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CIFE वार्षिक प्रतिवेदन
ANNUAL REPORT 2008-09

Central Institute of Fisheries Education
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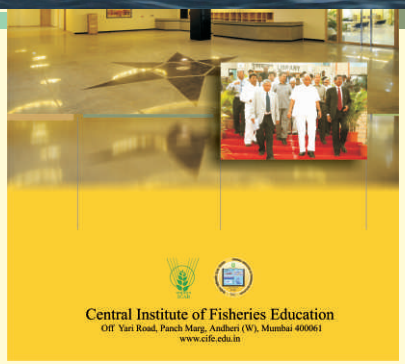

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Publisher:
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Contents

To keep pace with the advancement and development, change is inevitable. As and when required there have been changes in CIFE's organizational, academic and research programmes. The year 2008-09 has witnessed such changes in CIFE by reorganizing eight informal divisions into six ICAR approved divisions and creating the posts of six Heads of Division to achieve the mandate of the institute and meet the challenges ahead in an efficient manner. The new six divisions are: Aquaculture; Aquatic Environment and Health Management; Fisheries Resources, Harvest and Post Harvest Management; Fish Genetics and Biotechnology; Fish Nutrition, Biochemistry and Physiology; Fisheries Economics, Extension and Statistics.

The institute continued to witness a great success in the academic front by bagging six out eight of the ARS scientists' positions of ICAR in Aquaculture, and also one position in Animal Biotechnology discipline by the CIFE students. This reflects on the teaching environment at CIFE.

A new programme "Professional Development Programme (PDP)" is introduced in this year to develop trained professionals in fisheries sector. The PDP encompasses four modules, each of 100 days duration with an option for obtaining Diploma either in Fisheries Enterprise Management or in Fisheries Development Management.

Regular training programmes onboard vessels of the institute and hands-on training programme at CIFE Headquarters and its Centres have been conducted satisfactorily. CIFE continued providing training and result demonstration programmes in North-Eastern States which has made a great impact in aquaculture development in the region.

The on-going research projects in six thematic areas have shown good results. Commercial crop production of Shrimp, *Penaeus monodon* in salt-affected zone using underground saline water at CIFE Rohtak Centre has been one of the major achievements. This will help in utilizing the salt-affected wastelands economically and efficiently.

The institute also has developed academic and research infrastructure facilities of international standard. The state of art Library with modern facilities was inaugurated by Sh. Sharad Pawarji, Honb'le Union Minister for Agriculture, Government of India.

I feel highly obliged and my sincere thanks to the Director General (ICAR), Deputy Director General (Fisheries), Deputy Director General (Education) for their continued kind support and guidance. I am grateful to the Members of Board of Management, Chairman and

Members of Research Advisory Committee, Members of Academic Council, Extension Council, Head of Divisions, Board of Examiners and other institute level committees for their cooperation and support. I thank the Directors and scientists of all the Fisheries Institutes, Guest Faculty & External Examiners for their time to time support. I acknowledge with thanks all the scientists, technical and administrative staff and students of CIFE for their contributions. My appreciations to the publication team for bringing out this annual report on time.

Dilip Kumar

(Dilip Kumar)

The year 2008-09 witnessed good progress in every field besides certain positive changes. Total 99 students were admitted in the new academic session out of which 27 students for Ph.D., 50 students for M.F.Sc. and 22 students for P.G.Diploma in Inland Fisheries. In the ongoing educational programmes 19 students obtained Ph.D. Degrees, 34 students their M.F.Sc. Degrees and 22 their Post-Graduate Diploma in Inland Fisheries.

Research achievements have been quite satisfactory. The work under 26 institutional research projects, 16 externally funded projects, 2 international projects, 3 NAIP funded projects and 2 contract research projects continued as per scheduled activities and all the projects produced clearly defined outputs as planned except few deviations in some projects.

There has been a significant achievement in obtaining commercial crop of tiger shrimp, *Penaeus monodon* from inland saline water in Haryana with an overall survival of 60% and a net production of 660 Kg/ha in 115 days of culture duration. Under genetic evaluation and genetic characterization two new candidate species for aquaculture i.e., *Macrobrachium villosimanus* & *Osteobrama belengeri* (Pengba) were selected. Berried females of *M.villosimanus* were collected from the river Brahmaputra and air lifted to CIFE, Mumbai.The results indicated that the *M.villosimanus* required saline water of 10-15 ppt for completion of its life cycle but no maturity was observed unlike *M.rosenbergii* which normally matures in 5-6 months irrespective of any size. In case of Pengba, the seed of which was air lifted from Imphal were reared up to adult stage and the fishes attained maturity. A pair of Pengba (female 372 /280 mm and male 173 g/252 mm) was bred successfully and a total of 1,82,875 numbers of eggs were obtained with 90% fertilization and 36% hatching. 60,000 numbers of spawn was obtained which were reared to fingerling stage. 5000 numbers of fingerlings were stocked at Powarkheda Centre and 500 numbers of fingerlings were brought to Mumbai for further rearing.

In the studies on extraction of natural carotenoids to use as feed additives in ornamental fish feed, the results showed that marigold or rose petals meal can safely be supplemented at 4% levels in the diets of rosi barb as well as dwarf gourami to enhance their coloration. Fry of gold fish, *Carassius auratus* stocked in one of the cages on trial basis in Dimbhe reservoir, Maharashtra attained a size of 135 mm/42.37 g in six months culture period and showed very bright coloration with 90% survival.

One of the significant outcomes of the project on developing appropriate policy framework for the development of fisheries and aquaculture was interest shown by State Depts. of Fisheries for development and policy support. Accordingly, policy development support was provided to the

Fisheries Depts. of Bihar, Tamil Nadu and Assam. Ready to eat fish products like sandwich paste, fish curry in retortable pouch and different recipes developed in the institute were analyzed for changes in organoleptic, biochemical characteristics, fatty acid profile and for commercial sterility at quarterly interval. The products have been in excellent condition for one year.

The institute created good field level impacts through organizing various Extension Education/Transfer of Technology related programs and activities. Total 45 demand driven Short Term Training Programmes (STPs) were organized at Headquarters and its four centers in which 1121 numbers of participants were trained. The institute demonstrated Trickle Down System of Aquaculture Extension in the states of Tripura, Mizoram, Manipur, Madhya Pradesh, Andhra Pradesh, West Bengal and Assam. Farmers' led result demonstrations and site based trainings were organized on carp polyculture, low cost carp culture, crab fattening, fish cum poultry farming, fish cum pig farming were given to Result Demonstration Farmers and staff of Dept. of Fisheries created significant impact. The institute also arranged 23 exhibitions in different parts of the country. The activities of the institute were given wide coverage on television and print media. National Fish Farmers' Day was celebrated at CIFE Headquarters and at its centres. The Annual Day of the institute was celebrated in congruence with National Fish Farmers' Day on 10 July, 2008. The first Alumni Meet of ex students of CIFE was held on 25th December, 2008. 1974 students from various schools, colleges, institutions and universities visited CIFE and its centres and were demonstrated various ongoing activities. Two research and training Vessels *MFV Saraswati* and *MFV Narmada* conducted 19 cruises for the students and trainees. The institute also organized ICAR Zonal (West) Sports Meet 2008-09 during 02-06 February, 2009.

