fisheries Research Institute, Kochi; the Central Institute of Fisheries Technology, Kochi; and the Central Institute of Freshwater Aquaculture, Bhubaneshwar progressed satisfactorily as per schedule. A total of 66 students were awarded their Masters' Degrees. A total of 14 Ph.D. degrees were awarded while 28 trainees successfully completed the one-year PG Certificate Programme in Inland Fisheries Development and Administration.

Three new Masters' Programmes, one each in Fish Pathology and Microbiology, Fish Nutrition and Biochemistry, Fish Genetics and Biotechnology and one new Ph.D. Programme on Post Harvest Technology were commenced during the year. 60 students enrolled under these eight Masters' programmes, while 26 students enrolled for the four Ph.D. programmes. 30 trainees were admitted to the PG Certificate Programme in Inland Fisheries Development and Administration at Kolkata Centre. Two M.F.Sc. students and one Ph.D. student were deputed abroad for about 3 weeks each for training in specialized areas of their research work. Nine Guest lectures were arranged for the benefit of the students while the CIFE faculty delivered elevan guest lectures at other Institutes.

Three training programmes were conducted under a DBT/NBDB Sponsored Programme on HRD in Coastal Bioresource Development and Management besides one Summer School sponsored by the ICAR on EIA and Management of Coastal Zones, and an Indo-Israel International Training Programme on Advances in Aquaculture.

Nine Institutional Projects (with 32 constituent sub-projects) and 17 Externally Funded Projects were in operation. Notable research achievements during the year were preliminary proof of the viability of nylon cages for the culture of *Tor khudree* in open waters; continued inputs to the database of the marine fisheries of Maharastra; karyotyping of *Lates calcarifer* and *Chanos chanos;* addition of prawn flavour to low-cost fish; preparation of anti *Edwardsiella tarda* and anti *Aeromonas hydrophila* rabbit IgG HRPO conjugates; shortlisting *Azatobactar chroococcum* and *A. beijernckii* for use in aquaculture as nitrogenous bacterial fertilizer and the identification of the sleeper peptide in *Conus* venom. 28 dissertations were submitted by the M.F.Sc. students. A total of 46 research papers were published in National and International Journals while 116 research/theme/status papers were presented to seminars/symposia, etc. The staff contributed chapters in nine different books and 15 popular articles. 21 training manuals were also published and two technical reports were submitted. A total of 16 Seminar/ Symposia/Brainstorming Sessions were conducted on various aspects of research in fisheries sciences. The Institute conducted 36 Short-term Training Programmes of varying durations and a total of 647 were trained; one training programme was exclusively for 20 fisherwomen and another one for 22 children. 1371 students from all over India visited the Institute as part of the study tour during the period. Fishery Advisory Service of the Institute catered to the needs of 165 clients and year-round guidance to a team of 15 women from Tapuriaghata village of North 24 Pargana District in West Bengal. Seven exhibitions; 3 farmers meets, 3 radio talks in Telugu, technical guidance to 6 Scampi farms and one

# 2 Executive summary

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carp hatchery by the Kakinada Centre and the formation of a Fisherwomen Cooperative Society named `Matsyagandha' added to the Extension achievements of the Institute. Twelve extension booklets were published besides a brochure and a table spread on CIFE.

Infrastructure development included a new facility for the Extension Division; renovation of the institute's Gymnasium and establishment of the Central Instrumentation facility. The Library was also provided additional floor space and totally renovated and upgraded. Construction work on the first phase of Academic-Cum-Administrative building at the new campus was initiated. MFV Narmada was regularly cruising the Mumbai waters for student training and for research work of the Institute and sister institutes at Mumbai. Major repairs of MFV Saraswati have been completed for sailing in due course.

CIFE won the Chal Rajbhasha Shield for the consecutive year besides the Rajbhasha Shri award. The award of Dr. S.Z. Quasim Gold Medal to Dr. K. Pani Prasad, the award of a PDF to Dr. K.V. Rajendran by the Korea Science and Engineering Foundation, the award of best poster presentation at the European Association of Fish Pathologists to Dr. K.V. Rajendran, felicitation to Dr. S.D. Singh by SSD College, Vashi, the best scientific award to Dr. C.S. Chaturvedi by the UP Science and Technology Council all added feathers to the cap of CIFE. The Institute also bagged a number of prizes at the ICAR Inter-Institutional Sports Tournament and the Final ICAR Zonal Tournament.

# 3 Introduction

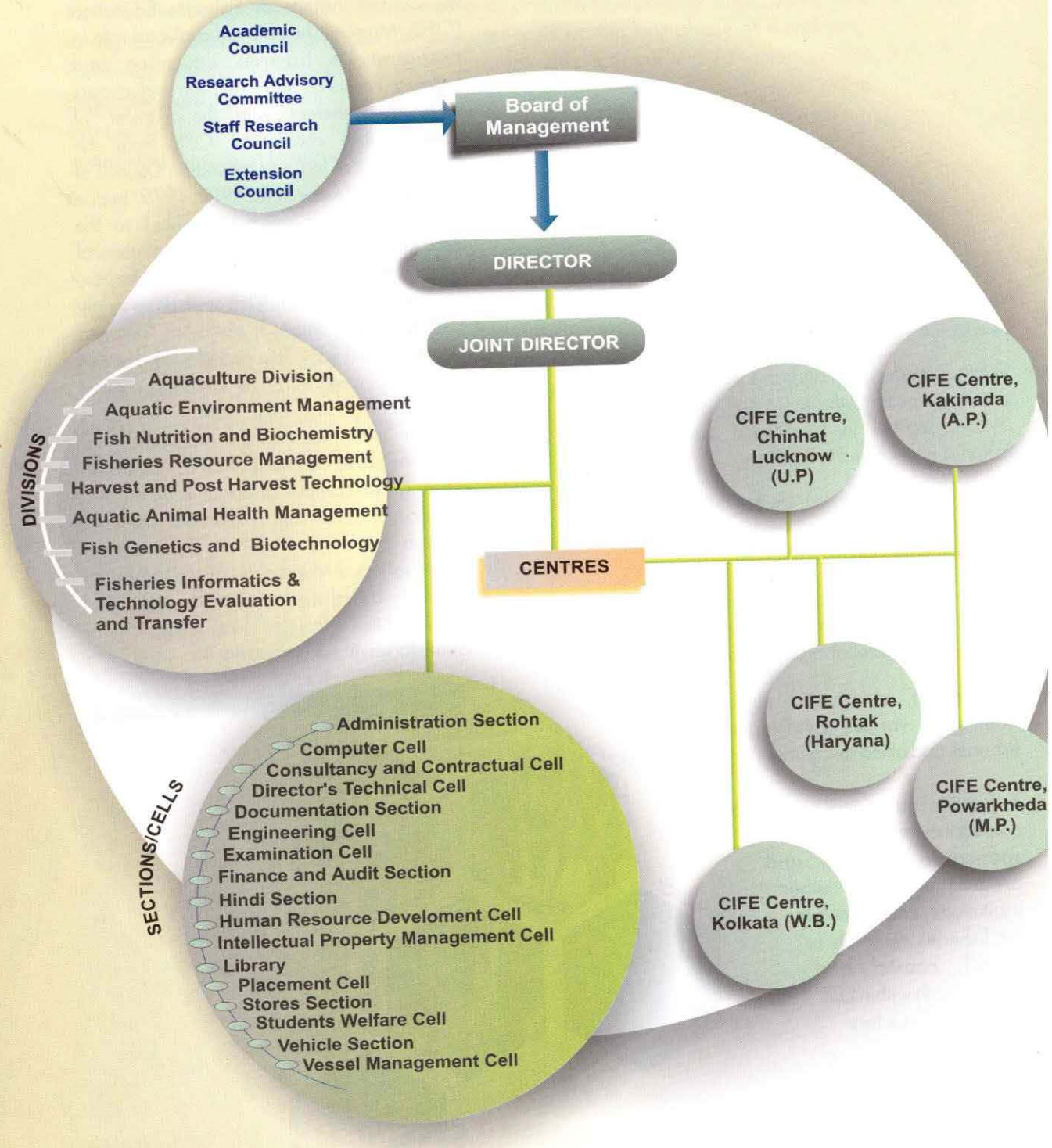
Ever since its establishment in 1961, the Central Institute of Fisheries Education (CIFE), Mumbai, has played a pivotal role in post-graduate fisheries education and training. Research and extension endeavours were strengthened with the transfer of administrative control of CIFE from the Government of India to the Indian Council of Agricultural Research (ICAR) in 1979. In due recognition of its yeomen services to the development of Indian fisheries in general and human resource development for the purpose in particular, CIFE was deservingly conferred the coveted status of Deemed University in 1989. This decade-old deemed university has registered remarkable progress since then. Today, CIFE stands tall as a premier *alma mater* in the global fisheries map. The present campus of CIFE is located in a lush green campus of about 2.22 ha at a distance of about half a kilometer from the Versova beach at Mumbai. The Institute's headquarters at Mumbai is housed in a three-storied building with all essential infrastructural facilities like class rooms, laboratories, library, aquaria, etc.

## Mandate

- To conduct education and research programmes leading to post-graduate (M.F.Sc.) and doctoral (Ph.D.) degrees in specialised disciplines of fisheries science and technology
- To conduct capsule courses for catering to the refresher training needs of fisheries developmental and extension personnel
- To conduct basic research in frontier areas of fisheries science and technology through institutional and collaborative efforts
- To conduct need-based capsule/vocational training on various technologies related to fisheries and allied disciplines
- To provide institutional support for consultancy and participation in sponsored projects and programmes with other institutions and agencies for fisheries research in inland, coastal and marine (both within EEZ and beyond ) sectors

### 3.2 Organisation and Management

At the helm of affairs of overall Institutional Management, CIFE has a Board of Management which is the highest decision making body at Institute level on all matters. The decisions and recommendations pertaining to academic, research and extension activities of the Institute are made by the Academic Council, Research Advisory Committee & Staff Research Council and the Extension Council respectively.



### 3.3 Staff position on 31 March, 2002

| Categories | Sanctioned | Filled |
|---|---|---|
| Research Management Position | | |
| Director | 01 | 01 |
| Joint Director | 01 | 01 |
| Scientific | | |
| Principal Scientists | 10 | 06 |
| Senior Scientists | 20 | 10 |
| Scientists | 60 | 37 |
| Technical | 133 | 123 |
| Administrative | 71 | 65 |
| Non-ministerial | 2 | 2 |
| Supporting | 112 | 101 |
| Total | 410 | 346 |

### 3.4 Budget (2001-2002)

(Figures in Lakhs of Rupees)

| Heads | Sanctioned | Expenditure |
|---|---|---|
| Non- Plan | 1370.70 | 1159.33 |
| Plan | 715.50+90.00* | 805.40 |
| National Agriculture Technology Project | 24.93 | 8.30 |
| Summer Institute | 1.75 | 1.70 |
| CAS | 6.94 | 3.73 |
| Strengthening Deemed University | 9.00+8.05** | 15.87 |
| AHRD | 2.28 | 1.27 |
| A.P. Cess Schemes | 18.81 | 11.16 |
| Junior & Senior Research Fellowships | 19.51 | 18.73 |

* Rs.90.00 lakhs received from CIFT, Kochi under the head Plan (Works)
** Rs.8.05 is the revalidated amount

**Institutional projects**

## Standardization of practices for sustainable aquaculture

### Subproject: Trial on cage culture of commercially important fishes in open waters

Kohli, M.P.S. (PI), Ayyappan, S., Dube Kiran, Saharan Neelam, Patel, M.B., Reddy, A.K., Langer, R.K. and Chandra Prakash

*The cage culture at Lonavala*

Sixteen cages made of nylon of different mesh sizes (4 mm to 15 mm), each measuring 3 x 3 x 3m were installed in Walwan reservoir, Lonavala. *Tor khudree* showed a mean growth of 138. 83 g in three cages from initial stocking size of 35. 2 g in 150 days. The gross weight in the cage was 6.8 kg/sq.m, with a survival of 98.0%. In *Tor putitora*, the growth was 68.0 g in one cage from initial stocking of 14.6g in 139 days. The gross weight was 3.32 kg/sq.m. with a survival of 97.78%.

### Sub project: Impact of certain organophosphorus pesticides and their metabolites on body tissue of a common teleost

Saharan Neelam (PI), Raizada, S. and Srivastava, P. P.

*Collection of samples*

Water samples collected from experimental sites namely Bhivpuri, Baijnath, Bhuirwadi and Malegaon were subjected to pesticide analysis by High Pressure Liquid Chromatography. Cypermethrin, Endosulphan and Chloropyriphos were present from nil to trace concentrations. Endosulphan ranged from Nil in Bhivpuri samples to 0.23 ppm,0.28 ppm and 0.21 ppm respectively in Bhuirvadi samples. This concentration is quite toxic to fish grown in these waters. The effect of these pesticides on the fish collected from those sites was studied. Only endosulphan sulphate is toxic to fish while endosulphan diol is not toxic.

| | Thiodon 35% EC | | | Cypermethrin 25% EC | | |
|---|---|---|---|---|---|---|
| Time (hrs.) | $LC_0$ | $LC_{50}$ | $LC_{100}$ | $LC_0$ | $LC_{50}$ | $LC_{100}$ |
| 24 | 0.21 | 0.25 (0.32 0.20) | 0.36 | 0.32 (0.40 0.27) | 0.39 | 0.39 |
| 48 | 0.14 | 0.16 (0.21 - 0.13) | 0.19 | 0.19 (0.23 0.13) | 0.22 | 0.22 |
| 72 | 0.10 | 0.12 (0.18 0.11) | 0.15 | 0.13 (0.15 0.10) | 0.17 | 0.17 |
| 96 | 0.06 | 0.08 (0.10 0.05) | 0.10 | 0.09 (0.12 0.07) | 0.11 | 0.11 |

LCo, $LC_{50}$ and $LC_{100}$ values(%) *Labeo rohita* (2-4 g); 95% confidence limit are given in parentheses.

### Sub-project: Comparative evaluation of extent of impact of Industry/agriculture/aquaculture on coastal aquatic ecosystem in selected study areas north and south of Mumbai coast.

Kohli, M.P.S. (PI), Saharan Neelam, Patel, M.B. Chandra Prakash and Jaiswar Ashok

Water in the Moorva creek, north off Mumbai is totally unfit for brackishwater aquaculture practices. The creek is polluted through out its 25 km stretch. The causative factors of higher pollution load in the Moorva creek are the relatively higher quantum of discharge of industrial waste water and lesser rate of water influx into it. The water of the Savitri river, south off Mumbai can be used for aquaculture practices after providing some preliminary treatment to it. The Savitri river stretch is polluted upto a distance of 5 km.

| S.No. | Parameter | Sampling Site | |
|---|---|---|---|
| | | Moorva Creek | Savithri River |
| 1. | Temp.(°C) | | |
| | (i) Air | 31.4-34.6 | 26.8 - 32.5 |
| | (ii) Water | 25.5 -35.5 | 25.0 - 33.0 |
| 2. | pH | 4.0 - 8.5 | 7.0 - 8.5 |
| 3. | Salinity (ppt) | 12-37 | 0 - 43 |
| 4. | Alkalinity (mg/l) | 6-144 | 30 - 164 |
| 5. | Dissolved oxygen (mg/l) | 0 - 6.8 | 0 - 5.4 |
| 6. | Dissolved free $CO_2$ (mg/l) | 0 - 60 | 0 - 16 |
| 7. | Ammonia-nitrogen ($NH_4^+$-N : mg/l) | 0.15 - 1.55 | 0.10 - 3.18 |
| 8. | Nitrite- nitrogen ($NO_2$-N: mg/l) | 0.03 - 1.53 | 0.05 - 1.98 |
| 9. | Nitrate- nitrogen ($NO_3$-N: mg/l) | 0.37 - 1.76 | 0.10 - 4.50 |
| 10. | Phosphate ($PO_4$-P: mg/l) | 0.05 - 1.65 | 0.02 - 0.53 |
| 11. | Total Organic matter (mg/l) | 27 - 400 | 2.0 - 520 |
| 12. | Iron (Fe: mg/l) | 0.24 - 1.87 | 0.03 - 0.37 |
| 13. | Manganese (Mn: mg/l) | 0.17 - 1.90 | 0.03 - 0.30 |
| 14. | Copper (Cu: mg/l) | 0.10 - 1.81 | 0 - 0.05 |
| 15. | Zinc (Zn: mg/l) | 1.90 - 3.50 | 0 - 0.68 |
| 16. | Lead (Pb: µg/l) | ND | ND |
| 17. | Cadmimum (Cd: µg/l) | ND | ND |
| 18. | Chromium (Cr: µg/l) | 0 - 135 | ND |
| 19. | Nickel (Ni: µg/l) | 0 - 176 | ND |
| 20. | Cyanide (CN: µg/l) | ND | ND |

Range of water quality parameters of Moorva Creek and Savithri River
ND:-Not detected

## Sub-project: Genetic variation in *Ulva* species from natural resources and biotechnically reared sources

Deshmukhe Geetanjali(PI), Singh, S.D., Dwivedi Alkesh and Srivastava, P.P.

*Natural marine algae*

*Ulva* - a green edible marine algal was re-examined for the taxonomical status of the species and analysed to understand its food value. The protein content varied from 13-14% for pre-monsoon season. The post-monsoon samples are being analysed. Two species were found doubtful and re-identified as *U. lobata* and *U. propenguinensis.*

## Management of marine fishery resources of Maharashtra Coast

### Sub-Project: Development of database for marine fisheries of Maharashtra

Biradar, R.S.(PI), Rao, G.K., Pikle Madhavi, Gajbhiye, S.B. and Pagare Rajani

Data on marine fish landings of Maharashtra State during the period 1995-96 to 1999-2000 were collected and seggregated according to quarters, districts and species. The database now consists of 36 tables giving details of species-wise and quarter-wise landings at district level for the five-year period 1995-96 to 1999-2000. Total marine fish landings of Maharashtra state have varied from 3,86,690 t in 1995-96 to 3,97,901 t in 1999-2000 with peak landings of 4,80,954 t during 1996-97. The third quarter (October-December) showed consistently higher landings as compared to other quarters in a year. Non-penaeid and penaeid prawns, Bombay duck, mackerel, pomfrets, ribbon fishes and cuttle fish contributed significantly to the marine landings of the state. Data on length of coastline, population density, literacy rate, livestock, commercial banks, hospitals, primary, secondary and higher secondary schools and colleges for each of the five maritime districts were also collected.

### Sub Project: Studies on the demersal fishery resources of Maharashtra coast

Chakarborty, S.K. (PI), Biradar, R.S., Jaiswar, A.K. and Palaniswamy R.

Studies on the demersal fishery resources of Maharashtra coast were made including length frequency data on eight species of demersal fishes, *Johnius macrorhynus, Johnieops vogleri, Otolithes cuvieri, Johnieops sina, Nemipterus japonicus, N. mesoprion, Priacanthus hamrur and Epinephelus diacanthus*. Based on the data collected from New Ferry Wharf

Annual size range, number of specimens measured.
January to December, 2001.

| S.No. | Species | Length Range ( mm ) | No.of specimens |
|---|---|---|---|
| 1. | *Johnius macrorhynus* | 110 - 319 | 2175 |
| 2. | *Johnieops vogleri* | 100 - 319 | 2514 |
| 3. | *Otolithes cuvieri* | 90 - 369 | 2886 |
| 4. | *Johnieops sina* | 70 - 219 | 2195 |
| 5. | *Nemipterus mesoprion* | 50 - 229 | 3458 |
| 6. | *Nemipterus japonicus* | 80 - 279 | 2678 |
| 7. | *Priacanthus hamrur* | 120 - 329 | 1983 |
| 8. | *Epinephelus diacanthus* | 90 - 480 | 2959 |
| | Total specimens measured | | 20,848 |

Mortality yield and population parameters

| Species name | Z | M | F | E | U | Y | Y/U | Y/F | MSY |
|---|---|---|---|---|---|---|---|---|---|
| *Johnius macrorhynus* | 4.75 | 1.44 | 3.31 | 0.69 | 0.68 | 344 | 506 | 104 | 247 |
| *Johnieops vogleri* | 4.72 | 1.47 | 3.25 | 0.68 | 0.67 | 519 | 775 | 160 | 377 |
| *Otolithes cuvieri* | 2.15 | 1.17 | 0.98 | 0.45 | 0.39 | 503 | 1290 | 513 | 552 |
| *Johnieops sina* | 7.17 | 1.85 | 5.34 | 0.74 | 0.73 | 157 | 215 | 290 | 105 |
| *Nemipterus mesoprion* | 10.15 | 1.70 | 8.45 | 0.83 | 0.83 | 913 | 1100 | 108 | 548 |
| *Nemipterus japonicus* | 6.67 | 1.54 | 5.13 | 0.77 | 0.76 | 414 | 545 | 81 | 269 |
| *Priacanthus hamrur* | 3.35 | 1.31 | 2.04 | 0.61 | 0.58 | 200 | 345 | 98 | 164 |
| *Epinephelus diacanthus* | 3.20 | 1.13 | 2.07 | 0.64 | 0.61 | 335 | 549 | 162 | 259 |

Z - Total mortality, M - Natural mortality, F - Fishing mortality, E - Exploitation ratio,
U - Exploitation rate, Y - Yield, MSY- Maximum Sustainable Yield

landing centre the mortality, population and stock parameters of all the eight species were worked out and the results are presented below. The rate of total mortality coefficient was very high for *J. sina, N. japonicus and N. mesoprion.* The catches of these three species have also registered a decline. Length cohort and Thomson and Bell's predictive Model was carried out for all the eight species.*J. macrorhynus, J. vogleri, J. sina and P. hamrur* indicated no decline in the catch at present level of F. *N. japonicus, N. mesoprion* and *E. diacanthus* shows decline at present F of 1.0.

### Sub Project: Fish consumption profile of Mumbai households

Shyam S. Salim (PI), Ojha, S.N., Ragabhagat, A.D. and Rao, G. K.

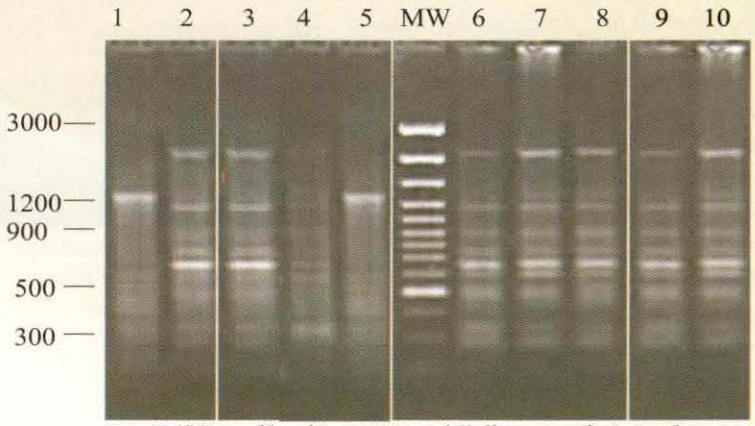
Two hundred households were surveyed during the period. Pomfrets were the most preferred fish (90%) followed by prawn/shrimp (80%). Mackerels were the least preferred species (12.5%) followed by Bombay duck (15%). The preferences among the different forms of fish for consumption of the selected respondents indicated that fresh form was most preferred (100%) followed by dried form (37.5 %). Frozen form was the least preferred form (10%) followed by processed product. Majority of the respondents consuming fish, purchase them from the local market (42.5%). While purchase from the cold storage was the least preferred (17.5%). The different problems faced by the respondents were high cost (69.5%) followed by the non-availability of fish (16%) and irregular supply in the market (14.5%).

## Studies on genetics and breeding of selected finfish and shellfish species

### Sub Project: Studies on population genetics of marine shrimp *Penaeus monodon*

Lakra,W.S. (PI), Gopal Krishna, Chaudhari, A., Jahageerdar Shrinivas and Bandkar Sanjeev

Population characterization of three different populations of the giant tiger shrimp *P. monodon*, from West and East coasts has been done using morphometric, isozymic and RAPD analysis.




*RAPD profile of Ratnagiri and Kolkata populations of P. monodon using primer 4. Lanes 1-5: Ratnagiri individuals, lanes 6-10: Kolkata individulas and MW: DNA size standard. Values given in the figure depict the sizes standards in bp.*

Morphometric observations were made on a total of 485 specimens of all age groups. Weight of edible and non-edible portions was also recorded. The analysis of data by applying basic statistics and multiple regression is being carried out. Twelve isozymes, ADH, LDH, MDH, ME, G6PDH, GDH, AAT, SOD & HK were analyzed. RAPD profiles were developed using 6 primers. 35 individuals from each population were analyzed for isozyme and RAPD polymorphism.

APD analysis showed a high level of polymorphism ranging from 35.48% to the 70.58% in the entire *P. monodon* population. The average percent polymorphism using the six primers was 45.34% for East coast and 39.15% for West coast populations suggesting that the former is more polymorphic and heterogeneous compared to the latter. In East coast population the highest percent polymorphism of 70.58% was found using primer 1, and the least 38.88%, was calculated by primer 3. In West coast population, the highest polymorphism of 44% was found using primer 3 and the least 35.48%, using primer 5. The Nei and Li similarity coefficient between East and West coast were 0.7727 and 0.705 using primer 4 and primer 3 respectively and genetic distance was 0.027 and 0.1608, respectively. The RAPD technique has been useful in uncovering within population and inter-population genetic diversity. The presence of higher genetic variation within the East coast population supports its preference as a better performing stock.

### Sub Project: Value added products from low cost fish

Basu, S. (PI) and Pal, A. K.

Prawn flavour was extracted by different methods. To characterise the flavour, the aroma components were extracted by simultaneous distillation extraction process of the acidic and alkaline extract of prawn heads. The extracts were analysed by GCMS using capillary Column DB-1. The analysis showed the following groups of compounds responsible for aroma. They are hydrocarbons, aldehydes, alcohols, ketones and fatty acids ($C_{16}$, $C_{18}$). The concentrations of individual components were found out. The effect of irradiation on these aroma compounds was also studied.

An extruded fish product was developed by using twin-screw extruder. Effect of different parameters like moisture, temperature, disc diameter, rpm and protein concentrations on expansion ration were studied. The product after frying in oil gave a very acceptable crisp product.

## Biodiversity and fish health conditions of the northwest coast of India

### Sub Project: Mapping of the biodiversity along Mumbai coast with special reference to pollution

Purushothaman, C.S. (PI), Langer, R.K., Padmanabhan, A.K., Tandel, R.D. and Koli, J. M.

Two sets of sampling stations were selected off Mahim and Manori creeks and the first phase of sampling was carried out. Six stations were selected at each transect, roughly separated by 1 km starting from the shore. The depth assessment showed an average increase of 1 m for every kilometer at both the stations. At each station, surface and bottom water samples, sediment samples and plankton samples were collected.

*A fish catch on board MFV Narmad*

The salient observations made during the three sets of sampling are :

1. Dissolved oxygen levels fluctuated between 1.1 and 6.7 mg $l^{-1}$
2. Chemical oxygen demand was up to 144 mg $O_2$ $l^{-1}$
3. Copper, iron, zinc and manganese were up to 88, 6272, 112 & 845 µg g-1 (dry wt), respectively
4. Heterotrophic bacterial populations were up to 12 x 103 cfu ml-1, 2.13 x 106 cfu $ml^{-1}$ & 1.85 x 106 cfu $g^{-1}$ (dry wt) in surface water, bottom water and sediment, respectively
5. Plankton was dominated by zoea larvae in the first 2 km and copepods in the rest
6. Other plankters were mysids, *Sagitta*, fish eggs and larvae, nauplius larvae, *Lucifer*, mysis larvae, ctenophores, *Oikopleura*, siphonophores and alima larvae
7. Benthos was conspicuous by its total absence

### Sub Project: Bioecology of Intertidal indicator species of polychaetes in changing environment around Mumbai & their heavy metal bioaccumulation

Varshney P.K. (PI), Jaiswar, A.K. and Chandra Prakash

Samples were collected and analysed for water quality and interstitial benthic organisms from four locations, namely, Seven Bungalows, Versova, Madh Island and Gorai creek from July to December 2001. Environmental studies indicated that Gorai was the most polluted area with low values of pH, salinity and dissolved oxygen and high values of nutrients. Conditions were comparatively better at Madh Island and Seven Bungalows while Versova showed an intermediate situation.

*A view of intertidal zone of polluted Versova beach*

Sediment texture was clayey and high in organic matter at Gorai Creek and sandy at all the other locations with comparatively less or moderate values of organic matter. Values of heavy metals like iron and manganese were almost similar with little variations. Interstitial and benthic organisms were more at Gorai Creek with less diversity. The density and biomass were poor at Madh Island with more diversity.

### Sub Project: Mapping of biotoxins in marine *Cinidarians* and *conids* and evaluation of their beneficial properties

Venkateshvaran, K. (PI), Venkateshwarlu, G., Landge, A.T. and Poojary Nalini

Three species of *Conus* and two species of jelly fish were shortlisted. Extraction of nematocyst venom by freeze-thaw method had been standardized. Toxicity levels of the venoms have been assayed and hemolytic activity studied. Nematocyst type categorization has been completed. Partial purification of venoms completed and their bioactivity had been attempted.

### Sub Project: Parasitological and Histopathological Investigations of a few selected marine food fishes

Rajendran, K.V. (PI) and Patel, M.B.

One hundred and seventy-five fishes belonging to 5 genera were collected and examined. Parasites recovered included: Microsporean- *Glugea* Sp., Unidentified cestode, Monogenean- *Diplectanum latesi,* Unidentified digenean, metacercaria. Histopathological analysis of microsporean and cestode infections have been carried out.

*Light microscopic view of the cestodes released from the gut of ribbon fish*

During the period under report, 14 cruises were undertaken to collect live marine fishes. Fishes were brought to the laboratory on ice or in live condition and immediately examined for the parasitic infection. Few sampled fishes were dissected out onboard and fixed in 10% neutral buffered formalin (NBF), for histopathological analysis. Infected tissue samples were also preserved at 80°C in deep freezer for further analysis. A total of 175 fishes were collected and examined during the period. The species, number and morphometric details of the fishes examined are given in the Table

| No | Host Species | No. of Fishes Collected | Length (cm) | Weight (g) |
|---|---|---|---|---|
| 1 | *Johnius dussumieri* | 73 | 10.0-25.3 (17.8) | 25.0-20.0 (69.3) |
| 2. | *Otolithus ruber* | 21 | 12.0-36.0 (20.1) | 25.0-50.0 (135.0) |
| 3. | *Trichiurus lepturus* | 44 | 30.0-52.5 (41.4) | 19.0-130.0 (50.1) |
| 4. | *Coilia dussumieri* | 29 | 12.0-18.2 (16.0) | 10.0-25.0 (19.0) |
| 5. | *Lates calcarifer* | 8 | 21.0-30.0 (26.8) | 280.0-350.0 (326.7) |

During the study, a total of five parasites could be recovered from different fish host

| No | Host Species | Parasites recovered | Site of Infection | Prevalence(%) |
|---|---|---|---|---|
| 1 | *Johnius dussumieri* | Unidentified metacercaria | Kidney, Gills & Gonads | 16.5 |
| 2. | *Otolithus ruber* | Nil | - | - |
| 3. | *Trichiurus lepturus* | Microsporean (*Glugea* sp.) | Kidney | 40.0 |
| | | Unidentified Cestode | Intestine | 90.9 |
| | | Myxosporean (*Myxobolus* sp.) | Gill | 11.36 |
| 4. | *Coilia dussumieri* | Nil | - | - |
| 5. | *Lates calcarifer* | Monogenean (*Diplectanum latesi*) | Gill | 37.5 |

Sub Project: Characterisation and comparative evaluation of macromolecules associated with virulence in pathogenic bacteria *Edwardsiella tarda* and *Aeromonas hydrophila*
Pani Prasad, K. (PI), Chaudhari, A. and Mukherjee, S.C.

The strains of bacteria of *A. Hydrophila* and *E. tarda* (CIFE strains) were exalted to increase the pathogenicity. The bacteria were grown in BHI agar, washed three times in PBS, adjusted the CFU to 1 x $10^6$cfu/ml and injected intra peritoneally (0.5 ml) to *Clarias batrachus* (Clinically healthy weighting about 150 g each). After 4-5 days the bacteria were re-isolated from liver and kidney of the infected fishes. Which were further characterized by different biochemical tests for identification. The cell extracts of *A. hydrophila were* prepared and outer membrane protein was isolated. The antibodies to *A. hydrophila* and *E. tarda* were raised in clinically healthy rabbits by injecting i/v these organisms on 0, 7, 14 and 21 days. Blood was collected 3 days after the last injection, serum separated and titrated for presence of antibodies. The titer was found to be 1: 256 for *A. hydrophila* and 1: 512 for *E. tarda*. The immunoglobulins were separated using ammonium sulphate precipitation and IgG separated using DEAE cellulose. Anti *E. tarda* and anti *A. hydrophila* rabbit IgG HRPO conjugates were prepared.The different components and the protective antigens have been separated and identified which will pave way for vaccine development

Studies on the efficacy of herbal medicines and medicinal plant extracts against microbial diseases of finfish and shellfish
Raman, R.P. (PI), Venkateshwarlu, G., Deshmukhe Geetanjali, Patel Mahesh and Koli. J.M.

1,000 no. of *Catla* fry was procured for experimental purpose. Following plants viz. *Tinospora cordifolia, Hallorhina antidysentrica, Moringa oleifera, Adhatoda vasica, Plumbigo zeylinica, Allium sativum, Ocimum sanctum* and *Acanthusl ilicifolius* were collected. Alcoholic and aqueous extracts of *Calotropis, Tinospora, Hallorhina, Moringa, Adhatoda, Plumbigo*, Garlic, Tulsi and *Acanthus* were prepared. The sensitivity of *Aeromonas hydrophila, Psendomonas fluorescens, P. putida, Vibrio anguillarum* and *V. alginolyticus to the above* mentioned extracts was tested using disc diffusion method. While the above pathogens were resistant to other herbal extracts, *P. fluorescens* was highly sensitive to aqueous extracts of *Adhatoda vasica* while *P. putida* was slightly sensitive to *Acanthus ilicifoleus*.

Sub Project: Development of nitrogenous bacterial fertilizers for aquaculture
Pandey, P.K. (PI), Ayyappan, S., Makesh, M. and Landge Asha

Samples of water and sediments were collected in aseptic conditions for the microbial and chemical analysis, from Mumbai, Kolkatta, Somnath, Powerkheda, Chinhat, and Kakinada, during pre-monsoon, monsoon and post-monsoon seasons. Different parameters of waters and sediments were analysed for brackishwater and freshwater fish ponds. One hundred isolates of nitrogen fixing bacterial populations of water and sediments were stored. Through morphological and biochemical analysis, the nitrogen-fixing bacterial species of *Azotobacter chroococcum* and *A. beijernckii* have been identified for testing their efficiency in nitrogen fixation. The identification of other species through morphological and biochemical test is in progress.

## Kolkata Centre

### Aquaculture productivity enhancement in eastern India

Sub Project: Chemical and toxicological studies of some hazardous pollutants in sewage fed fisheries of Kolkata
Datta,S. (PI) and Pal, A.K.

Hardness of water was able to reduce the bioavailability and acute toxicity of lead, deltamethrin, cypermethrin and to some extent of mercury to scale carp. Bioavailability and toxicity of arsenic was unaffected with increased hardness of water due to the change of chemical composition of arsenic from $As_2O_3$ to $AsO_3$ during the experiment. Soil sediment was able to reduce the bioavailability and acute toxicity of all the chemicals tested, among which the effect was more pronounced in case of mercury and pyrethroid insecticides. In sewage-fed fisheries of Kolkata, some parameters related to this study were; Total hardness 340-420 mg $CaCO_3$/l, Carbonate hardness 550-640 mg $CaCO_3$/l, Chlorinity 0.355-0.443 gm/l, Total Organic Carbon: 24-88.8 ppm, Hg: <0.001 ppm, Cd: <0.001 ppm, Pb: <0.01 ppm, Cr: <0.008 ppm, As: <0.003 ppm, Fe: 1.4 ppm, Mn: 0.210 ppm, Ni: <0.008 ppm.

### Sub Project: Development of aquafeed for ornamental fishes

Sinha Archana (PI), Pandey, P.S., Biswas, R.K. and Mondal, A.K.

The formulated feed contains 8% moisture, 30% protein, 6% fat and 8.6% ash. The prepared feed along with control feed were fed to the fishes in triplicate @ 5% of the body weight in three instalments. The experiment was continued for five weeks and feeding rations were adjusted every 15 days after proper sampling.The growth rate of gold fish was 26.66% in case of Feed-1 prepared in the laboratory by using only three non-conventional ingredients without addition of any vitamins of minerals, while the marketed feed (control) resulted only 17.5% growth rate. The growth of angel, black molly and tiger barb was 14.6%, 13.1%, 8.68%, respectively with prepared as against 12%, 9.5% and 5.15%, respectively with the control feed. The water analysis showed no changes in pH, dissolved oxygen and temperature but there was difference in levels of free $CO_2$, hardness and alkalinity.

This low cost feed (Rs.4.20/100 g ) was given to some of the aquarists for trials and their response is awaited. The stability of the feed was 80% for 2 hours.

To improve the coloration of the fishes certain natural color ingredients were added to the feed and feeding trial is continued in the same environment for gold fish, guppy, black molly, platy, sword tail, tiger barb and loaches and the trials are underway.

### Sub project: Conceptual framework of working model for a women fisheries society at a selected village in West Bengal

Arpita Sharma (PI), Maheshwari, U.K., Ojha, S.N. and Pandey, P.S.

Profile of women of the village Tapuriaghata, Kolkata, West Bengal, has been collected along with identification of problems and training needs. Women, family members, authorities and members of the fishery co-operative, etc. have been sensitized regarding the benefits of working in group through meetings, focused group discussions, interactions, etc. A number of women of this village belonging to Scheduled Castes and Scheduled Tribes and other sections of the society have been trained on topics like Carp breeding and nursery management, preparation of value added products, preparation of jute file folders etc. Women have started small-scale business of preparation of prawn pickle, folder making, handicraft making, etc. and are earning money thereby becoming financially empowered. They have also formed *'Tapuriaghata Nari Unnayan Kendra'* which has been registered on 10.01.02 by the Certificate of Registration of Societies, West Bengal Act XXVI of 1961. A website has been designed for this society which can be visited at www.geocities.com/tnariunyakendra.

### Sub Project: Toxicity of microcystin LR in pond water and its effect on hepatic and reproductive system of *H. molitrix*

Maheshwari, U.K. (PI), Sharma Arpita and Pandey, P.S.

Survey and selection of pond: Three ponds have been selected for the study, situated 3-4 kilometers away from the CIFE centre. The ponds are perennial, thickly infested with various kind of aquatic weeds and algal blooms. The size of the ponds range 0.5 to 1.2 hectare and having an average depth of 1.5 meter.

Collection of water sample and analysis: A total of 66 samples (two samples in each month from each ponds) were collected and analysed for physico-chemical nature of water and the availability of aquatic weeds, zoo and phytoplankton, bottom soil for benthos and fish species composition from fish catch on qualitative basis.

Primary productivity: The primary productivity of each pond was estimated once in each month. The average pond productivity ranged 40-60 mg C/$m^3$/hr.

Population density of *Microcystic aeruginosa*: The population density of *M. aeruginosa* from each pond was also estimated once in a month. The average population density ranged 1800-3000 units/l of water sample.

| *Observation on* | *Pond No.1* | *Pond No.2* | *Pond No.3* |
|---|---|---|---|
| Average total area | 0.5 ha | 0.7 ha | 1.2 ha |
| Color of water | Deep brownish green | Deep brownish green | Deep brownish green |
| Average depth | 1.2 meter | 1.5 meter | 1.5 meter |
| Turbidity | Highly turbid | Highly turbid | Highly turbid |
| Water temperature | 32.34°C | 32.34°C | 32.34°C |
| pH of water | 7.5-8.0 | 8.0-8.5 | 8.0-8.5 |
| Dissolved oxygen | 3.0 ppm | 4.0 ppm | 4.0 ppm |
| Dissolved $CO_2$ | 5.0 ppm | 7.0 ppm | 7.0 ppm |
| Total alkalinity | 290-350 ppt | 300-400 ppt | 300-450 ppt |
| Primary productivity (light & dark bottle method) | 60 mg C/$m^3$/hr | 40-60 mg.C/$m^3$/hr | 40-50 mg.C/$m^3$/hr |
| Density of weeds | Weed chocked with algal bloom | Weed chocked with more thick algal bloom area | Large area weed chocked with algal bloom |
| Zooplankton | *Brachionus, Keratella, Cyclops, Diaptomus, Daphnia & Moina* | *Brachionus, Keratella, Cyclops, Diaptomus, Daphnia & Moina* | *Brachionus, Keratella, Cyclops, Diaptomus, Daphnia & Moina* |
| Phytoplankton (mats scum) | *Chlamydomonas, Euglena, Spirogyra, Volvox. Cyclotella, Microcystis, Oscillatoria & Anabaena* | *Chlamydomonas, Euglena, Spirogyra, Volvox. Cyclotella, Microcystis, Oscillatoria & Anabaena* | *Chlamydomonas, Euglena Spirogyra, Volvox. Cyclotella, Microcystis, Oscillatoria & Anabaena* |
| Weeds (floating) | *Eichhornia, Pistia, Lemna & Azolla* | *Eichhornia, Pistia, Lemna & Azolla* | *Eichhornia, Pistia, Lemna & Azolla* |
| Weeds (emergent) | -- | -- | -- |
| Weeds (submerged) | *Hydrilla, Vallisneria & Ceratophyllum* | *Hydrilla, Vallisneria & Ceratophyllum* | *Hydrilla, Vallisneria & Ceratophyllum* |
| Weeds (marginal) | *Ipomoea* | *Ipomoea* | *Ipomoea* |
| Fish species | *Lebeo rohita, C.mrigala, Cyprinus carpio, H.molitrix, H.fossilis, Clarias batrachus, Notopterous notopterous, Glossogobius, Channa* sp., *Anabas testudineus & Tilapia* sp. | *Lebeo rohita, C.mrigala, Cyprinus carpio, H.molitrix, H.fossilis, Clarias batrachus, Notopterous notopterous, Glossogobius, Channa* sp., *Anabas testudineus &. Tilapia* sp. | *Lebeo rohita, C.mrigala, Cyprinus carpio, H.molitr H.fossilis, Clarias batrac Notopterous notopterous, Glossogobius, Channa* sp *Anabas testudineus & Tilapia* sp. |
| Aquatic insects & Leeches | *Ranatra, Nepa, Belostoma, Notonecta, Leeches* | *Ranatra, Nepa, Belostoma, Notonecta, Leeches* | *Ranatra, Nepa, Belostor Notonecta, Leeches* |
| Benthos | *Tubifex, Chironomus, Dragon fly and May fly nymphs, Cybister and their larvae, Pila, Tadpoles,* Dead fleshy material of various groups of aquatic animals | *Tubifex, Chironomus, Dragon fly and May fly nymphs, Cybister and their larvae, Pila, Tadpoles,* Dead fleshy material of various groups of aquatic animals | *Tubifex, Chironomus, Dr and May fly nymphs, Cy and their larvae, Pila, Ta* Dead fleshy material of groups of aquatic anim |
| Bottom soil | Alluvium-Sandy loam | Alluvium-Sandy loam | Alluvium-Sandy loam |

## Lucknow Centre

### Evaluation of fish and shellfish species for Aquaculture in Uttar Pradesh

Sub Project: Identification of constraints in fresh water prawn culture technology in agro-climatic condition of eastern U.P. and its extension

Yadav, A.K. (PI), Sharma, A.K., Chaturvedi, C.S., Upadhya, S.K., Singh Sanjay and Ravi Kumar

The project programme for the 2nd year was followed to workout the culture prospects of freshwater prawn in the region. The 3rd successive crop in the nursery pond selected in previous year was undertaken. 8,000 post larvae (PL-40) were stocked in a 450 sq.m (30x15x1.5 m) pond. 400 fingerlings of Rohu, Catla and grass carp were also stocked. The expected survival is 40-50%. The feeding was scheduled @ 10% of the body weight in beginning which was reduced to 5% after one month. In fact some of prawn which were observed during the cleaning of heavy infestation of filamentous algae ranged from 25 to 60 gm weight and 125 to 150 mm in length. During the culture period physico-chemical parameters of water have been regularly analyzed and monitored.

Sub Project: Standardization and transfer of Technology for breeding and culture *Clarias batrachus* (Magur)

*Clarias batrachus* (Magur) brooders were procured from Barabanki, Faizabad etc. They were fed with 5 to 10% supplementary feed containing rice bran, oil cake, trash fish and dried shrimp. Induced breeding of magur was done. Additional rearing facilities were generated this year by constructing 10 nos. of circular cement cisterns of 4' and 6' dia. Cooling tower was installed and an additional shower system was installed to increase the D.O. in the tube well water to optimum level. A total 22 sets of magur were tried 16 sets could bred successfully with 70% fertilization on average 32000 nos. of magur spawn were produced. Another catfish, *Heteropneustes fossilis* was also successfully bred. On similar pattern hybridization experiment of *Clarias batrachus* and *Clarias gariepinus* was done for genetic study purpose for National Bureau of Fisheries Genetic Resources, Lucknow. The other air breathing fish which was also bred successfully is *Channa striatus* which is also being used for conducting experiment of fluorosis in collaboration with ITRC.

Indian magur *Clarias batrachus* is reported to have high therapeutic value. To identify and record the bioactive compounds, magur samples were given to pharmacology division of CDRI (CSIR) Lucknow for preparation of extract for testing. This work is in progress.

## Kakinada Centre

### Experiments on eco-friendly culture practices in brackishwater aquaculture

Venugopal, G. (PI), Murlimohan,K, Srinivasa Rao,P., Acharyulu, Y.N., Satyanarayana, P., Patnaik, R.R.S. and Murthy, S.S.N.

*Milkfish(Chanos chanos ) harvest at brackishwater farm, Kakinada*

In monoculture and polyculture experiments *P. monodon* stock was infected with WSSV (white spot) and clinical symptoms were observed in 40 days of culture. However, mortality was observed from 60th day onwards, Therefore ponds were harvested. The average weight range of prawns was 6.3-15.5 g and survival rate 12.5 to 57.3%

Culture of Milkfish (*Chanos chanos*) in polyculture ponds was continued for 6 months period, with an yield rate of 698 kg/ha/6 months. While in monoculture at higher stocking density production of 933-969 kg/ha/7 months was recorded with survival of 78 to 81%.

Sea bass culture was conducted for 6 months period with a stocking density @ 8,000 nos/ha gave a production of 557 kg/ha/6 months with a survival of 18.6%. The sea bass was fed on indigenously formulated diet, which was applied at 5% body weight.

*Seabass harvest at brackishwater farm, CIFE Kakinada Centre*

**Powarkheda Centre**

**Integrated Farming of certain finfish, live stock and agro-crops**

Somdutt (PI), Rizvi,S.S.H., Murthy,K.B.S., Upadhyaya, R.K., Dubey, V.G. and Gurubachan Singh

Carp poly culture:

The major species used for carp poly culture under above project are *Catla catla* (Catla), *Labeo rohita* (Rohu), *Cirrhinus mrigala* (Mrigala) and *Ctenopharyngodon idella* (Grass carp). Besides, the hybrid of mrigal X rohu produced incidentally was also stocked for culture in stocking ponds in SP 6 (2.6). total 17,682 fishes of two sizes stunted big size (average weight 225 to 500 g) having a total initial body weight of 1201 kg and the fresh fingerlings (average weight 7 to 15 g) having a total initial body weight of 136 kg, were stocked during the period June, to September, 2000. In view of the thick green water colour liming was done at initial dose of 625 kg on 14th June, 2001 and then again on 12th October, 2001 and the stocked fishes were fed only on rice bran at the low rate of about 1% of initial body weight. So far 2590 kg rice bran was given as supplementary feed to the stocked fishes. The first phase harvesting started on 7th February 2001. The growth study of harvested fishes indicate a net body weight gain of 645 g, 231g and 336 g by big size (stunted yearlings) catla, rohu and mrigal respectively on an average and a yield of about 2-3 tonnes is expected during 1st phase of harvesting, which is going on.

Soya bean and Wheat culture:

During kharif season, the soy bean crop was grown in 3 acre of land for the first time at the centre, and 1085 quintals soybean (sold for Rs. 9,735) was produced. The total expenditure incurred on rearing this crop was about Rs. 5,340. Thus there was a net profit of Rs. 4,393.

At present wheat crop is grown in 4 acre and it is expected to have good yield (appr. 50 quintal) of wheat from this crop.

*Fully grown soybean crop*

**Rohtak Centre**

The following research activities are going on at the Rohtak Centre of CIFE

**Culture of milk fish (*Chanos chanos*)**

Culture of milkfish (*Chanos chanos*) was carried out in a 0.1 ha earthen pond having a water depth of 1 m. The milkfish fry of size 25-35 mm were stocked @ 17,000/ha. The pond was supplied with saline groundwater of 22-24 ppt from a tubewell and manured/fertilized with cowdung @ 20,000 kg/ha/yr and Di-ammonium phosphate @ 300 kg/ha phase-wise at

*Harvest of milkfish at CIFE Rohtak Centre*

monthly intervals. The water parameters recorded during the study period were temperature 8-36°C, pH 8.2-8.4, dissolved oxygen 6.0-10.8 mg/l, alkalinity 160-260 mg/l, hardness 5000-6200 mg/l, chlorides 12,000-13,500 mg/l, salinity 18-25 gm/l. The fish were fed with a diet of 28% crude protein comprising of only vegetable ingredients. At 12 months growing period, the fish attained an average length of 289.27 mm and a weight of 253.01 g with more than 90 % survival equalling a total biomass production of around 3,750 kg/ha/yr.

### Culture of giant freshwater prawn

Culture of giant freshwater prawn (*Macrobrachium rosenbergii*) was undertaken during winter season in two cement nursery ponds in order to raise prawn round the year. Each pond was covered with U.V. stabilized HDPE sheet and ordinary polythene sheet respectively. The minimum temperature in covered ponds did not drop below 14°C whereas, it was found to be 9°C in the adjacent ponds. Thus, a temperature conservation of 4-5°C was noticed in the covered ponds. The ponds were uncovered partially during day time for gaseous exchange. The prawns survived the extreme winter in both the ponds. This practice will be useful in maintaining the broodstock of prawn as well as in conserving the prawn seed stock available during early winter for raising table size crop during the full summer season. This also opened up possibilities of raising two crops in a year in northern part of India by manipulating temperature difference through solar energy conservation.

A low cost technology for the control of pond seepage was evaluated in an earthen saline water pond (22-24 ppt) using sugarcane husk, cowdung and soil combination. The pond bottom was covered with the above mixture in uniform layer of about 3-4 inches and puddle. The application helped in reducing the rate of seepage from the initial one foot to 2 inch draw-down in a day within a years time.

## Externally Funded Projects

### Thermal tolerance of important fish species from River Kali, Karnataka (Funded by BRNS, Department of Atomic Energy, Govt. of India)

Ayyappan, S. (PI) and Pal, A.K.

*Fishing at Kadra*

Fish catch composition of Kadra reservoir at three different sampling points, *viz.*, end of the hot water discharge channel of the nuclear power station i.e. Mixing Zone (Mz), 500 meters away from mixing zone at Hartuga village (Hv) and 15 km away from mixing zone at Virgae village (Vv) and thermal tolerance studies *viz.*, Critical temperature maximum (CTmax), Critical temperature minimum (CTmin), oxygen consumption rates of different fish were determined for acclimation temperatures of 26, 31, 33 and 36°C. The Enzyme activities *viz.*, Acetylcholine esterase (AchE), Malate dehydrogenase (MDH), Lactate dehydrogenase (LDH), Aspartate amino transferase (AST), Alanine amino transferase (ALT), Acid phosphatase (ACP) and Alkaline phosphatase (ALP) were studied in liver, gill, brain and muscle of *Puntius filamentosus, Etroplus suratensis* and *Parluciosoma labiosa* at different acclimatized temperatures in a constant thermostatic aquarium. The fish catch composition varied at different sampling points. The predominant fish species identified from the three sampling points were *Etroplus suratensis, Puntius sarana, parluciosoma labiosa, Chela argenta, Chela sardinella, Danio aequipinnatus* at Mixing zone, *Etroplus suratensis, Channa striatus, Channa micropeltes, Channa marulius, Ompok bimaculatus, Ompok malabaricus, Horabagrus brachysoma, Garragotyla stenorhynchus, Mastacembelus armatus* at Hartuga village and *Puntius filamentosus, Labeo calbasu, Gonoproktopterus curmuca, Ambasis dayii, Hemiramphus schlosseri, Periopthalmus limbatus* at Virgae village. CT max varied from 38.5°C to 42.6°C in different fish species. Oxygen consumption rate of all species of fishes increased with increase in water temperature but magnitudes of increase was different in different species. The enzymatic activities increased concomitantly with increase in temperature up to 33°C and followed a decrease at 36°C.