During this year **Dr. Dilip Kumar**, Director CIFE was elected Sectional President (Animal Sciences, Veterinary and Fisheries) of the 96th Session of prestigious Indian Science Congress held at Shillong during 03-08 January, 2009. **Dr. Dilip Kumar** was awarded ZSI Dorabjee Tata Gold Medal and the Meghnad Saha Award during 32nd Annual International Conference on Oriental Heritage, Kolkata on 05 February, 2009. CIFE was awarded second Prize for outstanding contribution in Hindi by Ashirwad Sansthan, Mumbai during 2008-09.

Dr. A. K. Pal, Principal Scientist, Fish Nutrition, Biochemistry and Physiology was admitted as Fellow of National Academy of Agricultural Sciences at NAAS Complex, New Delhi on 04 June, 2008 and was also awarded the M. S. Swaminathan Award for Best Indian Fisheries Scientist 2008 by Professional Fisheries Graduates Forum (PFGF).

Dr. K. K. Jain, Principal Scientist was awarded the third *Aashirwad Rajbhasa Puruskar & Samman* 2008 by Aashirwad Sanstha, Mumbai on 25 September 2008. **Dr. S. D. Singh** Principal Scientist received International CR Sullivan Endowment Award by International Fisheries Section, American Fisheries Society, Bethesda, USA, in August, 2008. **Dr. Singh** was also awarded International Membership by International Fisheries Section, American Fisheries Society, Bethesda, USA and nominated as a member in Executive Committee of Asian Fisheries Society Indian Branch - 2008.

Dr. Somdutt, Principal Scientist & Officer Incharge, Powarkheda Centre was felicitated by the District Collector, and Governor (ATMA) Board, West Champaran District, Bihar in recognition of the HRD programs conducted for Fish Farmers' of the district.

A team of Scientists led by **Dr. V. K. Sharma**, Principal Scientist & Officer Incharge Rohtak Centre received a letter of appreciation from DDG (Fisheries), ICAR for the successful demonstration of commercial shrimp culture using inland saline water at Rohtak Centre. **Dr. B. B. Nayak**, Senior Scientist was nominated as Coordinator for 7th EU Framework Programme Consortia with the nodal point – Food-N-CO at Jawaharlal Nehru University. And also as member, Expert Group to review Standard Conditions for sanitary import of fish and fishery products- Department of Animal Husbandry, Dairying and Fisheries.

Dr. V. K. Tiwari, Senior Scientist was awarded the BIOVED Fellowship-2009 and **Dr. R. P. Raman**, Senior Scientist ,received the Young Scientist Associate Award-2009 by the Bioved Research Society, Allahabad.

Dr. S. K. Mishra, Senior Scientist was awarded ISEE Fellow-2008 by the Indian Society of Extension Education (ISEE), IARI, New Delhi on 20th December, 2008. **Dr. Sanjay Jadhao**, Scientist (SS) received Animal Nutrition Association (ANA) Dr. U. B. Singh Memorial Young Scientist Award for biennium 2007-08 at the ANA World Conference inaugural ceremony held on 14 February, 2009 at NASC Complex, New Delhi. **Mr. Dasari Bhoomaiah**, Technical Officer received a certificate of appreciation from Tamil Nadu Fisheries Graduates Association, Chennai for the outstanding contribution in designing logo.

A total of 42 research papers were published in refereed journals. 12 popular articles, 48 abstracts, 5 training manuals, one book and 5 book chapters were published during the reporting period.

The faculty participated in 57 workshops/seminars/conferences/symposia /congress. Faculty attended 12 training programmes/winter school, 3 brainstorming

session, 38 meetings and 17 invited lectures at different places.Institute organized 17 meetings on different programmes, 5 workshops/conclave, 3 CAS programmes and one winter school.

The meetings of SRC, RAC, Board of Management, Academic Council and Extension Council were held as per schedule.

3. Introduction

The Central Institute of Fisheries Education (CIFE) was established on 6 June 1961 under Government of India with the assistance of FAO/UNDP to impart professional training and education to the in-service personnel of the expanding fisheries development sector at that juncture. Later, on 1st April 1979, the Institute came under the umbrella of Indian Council of Agricultural Research. The Deemed University status was accorded to CIFE on 29 March 1989. Subsequently, the scope and mandate have been widened to include education as well as research. At present, CIFE offers Master programmes in nine and Doctoral programmes in eight disciplines.

The infrastructure facilities of CIFE have been upgraded over the period to achieve the international competitiveness. Initially, CIFE was housed in the Institute of Science building, Bombay, and in 1964, it was shifted to a rented building at Masjid Bunder, Bombay. However, in March 1967, the Institute moved to campus at the Seven Bunglows, Versova, in the western suburb of Bombay. In 2003, CIFE developed its new campus at Yari Road. The Seven Bungalows Campus, and the newly developed Yari Road Campus are situated a kilometer apart. The 2.3 ha Seven Bungalows Campus has laboratories, classroom, computer cell, committee room, auditiorium, Director's chamber, library, aquarium, museum, workshop and administrative and accounts sections together with a backyard wet-lab and prawn hatchery. The campus also has hostel and dormitory facilities, guest house, staff quarters, gymnasium, healthcare centre and sports facilities. The 6.7 ha Yari Road Campus has (three floors with basement) academic building that houses state of the art laboratories, classrooms, faculty and staff chambers, chambers of the Director and Joint Director, conference hall, community hall, aquarium, examination and academic cells. Additional facilities such as wet labs, ponds and hatcheries, library, staff quarters and ladies hostel etc. were also developed in the Yari Road Campus. CIFE also possesses two training-cum-research vessels, *MFV Saraswati* and *MFV Narmada*.