### Intensive seed raising and grow-out production of carp through multiple cropping (Funded by Department of Science and Technology, Govt. of India)

Ayyappan, S. (PI), Reddy, A.K. and Landge, Asha T.

The ponds at the fish seed farm at Khopoli were stocked with carp seed at densities of 10 million/ha, 15 million/ha, and 20 million/ha, and regularly fed with formulated diet having 25% protein, prepared with locally available ingredients. In addition, application of a probiotic, Environ-AC was also carried out. Spawn rearing over a period of 15 days yielded 6.28 lakhs of fry with 62.8% survival at 10 million/ha stocking density and 7.15 lakhs of fry with 59.6% survival at 15 million/ ha stocking density. For grow-out studies under intensive culture system, private farmers' ponds of size 0.4 to 0.5 ha at Padi village of Ankleshwar Taluka of Bharuch Dist, Gujarat are identified for further studies.

### Human Resource Development in coastal bioresource development and management (Funded by Department of Biotechnology, Govt. of India)

Ayyappan, S. (PI), Lakra, W.S., Venkateshvaran, K., and Ojha, S.N.

Three training programmes were organised during the year wherein the participants were at the level of researchers and faculty members from ICAR research Institutes as also SAUs and Central Universities, viz., `Aquatic Animal Toxins and Pharmacological Bioresources' during 14-29 December 2001, 12 participants; `Taxonomy, Genetics and Gene Banking of Coastal and Marine Bioresources and Biodiversity' during 17 January-6 February 2002, 10 participants; and `Integrated Coastal Zone Management', 12 February-4 March 2002, 11 participants. Training - cum-awareness programme on Coastal bioresource development and management was held at Versova during March 22-26, 2002.

**Semi-Intensive carp polyculture for employment and entrepreneurship generation (Funded by Department of Biotechnology, Govt. of India)**

Sadaphal, M.N. (PI), Ayyappan, S.(Co-PI), Mohapatra, B.C., Reddy, A.K., Chadrakant, M.H. And Chandra Prakash

The project is in operation at the Maharogi Sewa Samiti (MSS) Somnath with the technical collaboration of the Central Institute of Fisheries Education and the Central Institute of Freshwater Aquaculture, Bhubaneswar. 6 ponds with a total area of 10.30 ha with a mean water area of 5.25 ha were stocked with 43,990 carp fingerlings which gave an average stocking rate of 8,380 nos. per ha. An average survival of 80% was achieved from egg to spawn in carp seed production in five nursery ponds. A total of $3.325 \times 10^5$ of advance fingerlings of 8 to 10 cm were produced

In addition to the above, as a part of the project, two farmers' meets were organized on 29th October, 2001 and 10th March, 2002 at MSS, Somnath. In the first farmers' meet, over 1000 farmers from the nearby villages took part with higher women participation. In the second farmers' meet technical discussions on carp culture, carp sed production, prawn culture and ornamental fish culture, etc. were dealt by Dr. S.Ayyappan, State Fisheries Officials and College lecturers.

*Feed mill*

Two training programmes were organized for local fish farmers and entrepreneurs. First training programme on "Operation of circular hatchery and production of carp seed" was organized during July17 - 20, 2001 at MSS, Somnath. Second training programme on "Carp culture" was organized during March 8-10,2002. Twenty eight farmers and entrepreneurs participated in the programme.

A mini feed mill has been designed and manufactured by M/s. Premium Engineers Pvt. Ltd., Ahmedabad with the help of CIFE. The feed mill consists of micro pulvariser, horizontal mixer, pelletiser, crumbler, tray dryer(12 trays) and platform type weighing balance of 300 kg of capacity. The production capacity of feed mill is 10kg/hr of 3 mm pellet. The first unit was installed at MSS, Somnath in the month of March, 2002. The operation of feed mill was demonstrated to the local fish farmers and entrepreneurs.

**Studies on Deep Scattering Layer (Funded by Department of Ocean Development, Govt. of India)**

Basu, S. (PI)

Samples from the Cruises undertaken (3 cruises) were sorted, identified and separated group wise. Their numerical counts were noted and their volume was determined using the volume displacement method. The data from all the stations and from all the cruises was divided into to major groups depending on their time of collection. Thus day hauls and night haul data was presented separately. The samples collected after dark clearly showed numerical and species dominance over samples collected during daytime.

**Standardization of techniques for commercial seed production of giant prawn using inland saline water (Funded by A.P.Cess Fund, ICAR)**

Jain, A.K. (PI) and Ali, M.

Hardness of the water was reduced to 350 mg/l from its initial level of 5000 mg/l. All the XI larval stages could be successfully completed in this water of reduced hardness with 5% survival. Further efforts are being made to mass produce the PL of *M. rosenbergii* using ground saline water.

## Ph.D. Programme

*Severe infestation of Eichhornia*

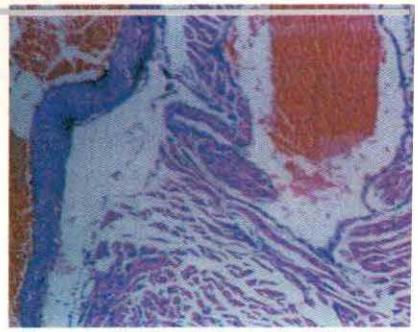
### Title
Benthic Ecology of Powai Lake, Mumbai, Maharashtra

### Student
Kislay Kishore

### Major Adviser
George J.P.

### Highlights
The present study evaluated the benthic community structure of the Powai lake in order to assess the trophic status of the lake in relation to water quality.

1. The benthic fauna was comprised mainly of threegroups i.e. Insecta (73.29%), Oligochaeta (22.1%) and Mollusca (4.61%).
2. Community wise, Insecta contributed on an average of 2788 no. $m^{-2}$, Oligochaeta 1048 no. $m^{-2}$ and Mollusca 171 no. $m^{-2}$.
3. The average values for water parameters recorded during the study were water temperature (21.3-28.3°C), pH (6.8-8.0), D.O. (3.2-6.7 mg.l-1), free $CO_2$ (0.9 6.5 mg. $l^{-1}$), Total alkalinity (97.2-151.6 mg. $l^{-1}$), Conductivity (171-537.7 micro mhos), BOD (0.9-3.4 mg. l-1), Nitrites (0.0033-0.099 mg. $l^{-1}$), Nitrates (0.2-0.5 mg. $l^{-1}$), Phosphates (0.3-0.6 mg. $l^{-1}$) and Silicates (12.0-27.2 mg.l ).
4. The overall average population of benthos fround was 3310-5231 no. $m^{-2}$ and 3390-4383 no. $m^{-2}$ during 1997-98 and 1988-99 respectively. Such high levels of benthic population indicated that the lake is highly productive and is on the verge of eutrophication.
5. An increase in the population amongst the Oligochaeta during second year indicated that organic load is increasing every year in the lake as the same forms the suitable conditions for their proliferation.
6. A drop in the population of insect larvae from 74.2% in 1997-98 to 71.85% 98-99 also showed that there is regular degradation of water quality as the maximum population of insect larvae is normally found in mesotrophic waters.



*C.S. of heart of mice injected with 1.0 m*

### Title
Paralytic Shellfish Toxins in a Clam and a Mussel from Mumbai Waters

### Student
Rupam Sharma

### Major Adviser
Dr. C.S. Purushothaman

### Highlights
Bioaccumulation of paralytic shellfish toxin in the clam *Meretrix meretrix* and the mussel *Perna viridis* from Mumbai waters was much lower than the hazardous level that can cause intoxication to humans. The toxins present in *M. meretrix* were dcGTX/STX and C1/C2 and

in *P. viridis*, GTX2/3 and C1/C2. Histopathological studies revealed profound effect on kidney and liver and mild effect on heart of the toxin challenged animal. The toxins had a potent hemolytic activity on chicken blood, and the showed a very mild analgesic activity also. The toxins were stable in acidic medium and at -80°C, but unstable upon lyophilisation. For purposes of depuration, ozone treatment was more effective than chlorine treatment. There was no correlation between the condition factor of these species and the accumulation level of the toxin.

### Title

Impact of Shrimp Farming on the Environment in Saphale Region of Maharashtra

*Sampling station at Datiwadi Village*

### Student

Sukham Munilkumar

### Major Adviser

C.S. Purushothaman

### Highlights

Except Nitrate, the physico-chemical parameters at the seven sampling stations of Saphale region did not show any significant increase over the study period, may be due to limited farming activities. Marginally high values were recorded at the outlet points for most of the parameters, but these do not differ significantly ($P > 0.05$). Increases in total suspended solids were due to the influence of surface run off and the churning action during monsoon. BOD and COD showed higher values when the dissolved organic carbon levels were higher, but the influence of monsoon is significant in lowering these values considerably. Since the nutrient loading was not in excess, plankton blooms could not be seen except the seasonal fluctuations, especially before and after the monsoon. The concentration of heavy metals in different water samples was below the lethal concentrations. The soil conditions were alkaline in nature and rich in organic carbon, which is suitable for shrimp farming.

### Title

Reproductive Biology and Seed Production of the Tropical Abalone *Haliotis varia* Linnaeus (Gastropoda)

### Student

T.M. Najmudeen

### Major Adviser

A.C.C. Victor

### Highlights

The size at first sexual maturity of *Haliotis varia* at Tuticorin is at a shell length range of 18-20 mm for males and 22-24 mm for females. In the Mandapam population size range for first sexual maturity among males recorded is 20-22 mm and that for females is 22-24 mm. So there are population differences as well as sexwise differences in attainment of sexual maturity in *H. varia*. The sex ratio in both the stations recorded **during the study period is**

not significantly different from 1:1 ratio. The fecundity of *H. varia* at Tuticorin is found to range between 15,160 in the animal with a shell length of 26.66 mm and 2,75,663 at a shell length of 48.04 mm. A curvilinear relationship was obtained between fecundity and shell length and linear relationship between total body weight and between fecundity and ovary weight. Juveniles of *H. varia* were cultured for a period of 200 days by feeding with three different types of feeds such as coralline red algae, green filamentous algae and seaweed *Ulva lactuca*. Of these, those fed with coralline red algae showed the best and consistent growth. The shell colour of the juveniles was found to be affected by the feed taken. The juveniles fed with *Ulva lactuca* had formed greenish white shells while those fed with coralline red algae had formed reddish brown shells.

### Title
Studies on Induced Maturation, Spawning and Larval Settlement in Green Mussel *Perna viridis* (Linnaeus, 1758)

### Student
Manoj Nair, R.

### Major Adviser
K.K. Appukuttan

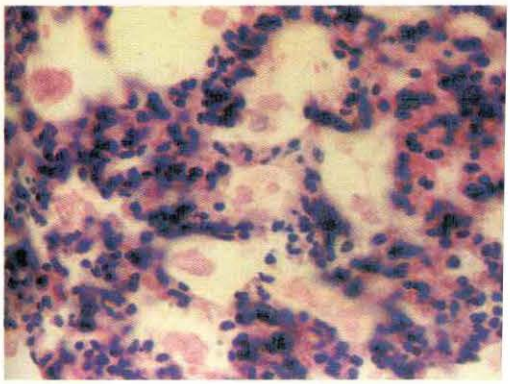
### Highlights
*Perna viridis* broodstock could be conditioned or induced to mature out of the spawning season by maintaining them at 23 ± 1°C, at > 30 ppt salinity, pH 7.5 8.2 and fed with *Chaetoceros calcitrans* at a cell concentration of $1x10^{6}ml^{-1}$ fortified with 700 I.U. cod liver oil @ 1 animal $^{-1}$ day $^{-1}$ in two installments for 15 and 32 days respectively. An increase of 5°C from the ambient water temperature at a salinity > 25 ppt and pH 7-8.2 with an addition of male or female gametes was able to induce 100% spawning in 1-2 hours in *P. viridis*. A temperature of 29°C 31°C at high salinity > 30 ppt with 50 ppm Chloramphenicol antibiotic at pH 8.2, with moderate aeration and fed with *Isochrysis galbana*, was the best for optimum growth, survival and settlement of spat. Primary settling of larvae required filamentous substrates. High temperature 31°C, moderate aeration, salinity of 25-38 ppt, pH 7-8 was optimum for larval settlement. Among the various chemicals tried, L-DOPA gave the best results with 100% settlement observed in 5 hours at $2.5x10^{-7}$ M. A 24 hour transportation period did not significantly affect the percentage of *P. viridis* larval survival or settlement.

### Title
Ichthyocrinotoxicity of Marine Catfishes of Mumbai Coast

### Student
Ashutosh Dharmendra Deo

### Major Adviser
M. Devaraj

### Highlights
Epidermal secretions of two marine catfishes *Arius*



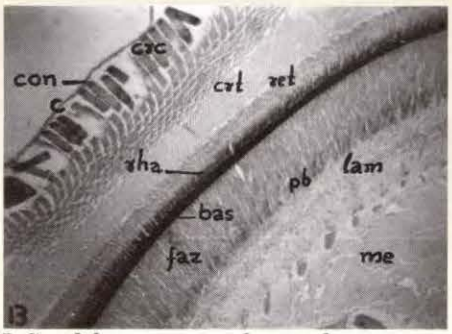
*C.S. of lung of mice injected i.p.with 0.25 ml crude mucus toxin of A. dussumieri Hematoxylene Eosin X400*

*Dussumieri* and *Osteogeneiosus militaris* from Mumbai waters were studied for their biotoxic properties. 24 Hr $LD_{50}$ values to be 20.06 mg/kg and 25.86 mg/kg for *A dussumieri* and *O. militaris* respectively. Potent hemolytic activity upto 16 HU (*A dussumieri*) and upto 8 HU (*O. militaris*) were exhibited while hemagglutnation was only partial. Crude extractrs also exhibited edematic activity, upto 154% ER in *A. dussumieri* and 137% ER in *O. militaris*. Partially purified toxin of both the fish had pronounced hemagglutination activity of 32 HAU. In case of the partially purified fractions, 2 lethal factors were discernible in each species. All lethal factors had a parallel hemolytic or edematic activity. In addition to these, fractions of both fishes each had 3 hemolysins and 2 edema factors. Avil ® and Dolonex ® blocked the edematic activity, the latter being more effective than the former; Atropine ®, on the other hand, enhanced the edematic activity. These toxic fractions were further separated on HPLC that indicated a compound resembling Cytochrome C to be the toxic factor. SDS-PAGE revealed the presence of at least 18 proteins in *A. dussumieri* and 16 proteins in *O. militaris* crude mucus, with their molecular weights ranging between 10 and 100 kD. Gas Chromatography of the lipid fractions indicated predominance of Palmitic acid, Oleic acid, Stearic acid, Palmitoleic acid, Myristic acid, Lauric acid and Linoleic acid, a precursor of prostaglandins.

Toxicity was not correlated with food of the fish but with season and the Condition Factor (Kn) of the fish indicating stress to be the causative factor for increased epidermal secretions.

### Title

Studies on White Spot Syndrome (WSS) in Penaeid Prawns from Culture Ponds at Cochin, India




*L.S. of the compound eye of normal P. indicus*

### Student

Jasmin K. Jose

### Major Adviser

G. Sudhakara Rao

### Highlights

The study conducted in the culture ponds showed that *Penaeus indicus* was more vulnerable to WDS at a size of 80 to 120 mm total length and 3.0 to 10 g body weight in case of females and 70 to 110 mm total length and 1 to 9 g weight in case of males. In the case of *P. monodon*, females having a total length of 75 to 115 mm and weight of 2 to 10 g and males having a total length of 75 to 110 mm and weight of 2 to 9 g were found to be more prone to WSD in culture ponds. In the case of *Metapenaeus dobsoni*, females of 60 to 80 mm total length and 1.5 to 4 g weight and males of 60 to 80 mm total length and 1.5 to 3 g weight were easily affected by WSD.

Tissues affected with white spot disease were ectodermal and mesodermal in origin. Midgut and hepatopancreatocytes which are endodermal in origin were unaffected by WSD. Marked histopathological changes were observed in the subcuticular epithelium, gills, hindgut, antennae and pleopods and heart. Haemocytes and connective tissues were also found affected by WSD. Retinular cell nuclei region of

Compound eyes of penaeid prawns was found to be one of the main target organs of WSD. Necrosis, cellular lesions and structural disintegration were severe that it might invariably led to functional disorders. Presence to eosinophilic and basophilic inclusion bodies in the markedly hypertrophied nuclei of affected cells was the foremost histopathological change observed in the present study. Eosinophilic and basophilic inclusion bodies in the markedly hypertrophied nuclei of affected cells was the foremost histopathological change observed in the present study. Eosinophilic and basophilic inclusion bodies were indications of initial and final stages of infection respectively. Nucleoli and nuclear membrances were absent in the affected nuclei. In severe cases of infection, cytoplasmic membranes were disintegrated and several hypertrophied nuclei with intranuclear inclusions were found to cluster together. The sizes of the hypertrophied nuclei ranged from 3 to 14 µm in healthy condition.

Ultrastructural studies were conducted in the subcuticular epithelial cells of exoskeleton, gills, stomach, myocardial cells and retinular cell nuclei region of the compound eyes of *Penaeus indicus* affected with white spot syndrome virus (WSSV). All the infected nuclei were highly hypertrophied. The nucleoli and nuclear membranes were completely lost. The chromatin became marginated and disintegrated, resulting in the formation of virogenic stroma in the affected nuclei. In the virogenic stroma, viral development and assembly occurred, resulting in the formationof fully-grown virions. Tubular and circular structures, empty capsids, nucleocapsids and partially formed envelopes observed in the affected nuclei were indications of viral developmentin the virogenic stroma. White spot syndrome virions were rod shaped, enveloped and with a highly electron dense nucleocapsid inside. The envelope was trilaminar, having two electron dense layers, separated by an electron lucent layer in between. The size of the virions ranged from 240 to 326 nm in length and 80 to 120 nm in width. Mature viral particles were released into the surrounding cytoplasm for fresh infection. Large voids were observed in the affected cell, indicating disintegration of the cellular organelles. Cytoplasmic organelles such as rough endoplasmic reticulum, ribosoms, mitochondria, golgi complex, etc. were found disintegrated. Immature viral particles along with the virogenic stroma were found in the centre of the infected nuclei. Mature virions arranged themselves along the periphery of the infected nuclei, resulting in the formation of paracrystalline arrays.

### Title

Techno-Socio-Economic Evaluation of Fish Farming Practices in Assam

*Pig cum fish culture*

### Student

Mukunda Goswami

### Major Adviser

R. Sathiadhas

### Highlights

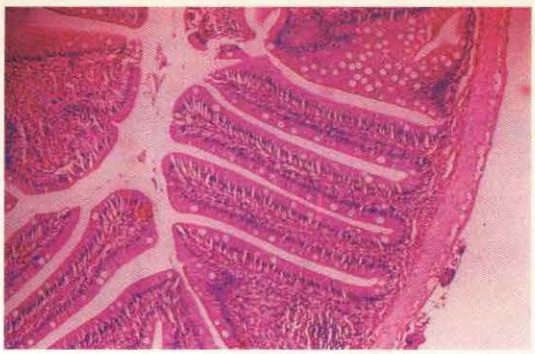
Fish farming system adopted by the farmers in the study area were extensive and semi-intensive. On an average 45 per cent respondents adopted the extensive fish farming. The average size of the fishpond under this system was 0.14 ha. The main inputs used in this farming system were fish seed without any management practice. They used lime (179 kg) much lower than the recommended dose where as they stocked fish in higher density. The fish production obtained was 1146 kg $ha^{-1}$ $yr^{-1}$. The cost of fish production in semi intensive farming (Rs.29.42) was lower that of extensive farming practices (Rs.31.17). I

addition to the above fish farming practices, 25 per cent of the respondents adopted paddy-cum-fish culture and pig-cum-fish culture following a mixture of traditional and scientific methods of culture. Majority of the respondents (86%) had family members more than four. Analysis of the socio-economic profile of the respondents revealed that majority of the respondents (76.66%) had 8-16 years of experience of fish farming in their own way. The studies on participation of women in fisheries indicated that majority of the women participated in aquaculture activities (42%), followed by fishing (26%), fish trading (18%), and net making and mending (14%).

The adoption of fish culture practice by the respondents was positively and significantly co-related to the knowledge level of respondents. Total family income and experience were positively and significantly correlated to the adoption of fish culture by the respondents of both the district, whereas age was negatively and significantly correlated to the adoption of fish culture. The independent variables like social participation, size of pond, total family expenditure, education had no significant relationship with adoption. The farmers are very much conscious about cost reduction and profit maximization in fish farming practices.

### Title
Evaluation of the Nutritional Role of Some Growth Promoters and Possibilities of Their Utilization in Mahseer Culture

### Student
Yasmeen Basade



*C.S. of intestine of Mahseer, Tor khudree fed 3.5% soylecithim supplemented diet under field trial (100x)*

### Major Adviser
M.P.Singh Kohli

### Highlights
Feeding trials were conducted to evaluate the possibilities of including growth promoting substances viz., vitamin D3, soylecithin, thyroxine and betaine in mahseer, *Tor khudree* diet. The results of the study showed that growth performance of *T. khudree* was significantly affected by the type of growth promoters as well as the level of inclusion and hence, it was found that soylecithin supplementation at 3.5% level gave better growth performance.

### Title
Studies on Sporulation in Some Commercially Important Marine Algae of Mandapam Coast

### Student
Soniya Sukumaran

### Major Adviser
N. Kaliyaperumal

### Highlights

The study reveals that submerged condition of the algae, light intensity of 10-40μEm$^{-2}$s$^{1}$, long day condition at low illuminance (20 μEm$^{-2}$s$^{-1}$ ), salinities around normal seawater (20-40%) and water temperature of 20-30°C are favourable for obtaining maximum quanity of spores in the four algae, *Gracilaria crassa, Hypnea valentiae, Sargassum wightii* and *Turbinaria conoides* and for taking up large scale cultivation of these commercially important seaweeds by spore culture method. These experimental findings closely agree with the hydrological and environmental conditions existing in the intertidal and subtidal region of Mandapam coast.

## M.F.Sc. Programme

### Title

Karyological Studies on the Giant Freshwater Prawn *Macrobrachium rosenbergii* (de Man)

### Student

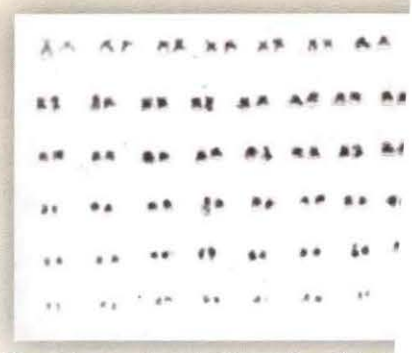
Purushothama M.N.

### Major Adviser

W.S. Lakra

### Highlights

A diploid chromosome number of 2n=118 was established for *Macrobrachium rosenbergii*. The karyotype analysis of male showed that out of 59 pairs, 32 pairs were metacentric, 6 submetacentric, 2 subtelocentric and 19 acrocentric.



*Karyotype of male Macrobrachium*

### Title

Effect of Papain and Vitamin-C on Growth and Survival of *Macrobrachium rosenbergii* (de Man)

### Student

Manush Sayd Mohammed

### Major Adviser

M.P.Singh Kohli

### Highlights

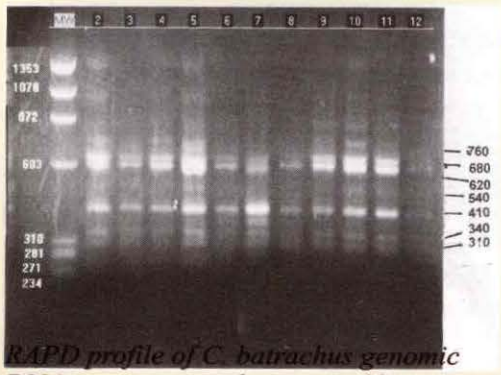
In *Macrobrachium rosenbergii*, the highest levels of body weight gain, daily growth increment, specific growth rate were obtained when fed diet with 0.3% papain and 0.2% vitamin C.

### Title

Genetic Characterization of *Clarias batrachus* (Linnaeus, 1758) Based on Isozyme Polymorphism and DNA Markers

### Student

Swapna Thomas




*RAPD profile of C. batrachus genomic DNA on agarose gel generated by using 33.15 primer*

Major Adviser
Aparna Chaudhari

Highlights
Studies on genetic variation between the two populations of *C. batrachus* from Kolkata and Lucknow, revealed that length-weight relationship was identical in both populations, while head length, size of mouth, length and width of dorsal fin, weight of head and weight of meat differed significantly between the two populations.

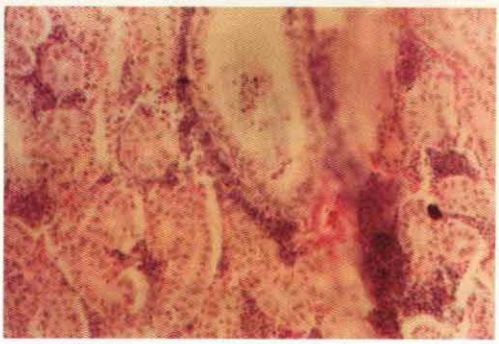
Title
Effect of a Commercial Water Probiotic on the Larval Rearing of Giant Freshwater Prawn *Macrobrachium rosenbergii* (de Man)

Student
Ganesh Kumar

Major Adviser
C.S. Purushothaman

Highlights
In the larval rearing of *Macrobrachium rosenbergii* Epicin a probiotic, works better with water exchange than without water exchange, and is able to keep ammonia and nitrite below toxic levels by converting it to less toxic nitrate.

Title
Effect of α-Permethrin Toxicity on Fingerlings of Rohu, *Labeo rohita* (Hamilton)



*Kidney showing marked tubular necrosis at places with focal aggregation of mononuclear cells*

Student
Arun Kumar Nayak

Major Adviser
M.P.Singh Kohli

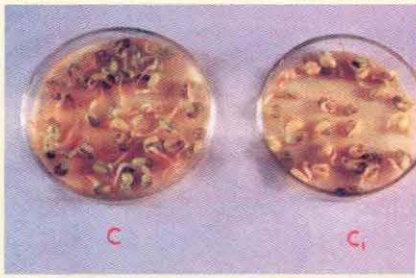
Highlights
96-hr $LC^{50}$ for α-permethrin for rohu fingerlings was 0.0305 ppm; 45-day's exposure to sublethal levels induced a significantly less muscle protein content, muscle RNA content, serum protein content and a significantly ($P<0.01$) high muscle DNA content, triglyceride level, blood glucose level and WBC count, besides decrease in Hb%, total erythrocytes count and cholesterol.