Budget

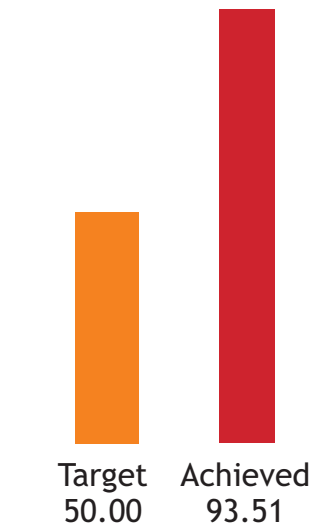
(Rs. in Lakhs)

S.No.	Head	Sanctioned	Received	Expenditure Incurred
1	Plan	995.00	995.00	995.00
2	Non-plan	1711.50	1547.97	1842.58
3	CAS	14.36	14.36	13.10
4	SDU	90.00	90.00	89.87

S.No.	Head	Balance C/f	Receipt in this year	Total
1	AP Cess	19.33	11.91	31.24
2	Externally Funded projects	144.94	151.37	296.31

Revenue Generated

(Rs. in Lakhs)

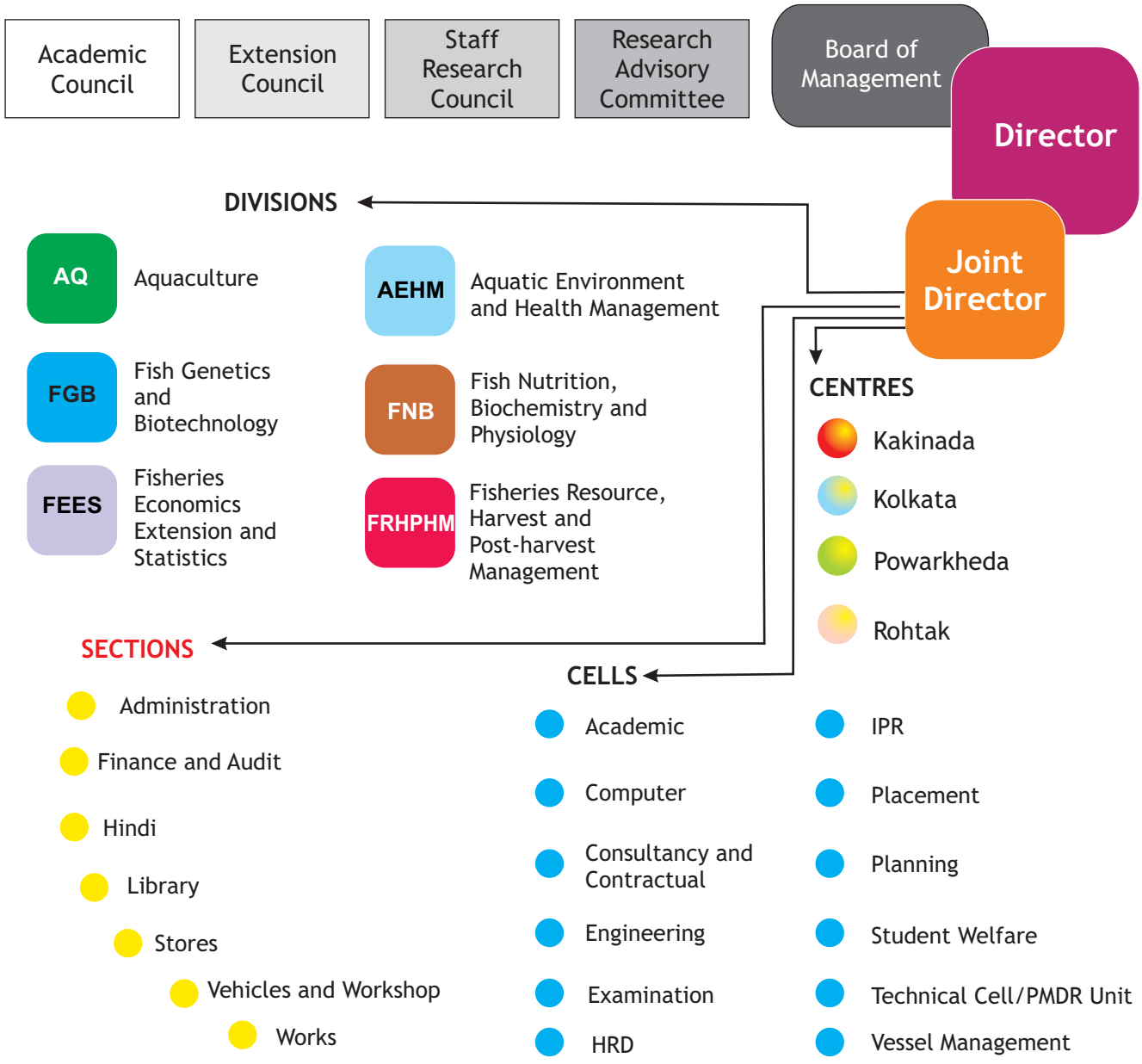


There are six major functional divisions of CIFE equipped with state of the art laboratories and various sections/cells to carry out specific work. Apart from the headquarters in Mumbai, the Institute has four centres located at different aqua-climatic regions (Kolkata in West Bengal, Kakinada in Andhra Pradesh, Powarkheda near Bhopal in Madhya Pradesh and Rohtak in Haryana) of the country with farms and infrastructural facilities to impart hands-on training to students, farmers and developmental personnel as well as to conduct need-based research projects.

Mandate

Organization and Management

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



Educational achievements

4.1 Results

Sr. No.	Name of the program		No. of successful students
1	**Ph.D.**		**19**
	Fisheries Resource Management	2	
	Inland Aquaculture	4	
	Post Harvest Technology	3	
	Fish Biotechnology	3	
	Fish Pathology & Microbiology	2	
	Fish Nutrition & Biochemistry	2	
	Mariculture	3	
2.	**M.F.Sc**		**34**
	Aquaculture	14	
	Fisheries Resources Management	3	
	Post-Harvest Technology	3	
	Fish Genetics & Biotechnology	4	
	Fish Pathology & Microbiology	3	
	Fish Nutrition & Biochemistry	5	
	Fish Business Management	2	
3.	**P.G. Diploma in Inland Fisheries**		**22**
	Total		**75**

4.2

The following are the Ph.D theses and M.F.Sc dissertations on which degrees were awarded during the year 2008-09:

Ph.D. Theses

Sno	Name of the student	Title	Guide
1	Mr. Surjya N. Datta Ph.D.-233 (2005-08)	Ecological studies of selected beaches of Mumbai coast	Dr. S. K. Chakraborty
2	Mr. Ashutosh Mishra Ph.D.138 (2001-04)	Study of biodiversity of selected reservoirs of Uttaranchal	Dr. S. K. Chakraborty
3	Mr. Zynudheen A.A. Ph.D.-200 (2003-06)	Biochemical, Microbiological and Nutritional evaluation of fermented Fish Silage	Dr. K. G. Ramachandran Nair, CIFT, Cochin
4	Mr. A. Surendraraj Ph.D.-199 (2003-06)	Enteric bacteria associated with aquaculture Systems with Emphasis on Enteropathogenic *E. coli*	Dr. N. Thampuran CIFT, Cochin
5	Mr. Mohan C.O. Ph.D.-222 (2004-07)	Shelf life extension of Seer fish (*Scomberomorus commerson*) steaks using O_{2-} scavenger and CO_2 emitters in chilled conditions	Dr. Ravishankar C. N. CIFT, Cochin
6	Mrs. Vasantha P. Ph.D.-240 (2005-08)	Accumulation and distribution of heavy metals in selected Mangrove species	Dr.C. S. Purushothaman
7	Mr. Prem Kumar Ph.D.-208 (2004-2007)	Immuno-physiological responses to thermal stress in *Labeo rohita* and its Mitigation	Dr. A. K. Pal
8	Ms. Vijula K. Ph.D.-189 (2003-06)	Evaluation of *Lemna minor* and *Azolla caroliniana* for the removal of heavy metals from aquatic ecosystem	Dr.C. S. Purushothaman
9	Mrs.M.G.I.S.Parakrama Ph.D.-239 (2005-08)	Effect of feeding vitamins, astaxanthin and HUFA enriched live and artificial feed on growth, survival, fatty acid profile and stress resistance of *Macrobrachium rosenbergii* (de Man)	Dr. Kiran Dubey Rawat