Title
Bioactivity of Herbicidal Natural Products from the Skin Secretions of *Mystus cavasius*

Student
Madhukar Reddy P.

Major Adviser
K. Venkateshvaran

Highlights
The epidermal secretion of the `Gangetic Mystus', *Mystus cavasius* recorded antibacterial property, inhibiting 9 species of Gram-negative bacteria. The toxin also exhibited herbicidal properties, restricting the germination of seeds.



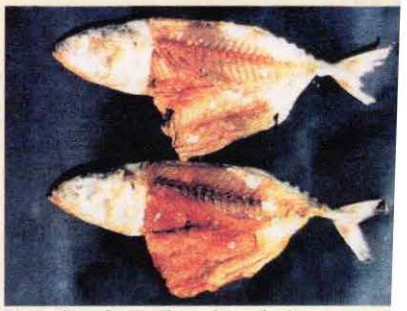
*Plates showing the herbicidal activity of cr mucus extract of Mustus cavasius*

Title
Fish Drying in Solar Drier and its Storage Characteristics

Student
Pravin Hiralal Sapkale

Major Adviser
S. Basu

Highlights
Fish dried in a solar drier had better quality and longer shelf life than the fish dried in sun on cement floor; the rate of drying was faster and the product was more hygienic in the former case than in the latter.


*Sun dried mackerel with fungus inf*

Title
Evaluation of Culture Media for Growth and Sporulation of *Ulva rigida* and *Ulva lactuca* under Laboratory and Outdoor Conditions

Student
Siba Ranjan Das

Major Adviser
Kiran Dube

Highlights
Grund medium was found to be best medium for vegetative growth of the seaweeds *Ulvar lactuca* and *Ulva rigida*. *U. lactuca* was found to sporulate only in ESP medium whereas *U. rigida* was found to sporulate in all media except plain filtered seawater.


*Laboratory culture and spor*

Title
Biomedical Activity of the Epidermal Secretions of *Ompok pabda*

Student
Biswa Ranjan Samantaray

Major Adviser
K. Venkateshvaran

*Plate showing inhibition of growth of A. hydrophila by crude mucus extract of Ompak pabda*

### Highlights

Crude mucus of *Ompak pabda* showed potent antimicrobial activity against *Proteus mirabilis* and *Klebsiella pneumoniae*.

### Title

Status of Certain Enzymes in Healthy and Diseased shrimps

Student
Pranaya Kumar Parida

Major Adviser
S.C. Mukherjee

### Highlights

Experimental infection in *Peneaus monodon*, carried out by injecting and feeding with white spot syndrome virus (WSSV) derived from infected shrimps, caused an increase in albumin, glucose and cholesterol levels, LDH, GOT, GPT and ACP activities in the haemolymph of both the experimental groups, whereas the levels of protein, globulin, triglyceride and activity of ALP and total haemocyte count were decreased.

### Title

Status of Fisheries and Socio-Economic Conditions of Fisherfolk Around the Chilka Lake of Orissa

Student
Bibekananda Mallick

Major Adviser
S.N. Ojha

### Highlights

Ninety per cent of the fisherfolk around Chilka Lake are traditional fishers whose efforts yield an average *per capita* catch of 11±2.5 kg/day. With catches declining over the past 10 years, all these fishers live just above the poverty line.

### Title

Growth, Mortality and Stock Assessment of *Cynoglossus arel* (Bloch and Schneider, 1801) from Mumbai Waters

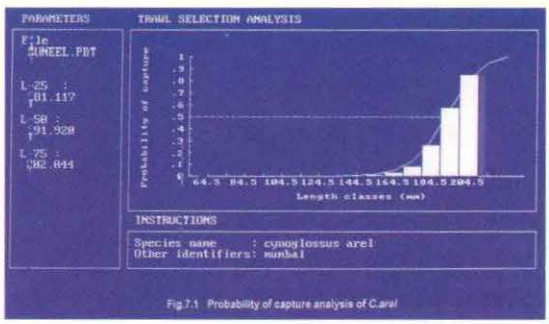


Fig.7.1 Probability of capture analysis of *C.arel*

*Structural proteins of WSSV*

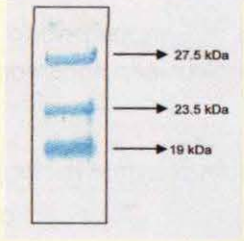
Student
Suneel Bommireddy

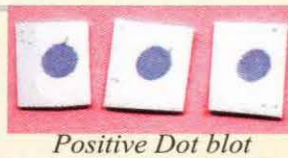
Major Adviser
S.K. Chakraborthy

### Highlights

Although there is no decline in the catches at the present level of fishing for the large scale tongue sole, *Cynoglossus arel* and it appears that efforts can be doubled without any decline in catches, it is better to continue fishing at present level only.

### Title
Incidence of White Spot Disease in Maharashtra State



*Positive Dot blot*

*Electron Micrograph of WSS*

### Student
Arun Kumar Rayapureddi

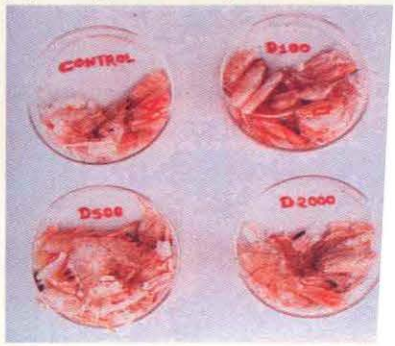
### Major Adviser
K. Pani Prasad

### Highlights
103 samples were collected from 27 shrimp farms spread over the four districts in Maharashtra namely Raigad, Thane, Ratnagiri and Sindhudurg. Upon dot-blot assay 53 samples tested positive confirming the presence of the white spot viral disease in the shrimp farms of Maharashtra.

### Title
Growth and Associated Biochemical Changes in *Macrobrachium rosenbergii* (de Man) Administered with Vitamin $D_3$

### Student
Santhosh Y. Metar

*Quantity of moults produced in diffe physiological dose of vitamin d3*




### Major Adviser
K.K. Jain

### Highlights
Intra-muscular vitamin $D_3$ was 100 IU, 500 IU and 2000 IU increased the number of moults in *Macrobrachium rosenbergii*, the highest (51 No.) being recorded in 500 IU; maximum absolute weight gain was also recorded in 500 IU dose. There was increase in calcium, inorganic phosphate and ash contents in both tissue and moults in all the experimental trials.

### Title
Studies on Some Aspects on the Biology, Growth, Mortality Parameters and Stock Assessment of *Polynemus heptadactylus* from Mumbai Waters

### Student
Rallabhandi Raja Prasad

### Major Adviser
S.K. Chakraborty

### Highlights
It appears that the stock of the sevenfinger threadfin *Polynemus heptadactylus* is slightly

overexploited. The Thompson and Bell analysis shows that at the present level there is no decline in the catches.

Title
Evaluation of *Cyperus rotundus* Tuber as a Feeding Stimulant on *Cirrhinus mrigala*

Student
Muvva Rambabu

Major Adviser
G. Venkateshwarlu

Highlights
A significant improvement in weight gain in *Cirrhinus mrigala* was observed in both fish fed with the 1% (66.18%) and 5% (72.28%) of *Cyperus rotundus* as a feeding stimulant compared to 43.40% in basal diet.

Title
Effect of Certain Plant Extracts on Immune System of *Cyprinus carpio*


*Catharenthus roseus*

Student
N. Kiran Kumar

Major Adviser
K. Pani Prasad

Highlights
Of three plant extracts chosen, the best immunostimulatory effect in *Cyprinus carpio* was solicited by that of *Catheranthus roseus* followed by *Calotropis gigantium* and *Datura stromoneum;* however, toxicity was more in *Datura stramoneum* followed by *Calotropis gigantium* and *Catheranthus roseus*.

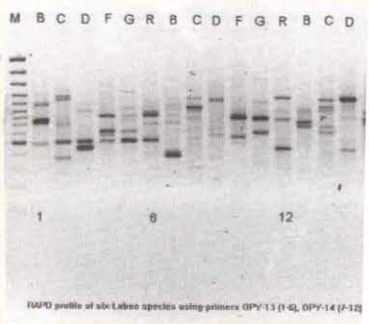
Title
Studies on Toxicity of Copper on Post larvae and Juveniles of *M. rosenbergii* (de man)

Student
G. Rameshwara Reddy

Major Adviser
Bindu R. Pillai

Highlights
The 96 hr $LC_{50}$ concentrations of copper sulphate for post larvae and juveniles were 0.0652 ppm and 0.39 ppm respectively. Significant changes were observed in protein, acid and alkaline phosphatases activity when the prawns were exposed to sublethal concentrations of copper. Accumulation of copper was found in all tissues, maximum in hepatopancreas followed by gill and muscle. Changes in gill structure such as necrosis and rupture of cuticular layer could be observed in prawns exposed to sublethal

concentrations of copper. The safe application factor was found to be 0.019 ppm for post larvae and 0.103 ppm for juveniles.




*RAPD profile of six species of Labeo gene by PCR using primers OPY-13, OPY14 &*

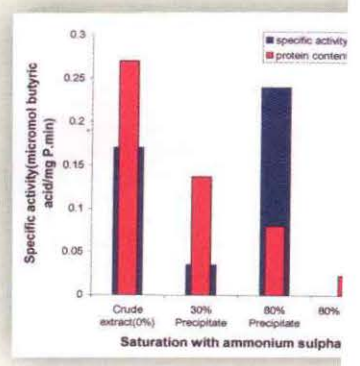
**Title**
Genetic Characterizertion of Six *Labeo* Species

**Student**
Harendra Pasad

**Major Adviser**
P. Das

**Highlights**
Six decamer random primers were chosen from 40 that amplified a total of 255 possible DNA fragments ranging in size from 400 to 3000 basepairs. Similarity conefficient based on Nei & Li (1979) were calculated to quantify the genetic divergence within and between species. The interspecies similarity matrices were further used to assess phylogenetic relationship between the species. The study provided evidence for RAPD as complementary tool for studying genetic variation at species level.

**Title**
Lipase Activity in Different Tissues of Few Species of Fish




*Salting out rohu intestinal li different saturation of ammo*

**Student**
Jyothi Ranjan Nayola

**Major Adviser**
Dr. P.G. Vishwanathan Nair

Highlights
Distinct differences in the lipolytic activity in different tissues of Rohu (*Labeo rohita*), Oil sardine (*Sardinella longiceps*), Indian mackerel (*Rastrelliger kanagurta*) and mullet (*Liza subviridis*) was observed. Rohu showed highest activity in all the tissues in comparison to other three species of fish. Among the three size groups of mullet, medium sized mullet showed higher activity than the other two groups in all the tissues except intestine. The $K_m$ and $V_{max}$ values, for crude intestinal lipase of rohu were 19.87 X $10^{-2}$ moles tributyrin and 24.99-µmol butyric acid. $Min^{-1}$ respectively. The partially purified lipase had an optimum activity at 45°C and at pH 7.0 SDS-PAGE showed the presence of five major bands and five minor bands in crude extract and only three major bands in purified extract. Aminoacid composition of the purified extract showed that the lipase had high proportion of Glutamic and Aspartic acids and low proportion of Methionine.

**Title**
Application of Chitosan as an Additive in Glaze in Frozen Storage of Fish

**Student**
Rajalakshmi M.

### Major Adviser
P.T. Mathew

### Highlights
Treatment with chitosan, in particular 1% chitosan solution, was effective in preserving the quality characteristics of sardine during frozen storage compared to water glaze. Such an effect was not observed in rohu fillets where in fact samples in water glaze showed better storage characteristics even though microbial quality was much better in chitosan treated samples.

### Title
Training Needs Assessment of Fishery Extension Officers

### Student
Sulip Kumar Majhi

### Major Adviser
Himanshu Kumar De

### Highlights
The study was conducted to sketch the personal and professional profile of selected Fishery Extension Officers, under State Department of Fisheries; to determine the training needs as perceived by the FEOs; to study the level of job satisfaction of FEOs; to study the organizational climate of FEOs and to identify the constraints that limits the job performance of FEOs.

Based on the findings of the study the following suggestion can be made:

1. The present study suggest that more professionals should be induced as FEOs. Recruitment of lady officers is also emphasized. Further, vast water area coverage by FEOs should be reduced to a manageable one so that they deliver the goods much better way.
2. It is suggested that there should be opportunities for FEOs to move up the career. It was observed that a few FEOs are continuing in the same post for last 15-20 years.
3. Department should provide decent accommodation at the block level for FEOs as the block towns are normally lacking the basic amenities of modern life.
4. Mode of transfer, payment of dues, disbursement of salary, traveling allowances, etc. should be improved and efforts are to be made to bring in transparency in official dealings.
5. As far the food and nutritional security, revenue generation are concerned, aquaculture in general and freshwater aquaculture in particular has great role to play. Keeping this is view, the present study suggests that the FEOs should be given training in emerging aquaculture sub-sector like disease and health management of fish, drugs and chemical uses, soil and water quality determination, induced breeding techniques, designing of hatchery, giant freshwater prawn culture and seed production, magur culture and seed production, pearl culture, ornamental fish culture.

Title
Studies on the Effect of Vaccum Packaging on Shelf Life of Chilled Fish *Scomberomorous guttatus*

Student
Rajesh

Major Adviser
T.K. Srinivasa Gopal

Highlights
The shelf life of seer fish steaks packed without vacuum and treatment was 21 days, whereas, sodium acetate treated steaks without vacuum and untreated vacuum packed steaks had a shelf life of 31 days. Steaks with sodium acetate treatment and vacuum packing had a shelf life of 34 days.

Title
Studies in the Effect of Various Disinfectants on the Bacteria Associated with Fish and Fishery Products

Student
Sathyanand Kumaran

Major Adviser
P.K. Surendran

Highlights
The Gram-negative bacteria predominated the microflora of fresh shrimp and fish. The effect of chlorine, iodine, cetyl pyridinium chloride (CPC), isopropanol and formaldehyde have been determined by the phenol coefficient method against the pathogenic/indicator bacterial cultures viz. *Vibrio cholerae, Salmonella, Escherichia coli, Staphylococcus aureus,* and *Pseudomonas.* Chlorine at 0.7, 2.3, 2.5, 2.8 and 3 ppm were respectively effective against *Vibrio cholerae, E. coli, Pseudomonas, Staphylococcus aureus,* and *Salmonella* in 10 minutes. Iodine at 6.3, 12.8, 10.8, 7.0 and 17.0 ppm were respectively effective against *Vibrio cholerae, E. coli, Pseudomonas, Staphylococcus aureus, and Salmonella* in 10 minutes. CPC at 10, 25, 15.2, 30.3 and 26.3 ppm were respectively effective against *Vibrio cholerae, E. coli, Pseudomonas, Staphylococcus aureus,* and *Salmonella* in 10 minutes. Isopropanol at 11.6, 13.6, 19.2, 18.2, and 14.5 %v/v were respectively effective against *Vibrio cholerae, E. coli, Pseudomonas, Staphylococcus aureus,* and *Salmonella* in 10 minutes. Formaldehyde 1.0, 1.5, 1.5, 5.0, and 2.0 %v/v were respectively effective against *Vibrio cholerae, E. coli, Pseudomonas, Staphylococcus aureus,* and *Salmonella* in 10 minutes.

Title
Correlation Between Indole and Volatile bases During Spoilage

Student
Nadia Mahmud Omar

Major Adviser
Francis Thomas

Highlights
The prawn, *Penaeus indicus*, had a shelf life of 9 hours based on sensory evaluation of whole prawn and 12 hours based on sensory evaluation of cooked meat at room temperature. At the borderline of acceptance, TMAN and TVBN were found to be higher than 5 mg% and 30 mg% (the TMAN and TVBN limits suggested for peeled shrimps in certain Austrailian and Japanese markets) respectively, and indole was below 10 µg/100g. The prawn, *Metapenaeus dobsoni,* stored in ice had a shelf life of 13 days based on the sensory evaluation of whole prawn and 17 days based on the sensory evaluation of cooked meat. TMAN and TVBN were 4.9 mg% and 32.55 mg% at the borderline of acceptance and indole was detected in negligible amounts throughout the storage period in ice. Mackerel (*Rastrelliger kanagurta*) had a shelf life of 6 hours based on the sensory evaluation of whole fish and 9 hours based on the sensory evaluation of whole fish and 9 hours based on the sensory evaluation of cooked meat at room temperature. TMAN and TVBN were below 10 mg% and 30 mg% respectively at the borderline of acceptance and indole did not show any trend during the entire storage period. Mackerel stored in ice had a shelf life of 6 days based on the sensory evaluation of whole fish and 9 days based on the sensory evaluation of cooked meat. TVBN was below 15 mg% at the borderline of acceptance and TMAN and indole did not show any trend during the entire storage life of the fish in ice.

Title
Incidence of Pathogens like *Salmonella, Listeria monocytogenes, Escherichia coli, Staphylococcus aureus and* Vibrio Cholerae in Seafoods

Student
Rekha Devi Kandgule

Major Adviser
P.R.G. Verma

Highlights
All 84 samples were found to be free from pathogenic organisms like *Salmonella, Listeria monocytogenes* and *Vibrio cholerae* however Non 01 *Vibrio cholerae* were found in some of the cephalopod samples. *E. coli* and *Staphylococcus* were isolated from some of the samples of cuttlefish, squid, PUD shrimps, water, ice and utensils. Out of which 11 samples exceeded the permissible limits for *E. coli* (20 cfu/gm) but all the samples were within the permissible limits in case of *Staphylococcus aureus*. Water and ice are suspected to be the source of contamination.

Title
Biofilm associated Bacterial Flora of Freshwater Habitat

Student
Bala Reddy

Major Adviser
S. Ayyappan

Highlights
The growth patterns of monospecies biofilm of *Staphylococcus* sp., *Bacillus* sp., *Enterobacter* sp. and *Pseudomonas* sp. was evaluated for a period of 8 days. The growth studies of biofilm bacteria showed that the *Staphylococcus* sp. increased in cell densities from day 1 to 8 and the other three species showed continuous fluctuations in cell densities. Biofilm bacteria showed resistance to bactericidal action of blood and serum as the biofilm got older (day 1 to day 8). Similarly, the biofilm bacteria exhibited varying degree of resistance to antimicrobial agents. *Alcaligenes* sp. exhibited antagonistic properties against some of the bacteria and *Staphylococcus* sp. showed dominance in terms of its growth over the colonies of some bacteria. The present observations showed that the biofilm formation in aquatic environment depends on type of substrate to a great extent; biofilm formation by bacteria is an important strategy to increase the resistance to antimicrobials. The antagonistic nature showed by bacteria can be attributed to dominance over other species, especially in natural ecosystems.

Title
Analysis of *Aeromonas hydrophila* Isolates using RAPD-PCR

Student
Anil Thankappan

Major Adviser
B.K. Das

Highlights
Genotypic tests were conducted on 12 phenotypically different isolates of *A.hydrophila* using RAPD-PCR.

1. The study showed that under identical amplification conditions RAPD assay could generate isolate-specific DNA profiles for all the isolates of *A.hydrophila*
2. All the primers selected were able to generate unique isolate specific bands in few isolates.
3. All the 12 isolates were phenotypically and biochemically distinct, therefore, the same was reflected in RAPD fingerprint profiles.
4. Genetic distance calculated for 12 isolates showed a minimum genetic distance between isolates A and C (0.01340) and maximum genetic distance between isolates G and J (0.4566).
5. The cluster analysis clearly demonstrated the presence of two distinguishable groups on the basis of geographical area of origin. Two isolates originated from the state of Andhra Pradesh were clustered together from the other group containing isolates originated from local area.
6. This method was found simple, rapid and sensitive. Therefore, after appropriate standardization, this technique can be used to generate fingerprinting profiles of various micro organisms and can be used for identification and epidemiological studies.

# 5 Education achievemements

## 5.1 Academic Programmes

The details of enrolments and results declared pertaining to the various academic programmes offered by the Institute for the year 2001-2002 are as follows:

**Results**

| Name of the programme | Year | Number of successful candidates |
|---|---|---|
| Ph.D (Fisheries Resources Management) | | 1 |
| Ph.D (Inland Aquaculture) | | 4 |
| Ph.D (Mariculture) | | 9 |
| M.F.Sc. (Fisheries Resources Management) | 1999-2001 | 8 |
| M.F.Sc (Inland Aquaculture) | 1999-2001 | 9 |
| M.F.Sc (Mariculture) | 1999-2001 | 10 |
| M.F.Sc (Freshwater Aquaculture) | 1999-2001 | 5 |
| M.F.Sc (Post-harvest Technology) | 1999-2001 | 6 |
| P.G. Certificate in Inland Fisheries Development & Administration | 2000-2001 | 28 |
| **Total** | | **80** |

**Enrolments during 2001-2002**

| Programme | No. of students admitted |
|---|---|
| Ph.D. (Fisheries Resources Management) | 5 |
| Ph.D. (Inland Aquaculture) | 10 |
| Ph.D. (Mariculture) | 4 |
| Ph.D. (Post Harvest Technology) | 7 |
| M.F.Sc. (Fisheries Resources Management) | 12 |
| M.F.Sc (Inland Aquaculture) | 15 |
| M.F.Sc (Mariculture) | 8 |
| M.F.Sc (Freshwater Aquaculture) | 5 |
| M.F.Sc (Post-harvest Technology) | 5 |
| M.F.Sc.(Fish Pathology & Microbiology) | 5 |
| M.F.Sc. (Fish Nutrition & Biochemistry) | 5 |
| M.F.Sc. (Fish Genetics & Biotechnology) | 5 |
| P.G. Certificate in Inland Fisheries Development & Administration | 30 |
| **Total** | **116** |

### 5.2 Guest lectures

| S.No. | Name | Topic | Date |
|---|---|---|---|
| 1. | Dr. Monty Little,<br>Founder of Syndel Laboratories,<br>British Columbia, Canada | Induced spawning in carps | April 21, 2001 |
| 2. | Professor T.J. Varghese,<br>Asian Fisheries Society,<br>Mangalore | Development of Leadership Qualities | April 27 May 11, |
| 3. | Mr. Huai-Shu Xu,<br>Professor and Head,<br>Department of Marine Sciences<br>Ocean University, Quingdao | Some aspect of Marine Microbiology | May 4, 2001 |
| 4. | Personnel from<br>Chromline Equipment Pvt. Ltd.,Mumbai | Recent Developments in Chromatography | May 18, 2001 |
| 5. | Dr. M.L.Madan,<br>Vice Chancellor,<br>Punjabrao Krishi Vishva Vidyalaya,<br>Akola | Animal Biotechnology-<br>Future Prospects | May 30, 2001 |
| 6. | Dr. Sheenan Harpat,<br>Head, Department of Aquaculture,<br>ARO, Israel | Research Trends in Fisheries in Israel | May 30, 2001 |
| 7. | Dr. Sundaram,<br>Former Director,<br>Reactor Operations,<br>BARC | Reactor - A Personal Experience | July 18, 2001 |
| 8. | Dr. K.Gopakumar,<br>Deputy Director General (Fy.),<br>ICAR, New Delhi | Post-mortem changes in fish and quality assessment and enzymes as quality indices | 22 September 2 |
| 9. | Prof. (Dr.) Krishna Swarup,<br>Formerly Head, Department of Zoology,<br>Gorakhpur University, Gorakhpur | Endocrine regulation of calcium in vertebrates | 11 October, 2( |
| 10. | Dr. D. Srinivasan,<br>Emeritus Scientist,<br>NIOT, Chennai | Acoustics in Fisheries | January 3-5, 2 |

### 5.3 Training programme under the project on HRD in Coastal Bioresearch Develo and Management', funded by Department of Biotechnology, Govt. of India

| Sl.No. | Title | Dates |
|---|---|---|
| 1. | Aquatic Animal Toxins and Pharmacological Resources | December 14-29, 2001 |
| 2. | Taxonomy, Genetics and Gene Banking of Coastal and Marine Bioresources and Biodiversity | January 17- February 6, 20( |
| 3. | Integrated Coastal Zone Management | February 12- March 4, 200 |

### 5.4 Special Lectures delivered

1. Dr. Sudhir Raizada
Senior Scientist
Status of Indian Fisheries and Various Aquaculture Technologies
Small Industries Service Institute, Matunga, Mumbai
April 24, 2001

2. Dr. Sudhir Raizada
Senior Scientist
Water Projects and their Impacts on Fish
Central Water Commission Training Unit
Khadagwasla, Pune
May 25, 2001

3. Dr. S.D. Singh
Principal Scientist
Role of Modern Sciences including Biotechnology in Society
Smt. Sushiladevi Deshmukh Vidyalaya, Navi Mumbai
July 11, 2001

4. Shri A.K. Reddy
Technical Officer
Induced Breeding of Carps
Karamvir Mahandyalaya, Mulchandrapur
July 20, 2001

5. Dr. Radha C. Das
Principal Scientist
Application of Genetics in Aquaculture
Ravenshaw College, Kolkata
September 27, 2001

6. Dr. A.K. Jain, Scientist (SS) and
Dr. Zeba Jaffer Abidi, Technical Officer
Role of Aquaculture in Rural Development
Schumacher Institute of Appropriate Technology and Rural Development,Chinhat,
October 15-31,2001

7. Dr. K.K.Jain
Principal Scientist
Fish for Nutritional Security
Department of Chemical Technology
Matunga, Mumbai
October 16, 2001

8. Shri Dasari Bhoomaiah
Technical Officer
Preparation of 35mm slides
SNDT Women's University, Mumbai
27 October 2001

9. Dr. G. Venugopal
Senior Scientist
Strategies to Boost Inland Fish Production to Achieve Functional Targets Under Core Indicators and Strategies to Achieve Seed Production
State Institute of Fisheries Technology, Kakinada
November 8, 2001

10. Shri A.K. Reddy
Technical Officer
Shrimp Hatchery and Grow-out Farm Management
Lal Bahadur Shastri College of Advanced Maritime Studies and Research, Mumbai
November 23, 2001

11. Shri A.K. Reddy
Technical Officer
Mariculture
Lal Bahadur Shastri College of Advanced Maritime Studies and Research, Mumbai
November 27, 2001

12. Mr. G.K. Rao
Technical Officer
Fisheries Statistics (8 lectures)
Bombay University, Mumbai
November 28-December 10, 2001

13. Dr. S.K. Chakraborty
Principal Scientist
The World Fisheries
Lal Bhadur Shastri Academy of Nautical Science, Mumbai
November 30, 2001

14. Shri R.P.Uniyal
Asstt. Director (O.L.)
*Rajbhasha Patrakarita*
Kendriya Anuwad Bureau, Mumbai
December 5, 2001

### 5.4 Special Lectures delivered

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Small Industries Service Institute, Matunga, Mumbai
April 24, 2001

2. Dr. Sudhir Raizada
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5. Dr. Radha C. Das
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6. Dr. A.K. Jain, Scientist (SS) and
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October 15-31,2001

7. Dr. K.K.Jain
Principal Scientist
Fish for Nutritional Security
Department of Chemical Technology
Matunga, Mumbai
October 16, 2001

8. Shri Dasari Bhoomaiah
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Principal Scientist
The World Fisheries
Lal Bhadur Shastri Academy of Nautical Science, Mumbai
November 30, 2001

14. Shri R.P.Uniyal
Asstt. Director (O.L.)
*Rajbhasha Patrakarita*
Kendriya Anuwad Bureau, Mumbai
December 5, 2001

15. Shri A.K. Reddy
Technical Officer
EIA Studies related to Aquafarms
Lal Bahadur Shastri College of Advanced Maritime Studies and Research, Mumbai
December 7, 2001

16. Dr. M. Makesh
Scientist
PCR and its Applications
Bhavans College, Mumbai
December 28, 2001

17. Dr. K. Pani Prasad
Scientist
Fish Health Management
Bhavans College, Mumbai
December 28, 2001

18. Shri A.K. Reddy
Technical Officer
Carp Culture, Freshwater Prawn Culture, Polyculture of Carps and Freshwater Prawn
Maharogi Sewa Samiti, Somnath
March 8-10, 2002

19. Dr. S.D. Singh
Principal Scientist
Awareness in Human Society for Biotechnology with Special Reference to Aquaculture
Kharland Research Station,
Konkan Agricultural University, Panvel
February 12, 2002

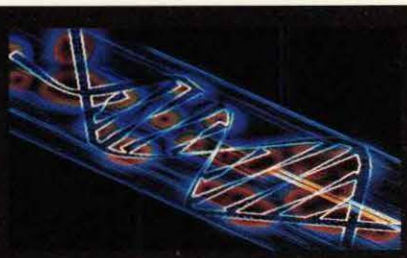
### 5.5 Summer training

Summer training related to Fish immunology was offered to the post-graduate students from K.S.R. college o Arts and Science, Mumbai, American College, Madurai, Tamilnadu and Goa University, Goa.