10	Ms. G. Annie Selva Sonia Ph.D.-225 (2004-07)	Bioactivity profile of chosen sponge extracts and their efficacy in managing common microbial diseases of marine ornamental fishes	Dr. A. P. Lipton CMFRI, Cochin.
11	Mr. Anand C. Ph.D.-172 (2002-05)	Molecular and cytogenetic studies of sex inversion in the grouper, *Epinephelus diacanthus* (Valenciennes, 1828)	Dr. P. Jayasankar CMFRI, Cochin.
12	Ms. Seema C. Ph.D.-179 (2002-05)	Aquaculture management by integrating seaweed with shrimp	Dr. Reeta Jayasankar, CMFRI, Cochin.
13	Ms. Sona Yangkokpam Ph.D.-218 (2004-07)	Compensatory growth and physio-biochemical responses to feed deprivation in *Labeo rohita* fingerlings	Dr. K. K. Jain
14	Mr.Shivendra Kumar Ph.D.-252 (2005-08)	Metabolism and Immuno modulation of thermally expressed *Labeo rohita* Under different dietary regime	Dr. N. P. Sahu
15	Mr. P. Krishnan Ph.D.-248 (2005-08)	Silencing WSSV genes in *Penaeus monodon* using DNA vector-based RNAi constructs	Dr. Aparna Chaudhari
16	Ms. Neetu Shahi Ph.D.-193 (2003-06)	Risks associated with marine microalgae of North Mumbai Waters	Dr. B. B. Nayak
17	Mr. Binod Kr. Choudhary Ph.D.-192 (2003-06)	Phylogenetics of Indian Puffer fish inferred from mitochondrial DNA cytochrome BGene Sequences	Dr. W. S. Lakra
18	Mr. Rajesh Kumar Ph.D.-215 (2004-07)	Immunological studies on the effect of *Bacillus subtilis* in *Catla catla* and *Labeo rohita*	Dr. S. C. Mukherjee
19	Mrs.A.D.W.R.Rajapakshe Ph.D.-251 (2005-08)	Infectivity studies of some bacterial infections in Koi Carp *Cyprinus carpio* (L.)	Dr. K. Pani Prasad

M.F.Sc. Dissertations

Sno	Name of the student	Title	Guide
	FISHERIES RESOURCE MANAGEMENT		
1	Ms. Thankam T. Paul FRM-200	Mapping of clam beds in Vembanad lake, using GIS and remote sensing	Dr. R. S. Biradar
2	Ms.Sandhya K. M. FRM-201	Comparison of heavy metal accumulation in *Perna viridis* (Linnaeus, 1758)	Dr. C. S. Purushothaman
3	Mr. Swapnil S. Ghatge FRM-203	Fisheries GIS for greater Mumbai region	Dr. R. S. Biradar
	AQUACULTURE		
1	Mr. Tarkeshwar Kr. AQ-201	Combined effect of temperature and tryptophan on gonadal development of *Cyprinus carpio* var koi L.	Dr. V. K. Tiwari
2	Mr. Umesh Kr. Dharua AQ-202	Effect of dietary probiotics on growth and survival of *Carassius auratus* (Linn.)	Dr. M. P. S. Kohli
3	Mr. Mallikarjun H. AQ-203	Effect of beta-carotene on growth and colour of angel fish *Pterophyllum scalare* (Schultze, 1823)	Dr. Neelam Saharan
4	Mr. Subodh Kumar AQ-204	Comparative studies on Lime and Alum application for development of eutrophic condition	Dr. Chandra Prakash
5	Mr. Pawar Nilesh Anil AQ-205	Effect of aeration on fingerlings production of carps	Dr. J. K. Jena, CIFA, Bhubaneswar

6	Mr. Satheesha A. AQ-207	Cloning of Lysozyme encoding cDNA and its expression in rohu, *Labeo rohita* (Ham.)	Dr. N. K. Maiti, Principal Scientist CIFA, Bhubaneshwar
7	Mr. Chandan Debnath AQ-208	Studies on experimental transmission, pathogenecity, immunology and characterisation of *Saprolegnia parasitica* (Coker)	Dr. B. K. Das Senior Scientist CIFA, Bhubaneshwar
8	Mr. Periasamy K. AQ-209	Effect of aromatase inhibitor on sex steroid radio and neurogenesis of *Cyprinus carpio*	Dr. M. P. S. Kohli
9	Mr.Kiruba Sankar R. AQ-210	cDNA cloning and expression of activin gene in rohu, *Labeo rohita* (Ham.)	Dr. Ashis Saha Scientist (SS) CIFA, Bhubaneshwar
10	Mr.Jacob Cherian AQ-211	Water budgeting studies on the hatchery and nursery rearing practices for the common carp, *Cyprinus carpio* (Linnaeus, 1758)	Dr. A. K. Verma
11	Ms.Fathima S. Hameed AQ-212	Effect of temperature on the Growth and metabolic responses of angel fish *Pterophyllum scalare*	Dr. Kiran Dubey Rawat
12	Ms.Surabhi Chandran AQ-213	Effect of dietary incorporation of spirulina on growth and pigmentation of goldfish, *Carassius auratus* (Linn.)	Dr. M. P. S. Kohli
13	Ms.Santhi Krishna G. AQ-214	Sublethal effect of Nitrite at various chloride concentrations on selected biochemical parameters of *Cirrhinus mrigala* (Hamilton)"	Dr. V. K. Tiwari
14	Mr. Sreenath K.R. AQ-215	Physiological responses of *Macrobrachium rosenbergii* (de Man) to salinity variation"	Dr. Chandra Prakash

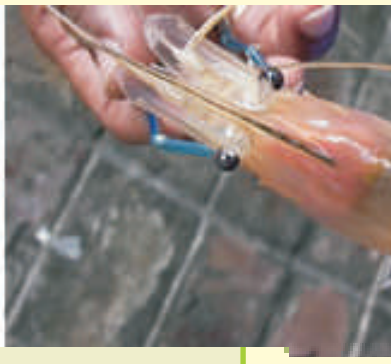
POST HARVEST TECHNOLOGY

1	Ms. Nagalakshmi K. PHT-43	Isolation and identification of *Helicobacter pylori* from seafood	Dr. B. B. Nayak
2	Ms. Viji P. PHT-45	Expansion characteristics and protection of n-3 PUFA enriched extruded rice-corn-bengal gram blends	Dr. G. Venkateshwarulu
3	Ms. Sumitha E.B. PHT-46	Ready-to-eat fish sandwich paste fortified with EPA and DHA in retort pouch	Dr. S. Basu