### 5.6 Overseas Students Training

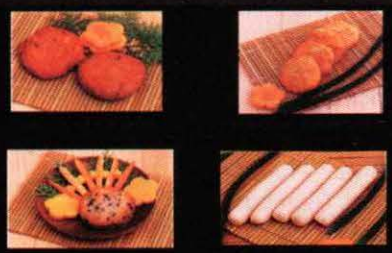
A new scheme of training students overseas was initiated this year under the Sir Dorabji Tata Memorial Endowment fund in association with Network of Aquaculture Centres in Asia-Pacific (NACA), Bangkok. First batch of three students were sent to Thailand, the details of which are as follows:

**Mr. Baneshwar Singh**
M.F.Sc. (FRM)
Genetic Engineering & Biotechnology
February 20-March 13, 2002
DNA Technology Laboratory,
Department of Biotechnology,
Kasetsart University, Bangkok, Thailand



**Mr. S. John Josephraj**
Ph.D. (FRM)
Remote Sensing & Geographic Information Systems Application in Fisheries
March 4-22, 2002
The GIS Centre,
Royal Thai Department of Fisheries,
Bangkok, Thailand

**Ms. Teresa Neelima Giles**
M.F.Sc.(Post Harvest Technology)
Post Harvest Technology, Quality Assurance, Fish Inspection & HACCP
March 4-22, 2002
Fish Inspection Centre, Songkhla, Thailand &
Department of Fishery Products,
Faculty of Fisheries,
Kasetsart University Bangkok, Thailand



### 6.1 Short Term Training Programmes

| Sl.No. | Name of the training programme | Date | No. of participants |
|---|---|---|---|
| **CIFE, Mumbai** | | | |
| 1. | Fish Products for Fisherwomen | April 30- May 5, 2001 | 20 fisherwomen |
| 2. | STRIDE - A Short Course on Digital Imaging and Publications | May 10-19, 2001 | 9 |
| 3. | Fish Nutrition and Feed Technology | May 8-14, 2001 | 7 |
| 4. | Basic Application of Computers at Primary Level | May 21-26, 2001 | 22 children |
| 5. | Aquaculture Engineering | May 22-31, 2001 | 4 |
| 6. | Biochemical Techniques in Fisheries | June 19-25, 2001 | 9 |
| 7. | Breeding Strategies in Fisheries | July 3-9, 2001 | 13 |
| 8. | Carp and Catfish Breeding and Culture | July 17-23, 2001 | 10 |
| 9. | Ornamental Fish Culture | September 11-17, 2001 | 21 |
| 10. | IPR and WTO Awareness | September 18-20, 2001 | 61 |
| 11. | Freshwater Prawn Hatchery Management | September 20-27, 2001 | 18 |
| 12. | Environment Impact Assessment in Aquaculture | October 16-22, 2001 | 4 |
| 13. | Fish Health Management | October 30- November 5, 2001 | 7 |
| 14. | Fish Processing and Product Development | November 20-26, 2001 | 8 |
| 15. | Environmental Management in Fisheries | December 4-10, 2001 | 4 |
| 16. | Culture of Live Food Organisms | January 8-14, 2002 | 9 |
| 17. | Entrepreneurship Development and Project Formulation in Fisheries | January 15-21, 2002 | 21 |
| 18. | Computer Applications in Fisheries | January 29- February 4, 2002 | 13 |
| 19. | Integrated Coastal Zone Management | February 12- March 4, 2002 | 11 |
| 20. | Hortish- Special Course for Indian Institute of Horticulture Research, Bangalore on Computer Graphics and Imaging | March 6-15, 2002 | 10 |
| **Kolkata Centre of CIFE** | | | |
| 1. | Preparation of Value Added Products | March 18-23, 2002 | 35 |
| 2. | Carp Breeding and Nursery Pond Management (Specially for Women) | June 11-16, 2001 | Over 100 invitees |
| 3. | Preparation of Aquarium for Rearing of Ornamental Fishes (In Hindi) | September 19-20, 2001 | 35 |
| **Kakinada Centre of CIFE** | | | |
| 1. | Giant Prawn Hatchery Management and Grow-out Techniques | June 14-23, 2001 | 15 |
| 2. | Breeding and Culture of Carps | July 10-19, 2001 | 10 |
| 3. | Brackishwater Finfish & Shellfish | August 1-8, 2001 | 14 |
| 4. | Freshwater Prawn Hatchery Management | September 18-24, 2001 | 6 |
| 5. | Some aspects of Inland Fisheries for the A.P. State departmental officers of SIFT, Kakinada | October 15-20, 2001 | 18 |
| 6. | Freshwater Prawn and Fish Farming | October 30-November 8, 2001 | 12 |
| 7. | Awareness cum-training programme on Scampi Farming ( conducted at Mahaboobnagar, A.P.) | January 17-19, 2002 | 45 |

**Rohtak Centre of CIFE**

| | | | |
|---|---|---|---|
| 1. | Training on Ornamental Fish Breeding and Culture | May 15-21, 2001 | 12 |

**Powarkheda Centre of CIFE**

| | | | |
|---|---|---|---|
| 1. | Fish Seed Rearing | July 25-August 3, 2001 | 11 |
| 2. | Breeding and Culture of Carps | August 22-September 5, 2001 | 19 |
| 3. | Culture of Carps | October 16-25, 2001 | 6 |

**Lucknow Centre of CIFE**

| | | | |
|---|---|---|---|
| 1. | Carp Culture (special training programme for Jammu & Kashmir and U.P. Trainees ) | April 16, 2001- October 10, 2001 | 19 |
| 2. | Carp Culture (special training programme for Jammu & Kashmir and U.P. Trainees ) | October 16 - April 15, 2002 | 15 |

### 6.2 Summer School sponsored by ICAR, New Delhi

| | | |
|---|---|---|
| 1. | Environmental Impact Assessment and Management of Coastal Zones: An Integrated Approach | August 7-27, 2001 |

### 6.3 Indo-Israel International Training Programme

| | | |
|---|---|---|
| 1. | Advances in Aquaculture | August 29-September 6, 2001 |

### 6.4 Fisheries Awareness Programme/Visit Coordination

1371 Students from all over India visited the Institute as a part of their study tour during the period. The composition of the group was as follows :

| Sl.No. | Category | Number |
|---|---|---|
| 1 | Fisheries College Students | 78 |
| 2 | Post graduate students from different colleges | 52 |
| 3 | Graduate students from different colleges | 451 |
| 4 | Primary School Children | 600 |
| 5 | Others | 175 |
| 6 | Trainees from CIFE Center, Lucknow | 15 |
| | Total | 1371 |

A team of 15 women members from Tapuriaghata Village of North 24 Parganas have been in touch w the Kolkata Centre of CIFE throughout the year for developing awareness of fish farming activity, value added fishery products and other related jobs.

## 6.5 Exhibitions

| Sl.No. | Title | Duration |
|---|---|---|
| 1. | Exhibition on the occasion of State Farmers Day in collaboration with the Department of Fisheries, Haryana at Faridabad | July 10, 2001 |
| 2. | Exhibition on the occasion of Kisan Mela in collaboration with Department of Fisheries, Haryana | September 21-25, 2001 |
| 3. | Meen Milan during the International Symposium on Fish for Nutritional Security in the 21st Century, CIFE, Mumbai | December 4-6, 2001 |
| 4. | Exhibition on the occasion of International Conference on Women in Fisheries, Mumbai | December 11-12, 2001 |
| 5. | Science Exhibition at Shamli (Dist.) Muzaffarnagar, U.P. | December 19-22, 2001 |
| 6. | Second State Level Science Exhibition at Pratapgarh, U.P. | December 27-30, 2001 |
| 7. | Ornamental Fish Exhibition, Mumbai Aquarium Society, Mumbai | January 23-27, 2002 |
| 8. | Exhibition on Kisan Mela-Wheat Day, Zonal Agriculture Research Station (J.N.K.V.V.) Powarkheda | March 2, 2002 |
| 9. | Exhibition on Bioresources, Versova | March 22-26, 2002 |



## 6.6 Radio talks

| Sl.No. | Name | Topic & Venue | Date |
|---|---|---|---|
| 1. | Shri P. Srinivasa Rao<br>Technical Officer | Brood stock management and seed production of carps (in Telugu) at All India Radio, Visakhapatnam | May 29, 2001 |
| 2. | Shri K. Murali Mohan<br>Technical Officer | Mixed farming of milkfish and tiger prawn in brackishwater ponds (in Telugu) at All India Radio, Visakhapatnam | January 16, 2002 |
| 3. | Shri K. Radha Krishna Reddy<br>Technical Assistant | Brood stock management of *Clarias* (in Telugu) at All India Radio, Visakhapatnam | March 5, 2002 |

### 6.7 Farmer's Meet/Kisan Goshthi

Kisan Goshthi was organized at the Kakinada Centre of CIFE on July 10, 2001 which was celebrated as Special Fish Farmers Day. Around 70 fisherman participated in this Goshthi.

Fishermens' meet was organised from March 22-26, 2002 at Versova Village, Mumbai. More than 50 fishermen participated in the meet.

Farmers' meet was organized at MSS, Somnath on March 10, 2002.

### 6.8 Technical guidance

Dr. G.Venugopal, Officer-In charge, Kakinada and his team visited six scampi farms at Gadwal region and extended technical guidance on Scampi culture and fish culture.

CIFE Kakinada Centre have extended technical guidance to the farmers on the aspects of carp culture and seed production, freshwater prawn farming, seed production and grow out techniques for *Clarias batrachus*, brackishwater fin fish and shell fish farming and health management. Besides this, water and soil management problems were also attended.

### 6.9 Fishery Advisory Service

Fisheries Advisory Service were provided to 165 clients on various aspects of fisheries at CIFE, Mumbai.

At the CIFE Centres Fisheries Advisory Service were provided to entrepreneurs, farmers, extension officers regarding prawn farming, pros and cons of aquaculture, disease control, etc.

Staff at the centres also visited various farms and advised them suitably to improve upon their aquaculture programmes

### 6.10 Women's Cooperative Society

A Women's Cooperative Society named *Matsyagandha* was formed for production of value added fish products at Mumbai and similar efforts at Kolkata, in collaborations with TIFAC, Department of Science and Technology, Govt. of India are underway.

### 6.11 Transfer of Technology

a) Technology transfer of carp seed production to M/s. Sri Sai Ram Hatcheries, Pallivada, Krishna District, A.P. This hatchery takes up only carp spawn production by operating Chinese circular hatchery on commercial basis. The farmer expressed the following problems.

- Improper development of brood stock
- Mortality of hatchlings after 24 hours of hatching
- Poor response of male spawners

Scientist and technical staff of CIFE Kakinada centre visited the hatchery and investigated the problems. Suitable remedial measures were suggested and successful spawn production in

Chinese hatchery was demonstrated. About 410 millions of carp spawn production was demonstrated and further hatchery operations were continued with the same techniques and farmer had achieved a production of 1500 million spawn during the year 2001. In recognition of high level of carp spawn production M/s. Sai Ram Hatchery was adjusted as *Best fish hatchery* of the district.

b) Transfer of Scampi culture technology in Telangana region of A.P.

Unlike coastal districts of A.P., in the northern districts of A.P., which is known as Telangana region, aquaculture activities are not well developed. The CIFE, Kakinada centre has taken lead to transfer the scampi culture technology to the farmers of the Gadwal region where about 150-200 acres are being put to culture. Identification of morphotypes, hand sexing, water management and feed management were demonstrated. Technical guidance was provided on aspects of stock manipulation, partial culling, health management.

c) Demonstration of Seabass culture

Demonstration of seabass culture is being taken up at a private brackishwater fish farm at Vakapadu Village, near Yellamanchili, Visakhapatnam District. The culture demonstration in 1.0 ha grow out pond is in progress. The stock is fed and managed on formulated feed. The average growth of the stock is in the range of 400-700 g over a period of 7 months. It is proposed to harvest the stock by the end of May 2002.

## 6.12 Farm revenue

The following are the details of revenue obtained from Brackishwater farm, Kakinada Centre revenue by sale of seed, prawn, fish, etc.

| | | |
|---|---|---|
| *Chanos chanos* | 493.7 kg | Rs.12,033 |
| *Chanos chanos* seed | 40 Nos. | Rs. 100 |
| *Lates calcerifer* | 79.37 kg | Rs. 3,092 |
| *Penaeus monodon* | 136.27 kg | Rs.17,463 |
| Miscellaneous fish | 40-85 kg | Rs. 493 |
| **Total revenue** | | **Rs.33,181** |

The details of revenue realized from Freshwater fish farm, Balabhadrapuram are as follows:

| | |
|---|---|
| Spawn/fry/adult fish sales | Rs.35,630 |
| Prawn sales | Rs. 1,382 |
| Coconut/Grass sales | Rs. 7,200 |
| **Total revenue** | **Rs.44,212** |

A total revenue of Rs.1,41,554 was generated by the sale of spawn and fingerlings of Catla, Rohu, Mrigal, Silver carp and Grass carp by the Powarkheda centre of CIFE.

## Chal Rajbhasha Shield and Rajbhasha Shri Award

The Chal Rajbhasha shield was awarded to CIFE for the third consecutive year by the *Ashirwad* a cultural and social organization of Mumbai.

Shri Anu Gujarati, Hon'ble Speaker of Maharashtra Vidhansabha presented the award to Dr. S. Ayyappan, Director, CIFE on September 5, 2001.

Shri R.P. Uniyal, Asstt. Director (O.L.) was awarded the Rajbhasha Shri award on this occasion.

## Dr. S.Z. Qasim Gold Medal

Dr. K. Pani Prasad, Scientist received the Dr. S.Z. Qasim Gold Medal of the Society of Biosciences for the year 2000 from Dr. Harsh K. Gupta, Secretary, Department of Ocean Development, New Delhi on September 11, 2001 during the National Symposium on `Basic Sciences and Fisheries' held at Central Institute of Fisheries Education.

## Felicitation

Prof. S.D. Singh, Principal Scientist, CIFE Mumbai was felicitated by Hon'ble Chief Minister of Maharashtra, Shri Vilasrao Deshmukh during Annual Day Function of Smt. Sushiladevi Deshmukh College at Vashi, Mumbai on January 12, 2002 for his contributions in bringing awareness of biotechnology among students and society.

Dr. C.S. Chaturvedi, Technical Officer, Lucknow Centre of CIFE was felicitated by the U.P. Science & Technology Council, Mujaffarnagar for his best scientific paper presentation in State level Science Mela conducted between December 19 and 22, 2001.

## Post Doctoral Fellowship

Dr. K.V. Rajendran, Senior Scientist was awarded the Korea Science and Engineering Foundation (KOSEF) Post-doctoral Fellowship (26 April 2000- 26 April 2001).

## Best Poster Presentation

Dr. K.V. Rajendran, Senior Scientist was awarded the Best Poster Presentation Prize at the European Association of Fish Pathologists (EAFP) 10th International Conference on Diseases of Fish and Shellfish, Trinity College, Dublin, Ireland (9 to 14 September 2001).

## Best Exhibition

Lucknow Centre of CIFE, Mumbai won the first prize in recognition of its excellence in technology displayed at the Science exhibition held at Shamli district, Muzaffarnagar, U.P. from December 19-22, 2001

Lucknow Centre of CIFE, Mumbai again won the first prize in the State level exhibition organized by Council of Science & Technology U.P. from December 27-30, 2001 at Pratapgarh Distt. Allahabad (U.P.) In the exhibition various hatchery models, aquaria with live fishes, prawn, fry, fingerlings, etc., were put up and live demonstrations of various aquaculture techniques were shown to the visitors.

## Chal Raj Bhasha Shield of CIFE

The Chal Raj Bhasha Shield for the year 2001-02 was awarded to the Lucknow Centre of CIFE.

## Membership in Professional Body

Dr. K.K. Jain, Sr. Scientist has been elected as a Life Member of the National Academy of Sciences (India), Allahabad

## Sports

The Institute participated in the ICAR Inter-institutional sports tournament at CIAE, Bhopal from November 3-7, 2001 and won the following prizes:

| Name | Event | Place |
|---|---|---|
| Mrs. V. Tambe | 100 mt | First |
| | 200 mt | First |
| Mrs. S.M. Bagwe | Discus throw | First |
| | Javelin throw | Second |
| | Carrom | Second |
| Ms. Revti Dhongade | Chess | First |

The winners in the ICAR Inter-institutional sports tournament participated in the Final ICAR Zonal tournament held at IARI, New Delhi from March 27-3, 2002 and Mrs. S.M. Bagwe was placed Second Runner-up in Carrom

# Institutional awards

## CIFE Dr. Hiralal Chaudhuri Awards 2000-01

The Institute introduced a set of Annual Awards under the auspices of the Dr. Hiralal Choudhuri Endowment, with a view to recognize the contributions of the staff of the Deemed University as also fish farmers in different areas from the year 2000-01..

**Best Section/ Best Research Group of the Institute**

Division of Aquatic Environment and Fish Health Management

**Best Young Scientist of the Institute**
Dr. K. Pani Prasad
Scientist

**Best Technical Staff of the Institute**
Shri Dasari Bhoomaiah
Technical Officer
and
Shri Chandrakant C.H.
Technical Officer

**Best Administrative Staff of the Institute**
Mrs. Valsa Pavitran
Assistant
and
Mrs. Kaberi Biswas
Stenographer

**Best Supporting Staff of the Institute**
Shri Ashok More
SSG-II
and
Shri B.R. Chavan
SSG-II

**Best Teacher of the Deemed University**
Dr. R.S. Biradar
Principal Scientist

**Award for Hindi work at the Institute**
Dr. K.K.Jain
Senior Scientist
and
Dr. Sudhir Raizada
Senior Scientist

**Award for Technology Transf**
Shri A. K. Reddy
Technical Officer

**Best Fish Farmer**
Shri Haricharan Das
Agartala

**Awards for Staff Children (X S**
Shri Vaibhav Saharan,
Son of Dr.(Mrs.) Neelam Sahar
Sr.Scientist

**Awards for Staff Children (XII**
Shri Shaikh Farhan Iftekhar
Son of Late Dr. M.B.Iftekha
Sr. Scientist

## CIFE staff awards for promoting work in Hindi

### First Prize

Shri Chandrakant Kareer
Technical Assistant

Shri Raju Deshmukh
Technical Assistant

### Second Prize

Mrs. Sandhya Wadawkar
Assistant

Shri Kishore Jagtap
Junior Clerk

Shri Sambhaji Shinde
Technical Assistant

### Consolation prize

Dr. Somdutt
Sr. Scientist
Powarkheda of CIFE Centre.

### For Hindi Typing

Mrs. Swati Koli
Senior Clerk

Mrs. Anagha Joshi
Junior Clerk

Shri Vijay Kuveskar
Senior Clerk

Ms. Kaveri Biswas
Stenotypist

Shri Phoolchand Verma
Junior Clerk



Shri Ravi Kumar
Technical Assistant

## 8.1 Linkages and collaboration

CIFE maintains linkages with various national and International organizations and agencies for faculty exchange and research collaborations. These would further be enlarged and strengthened during the X Plan for a more fruitful academic, research, and extension activities through multi-disciplinary, collaborative research, with the following Institutions:

### International institutions

1. International Ocean Institute, Operational Centre, India (Oceanography and Coastal Zone Management)
2. International Ocean Institute, Malta (Oceanography and Coastal zone management )
3. ICLARM (Aquaculture)
4. FAO (Capture and Culture Fisheries, AHRD)
5. SEAFDEC (Aquaculture)
6. NACA (Aquaculture)

### GOI Organizations

1. IFP, Cochin (Fish Products)
2. CICEF, Bangalore (Development of Fish Harbours & Coastal Aquaculture Farms)
3. CIFNET, Cochin (Nautical Engineering)
4. FSI, Mumbai (Exploratory Survey)
5. DOD, New Delhi (Oceanography)
6. DST, New Delhi (Biotechnology)
7. DBT, New Delhi (Biotechnology)
8. MPEDA, Cochin (Ornamental Fish Culture)

## ICAR Institutes

1. CMFRI, Kochi (Marine Fisheries and Sea Farming)
2. CIBA, Madras (Brackishwater Aquaculture)
3. CIFA, Bhubaneshwar (Freshwater Aquaculture)
4. NRCCWC, Bhimtal (Coldwater Fisheries)
5. CICFRI, Barrackpore (Inland Capture Fisheries)
6. NBFGR, Lucknow (Genetics and Biotechnology)
7. CIFT, Kochi (Fisheries Technology)

## CSIR Institutes

1. ITRC, Lucknow (Toxicology)
2. CDRI, Lucknow (Drug based Sea Resources)
3. CIMAP, Lucknow (Drug based Sea Resources)
4. CFTRI, Mysore (Product Development)
5. NIO, Goa (Fisheries Oceanography)

## Other Institutes

1. NIN, Hyderabad (Fish Nutrition)
2. IIT, Kharagapur (Aquaculture Engineering)
3. IIT, Madras (Ocean Engineering & Coastal Zone Management)
4. ZSI, Calcutta (Basic Taxonomy)
5. Goa University (Biotechnology)
6. IIS, Bangalore (Molecular Biology & Biotechnology)
7. Cochin University of Science & Technology (Industrial Fisheries)
8. NRSA, Hyderabad (Remote Sensing)
9. NIOT & ICMAM, Chennai (Coastal Zone Management)
10. CAS in Marine Biology, Parangipettai (Marine Biology & Oceanography)

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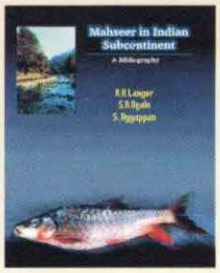


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Catfish Breeding and Culture in India.

Cell and Tissue Culture Techniques

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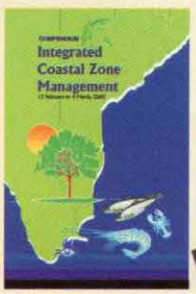




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**i CIFE(M)-2000/1-AQ-I (S1)**
Trials on cage culture of commercially important fishes in open waters
Kohli, M.P.S. (PI), Ayyappan, S., Dube Kiran, Saharan Neelam, Patel, M.B., Reddy, A.K., Langer, R.K. and Chandra Prakash

**ii CIFE(M)-2000/1-AQ-I(S2)**
Impact of certain organophosphorus pesticides on body fluids and tissue of a common teleost *Labeo rohita*
Saharan Neelam (PI), Raizada, S. and Srivastava, P.P.

**iii CIFE(M)-2000/1-AQ-I(S3)**
Comparative evaluation of extent of impact of Agriculture / Industry / Fisheries and Aquaculture on the coastal aquatic ecosystems in selected study areas
Kohli, M.P.S. (PI), Saharan Neelam, Patel, M.B. Chandra Prakash and Jaiswar, Ashok

**iv CIFE(M)-2001/1-AQ-I(S5)**
Genetic variation in Ulva species from natural resources and biotechnically reared sources
Deshmukhe Geetanjali(PI), Singh, S.D., Dwivedi, Alkesh and Srivastava, P.P.

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**i CIFE(M)2000/2-FGB-I(S1)**
Studies on population genetics of marine shrimp, *Penaeus monodon*
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**ii CIFE(M)-2000/2-FGB-I(S2)**
Estimation of rate of inbreeding in fish population of hatcheries of Maharastra.
Jahageerdar, Shrinivas (PI) and Biradar, R.S.

**iii CIFE(M)-2000/2-FGB-I(S3)**
Studies on the karyomorphology of Brackish water fishes *Lates calcarifer* and *Chanos chanos* in relation to heavy metal pollution
Gopal Krishna (PI), Lakra,W.S. and Bandkar, Sanjeev

**iv CIFE(M)-2000/2-FGB-I(S5)**
Optimisation of sperm:egg ratio in Indian carps
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**v CIFE(M)-20001/2-FGB-I(S6)**
Development of genomic library of WSSV for identification, cloning and expression of major antigenic protein(s)
Akare Sandeep (PI), Makesh, M., Lakra, W.S., Mukherjee, S.C. and Bandakar, S.