FISH GENETICS AND BIOTECHNOLOGY

1	Mr. Vinay T.N. FGB-26	Evaluation of immune response to *Aeromonas hydrophila* biofilm vaccine in *Labeo rohita* employing monoclonal antibody based ELISA	Dr. R. S. Rana
2	Mr. Subrata Kr. Sahoo FGB-28	Characterization of *Mus musculus* MT-4 promoter for use in transgenic fish biosensor responsive to copper	Dr. Aparna Chaudhari
3	Mr. Imtiaz Ahmed S. FGB-29	Immobilization of recombinant bacterial biosensors for development of user-friendly heavy metal diction kits	Dr. Aparna Chaudhari
4	Ms. Wanglar Chimwar FGB-30	Colour interitance patterns in Guppy, *Poecilia reticulate* (Peters 1860)	Dr. Gopal Krishna





1	Mr. Gyanaranjan D. FPM-28	Production, partial purification & characterization of Rohu interleukin 2	Dr. K. Pani Prasad
2	Mr. Binoy Rajan FPM-30	Quantification of Rohu Serum Immunoglobulin by ELISA	Dr. M. Makesh
3	Ms.Swarnalata Misra FPM-31	Characterization of Muxozoan infecting freshwater fish *Labeo rohita* (Hamilton)	Dr. K. V. Rajendran

FISH NUTRITION AND BIOCHEMISTRY

1	Mr. Neeraj Kumar FNB-26	Responses of endosulfan and temperature exposed *Labeo rohtia* to dietary methyl donors	Dr. S. Jadhao
2	Ms. Ciji Alexander FNB-27	Effect of temperature on dietary carbohydrate utilization and associated stress responses in *Labeo rohita* fingerlings	Dr. N. P. Sahu
3	Mr. D. K. Meena FNB-28	Cloning & sequencing of partial Δ-6 desaturate gene from *Catla catla*	Dr. S. D. Singh
4	Mr. Saravanan S. FNB-29	Physiometabolic response of freshwater prawn, *Macrobrachium rosenbergi* to dietary carbohydrate	Dr. K. K. Jain
5	Md. Shahbaz Akhtar FNB-30	Responses to dietary pyridoxine on stress mitigation and immunomodulation in *Labeo rohita* fingerlings	Dr. A. K. Pal

FISH BUSINESS MANAGEMENT

1	Ms. Tanmaya Dev FBM-22	Social and economic impact study of selected SHGs in fisheries and allied sector in Madhubani, (Bihar)	Dr. Arpita Sharma
2	Mr.Sadafule Nakul A. FBM-24	Technical efficiency of shrimp farming in Costal Maharahstra	Dr. S. S. Salim

4.4 Enrollments (Ph.D.)

S.No.	Discipline	Students on Roll		
		2008-2011	2007-2010	2006-2009
1	Fisheries Resource Management	6	5	5
2	Aquaculture	15	9	10
3	Post Harvest Technology	5	3	2
4	Fish Biotechnology	1	2	2
5	Fish Genetics	1	2	2
6	Fish Pathology & Microbiology	3	2	2
7	Fish Nutrition and Biotechnology	4	2	2
8	Fish Business Management	1	--	1
	Total	**36**	**25**	**26**

4.5 Enrollments (M.F.Sc.)

S.No.	Discipline	Students on Roll	
		2008-2010	2007-2009
1	Fisheries Resource Management	4	5
2	Aquaculture	10	9
3	Post Harvest Technology	6	5
4	Fish Genetics & Biotechnology	6	5
5	Fish Pathology & Microbiology	6	5
6	Fish Nutrition and Biotechnology	5	5
7	Fish Business Management	4	4
8	Fish Extension	5	4
9	Aquatic Environment Management	4	3
	Total	**50**	**45**

5.1 Institutional Project

Thrust Area 1: Utilization of Salt - Affected Inland Areas through Aquaculture

Project Title: Refinement of existing and development of new technologies for inland-saline aquaculture

Personnel :

C. S. Purushothaman, S. Raizada, U. K. Maheshwari, N. K. Chadha, G. Deshmukhe, A. K. Verma and G. Venugopal

Achievements:

The Sea weed, *Ulva lobata* inserted in monofilament yarn was introduced into 200-l tanks with 15, 20 and 25‰ salinity at Rohtak Centre in September 2008. Experiments had been set up to evaluate the nutrient requirements of the species for taking up the culture under field conditions. Water and algal samples have been collected from Rohtak centre for the studies on the optimization of dissolved ions for algal culture. Though the growth of sea weed under indoor conditions had been poor, it had shown considerable growth in the outdoor cement cisterns during winter. Pearlspot *(Etroplus suratensis)* stocked in April 2008 had grown to average size of 31g with a maximum of 60g in eight months at a stocking density of 7,000/ha when stocked along with Indian major carps at 14,000/ha. A growth medium had been developed and studies had been conducted, on inoculum preparation in air-lift cultures to compare growth in batch, indoor and outdoor cultures of *Spirulina*.

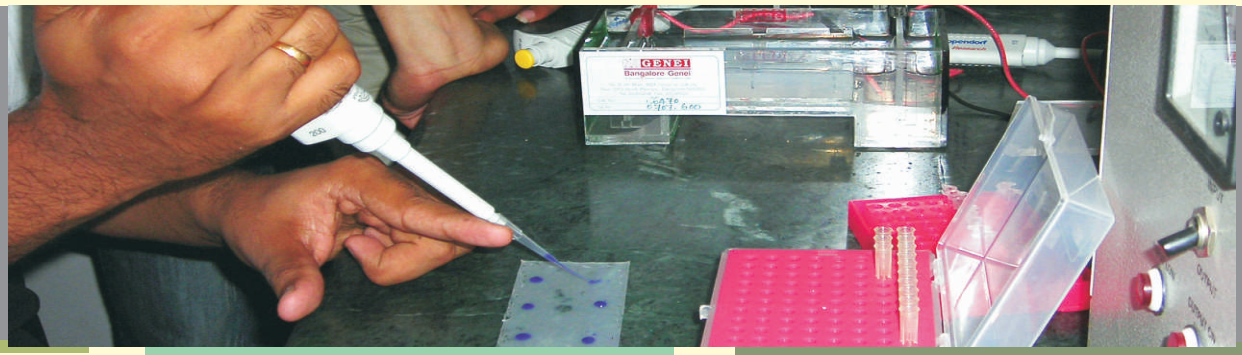
Project Title: Nutrient management and seepage control in salt-affected areas for aquaculture