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**iv CIFE(M)-2000/3-FHM-I(S4)**
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**v CIFE(M)-2001/3-FHM-I(S5)**
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**vi CIFE(M)-2001/3-FHM-I(S6)**
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**5 CIFE(M)-2000/5-PHT-I**
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**ii CIFE(M)-2000/5-PHT-I(S2)**
Value-added products from low-cost fish
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**iii CIFE(M)-2000/5-PHT-I(S3)**
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**iii CIFE(C)-2001/6-CAL-I(S5)**
Conceptual frame work of a working model for women fisheries co-operative at a selected village in West Bengal : A Pilot Study
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**7 CIFE(L)/7-LUC-I**
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**i CIFE(L)-2000/7-LUC-I(S1)**
Utilization of freshwater mussel Lamillidens marginalis Lamark available in and around Lucknow for pearl culture technology and for therapeutic purposes
Zeba Jaffar (PI) and Sherry, P.M.

**ii CIFE(L)-2000/7-LUC-I(S2)**
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**iii CIFE(L)-2000/7-LUC-I(S3)**
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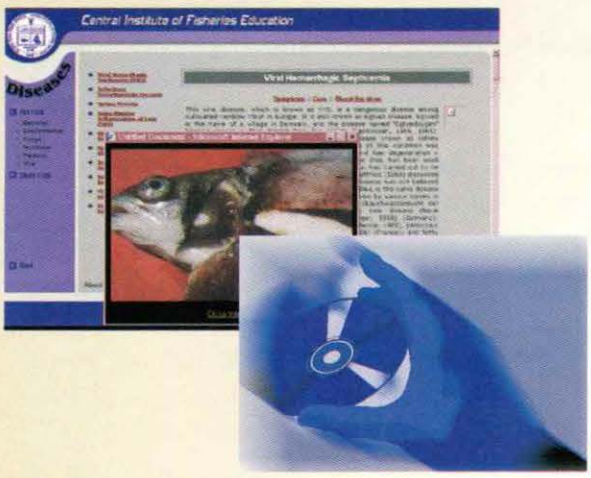
Standardisation and transfer of technology for breeding and culture of *Clarias batrachus*
Sharma, A.K. (PI), Chaturvedi, C.S., Yadav, A.K., Upadhya, S.K. and Sanjay Singh

**8 CIFE(K)-2001/8-KAK-I**
**Experiments on Eco-friendly Culture Practices in Aquaculture**
Venugopal, G. (PI), Muralimohan, K, Srinivasa Rao, P., Acharyulu, V.N., Satyanarayana, P., Patnaik, R.R.S. and Murthy, S.S.N.

**9 CIFE(P)-2001/9-POW-I**
**Integrated farming of certain finfish, livestock and agrocrops**
Somdutt (PI), Rizvi, S.S.H., Murthy, K.B.S., Upadhyaya, R.K., Dubey, V.G. and Singh Gurubachan

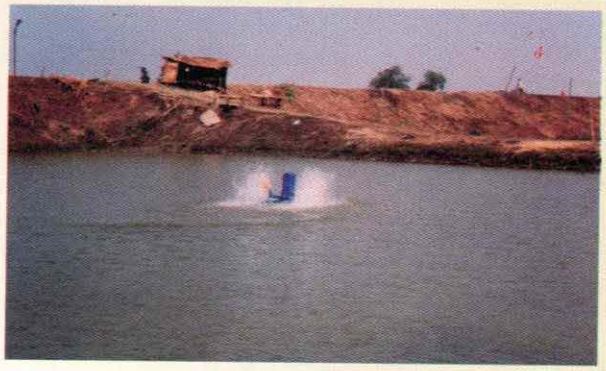
## Externally Funded Projects

| Title of Project | Funding Agency | PI / Co-ordinator/ Associates | Budget (Rs. lakh) | Duration |
|---|---|---|---|---|
| Thermal tolerance of important fish species from River Kali, Karnataka | DAE | Dr. S. Ayyappan (PI)<br>Dr. A.K. Pal | 12.25 | 1999-2003 |
| Intensive seed raising and growout production of carp through multiple cropping | DST | Dr. S. Ayyappan (PI)<br>Mr. A.K. Reddy<br>Mrs. Asha Landge | 13.73 | 2001-2004 |
| Assessment of environmental parameters and the Marine lLiving resources (Primary and Secondary) in the Indian EEZ and the role of Myctophid fauna in the mesopelagic habitat | DOD | Dr. C.S. Purushothman (PI) | 2.80 | 1997-2002 |
| Resource assessment & biology of the deep sea fishes along the continental slope of the Indian EEZ collaborations | DOD | Dr. R.S. Biradar (PI) | 6.65 | 1997-2001 |
| Studies on deep scattering layer | DOD | Dr. S. Basu (PI) | 4.88 | 1997-2002 |
| Harvest technology & catch composition of deep sea fishery resource in the Indian EEZ | DOD | Dr. Latha Shenoy (PI) | 3.95 | 1997-2001 |
| Standardization of techniques for commercial seed production of giant prawn using inland saline water | A.P.Cess Fund, ICAR | Dr. A. K. Jain (PI)<br>Dr. M. Ali | 7.63 | 1998-2001 |
| Microflora associated with histamine formation & histamine decomposition | A.P.Cess Fund ICAR | Dr. S. Basu (PI) | 17.04 | 1999-2002 |
| Development of interactive CD-ROM for finfish and shellfish diseases | Education Division ICAR | Dr. Pani Prasad (PI)<br>Dr. R.S. Biradar<br>Mr. Dasari Bhoomaiah | 5.50 | 2001-2002 |
| Cytogenetic and molecular characterization of the giant freshwater prawn | A.P.Cess Fund ICAR | Dr. W.S. Lakra (PI)<br>Dr. Aparna Choudhari | 17.74 | 2000-2003 |
| Fish production using brackish-water in arid ecosystem | NATP | Dr. A. K. Jain (PI) | 25.01 | 2000 -2003 |




# List of approved on-going projects

| | | | | |
|---|---|---|---|---|
| Laboratory and field culture of edible Seaweeds along Maharashtra coast and their product development for health and nutrition | DOD | Dr. Kiran Dube (PI)<br>Dr. S. Basu,<br>Dr. Geetanjali Deshmukhe,<br>Dr. P.P.Srivastava,Mr. Alkesh Dwivedi | 10.02 | 2000-2003 |
| In-service training programme in molecular biology | DBT | Dr.S. Ayyappan (PI)<br>Dr. W.S. Lakra,<br>Dr. Gopal Krishna,<br>Dr. Aparna Choudhari,<br>Dr. Jahageerdar,<br>Dr. S. Akare,<br>Dr. R.S. Rana | 59.37 | 2000- 2003 |
| Wound healing, antineoplastic and antioxidant compounds from two marine crinotoxic fishes | CGP/ NATP | Mr. K. Venkateshvaran (PI)<br>Dr. Ayyappan,<br>Dr. Mukherjee,<br>Dr. G.Venkateshwarlu,<br>Ms. Asha Landge,<br>Ms. Nalini Poojary | 20.44 | 2001 - 2003 |
| Development and characterization of cell lines from selected fish and shellfish species used in aquacultre | DBT | Dr. W. S. Lakra, CIFE (PI)<br>Dr. R.R. Bhonde, NCCS, Pune | 20.45 | 2001-. 2004 |
| Human resource development in coastal bioresource development and management | DBT | Dr. S. Ayyappan (PI)<br>Dr. W. S. Lakra<br>Mr. K. Venkateshvaran | 17.00 | 2001-2002 |
| Semi-Intensive carp polyculture for employment and entrepreneurship generation | DBT | Dr. S. Ayyappan (PI) | 35.18 | 2000-2003 |
| TOTAL | | | 279.64 | |



**1. Evaluation of cotton seed meal derived from Bt-Gene cotton Seed as a feed ingredient for Indian catfish *magur* (*Clarias batrachus*)**
M/s. Maharashtra Hybrid Seed Company (MAHYCO), Mumbai
Dr. K.K. Jain
Dr. P.P. Srivastava
Dr. S. Raizada

**2. Evaluation of Glyphosate commercial formulation 'Roundup', used against aquatic weed waterhyacinth (*Eichhornia crassipes*), residue in fish**
M/s. Monsanto India Limited, Mumbai
Dr. K.K. Jain
Dr. P.P. Srivastava
Mr. A.K. Reddy
Dr. Chandra Prakash
Mrs. K. Thilgavathy

**3. Comparative muscle biochemistry and genetics of fish for applications in Surumi**
M/s. Hindustan Lever Limited, Mumbai
Dr. Aparna Chaudhari
Dr. A.K. Pal
Mr. Sanjeev Bhandkar

# 12 Participation of faculty in Conference/meetings/training programme etc. in India and abroad

## 12.1 Participation of faculty in Conference/meetings etc. in India

| S.No | Meeting | Date | Venue | Attended by |
|---|---|---|---|---|
| 1. | Interactive workshop on Prawn and Air-breathing fish | March 15, 2001 | ARTC, Hissar (Haryana) | Dr. Sudhir Raizada |
| 2. | Inter-regional Workshop on Techno-Economic Performance of Marine Capture Fisheries and the Role of Economic Incentives, Value Addition and Changes of Fleet Structure | April 2-6, 2001 | Lucknow | Dr. S. Ayyappan |
| 3. | Harnessing Intellectual Property for Strategic Competitive Advantage | April 8, 2001 | IIM, Ahmedabad | Dr. G.Venkateshwarlu |
| 4. | Meeting for collaborative projects between ICLARM and ICAR | April 12-13, 2001 | Lucknow | Dr. S. Ayyappan |
| 5. | Fisheries Working Group Meeting of IX plan at Planning Commission | 24 April 2001 | New Delhi | Dr. S. Ayyappan |
| 6. | AHRD Technical Committee Meetings of SIFT | May 2001 | Commissioner of Fisheries, Hyderabad | Dr. G. Venugopal |
| 7. | Workshop on Application of Radiation in Presentation and Quality Control of Fishery Products | June 4, 2001 | Visakhapatnam | Dr. S. Basu |
| 8. | The Retreat Programme of the Senior Executives of ICAR at IIM | June 8-10, 2001 | Ahmedabad | Dr. S. Ayyappan |
| 9. | Meeting at ICAR and DBT Task Force Meeting | June 25, 2001 | New Delhi | Dr. S. Ayyappan |
| 10. | Hindi Workshop on *Ghan Hindi parirakshan va karyashala* | July 2-6, 2001 | NAARM, Hyderabad | Dr. C.S. Chaturvedi<br>Shri Sunil Kumar |
| 11. | Meeting on Agricultural Research Prioritization for South and West Asia Region of APAARI | July 5, 2001 | ICRISAT, Hyderabad | Dr. S. Ayyappan |
| 12. | ICAR Meeting on Training capabilities in Agriculture | July 12, 2001 | New Delhi | Dr. S. Ayyappan |
| 13. | Seminar on Mac OSX | July 17, 2001 | IIT, Mumbai | Mrs. Madhavi Pikle<br>Ms. Rajani Pagare |
| 14. | MoU meeting | August 1-2,2001 | GAU and CSMCRI, Bhavnagar | Dr. S. Ayyappan |
| 15. | First Meeting of the Advisory Committee of the Project WATER | 10 August, 2001 | XIM, Bhubaneswar | Dr. S. Ayyappan |
| 16. | Book Writing Workshop | September 4, 2001 | ICAR, New Delhi | Dr. R.S. Biradar |
| 17. | Requirement Analysis Workshop on the NATP Mission Mode Project on Integrated National Agricultural Research Information System | September 26-27, 2001 | NBFGR, Lucknow | Dr. S.N. Ojha and<br>Dr. A.K. Sharma |
| 18. | National Official Language Seminar on Use of Hindi in ICAR Research Institutes, | 12 October, 2001 | CMFRI, Kochi | Dr. S. Ayyappan |
| 19. | International Conference on Pesticide Environment and Food Security | November 19-23, 2001 | IARI, New Delhi | Dr. Subhendu Datta |
| 20. | Programme on Indian Environmental Legislation | October 22, 2001 | IIQM, Jaipur | Dr. C.S. Purushothaman |
| 21. | Programme on Internal audit for Environmental Management System (ISO 14001) | October 23-24, 2001 | IIQM, Jaipur | Dr. C.S. Purushothaman |
| 22. | Workshop on *Rajbhasha Neeti ki Prathamikata evam Uttardayeetva* | November 6-9, 2001 | NAARM, Hyderabad | Shri R.P. Uniyal<br>Shri P.K. Das |
| 23. | Workshop-cum-Discussion on National Biodiversity Strategy & Action Plan-East Coast Eco-region | November 16, 2001 | Ministry of Environment and Forests, New Delhi | Dr. G. Venugopal |
| 24. | International Conference on Application of Radioisotopes and Radiation Technology in 21st Century | December 12-14, 2001 | Hotel Oberoi, Mumbai | Dr. S. Basu |
| 25. | Basic Applications Using SPSS | December 21, 2001 | SPSS South Asia, Kolkata | Dr. Subhendu Datta |
| 26. | Meeting Agri-clinics and Agri-business | 22 December, 2001 | MANAGE, Hyderabad | Dr. S. Ayyappan |
| 27. | 89th Indian Science Congress | March 31-April, 2002 | CCMB, Hyderabad | Dr. S. D. Singh |

## Participation of faculty in Conference/meetings/training programme etc. i India and abroad

| | | | | |
|---|---|---|---|---|
| 28. | Workshop of NATP on Fish Production using Brackishwater in Arid ecosystem | January 9, 2002 | Udaipur | Dr. Sudh<br>Dr. Atul |
| 29. | National Seminar on Environmental Toxicology | January 12-13, 2002 | Govt. N. Collage, Hoshangabad | Dr. Som<br>Shri S.S.<br>Shri R.K.<br>Shri V.G |
| 30. | Workshop cum- training Programme on PME under NATP | January 14-15, 2002 | NCAP, New Delhi | Dr. K.K.J |
| 31. | XIV Annual Conference and National Seminar at IVRI | January 18, 2002 | Bangalore | Dr. S. A |
| 32. | National Workshop on Aquaculture Drugs | January 18-20, 2002 | CUST, Kochi | Dr. S.C.<br>Dr. K.V.<br>Dr. K.Pa<br>Dr. G. V |
| 33. | DAE-BRNS Meeting | January 29-30, 2002 | Tirunelveli | Dr. S. A |
| 34. | TES (Thermal Ecological Studies) Meeting | February 1-2, 2002 | MSU, Tirunelvelli | Dr. A.K. |
| 35. | Meet on Agri-business and Agri-Clinics | February 4-5, 2002 | MANAGE, Hyderabad | Dr. K.K. |
| 36. | Indian National Center for Ocean Information services at Hyderabad (INCOIS) for discussions with Dr. R. Chidambaram, Principal Scientific Adviser to the Prime Minister and Director, INCOIS Hyderabad | February 7-8, 2002. | INCOIS, Hyderabad | Dr. S. A |
| 37. | Seminar on Continental Shelf of West Coast and its living Resources | February 8-9, 2002 | Dep. of Geography, University of Bombay, Mumbai | Dr. C.S. |
| 38. | Meeting of the Maharashtra Coastal Zone Management Authority | February 8, 2002 | MPCB&I/CMCZMA Cell, Mumbai | Dr. R.S. |
| 39. | Planning and Implementation of Environmental Management System:ISO-14001 | February 14-15, 2002 | IIQM, Jaipur | Dr. Cha |
| 40. | Meeting with Mr. Nitin Desai, Under-Secretary General, UNO, New York | February 15, 2002 | Leela Kempinski Hotel, Mumbai | Dr. C.S |
| 41. | One day meet on Environmental Challenges for India | February 15, 2002 | Leela Kempenski Hotel, Mumbai | Dr. P.P.S |
| 42. | International Symposium on Food Nutrition and Economic Security through Diverification in Sugarcane Production and Processing systems | February 16-18, 2002 | | Dr. A.K |
| 43. | High Power Committee Meeting with Hon'ble Chairman, National Commission on Labour, Shri Ravindra Varma | February 22, 2002 | New Delhi | Dr. K.K |
| 44. | DBT project Meeting | March 10, 2002. | Nagpur | Dr. S. A |
| 45. | Workshop on Bio- informatics for Cyanobacteriologists | March 11-15, 2002. | BU, Tiruchirapalli | Mr. P.K |
| 46. | International Training programme in Intellectual Property Management and Technology Transfer | March 17-22, 2002 | University of Pune, Pune | Dr. G. |
| 47. | DST-TIFAC meeting for Fisheries | 26 March, 2002 | Kolkata | Dr. S. A |
| 48. | Workshop on Research Techniques in Cyanobacteriology | March 18-29, 2002 | BU, Tiruchirapalli | Mr. P.K |
| 49. | Working Group meeting for instructional material development for some occuaption based inland fisheries modules | March 31-April 5, 2002 | PSSCIVE, Bhopal | Dr.Arc |

## 12.2 Visits Abroad

| Sl.No. | Attended by | Date | Purpose & Venue |
|---|---|---|---|
| 1. | Dr. K.V. Rajendran, Sr. Scientist | April 26, 2000- April 26, 2001 | Project on Development and characterization of monoclonal antibodies (MAbs) for white spot syndrome virus (WSSV) of shrimp, Korea Science and Engineering Foundation KOSEF Post-doctoral Fellowship |
| 1. | Dr. K.V. Rajendran, Sr. Scientist | September 9-14, 2001 | 10th International Conference of the European Association of Fish Pathologist on Diseases of Fish and Shellfish, Trinity College, Dublin |
| 2. | Dr. S. Ayyappan, Director | October 25- November 5, 2001 | The UNOPS Supervision mission for IFAD-funded Aquaculture Development project in Bangladesh |
| 3. | Dr. S. Ayyappan, Director | November 13-15, 2001 | The FAO/NACA Expert Consultation on Aquaculture Education Consortium at Hanoi, Vietnam |
| 4. | Dr. S. Ayyappan, Director | 4-8 March, 2002 | ICLARM Board of Trustees Meeting at Penang, Malaysia |

## Participation of faculty in Conference/meetings/training programme etc. in India and abroad

### 12.3 Manpower Development

| Sl.No. | Training | Date | Venue | Attended by |
|---|---|---|---|---|
| 1. | Harnessing Intellectual Property for Strategic Competitive Advantage | April 6-8, 2001 | IIM, Ahmedabad | Dr. G. Venkateshwarlu |
| 2. | Plant Biotechnology | May 5-15, 2001 | NRCPB Biotechnology, IARI, New Delhi | Dr. Geetanjali Deshmukhe |
| 3. | Plant Cryopreservation Techniques | May 16-24, 2001 | NRCPB Biotechnology, IARI, New Delhi | Dr. Geetanjali Deshmukhe |
| 4. | Blue Green Algae and Azolla Biofertilizers for Rice | May 25-31, 2001 | NCCUBGA, IARI, New Delhi | Dr. Geetanjali Deshmukhe |
| 5. | 73rd FOCARS | June 1-Sept. 28, 2001 | NAARM, Hyderabad | Dr. Sandeep Akare |
| 6. | C.A.S. Programme on fisheries resources | June 6-26, 2001 | CMFRI, Cochin | Shri S.S.H. Razvi, Scientist |
| 7. | Summer School on Advances in Fish and Crustaceans Nutrition and Aquafeed Biotechnology | June 6-26, 2001 | CMFRI, Kochi | Shri P.K. Roy |
| 8. | Training on 3D Studio Max 4 | June 12- July 3, 2001 | NSIC,TSC, New Delhi | Shri Dasari Bhoomaiah |
| 9. | Summer School on Culture based Fisheries for Inland Fisheries Development | July 18 August 17, 2001 | CICFRI Barrackpore | Mr. B.N. Tiwari |
| 10. | Training on Freshwater Pearl culture | July 30 to August 3, 2001 | SIFT,A.P. | Shri J. Krishna Prasad |
| 11. | Summer School on Environmental Impact Assessment and Management of Coastal Zones: An Integrated Approach | August 7-27, 2001 | CIFE, Mumbai | Mr. P.K. Roy |
| 12. | Hands on training for Analysis of Biochemical Parameters of Fish under stress | Aug.22 Sep.13, 2001 | CIFE, Mumbai | Dr. Subhendu Datta |
| 13. | Advances in Aquaculture, collaboration with the Consulate General of Israel | Aug. 29 Sept. 6, 2001 | CIFE, Mumbai | Dr. Subhendu Datta |
| 14. | Advances in Microbiological and Biotechnological Methods for Detection of Pathogenic Microorganisms and their Toxins in Fishery Environment | November 5-25, 2001 | CIFT, Cochin | Dr. A.K. Sharma |
| 15. | U.G.C. sponsored Orientation refresher course | Nov. 26-Dec. 22, 2001 | University of Allahabad | Mrs. Arpita Sharma |
| 16. | Diploma course on Multimedia Engineering with proficiency in Macromedia Director and Adobe Premiere | Dec. 2000 to Apr. 2001 | Dots Software Solutions India Limited, Mumbai | Shri Dasari Bhoomaiah |
| 17. | Aquatic Animal Toxins and Pharmacological Bioresources | December 14-29, 2001 | CIFE, Mumbai | Mrs. Asha Landge |
| 18. | Vigilance Awareness | February 1-4, 2002 | CIFE, Mumbai | Dr. R.S. Biradar |
| 19. | International Training Course on Coastal Biodiversity in Mangrove Ecosystems | February 4-18, 2002 | Annamalia University Madras | Dr. Geetanjali Deshmukhe |
| 20. | Application of Molecular Techniques for Live Stock Improvement | February 6-26, 2002 | NDRI, Karnal | Dr. R.S. Rana |
| 21. | Transgenesis in Fish and Construction of Genomic DNA Libraries | February 18 - March 30, 2002 | MKU, Madurai | Dr. A.Chaudhari |
| 22. | International training programme in Intellectual Property Management and Technology Transfer | March 17-22, 2002 | University of Pune Pune | Dr. G. Venkateshwarlu |
| 23. | Recent Trends in Food Technology | March 18-22, 2002. | CFTRI, Mysore | Shri S. Kannappan |
| 24. | An International Hands-on-Training Course on DNA Sequencing and Genotyping | 25 Feb.-10 March, 2002. | C.C.M.B., Hyderabad | Dr. W.S. Lakra |
| 25. | Molecular Biology (Recombinant DNA Technology) | March 4-20, 2002 | CBT, JNU, New Delhi | Dr. P.P. Srivastava |
| 26. | Improving Organizational office Effectiveness | March 25-29, 2002 | NIMMA, New Delhi held at Goa | Mr. G.S. Fernandes |
| 27. | Impact Assessment of Technologies | | TNAU, Coimbatore | Dr. S.N. Ojha |
| 28. | Molecular Biological tools hands on training | March 31-April, 2002 | CCMB, Hyderabad | Dr. S. D. Singh |

### 12.4 Hindi Karyashala

CIFE organized 4 Computer Training Workshop in Hindi for staff from headquarter and its sub centres in which a total 85 staff members were trained during June 11-16,2001(23), June 18-25,2001(24), June 25-30, 2001(24) and August 20-25, 2001(14).

# 13 Workshops/Seminars/Summer Institute/Meeting etc. organised

**CIFE, Mumbai**

| | |
|---|---|
| May 2-3, 2001 | Programme on `Development of Leadership Qualities' |
| June 28-29, 2001 | National Workshop on `Fisheries Economics Education and Research An Overview' |
| August 7-27, 2001 | Summer School on `Environmental Impact Assessment and Management of Coastal Zones : An Integrated Approach' |
| September 7, 2001 | Workshop on `Basic Science and Fisheries' |
| September 18-21, 2001 | Workshop on `IPR and WTO Awareness' |
| November 24,2001 | Workshop on `Remote Sensing, Geographical Information Systems (GIS) and GPS' |
| December 4-6, 2001 | International Symposium on `Fish Nutritional Security for 21st Century' |
| December 11-12, 2001 | International Workshop on the `Role of Women in Fisheries' |
| January 23-24, 2002 | National Seminar on `Resource Recovery-based Wastewater Treatment systems' |
| February 1-4, 2002 | ICAR Vigilance Awareness Programme |
| February 7, 2002 | Brainstorming Session on `WTO and Fisheries' |
| February 12, 2002 | Brainstorming Session on `Fisheries Legislation in India' |
| March 11-12, 2002 | |
| March 20, 2002 | Workshop on `Challenges, Opportunities and Constraints Faced by Women in Agriculture and Allied Industries' |

**Lonavala**

| | |
|---|---|
| August 24-25, 2001 | National Workshop on `The Mighty Mahseer:Biodiversity and Genetic Conservation' |

**Udaipur**

| | |
|---|---|
| January 9, 2002 | Second Interaction Workshop of NATP on `Fish Production using Brackishwater in Arid Ecosystem' |

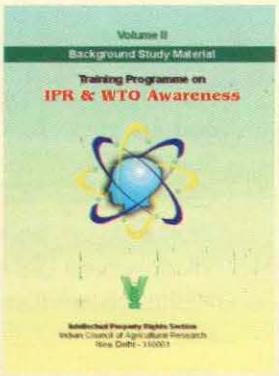
**Kakinada**

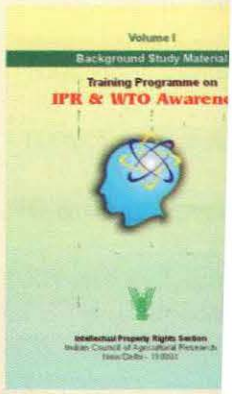
| | |
|---|---|
| March 8, 2002 | Workshop on `Responsible Brackishwater Aquaculture' |

**CIFE, Kolkata Centre**

| | |
|---|---|
| March 14-15, 2002 | National Seminar on `HRD in Fisheries and Aquaculture for Eastern and North-Eastern India' |

## Training Programme on IPR & WTO Awareness




A training programme on IPR & WTO awareness was organized during 18-20 September, 2001 under aegis of IPR Section, ICAR, New Delhi. The programme was inaugurated on September 18, 2001 at 10.00 a.m. by Chief Guest Dr. S.D. Tripathi, Former Director, CIFE. The main resource persons for conducting the training programme were Dr. Bala Ravi, ADG (IPR) and Dr. Sudhir Kochhar, Principal Scientist, IPR Section, ICAR and the guest faculty from IPMD (CSIR), Chennai, APEDA, New Delhi, Gene Campaign, New Delhi and DAC, GOI, New Delhi. 61 Scientists from different parts of India representing six Central Institutes and six National Research Centers of ICAR, Five State Agricultural Universities and Maharashtra State Seeds Corporation participated in this training programme.

## First Fisheries Pathshala at Mahura Khurd from November 26-December 2,2001

For the benefit of aquafarmers at their own places, a weeklong *Fisheries Pathshala* was organized by the scientists of CIFE, Lucknow Centre at Mahura Khurd village from November 26 to December 2, 2001. This programme was conducted in a fashion similar to ancient Indian tradition of *Gurukula*. Although, short term programmes for fish farmers have been traditionally conducted within the campus of institutes and its training centers, but this innovative programmes has proved more effective in identifying and solving the problems of aquafarmers.

The CIFE team identified and solved the problems of pond culture on the basis of their own knowledge and experience with the support of minute descriptions given by the farmers. A wall-to-wall poster and herbarium exhibition was also set-up along with the pathshala which was unique in the sense that it was in complete synchronization with the course contents of the pathshala and level of understanding of participants.

The objectives of conducting the pathshala were to educate the village folk of benefits of fish culture, utilization of water bodies for fish culture, teach the participants scientific methods of fish culture in village ponds, solve the common problems of those aquafarmers who are utilizing some of the available ponds with conventional methods, and finally generate interest and awareness about pisciculture among the folks of target and nearby areas of Mahura Khurd.

During the pathshala schedule, enthusiasm of all the thirty two participants was at its peak. The theme of the First Fisheries Pathshala was management of village ponds and fish culture therein. During the programme various aspects of fish culture such as culture and management of village ponds, food and feeding habits of culturable carp species suitable for village ponds, composite fish culture, pond productivity, natural and supplementary fish feed, production economics, importance of physico-chemical parameters of pond water, etc. were taught in easily assimilable mode. Practicals based on these topics were also demonstrated besides visits to ponds for diagnosis and treatment advice.

The programme came to an end on December 2, 2001 with distribution of certificates to all the participants by Gram Pramukh of Mahura Khurd.

### Second interaction workshop of NATP on Fish Production using Brackishwater in Arid Ecosystem

Second interaction workshop of National Agricultural Technology Project 'Fish Production using Brackishwater in Arid Ecosystem' was organized at Aquaculture Research Laboratory of CIFE under NATP with an objective to review the progress of the project, decide the future work plans and to interact among the project team and user agencies and also to have comments and advise of the experts in this field. The one day workshop held on January 9, 2002 was presided over by Dr. S. Ayyappan, Director, Central Institute of Fisheries Education, Mumbai. Shri N.P.S. Rathi, Director of Fisheries, Govt. of Rajasthan was the Chief Guest on this occasion. Dr. D.C. Joshi, Principal Production System Scientist (NATP) CAZRI, Jodhpur and Dr. V.S. Durve, Ex-professor, Department of Limnology and Fisheries, Rajasthan Agricultural University, Udaipur were the invited speakers. In addition to the team members of the project, the other invited participants in the workshop were various researchers, academicians, state fisheries developmental officers, administrators, fish farmers and private entrepreneurs.

### Regional Workshop on Challenges, Opportunities and Constraints faced by Women in Agriculture and Allied Industries


Regional Workshop on Challenges, Opportunities and Constraints faced by Women in Agriculture and Allied Industries, with reference to fisheries was organized during 11 and 12 March, 2002 in association with National Commission for Women, New Delhi, and Central Institute of Fisheries Education, ICAR and Indian Fisheries Association. Mrs. Nirmal Sawant Prabhawalkar, Chairman, MWC Chief Guest inaugurated the workshop. The dignitaries who participated in the workshop included Mrs. Santa Reddy, Member NCW, Smt. P. Girwani, Co-ordinator, NCW and Ex. Former Vice Chancellor, Tirupathi University, Dr. S.D. Tripathi, Ex. Director, CIFE and Dr. M.A. Upare, General Manager, NABARD.

A total of 17 invited lectures were presented by the resource persons in the field of agriculture, fisheries, nutrition, banking, education, extension workers, etc. The workshop highlighted the need for empowerment of women in the field of agriculture and allied industries. The highlight of the workshop was the participation of fisherwomen from the fishing village of Versova and the Matsyagandha Co-operative Society. A visit to Lijjat Papad Industries and the Versova fishing village was also co-ordinated.

## 13.2 Meetings Organised

### Board of Management
XXVI Meeting, July 11, 2001
XXVII Meeting, February 16, 2002

### Academic Council
XXVIII Meeting May 14, 2001
XXIX Meeting November 19, 2001

### Extension Council
XI Meeting, July 21, 2001

### Research Advisory Committee
February 25-26, 2002

### Staff Research Council
Quarterly Meeting, July 3, 2001
Quarterly Meeting, September 25, 2001
Quarterly Meeting, December 21, 2001
Annual Meeting, February 27 to March 2, 2002

### Official Language Implementation Committee
XXXX Meeting, July 28, 2001
XXXXI Meeting December 15, 2001

### Board of Examiners
I Meeting, May 12-13, 2001
II Meeting, July 20-22, 2001
III Meeting, August 28, 2001
IV Meeting, October 9, 2001
V Meeting, November 12, 2001
VI Meeting, January 16, 2002


### Other Meetings

Meeting of the High Level Committee on Aquaculture, Ministry of Agriculture and Co-operation, Govt. of India, April 21, 2001

Meeting of the Scientists, Technical staff and students to discuss the proposal of "Agri-Clinics", NABARD, April 28, 2001

Meeting of Former Staff Members and students at the Institute on CIFE's Four Decades - Achievements and Paths ahead, June 5, 2001

Meet on `Scientific Manpower Pplanning in ICAR Fisheries Research Institutes', September 21-22, 2001

Indo-Norwegian Consultation on Selection in Prawns, 28-29 September, 2001

CIFE Staff Club Committee Meeting, November 19,2001

Special meeting on Promotion of Technology Innovation on the Production Possibilities of Fisl Products in West Bengal at Kolkata Centre CIFE March 26, 2002

### CIFE Headquarters, Mumbai

| | |
|---|---|
| April 12, 2001 | Dr. Ashok K. Seth, Task Manager, World Bank Review Mission, NATP, New Delhi |
| April 17-18, 2001 | The QRT team consisting of Chairman, Dr.E.G.Silas, Ex. Vice Chancellor, KAU; Prof. D.Vinayshil Gautam, Prof. & Head School of Management, (IIT, Delhi); Dr. R.A. Selvakumar, Ex. ADG (Marine Fisheries) ICAR; Dr. S.L. Shanbough, Director of Instruction, College of Fisheries, Mangalore; Dr. D.R. Nayak, Vice Chancellor, Sambalpur University & Ex. Head of Professor of Zoology, Utkal University; Prof. N.R. Menon, Director, School of Marine Sciences, Deptt. of Marine Sciences, Cochin, University of Science & Technology, Cochin |
| June 28, 2001 | Dr. Mahadevappa, Chairman ASRB, New Delhi |
| November 28, 2001 | A team comprising of Mr. Animesh Srivastava (FAO/CP, Mission Leader), Mr. Carl Eicher (Consultant), Dr. P.S. Sidhu and Dr. H.S. Nainawatee, in connection with Implementation Completion Report and Final Supervision of the World Bank AHRD Project |
| January 25, 2002 | Shri Sunil Bhargav, Member, Governing Body of ICAR, New Delhi |

### Kolkata Centre of CIFE, Kolkatta

| | |
|---|---|
| May 24, 2001 | Dr. Debendra Pradhan, Hon'ble Minister of State (Animal Husbandry, Dairy and Fisheries) Govt. of India, New Delhi |
| May 31, 2001 | Shri B.S. Saharan, Director, Department of Fisheries, Govt. of Haryana, Chandigarh |
| June 11, 2001 and March 26, 2002 | Dr. S.A.H. Abidi, Member, ASRB, Krishi Anusandhan Bhuvan, Pusa, New Delhi |
| June 11, 2002 | Dr. B.B. Mallick, Former Vice-Chancellor, West Bengal University of Animal & Fishery Sciences |

### Rohtak Centre of CIFE, Rohtak

| | |
|---|---|
| May 15, 2001 | Shri Umrao Singh Kadian, AGM, NABARD, Rohtak & Shri B.S. Saharan, Director of Fisheries, Haryana Govt. |
| July 17, 2001 | Dr. A.D. Diwan, ADG (Marine Fisheries), ICAR, New Delhi |
| September 5, 2001 | Dr. E.G. Silas, Ex. Vice Chancellor, TNAU, Coimbatore & Chairman, QRT of CIFE & Dr. S.A. Selvakumar, Ex. ADG (Marine Fisheries), ICAR, New Delhi & Member QRT of CIFE |
| November 26, 2001 | Dr. S.A.H. Abidi, Member, ASRB, New Delhi |
| November 27, 2001 | Dr. A.D. Diwan, ADG (Marine Fisheries), ICAR, New Delhi |
| December 5,2001 | Dr. B.N. Singh, ADG (Inland Fisheries), ICAR, New Delhi & Dr. Steward Fielder, Scientist Marine Fisheries Breeding NSW Fisheries, Australia |

### Lucknow Centre of CIFE , Lucknow

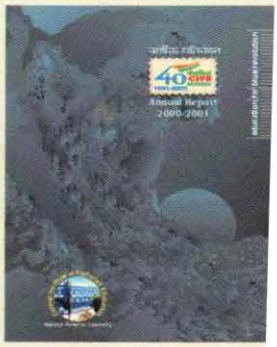
| | |
|---|---|
| May 21, 2001 | Prof. A.R. Kidwai, Hon'ble Member of Parliament (Rajya Sabha) |

### Kakinada Centre of CIFE , Kakinada

| | |
|---|---|
| June 20, 2001 | Shri Sarfaroz Ali, Fisheries Inspector, Dept., of Fisheries |

## Documentation Services

The Documentation section continued to render active support services towards external reporting of the institute's progress. Reports/documents like monthly reports, quarterly reports, status reports/ action taken reports on the recommendations of the ICAR Regional Committees, News items for the ICAR Reporter/ News, reports for DARE, Quarterly performance review, were compiled and edited by the Section. Besides the print version of the Institute's Annual Report (2000-2001), a CD version of the same was also brought out.



## Library Services

Dr. Hiralal Chaudhuri Library, CIFE is a national facility for fisheries and allied disciplines. The library houses a total of 16,718 books, 30,000 back volumes (Journals) 10,377 donated publications and reports, 975 micro-films, 1015 post-graduate dissertations. The library has on its role 120 members comprising Scientists and Technical Staff, 200 M.F.Sc. Students, 50 Doctoral Students and 9 Research Fellows. The library also serves about 25 visitors per day. It has got 18 computers including 4 servers (CD-Net, Internet, LAN and Libsys). It has an internet connectivity through BSES leased line of 128 Kbps connected to 5 computers in the library and 25 computers in various divisions/ laboratories and students' hostel.. Audio-Video facility is also created with two TV sets, two audio VCD/DVD player and one video cassette player. Library function is computerised and the issue/ retrieval of 16,000 books is being done through barcoding using Libsys Software. During the last year 604 books were procured for library. The library also procured 56 Foreign and 43 Indian Journals through subscription. CIFE Library is providing Current Contents Page Service of the latest Journals for the Scientists at the head quarters and centres. Library provides photocopying facilities to student users and staff members. The library also provides binding and lamination services.


## Western Regional Chapter of NAAS

The Western Regional Chapter of National Academy of Agricultural Sciences, New Delhi was formed at CIFE, Mumbai on July 18, 2001. Under this, guest lectures of specialized and high profile scientists were arranged. The Western Chapter includes 34 Fellows of the Academy from four states viz. Gujarat, Maharashtra, Rajasthan and Madhya Pradesh. The Chapter is planning to start the publication of a quarterly report at the chapter's activities.

## Fisheries University Road

Greater visibility was brought to the Institute by renaming the road on which the institute is situated at Versova, Mumbai as `Fisheries University Road'. The road was inaugurated by Shri Karun C. Srivastava, Commissioner, Mumbai Muncipal Corporation on September 16, 2001 in the presence of Smt. Vanita Marucha, Muncipal Corporator, Versova and other dignitaries of the local area and BMC staff.

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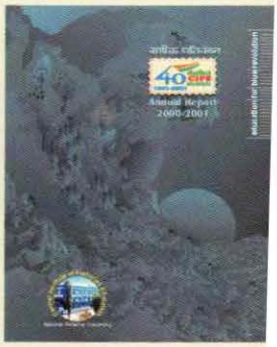

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## UNESCO-MIRCEN

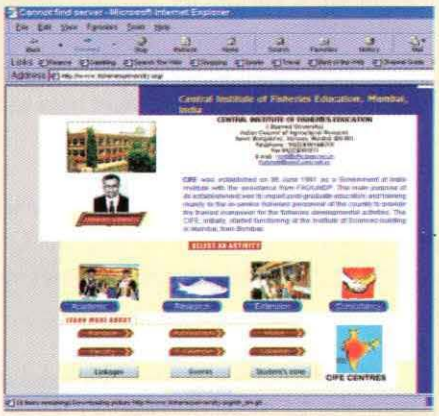
Aquaculture MIRCEN, was relocated at CIFE, Mumbai with effect from June, 2000. Microbial Research Centres (MIRCEN) are widely spread in 23 countries over the World, the network of MIRCEN is organised under the aegis of the UNESCO. The objectives of the centre are to train researchers from developing countries in microbial technology, technology transfer, collection of bacterial strains, etc. Efforts are afoot in these directions.

## Infrastructure Development

The Dr. S.A.H. Abidi Fish Feed Laboratory was inaugurated by Dr. S.N. Dwivedi, Former Additional Secretary, Department of Ocean Development, New Delhi in the presence of Dr. S.A.H. Abidi, Member, ASRB, New Delhi.

## Hindi *Saptah*

Hindi *Saptah* was celebrated during September 14-27, 2001. On this occasion several competitions, seminar, debate and essay competitions, cultural programmes, etc. were organized. Likewise Hindi Saptah was also organized at the CIFE centres.




## Websites

CIFE has created its own website in English and Hindi http:/www.fisheriesuniversity.org and http://www.cife-matsya.com respectively. These websites provides information on CIFE regarding research activities, academic programmes, training programme, publications, etc.

## Fish Farmer's Day

Special Fish Farmers' Day was celebrated at the CIFE, HQ on July 10, 2001 in association with Fisheries Division, Dept. of Animal Husbandry and Dairying.


On July 10, 2001, a special `Fish Farmers Day' was celebrated at Freshwater Fish Farm of Kakinada centre at Balabhadrapuram. More than 40 fish farmers attended the programme. Prof. D.V. Reddi, Retired Principal Scientist of CIFE was the Chief Guest of the function. During the function two leading fish farmers Shri Seshagiri Shetty and Shri J. Venkataramana were felicitated. To commemorate the occasion a 10 days training programme on Breeding and culture of carp was organized.

## Student Welfare Activities

PGSSU, CIFE participated in the Indo-UK Workshop on `Need Based Professional Education and Human Resource Development in fisheries' at College of Fisheries, Mangalore, organized by the Association of British Scholars, Mangalore, Chapter on June 30, 2001. Mr. S.K. Panda, Mr. Pramod Kiran R.B. and Mr. Brundaban Sahu participated and presented a lead paper `A Perspective Analysis of Professional Fisheries Education in India'.

The President, PGSSU Mr. S.K. Panda and General Secretary, Mr. Pramod Kiran R.B. attended the Annual General Body Meeting of Federation of All India Fisheries Graduates Associations (FAIFGA) at College of Fisheries, Mangalore on July 2, 2001.

President, PGSSU, Mr. S.K. Panda presented the `Student Perceptions' in the two day meeting on `Scientific Manpower Planning in ICAR Fisheries Research Institutes' organized by CIFE from September 21-22, 2001.

MILAN 2001, a unique celebration to mark the entry of new batches of MFSc and Ph.D. students was organized on September 25, 2001. Mr. Grinson George and Mr. Gautam Raj, the class representatives of PGSSU introduced the new faces to the audience followed by a splendid cultural extravaganza by the juniors.

A contingent of 39 students participated in the Inter-Agricultural University Sports Meet held at Bikaner, Rajasthan, November 7-10, 2001.

Mr. Biswamitra Patro, Mr. Grinson George and the outstation representatives of PGSSU, Mr. C. Anand, Mr. Vijay Shankar Chaurasia participated in the one day Workshop on Postgraduate programmes in ICAR Fisheries Research Institutes held on November 27, 2001 at CIFE.

PGSSU participated in the exhibition during the International Symposium on Fish for Nutritional Security in the 21st Century held at CIFE during December 4-6, 2001 and projected the state-wise fisheries resource potential and appraised its organizational activities to the delegates.

In the special session on Formation of a National Body on fisheries during the same symposium, Mr. Biswamitra Patro, President, PGSSU, presented a base paper on `Fisheries Council of India-A Blue print to Professionalism'.

Donations were collected for the cause of communal harmony and the sent to the National Foundation for Communal Harmony, New Delhi.


Hostel Day was organized with full fervor on December 15, 2001 with Dr. T.J. Pandian as the Chief-Guest. Reflections 2001 (Cultural Event) and Kshitiz 2001 (Games and Sports Event) were organized to mark the annual Hostel Day Celebrations. Awards and commemorations were given away to the winners of various competitions and a cultural programme added colours to this special occasion.

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A touching farewell was given to the off-campus students of Mariculture, Post Harvest Technology and Freshwater Aquaculture on January 25, 2002, who completed their one semester stint in the main campus. The passing out M.F.Sc. batch (1999-2001) were also given a grand farewell in the CIFE auditorium on August 20, 2001.

A special music concert was organized in the CIFE Auditorium with one of the upcoming talents in the Indipop industry Valentine Shipley, who enthralled the audience with spellbinding music numbers.

PGSSU revived the "FISH TALK" programme, a weekly event to encourage the students to be in sync with their professional goals. With the sole motto of `Back to Basics', this unique event has been instrumental in ushering the academic talents among the student community.

New PGSSU body (2001-2002) took the oath of office on November 15, 2001 with the following office bearers.

| | | |
|---|---|---|
| President | : | Mr. Biswamitra Patro |
| Vice President | : | Mr. Abijeet V. Barse |
| General Secretary | : | Mr. Grinson George |
| Finance Secretary | : | Mr. Deepak P.K. |
| Games Secretary | : | Mr. Puneet Kumar |
| Social and Cultural Secretary | : | Mr. Anand N. Pillai |
| Student Representative to Academic Council | : | Mr. Brundaban Sahu |
| Library Secretary | : | Mr. Bibek Sharma |
| Class Representatives | : | Mr. Sullip Kumar Manjhi (Ph.D.) |
| | | Mr. Prashant a. Telvekar (Sr. M.F.Sc.) |
| | | Mr. M. Jairaj (Jr. M.F.Sc.) |
| Outstation representatives | : | Mr. C. Anand (CMFRI) |
| | | Mr. Thippeswamy S. (CIFT) |
| | | Mr. Vijay S. Chaurasia (CIFA) |

Later Mr. Sumanth Kumar Kunda and Ms. Vidya Balagopal were co-opted to the Executive Committee.

PGSSU felicitated Dr. M. Mahadevappa, Chairman, ASRB and Dr. C.V. Mohan, Associated Professor, College of Fisheries, Mangalore.

Apart from the regular activities, PGSSU actively coordinated the periodic syllabus revision process for M.F.Sc. and Ph.D. programmes and the introduction of new disciplines at M.F.Sc. level.

Festivals like Ganesh Puja, Dandiya, Diwali, Christmas, Saraswati Puja and Holi were celebrated with enthusiastic participation of students.

## Handing over part of Freshwater Fish Farm, Balabhadrapuram

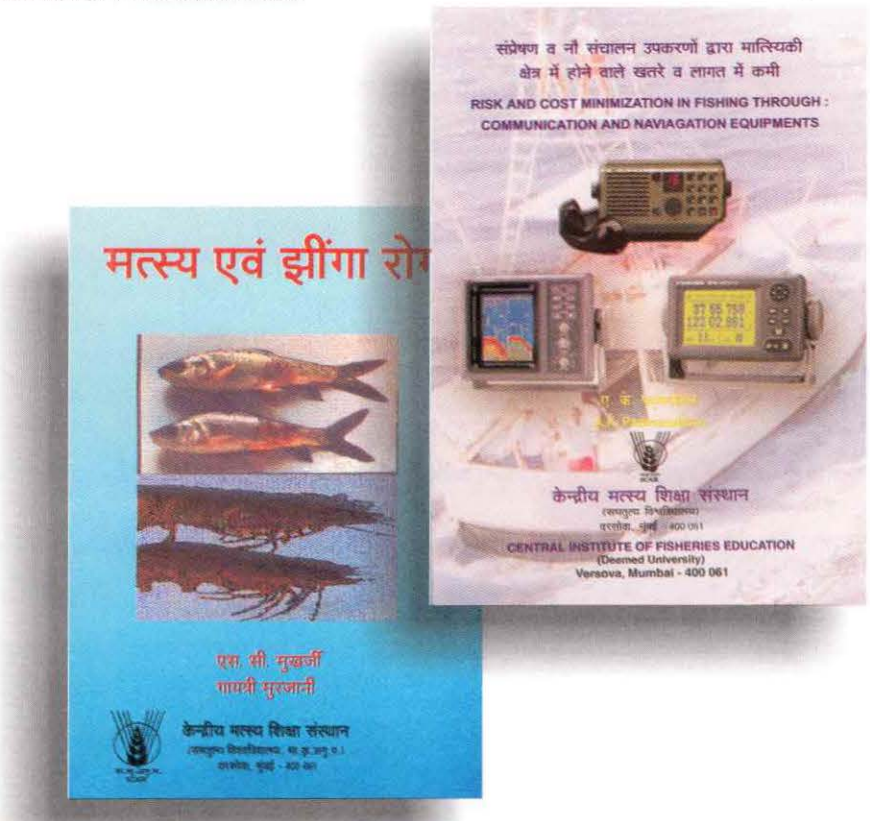
Consequent upon approval of ICAR and as per instructions of CIFE Headquarters Dr. G. Venugopal, Officer Incharge, CIFE Kakinada Centre has handed over a part of the Freshwater Fish Farm, Balabhadrapuram to Shri Sitaram Raju, Assistant Director of Fisheries, Kakinada on March 9, 2002 in the presence of Dr. S.C. Mukherjee, Joint Director, CIFE and Shri C. Ilaiah, Additional Director, A.P. State Fisheries.

## Official Magazine

An annual colourful magazine 'ANKUR' was published and released for the first time from Kolkata Centre on 14.3.2002 by Prof. Hiralal Chaudhuri. The articles in English, Bengali, Hindi and Urdu were contributed by most of the trainees, faculty and other staff members of the Centre.

## Official Language Implementation

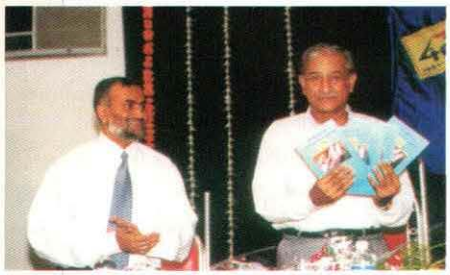
The bygone year saw many rewards in the form of various awards for the commendable work done for the progress of the hindi. During the year 2001-02 four official languages meetings were held. Four computer workshops to train the CIFE staff at the headquarters and subcentres were organised. A Hindi website has also been created. Bilingual salary slip has been introduced this year. The year also saw publication of 14 books in hindi.



## 40th Annual Day of CIFE

To commemorate the occasion a National Workshop on CIFE Four Decades Achievements and Path Ahead was organized on June, 5, 2001. The 40th Annual Day of CIFE was celebrated in a grand manner on June 6, 2001.

Padma Vibhushan Dr. R. Chidambaram, DAE, Homi Bhabha Chair Professor was the Chief Guest and Dr. S.A.H. Abidi, Member ASRB was the Guest of Honour on this occasion. The retired staff of CIFE was invited and felicitated with momentos. Former Directors of CIFE Dr. K.H. Alikunhi, Dr. S.N. Dwivedi, Dr. S.D. Tripathi were also present on this occasion. Dr. R. Chidambaram distributed the CIFE Dr. Hiralal Chaudhuri Awards 2000-01. The Best Fish Farmer award for the year was awarded to Shri Haricharan Das, Agartala. Prizes for sports/Literary activities were also distributed among the staff and students. The function marked the release of a series of publications.



CIFE - At a Glance (Folder)
Annual Report 2000-2001
*Matsya Darpan* Special Issue
Table spread on CIFE's academic programmes
Proceedings of seminar on *Lavniya Mridha ka Jalkrishi Hettu Upyog*, Rohtak, Haryana 23-24 March, 2000.
*Matsya Poshan*
Extension booklets
- *Carp macchliyon ke saath jhinga paliye*
- *Mitti aur pani ki janch kijiye*
- *Carp macchliyon ke beej ke liye circular hatchery*
- *Carp macchliyon ki ardhsagan star par kheti kare*

Dr. K. Gopakumar, Dy. Director General (Fy.) ICAR delivered the presidential address. Later in the afternoon a cultural programme was organised to mark the day.

The Institute introduced Dr. Hiralal Chaudhuri Annual Awards, with a view to recognise the contributions of Staff Members of CIFE, teachers of the Deemed University as also fish farmers in different areas from the year 2000-01, in association with Dr. Hiralal Chaudhuri Fisheries Endowment.

**Central Institute of Fisheries Education**
(Deemed University, ICAR)
Seven Bungalows, Versova,
Mumbai 400 061
Maharashtra
Phone: 022-636 1446/7/8
Fax: 022-636 1573 & 022-634 8223
e-Mail: fishinst@bom3.vsnl.net.in
website: http://www.fisheriesuniversity.org.