Personnel:

A. Vennila, N. Saharan, S. Raizada, V. K. Tiwari, P. K. Pandey, A. K. Verma, A. K. Reddy, Chandraprakash

Achievements:

After screening of about 50 isolates for inorganic phosphate solubilization and phosphatase activity, two from each group was selected for further studies. The isolates HPS 3 and HPS 4 solubilized 2.08 and 1.90mg P per g cell dry weight (CDW), respectively in 72 hours of incubation. HWPP 8 and HPP 19 produced significantly higher phosphatase activity (117.41 and 82.71mg p-nitrophenol released/g CDW). Charcoal as a carrier material provided comparatively higher viability of all the four selected isolates than the Fuller's earth and sawdust. Among the isolates HPS 3 and HPP 19 were found to be stable for a storage period of 32 weeks. These isolates were subjected to identification through GC-FAME analysis. HPS 3 and HPP 19 were identified as *Bacillus cereus*, GC subgroup A and HPS 4 as *Enterobacter cloacae*. The isolate HWPP 8 did not match with any of the organism in the GC-FAME Library. Seepage management experiment with Haryana soils showed that the incorporation of organic material as a layer significantly reduced the seepage in both Banyani and Lahli soils. Among the



organic materials, cow-dung treatment was found to reduce seepage in Lahli soils significantly than the sugarcane bagasse, whereas the opposite was true for the Banyani soils.

Project title: Strategies for the control of Nodavirus infection in *Macrobrachium rosenbergii*

Personnel:

K. V. Rajendran , A. Chaudhari, M. Makesh

Achievements

Samples of white tail disease-infected *M. rosenbergii* were collected from Andhra Pradesh and Tamil Nadu. Total RNA was extracted either from muscles or from the whole larvae using Trizol ® (Invitrogen) and a known quantity of RNA was reverse-transcribed into cDNA. Three pairs of primers were designed to amplify different regions of the genome of MrNV and two sets of primers for XVS. PCR conditions were standardized for all the primers which were designed. A 590 bp of RNA1, 681 bp of RNA2 and another 1.14 kb of RNA2 of MrNV and 500 bp and 772 bp of XSV were PCR amplified, cloned and sequenced. The sequences were compared with the GenBank sequences available for both MrNV and XSV. A set of new primers targeting the gene coding the capsid protein of MrNV and XSV was designed. MrNV and XSV were amplified, using these primers, and cloned in pTZ57R/T vector. The plasmid DNA was used as a control in standardizing the real-time PCR. The plasmid copy number was calculated using the concentration (OD_{260nm}) and molecular mass. In the case of MrNV, a dilution series was prepared with the starting copy number of $3.92x10^9$ molecules/µl down to approximately 4 molecules/µl. Similarly, for XSV, a dilution of $5.2x10^9$ molecules/µl down to approximately 5 molecules/µl was prepared. The dilution series was titrated using conventional PCR before it was being used in the real-time format. In the real-time PCR, SYBR Green master mix (Fermentas) was used. Amplification plots and standard curves were generated for both MrNV and XSV. Using these standard curves, clinical samples were analysed to estimate the copy number. Therefore, a SYBR Green-based, quantitative real-time PCR (qRT-PCR) assays for the causative agents of white tail disease of freshwater prawn were developed.

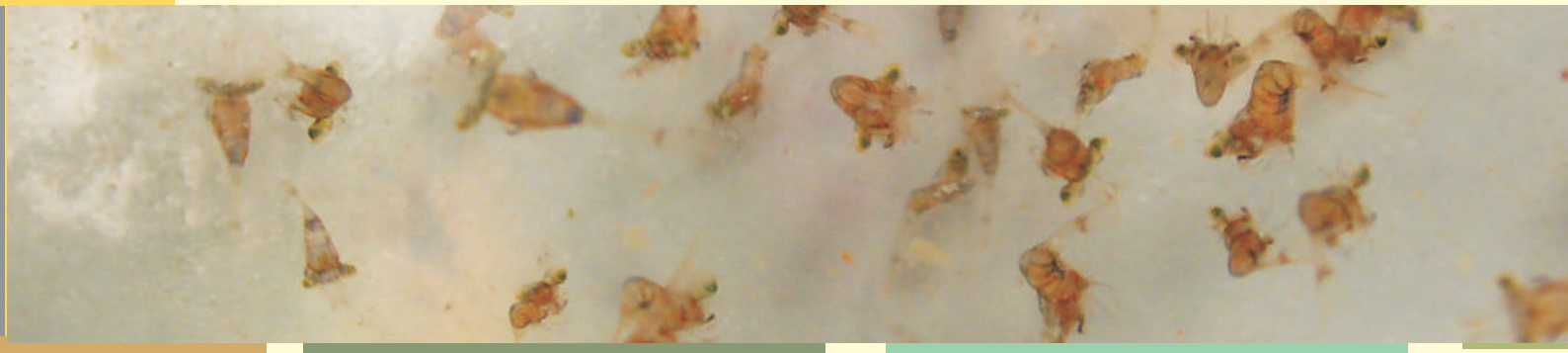
Project title: Bacterial biofilm in aquaculture and their potential uses

Personnel:

P. K. Pandey, C. S. Purushothaman, S. P. Shukla

Achievements

Materials namely wood, glass slides, stones, tiles (rough and smooth surface), PVC, sugarcane bagasse, coconut husk and bamboo were used as the substrata for the settlement of the biofilms. There was progressive enhancement in the colony forming unit of the bacteria during the experimental period on all substrata. However, sugarcane bagasse was found to be



the most suitable substratum for the settlement of bacteria. Water as well as microbiological samples were collected at weekly intervals for various analyses for five weeks. Periodical observations of phytoplankton were also made. The most dominant algae observed from the settlements are *Cosmarium reniforme*, *Chlorococcum humicola*, *Protococcus* sp., *Chlorella vulgaris*, *Nitzschia linearis*, *Scenedesmus quadricauda*.

A yard experiment has been set up using sugarcane bagasse as the substratum for the settlement of the bacteria as biofilm; 0.5, 1.0 and 1.5 kg of bagasse has been introduced along with koi carps in the fibreglass tanks.

THRUST AREA 2: GENOTYPE ENVIRONMENT INTERACTION STUDIES FOR ECONOMICALLY IMPORTANT TRAITS

Project title: Brood stock management, rearing and evaluation of genetic parameters of different *Macrobrachium rosenbergii* populations

Personnel:

Gopal Krishna, S. Jahageerdar, G. Venugopal, M. Abbas, N. K. Chadha, Somdutt

Achievements

The project was initiated with the collection of *M. rosenbergii* stocks from Maharashtra (Mah), Gujarat, Orissa and Andhra Pradesh, during third quarter of the first year. The stock was maintained at Balbhadrapuram farm of Kakinada centre. The stock was then maintained separately till the prawns were two to three gm size. The prawns were then tagged for the identification of the stocks during Nov 2006. A total of about 350 to 425 prawns were tagged from each stock. After tagging, the prawns were kept in the FRP tanks for acclimatization before being released and maintained in the earthen ponds for the growth and maturation studies. Simultaneously, the animals were allocated for further nutritional studies.