## 16.1 LIST OF STAFF* (AS ON MARCH 31, 2001) (This is not a seniority list)

CIFE Headquarters, Mumbai

### Director
Dr. S.Ayyappan

### Joint Director
Dr. S.C. Mukherjee

### Principal Scientists
Dr. M.P. Singh Kohli
Dr. R.S. Biradar
Dr. C.S. Purushothaman
Dr. S.D. Singh
Dr. W.S. Lakra
Dr. Subrata Basu
Dr. S.K. Chakraborty

### Senior Scientists
Dr. K.K. Jain
Dr. (Mrs.) Kiran Dube
Dr. (Mrs.) Neelam Saharan
Dr. (Ms.) Latha Shenoy
Dr. S.N. Ojha
Dr. K.V. Rajendran
Dr. A.K. Pal
Dr. G. Venkateshwarlu
Dr. P.K. Varshney
Dr. Geetanjali Deshmukhe
Dr. Gopal Krishna Saxena

### Scientists-SG
Mr. K. Venkateshvaran

### Scientists (SS)
Dr. M.B. Patel
Dr. S. Jahageerdar
Mr. P.K. Pandey
Mr. R.P. Raman
Mr. S.K. Patil
Dr. K. Pani Prasad
Dr. N.P. Sahu
Dr. (Mrs.) Aparna Chaudhari

### Scientists
Dr. B.B. Nayak (Deputed abroad)
Dr. Sanjay Jadhav
Dr. M. Makesh
Mr. Shyam Salim
Dr. Sandeep J. Akare
Dr. S. Kannappan

### Technical Officers T - 8
Mr. S.K. Pal
Mr. Nandlal Singh

### T - 7
Mr. A.K. Reddy
Mr. S. Natarajan

### T - 6
Mr. R.K. Langer
Dr. Chandra Prakash
Mr. A.K. Padmanabhan
Mr. A.R. Warange
Dr. Ashok Kumar Jaiswar
Dr. R.S. Rana
Mr. Alkesh Dwivedi
Dr. Prem Prakash Srivastava
Mr. R.D. Tandel (On study leave)
Mr. S.G.S. Zaidi
Mrs. Rama Sharma (On study leave)
Mr. G.K. Rao
Mr. S.K. Pandey(On study leave)
Mrs. Asha T. Landge

### T - 5
Mr. A.D. Ragabhagat
Ms. Ujwala Gadre
Mr. Chandrakant M.H
Mr. D.L. Sawant
Mr. Deepak Khogre
Mr. Dasari Bhoomaiah
Mr. K.P. Khalsa
Mr. M.K. Chouksey
Mr. Satish Kamat
Mr. J.P. Patil
Mr. R.H. Rajguru

### Technicians T - 4
Mrs. Aravinder Mehta
Mrs. K. Thilagavathi
Mr. Palaniswamy
Mrs. Nalini Poojary
Mr. K.P. Shetty
Mr. P.K. Das
Mr. A.B. Birade
Mrs. Madhavi Pikle
Mr. A. Sadanand
Mr. P.B. Sonawane
Mrs. S.M. Bagwe
Mr. S.M. Shinde
Mrs. S.P. Nalawade
Mr. Chandrakant Kareer
Mrs. S.S. Gajbhiye
Mr. B.G. Mandhare
Mr. R.G. Kudale
Mr. Bhagat Singh Rawat
Mrs. Rajani Pagare
Mr. J.M. Koli

### T - II - 3
Ms. Revati Dhongde
Mrs. Rekha Nair

### T - I 3
Mr. S.V. Patil
Mr. B.J. Rathod
Mr. Sanjeev R. Bandkar
Mr. N.K. Aglave
Ms. B.S. Ghagre
Mr. Avinash Sable
Mr. Baburam Jaiswar
Mr. S.L. Koli
Mr. B.T. Phande

### T - 2
Mr. S.R. Vinarkar
Mr. A. L. Kokane
Mr. Sikander Sheikh

T-1
Mr. Arun Puri (Gosavi)
Mr. R. D. Deshmukh
Mr. Dhanpat Singh
Mr. A.N. Mahadik
Mrs. V.D. Misale
Mr. V.K. Bhave
Mr. Mohd. Baqar

Administration & Finance
Senior Administrative Officer
Mr. Suresh Kumar

Finance & Accounts Officer
Mr. Prem Shankar

Administrative Officer
Mr. M.K. Pachauri

Assistant Director (Official Language)
Mr. R.P. Uniyal

Assistant Administrative Officer
Mrs. Kamala B. Menon
Mr. K. Mahmood
Mr. P. B. Tandav
Mr. R. L. Mohite
Mr. Sunil Kumar

Private Secretary
Mrs. T. Kuruvilla

Personal Assistant
Mr. G.S. Fernandes

Stenographer (Grade III )
Mrs. S. R. Arutla
Mr. P.R. Ninawe

Assistants
Mr. S.S. Kocharekar
Mr. T.D. Kumar
Ms. S.S. Parab
Ms. Valsa Pavitran
Mr. Y.P. Belgaonkar
Mr. B.L. Kokkula
Mrs. N.Y. Raorane
Mrs. Sushma Singh
Mrs. S.R. Wadhavkar
Mrs. Deepika N. Behl

Upper Division Clerks
Mrs. S.V. Kadam
Mrs. A.A. Shukla
Mrs. D.S. Naik
Mr. J.D. Chandramore
Mrs. F. G. Fernandes
Ms. Chandrarekha S. Khundol
Mr. R.R. Shah
Mr. D.S. Ingle
Mr. R.R. Kadam
Mr. R.G. Gamare
Mrs. Swati S. Koli
Mr. Vijay S. Kuveskar

Lower Division Clerks
Mr. Devendra Raorane
Mrs. Sujata V. Pawar
Mrs. Anagha U. Joshi
Ms. Yashoda S. Dhatavkar
Mr. A.G. Kolambkar
Mr. Bharat Kumar P. Chauhan
Mrs. Sanyuja S. Parab
Mr. Pradeep G. Angane
Mrs. Chaitali C. Raut
Mrs. Pragati R. Gadre
Mrs. Anu Grover
Mr. K.K. Jagtap
Mr. Suresh H. Bhosle
Ms. Nalini A. Sawant
Mr. M.B. Waghela

Supporting Staff
Grade IV
Mr. Shantaram D. Jadhav
Mr. S.L. Garate
Mr. B.K. Raut

Grade III
Mr. K.D. Solanki
Mrs. S.M. Supat
Mr. Madhu Wasnik
Mr. S.V. Gawade
Mr. Vinod P. Tiwari
Mr. Surajbali R. Jaiswar
Mr. B.S. Tamankar
Mr. Ashok R. More

Grade II
Mr. I.R. Solanki
Mr. D.B. Gaikwad
Ms. Vandana Tambe
Ms. K.R. Ahire
Mr. T.G. Gaikwad
Mr. J.K. Makwana
Mr. Ankush R. Dore
Mr. Bandu R. Chavan

Grade I
Mr. M.P. Kotian
Mr. G. B. Kamble
Mr. Ashok R. Shingade
Mr. Jagdish Namdev Dhanu
Mr. Nandu L. Ghane
Mr. Vasant N. Ondkar
Mrs. Shantabai Kamble
Mr. S.P. Malvankar
Mrs. R. H. Chavan
Mr. R.N. Kamble
Mrs. Siddhi J. Kolambkar

Vessel Staff
Skipper
Mr. K. Satyanarayana (T-7)

Engineer F.T.V. (T-8)
Mr. Josey Jacob

Engine Driver (T-5)
Mr. S.K. Chodankar

Additional Engine Driver(T-5)
Mr. S.L. Kotian

Mate (T-II-3)
Mr. S. Maity

Deckhand (T-2)
Mr. K.A. Shirogaonkar
Mr. K.V. Rajendran
Mr. S.L. Mungekar
Mr. A.P. Dhawde
Mr. V.B. Khandalgaonkar

Cook
Mr. S. Kamaraju

Supporting Staff
Mr. B.N. Sukur (Gr. IV)
Mr. M.B. Bhokse (Gr. IV)
Mr. Ayubkhan Bijali (Gr. IV)
Mr. G.G. Zendekar (Gr. III)
Mr. Vishnu Patil (Gr. III)
Mr. Sitaram Padyal (Gr. II)
Mr. Arvind Lavande (Gr. I)

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### Sr. Scientists
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### Scientists-SG
Mr. P. K. Roy (on study leave)
Mr. B.N. Tiwari

### Scientists-SS
Dr. Shubendhu Datta

### Scientists
Mrs.Arpita Sharma
Dr. Parimal Sardar

### Technical Officers (T - 5)
Mr. Rakesh Kumar
Mr. P.S. Pandey
Mr. S. K. Sharma
Mr. R.K. Biswas
Mr. A.K. Mondal

### T-1-3
Mr. R.K. Mondal
Mr. P.K. Patra
Mr. S.K. Das, Engine Driver

### T-1
Mr. T.K. Ghosh

### Adminstrative Staff

### Assistant
Mr. B. Veera Raju

### Jr. Stenographer
Ms. Kaberi Biswas

### Upper Division Clerks
Mr. C.N. Sahani

### Lower Division Clerks
Mr. P.K. De,
Mr. Abhilash Thankappan

### Supporting Staff
Mr. G.C. Saha, Jr. Deckhand (Auxillary)
Mr. B. Dhar, Masalchi, Gr. (IV)
Mr. B.L. Mahato, Cook, Gr.(III)
Mr. B.D. Mondal, Gr. (III)
Mr. T.C. Balmiki, Gr. (III)
Mr. Manju Paul, Gr. (III)
Mr. Raghunath Das, Gr. (III)
Mr. Ram Narain Prasad, Gr.(III)
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### Scientist(SS)
Dr. N. K. Chaddha

### Scientist
Mr. Ajit Kumar Verma

### Technical Officers T-7
Dr. M. Ali

### T-II-3
Mr. Hasan Javed
Mr. Sanjeevan Kumar

### T-1
Mr. K. Dhana Raju
Mr. Kishan Kumar

### Administrative Staff
Mr. V.K. Sinha, UDC

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Mr. Lavesh Kumar, Gr. (I)

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Senior Scientist
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(Officer In-charge)

Technical Officers (T-5)
Mr. P. Rami Reddy (on study leave)
Mr. J. Krishna Prasad
Mr. K. Murali Mohan
Mr. P. Sreenivasa Rao
Mr. V.N. Acharyulu

Technicians-T-4
Mr. J. Satyanarayana
Mr. P. Satyanarayana
Mr. K. Radhakrishna Reddy
Mr. Ravi Shankar Patnaik
Mr. B. Krishna Rao

T-2
Mr. V. Das
Mr. Shankar Lal
Mr. K. Rangiah
Mr. S.S. Murthy
Mr. Y.S. Murthy

T-1
Mr. B. Satyanarayana
Mr. M. Satyanarayana

Administrative Staff
Assistant
Mr. T. Padmavathy
Mr. P.V.G.K. Murthy

Senior Clerk
Mr. B. Laxman Rao

Junior Clerk
Mrs. M. Rama Mani

Supporting Staff
Mr. K. Pothu Raju, Gr. (IV)
Mr. M.Harichandra Reddy, Gr. (III)
Mr. M. Krishna, Gr. (III)
Mr. Sivaram Kale, Gr. (III)
Mr. M. Gandhi Prasad, Gr. (III)
Mr. M. Ch. Appa Rao, Gr. (II)
Mr. K. Malliah, Gr. (II)
Mr. K. Satyanarayana, Gr. (II)
Mr. Shaikh Nana Saheb, Gr. (II)
Mr. K. Niranjan, Gr. (II)
Mr. N. Venkata Ramana, Gr. (I)
Mr. K. Prasad, Gr. (I)
Mr. V. Shivaji, Gr. (I)
Mr. O. Veeraraju, Gr. (I)
Mr. K. Dharma Raju, Gr. (I)
Mr. P. Brahmaananda Rao, Gr.(I)
Mr. T. Satyanarayana, Gr. (I)
Mr. P. Venkata K. Reddy, Gr. (I)
Mr. P. Dora Reddy, Gr. (I)
Mr. Shaikh Valisha, Gr. (I)
Mr. A. Lakshman Reddy, Gr. (I)
Mr. S. Subba Reddy, Gr.(I)
Mr. Y. Buchilingam, Gr.(I)
Mr. M. Govindu, Gr. (I)
Mr. A. Anandu, Gr.(I)
Mr. A. Gurriah, Gr.(I)
Mr. G.V.V. Satyanarayana, Gr. (I)
Mr. M.A. Rao , Gr. (I)

## The following staff were upgraded under ACP Scheme to the higher scale

| S. No | Name | Designation |
|---|---|---|
| 1. | Mrs. Sarala R. Arutla | Jr. Stenographer |
| 2. | Mr. D.V. Raorane | LDC |
| 3. | Mrs. Sujata V. Pawar | LDC |
| 4. | Mrs. Anagha U. Joshi | LDC |
| 5. | Ms. Yadhoda S. Dhatavkar | LDC |
| 6. | Mr. A.G. Kolambkar | LDC |
| 7. | Mr. Vijay S. Kuveskar | LDC |

## Voluntary Retirement

| S. No | Name | Date |
|---|---|---|
| 1. | Mrs. M. Abraham, Sr. P.S. | 6.7.2001 |

## Retirements

| Sl.No. | Name | Date |
|---|---|---|
| 1. | Mr. T.P.K. Rao, T-2 | 30.6.2001 |
| 2. | Mr. Haridas Sukhan, S.S.Gr.IV | 31.12.2001 |

## Obituary

CIFE Mourns the death of the following CIFE Members

| S. No | Name | Date |
|---|---|---|
| 1. | Dr. M.B. Iftekhar, Sr.Scientist | 26.5.2001 |
| 2. | Shri. J.N. Kolambkar, T-2 | 10.12.2001 |
| 3. | Shri U.A. Mullaji, Gr.IV | 17.3.2002 |

# कार्यकारी सारांश

संस्थान के मुख्यालय तथा इसके केन्द्रों एवं केन्द्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान, कोच्ची, केन्द्रीय मत्स्य प्रौद्योगिकी संस्थान, कोच्ची तथा केन्द्रीय मीठाजल जीवपालन अनुसंधान संस्थान, भुवनेश्वर में विभिन्न शैक्षणिक कार्यक्रमों के अंतर्गत चलाए जाने वाले स्नातकोत्तर एवं डाक्टरेट स्तर के कार्यक्रम सफलतापूर्वक चल रहे हैं। इस सत्र में कुल 66 छात्रों को स्नातकोत्तर डिग्री की उपाधि प्रदान की गई। पी.एच.डी.पाठ्यक्रम के अन्तर्गत जहां कुल 14 छात्रों को डिग्री प्रदान किया गया वहीं कुल 28 प्रशिक्षणार्थियों ने अन्तरस्थलीय मात्स्यिकी विकास एवं प्रशासन में एक वर्षीय पी.जी.प्रमाण पत्र पाठ्यक्रम सफलतापूर्वक पूर्ण किया ।

इस वर्ष स्नातकोत्तर स्तर के तीन नए पाठ्यक्रमों मत्स्य रोग एवं सूक्ष्मजीव विज्ञान, मत्स्य पोषण एवं जैव रसायन तथा मत्स्य अनुवंशिकी एवं जैव प्रौद्योगिकी प्रत्येक में एक-एक सीट तथा पी.एच.डी.कार्यक्रम के अन्तर्गत फसलोत्तर प्रौद्योगिकी में एक सीट सम्मिलित किए गए हैं। 8 विभिन्न स्नातकोत्तर पाठ्यक्रम के अन्तर्गत कुल 60 छात्रों तथा 4 विभिन्न पी.एच.डी. कार्यक्रमों में 26 छात्रों के नामांकन किए गए। कलकत्ता केन्द्र में आन्तर स्थलीय मात्स्यिकी विकास एवं प्रशासन में पी.जी. पमाणपत्र पाठ्यक्रम के अंतर्गत 30 प्रशिक्षणार्थियों के नामांकन किए गए। एम.एफ.एस.सी. एवं पी.एच.डी. के एक-एक छात्र को उनके अनुसंधान प्रशिक्षण के लिए लगभग 3 सप्ताह हेतु विदेश दौरे पर भेजा गया।

छात्रों के लिए संस्थान में कुल 9 अतिथि व्याख्यानों का आयोजन किया गया तथा के.म.शि.सं. संकाय ने संस्थान से बाहर 11 अतिथि व्याख्यान दिए ।

डी.बी.टी./एन.ए.टी.पी. द्वारा प्रायोजित कार्यक्रमों के अन्तर्गत 3 प्रशिक्षण कार्यक्रमों को संचालित किया गया। समुद्री जैव संसाधन विकास एवं प्रबंधन में मानव संसाधन विकास विषय पर प्रायोजित कार्यक्रम आयोजित किए गए जबकि ई.आई.ए. एवं समुद्री जोन प्रबंध पर भा.कृ.अनु.प. द्वारा प्रायोजित एक ग्रीष्मकालीन स्कूल तथा जलकृषि में आधुनिकता पर इंडो-ईजराइल अन्तरराष्ट्रीय प्रशिक्षण कार्यक्रम भी आयोजित किए गए।

9 संस्थागत परियोजनाएं (32 उप परियोजना सहित) तथा 17 बाह्य वित्तीय परियोजनाएं संचालित किए गए। इस वर्ष की अन्य उल्लेखनीय उपलब्धियां हैं - खुले जल में टोर खुदरी के पालन हेतु नाइलन केज के जीवनक्षमता का प्रारंभिक प्रमाण, महाराष्ट्र के समुद्री मात्स्यिकी के आंकड़े निरंतन इकठ्ठा करने का कार्य तथा लेट्स कलकलिफर एवं चानोस चानोस का कार्योटाइपिंग।

एन्टी इडवारडसीला टारडा एवं एन्टी ऐरोमोनास हाइड्रोफिलिया खरगोश 1 एच.आर.पी.ओ. संयुग्मी तैयार करना, जलकृषि में उपयोग के लिए एंजाइटोबैक्टर क्रोकोकम एवं बिजरकी की अनुसूची तैयार करना व नाइट्रोजनस बैक्टोरियल उर्वरक एवं कोनस बेनॉम में स्लीपर पेप्पटाइड की पहचान करने का कार्य किया। एम.एफ.एस.सी. के छात्रों ने कुल 28 शोध प्रस्तुत किए। राष्ट्रीय एवं अन्तरराष्ट्रीय जरनल में कुल 46 शोध पत्र प्रकाशित किए गए जबकि 109 शोध/टीम/पत्र सेमिनार/सम्मेलन में प्रस्तुत किए गए। संस्थान के अन्य प्रकाशनों में 9 सेमिनारों के सारांश एवं प्रोसेडिंग प्रकाशित किए गए। इसके साथ ही 9विभिन्न पुस्तकों में 15 लोकप्रिय लेख प्रकाशित किए गए तथा 21प्रशिक्षण मैनुअल व 2 तकनीकी प्रतिवेदन भी प्रकाशित किए गए। मात्स्यिकी विज्ञान के अनुसंधान के विभिन्न पहलुओं पर कुल 16 सेमिनार/सिम्पोसियम/ब्रेनस्टॉर्मिंग सेशन संचालित किए गए। इस वर्ष के दौरान इस संस्थान ने 36 अल्पकालीन प्रशिक्षण कार्यक्रम संचालित किए जिसमें कुल 647 लोग प्रशिक्षित हुए। 20 मछुआरिनों के लिए एक विशेष कार्यक्रम का आयोजन किया गया। इसी के साथ 22 बच्चों के लिए भी एक विशेष प्रशिक्षण कार्यक्रम का आयोजन किया गया। इस वर्ष के दौरान भारत के विभिन्न भागों से कुल 1371 छात्र संस्थान में आए। संस्थान की मत्स्य सलाहकार सेवा में 165 लोगों (जरुरत मंद लोगों) को आवश्यक परामर्श व सहयोग दिया गया। पश्चिम बंगाल के उत्तरी 24 परगना जिले के तपुरियागाटा गांव की 15 महिलाओं की टीम का मार्गदर्शन किया गया। 7 प्रदर्शनी, 3 मत्स्य सम्मेलन, 3 रेडियो प्रसारण (तेलगू में) तथा मत्स्यगंधा नाम का फिशर वीमेन कॉपरेटिव सोसायटी की स्थापना कर संस्थान के विस्तार विभाग ने एक उल्लेखनीय कार्य किया। 12 विस्तार पुस्तिकाओं का भी प्रकाशन कार्य किया गया।

संस्थागत विकास में संस्थान के विस्तार विभाग को नई सुविधाएं प्रदान की गई है। संस्थान के व्यायामशाला का नवीनीकरण कार्य किया गया तथा केन्द्रीय उपकरण प्रयोगशाला को अत्याधुनिक सुविधाएं प्रदान की गई। इसी के साथ पुस्तकालय का भी नवीनीकरण किया गया है। पुस्तकालय को और अधिक स्थान उपलब्ध कराया गया जिसमें प्रथम तल का निर्माण कार्य शामिल है। संस्थान के नवीन परिसर का कार्य भी प्रारंभ कर दिया गया है, जिसके प्रथम चरण में शैक्षणिक सह प्रशासनिक भवन का निर्माण किया जाएगा। एम.एफ.वी.नर्मदा छात्रों के नियमित प्रशिक्षण एवं अनुसंधान कार्य हेतु उपयोग में लाया जा रहा है। एम.एफ.वी.सरस्वती के मरम्मत का कार्य सम्पन्न किया गया।

के.म.शि.सं. को इस वर्ष मुंबई स्थित समस्त केन्द्रीय कार्यालयों में हिन्दी में सबसे अच्छा काम करने पर आशीर्वाद संस्था द्वारा चल राजभाषा शील्ड से सम्मानित किया गया। इसी के साथ, राजभाषाश्री पुरस्कार भी प्रदान किया गया। संस्थान के वैज्ञानिक डा. पानी प्रसाद को डा. एस.जेड.कासिम गोल्ड मेडल से सम्मानित किया गया। कोरियन सायंस एण्ड इंजीनियरिंग फाऊन्डेशन द्वारा संस्थान के वरिष्ठ वैज्ञानिक डा. के.वी. राजेन्द्रन को पी.डी.एफ. अवार्ड से सम्मानित किया गया। इसी के साथ, यूरोपियन असोसिएशन ने भी मत्स्य रोग विशेषज्ञ डा. के.वी. राजेन्द्रन को उत्कृष्ट पोस्टर प्रस्तुति हेतु अवार्ड प्रदान किया। एस.एस.डी. कॉलेज, वाशी द्वारा प्रधान वैज्ञानिक डा.एस.डी. सिंह को सम्मानित किया गया। उत्तर प्रदेश विज्ञान एवं प्रौद्यागिकी परिषद ने के.म.शि.सं. लखनऊ केन्द्र के डा.सी.एस. चतुर्वेदी को उत्कृष्ट वैज्ञानिक (बेस्ट साइंटिफिक अवार्ड) अवार्ड से सम्मानित किया। संस्थान ने क्रीडा के क्षेत्र में अन्तर संस्थानीय क्रीडा एवं भा.कृ.अनु.प. क्षेत्रीय टूर्नामेंट में भी कई उल्लेखनीय पदक प्राप्त किए हैं।

# IMPORTANT COMMITTEES OF CIFE

## Board of Management

| | |
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| Dr. K. Gopakumar | Member |
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| Dr. R.S. Biradar | Member |
| Dr. C.S. Purushothaman | Member |
| Dr. S.D. Singh | Member |
| Dr. W. S. Lakra | Member |
| Dr. S. Basu | Member |
| Dr. S.K. Chakraborty | Member |
| Shri Suresh Kumar | Member Secretary |

## Extension Council

| | |
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| Dr. S.C. Mukherjee | Member |
| Dr. P. Das | Member |
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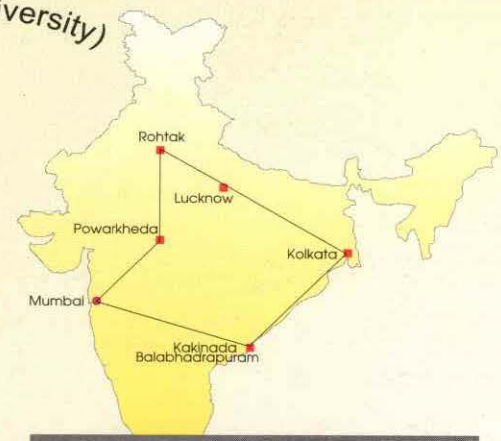


learn to fish
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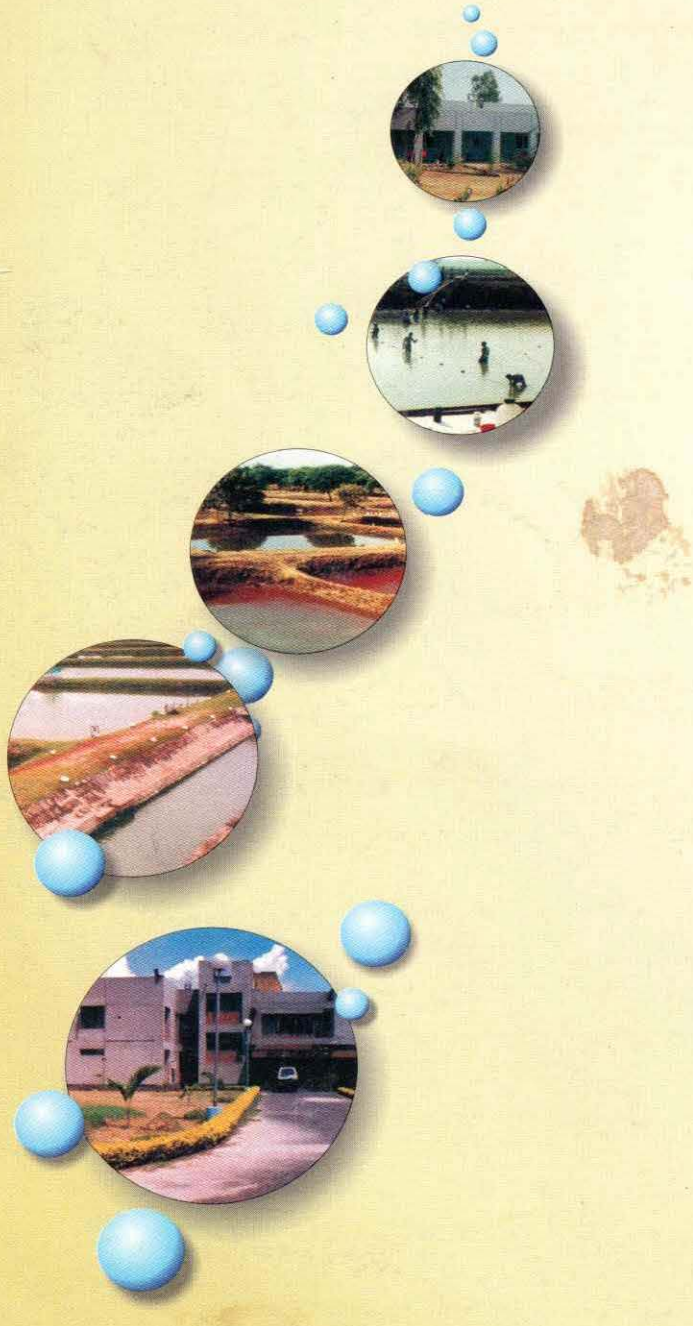

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