Project title: Improvement of economic traits in Rohu by diallel crossing of inbred lines

Personnel:

S. Jahageerdar, Somdutt

Achievements

A total of 35 full-sib families using partial diallele mating have been produced and tagged with PIT tags and were reared at Powarkheda. Stocks from Bhadra (Karnataka), Aarey and Khopoli (Maharashtra) Bhopal and Maihar (Madhya Pradesh), CIFE Powarkheda and one private hatchery were assembled at CIFE Powarkheda center. A partial diallele mating design was planned and a total of 47 families consisting of both F1 and reciprocal crosses were produced over tow breeding seasons. The full-sib families were reared in 1 ton capacity FRP tanks, hapas of 3 X 2 X 1 M and in the earthen pond portioned with the hapa materials till the fishes attained a body weight of 5 g, for purpose of PIT tagging. It was observed that the animals reared in the

earthen ponds reached a taggable size much earlier than the animals in the hapas or FRP tanks. The preliminary analysis of the data revealed that the pond cross had significant effect on body weight.

Project title: Genetic evaluation and genetic characterization of two new candidate species for aquaculture *Macrobrachium villosimanus* & *Osteobrama belangeri*

Personnel :

A. K. Reddy, Rupam Sharma, Gopal Krishna, Aparna Chaudhari, Gayatri Tripati, Pavan Kumar, Gireesh Babu and S.S.H. Razvi

Achievements:

M. villosimanus

Berried females of *M. villosimanus* collected from the river Brahmaputra were air lifted to CIFE, Mumbai. The eggs hatched in fresh water. The larvae were stocked in four 50 litres capacity plastic tubs filled with water of different salinity i.e., 0 ppt, 5 ppt, 10 ppt and 15 ppt. Complete mortality was observed at 0 and 5ppt whereas larvae reached post larval stage at 10 ppt and 15 ppt with a survival of 34.50 and 37.50 % respectively. The results indicated that the M. *villosimanus* required saline water of 10-15 ppt for completion of its life cycle. 200 nos. of juveniles were stocked in a cement tank grew to an average weight of 5.25 g in 6 months. But no maturity was observed unlike *M. rosenbergii* which normally matures in 5-6 months irrespective of any size.

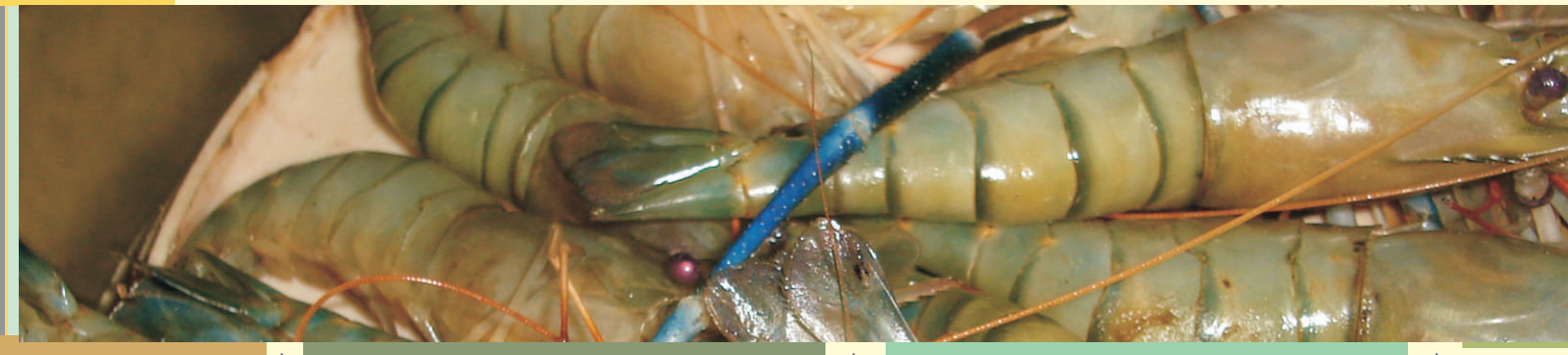
O. belangeri

500 nos. of ***O. belangeri*** fry (2.0 – 2.5 cm) locally known as Pengba were air lifted from Imphal, Manipur during November, 2006 and reared to fingerling size (4.5 – 5.5 cm) at CIFE, Mumbai. 300 nos. of fingerlings were shifted to CIFE Powarkheda Center during January, 2007. The fishes matured by June, 2007. A pair of pengba (female 372 g / 280 mm and male 173 g / 252 mm) were bred in August, 2008. A total of 1, 82, 875 Nos. of eggs were obtained with 90 % fertilization and 36 % hatching. 60,000 nos. of spawn was obtained which were reared to fingering stage. 5000 nos. of fingerlings were stocked in three ponds and 500 nos. of fry were brought to Mumbai. The fishes grew to 13-15 g in earthen ponds at Powarkheda and 12-14 g in FRP tanks at Mumbai. 500 nos. of Pengba fry brought from Manipur during December, 2007 were reared to fingerling size at Mumbai. 200 nos. of fingerlings were supplied to Kakinada center for raising brood stock. The fishes grew to 110-122 g and matured by April, 2009. 9 nos. of Pengba have grown to 130 -240 g and matured at Mumbai. Standardization of technique for development of cytogenetic markers for *M. villosimanus* and Pengba, *Osteobrama belangeri* is in progress.

Project title: Characterization and nanoencapsulation of fish pheromones for using in fish reproduction

Personnel:

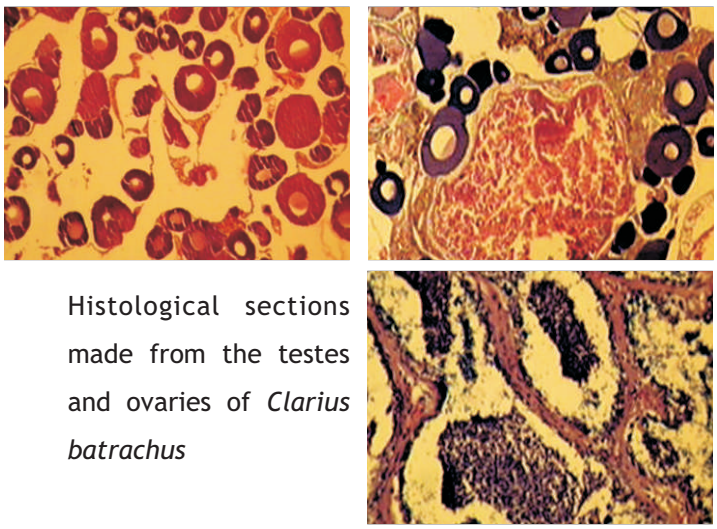
Rupam Sharma, S. Munilkumar, S. Gupta,



S. D. Singh and Deepa Bhagat (PDBC, Bangalore)

Achievements:

Sample from water, blood and gonads were collected from natuarl breeding ground and also from hatchery and were analyzed for the presence of pheromones by chromatographic technques. Histological slides were prepared of the gonads of both the sex of *Clarias batrachus* in different seasons and the various changes were monitored to correlate the level of pheromone production in different season.



Histological sections made from the testes and ovaries of *Clarius batrachus*

Project title: Nutritional and biochemical responses of different *Macrobrachium rosenbergii* populations to varying environmental conditions

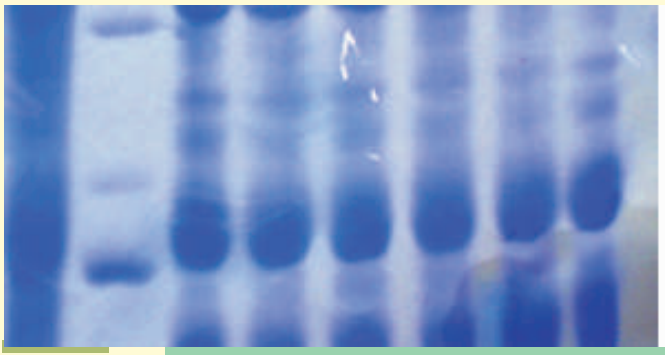
Personnel:

N. P. Sahu, A. K. Pal, K. K. Jain

Achievements:

A 60-day feeding trial was conducted to study the effect of dietary lipid level on growth and fatty acid profile of *Macrobrachium rosenbergii* juveniles of Andha Pradesh and Orissa stocks. A total of 72 prawns (average weight 7.61±0.32 g) from each stock i.e., Andha Pradesh and Orissa were randomly distributed into four treatments having 18 prawns in each treatment with each of three replicates. Each tub was provided with hiding device and acclimated for 7 days before start of the experiment. Two isonitrogenous (CP-25%) diets with two levels of lipid were fed for 60 days. Following growth parameters viz., % weight gain, SGR, FCR, FER, PER, and ANPU were observed. The physiometabolic parameters like GOT and GPT activities were observed to be similar ($P>0.05$) in both the stocks. It was observed that growth rate of different stocks of prawns were not affected due to dietary lipid level. However, tissue fatty acids profiles were significantly varied ($P<0.05$) with respect to dietary lipid level and stocks as well. Total mono unsaturated fatty acid (MUFA) and n-6 fatty acids were not significantly affected with respect to different stocks. Increased level of dietary lipid significantly reduced the MUFA and total n-6 fatty acid level. But total n-3 fatty acid content was not affected with respect to dietary lipid level. But Andhra Pradesh stocks exhibited significantly higher ($P<0.05$) n-3 fatty acid level than the orissa stock.

Project Title: Isolation, identification and characterization of common pathogens of



Macrobrachium rosenbergii from selected stocks

Personnel:

M. Makesh, S. C. Mukherjee, K. Pani Prasad, R. P. Raman, Gayatri Tripathi

Achievements :

A common disease found to cause an impact on scampi culture is the white tail disease. The disease is caused by both *M. rosenbergii* nodavirus (MrNV) and extra small virus (XSV) as reported earlier. Both the viruses, MrNV and XSV were detected in the infected samples. It was difficult to reproduce the disease as the attempts to reproduce the disease through various routes failed. The failure may be attributed to the fact that the causative agents being RNA viruses gets degraded very fast and the predisposing factors responsible for the infection are not known. Hence, following simple biosecurity measures and disinfection of farm and equipments, all-in all-out culture practice will control the disease outbreaks. The incidence of bacterial and fungal infections was quite rare. However, the *Aeromonas hydrophila* isolated are resistant to various antibiotics indicating the indiscriminate use of antibiotics. Application of formalin at the rate of 50 ppm as bath treatment proved successful in removing the epibionts.

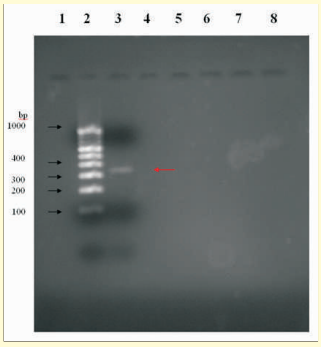
Project Title: Molecular Analysis of growth promoting peptide hormone from food fish (Mullet/Seabass).

Personnel:

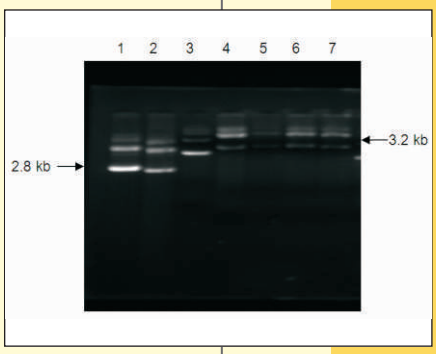
S. D. Singh, R.S. Rana, Subodh Gupta

Achievements :

Asian Seabass, *Lates calcarifer* (about 500g live weight) were procured from Kharland Research Station, Panvel, Navi Mumbai and tissues - fin, liver and pituitary glands were dissected out and preserved in cell lysis buffer at 4°C for further use in molecular characterization of peptide hormone genes. Total RNA from liver and genomic DNA from fin and pituitary glands were isolated and purified as per standard protocol. Their quality, purity and integrity were found to be good on checking in agarose gel electrophoresis and therefore are being used in their molecular characterization studies. Oligonucleotide primers for growth promoting peptide hormones - IGF 1 (Insulin like Growth Factor 1) and Leptin (Obese, Ob gene) were designed on the basis of NCBI gene bank and nucleotide data base and got synthesized. cDNA was synthesized from total RNA with the help of oligo dT and RT - PCR. A cDNA gene of about 350 bp for IGF 1



Lane 2. DNA Mol Wt Marker
Lane 3. cDNA of IGF 1 gene (350 bp) of Seabass



Slot Analysis of Plasmids
Slot 1-3 are plain plasmid (2.8 Kb).
Slot 4, 6 and 7 are recombinant plasmid (3.2 Kb) having IGF 1 gene (350 bp)

was produced by PCR using IGF 1 specific primers. This cDNA gene of about 350 bp for IGF 1 was preserved at -20° C and utilized for molecular cloning into *E. coli* /pTZ plasmid vector.

Thrust Area 3 : Non-food Organisms in Aquaculture

Project title: Breeding of some indigenous ornamental fishes from North-East India

Personnel :

Chandra Prakash, M.P. Singh Kohli, K. Dube, Babitha Rani

Achievements :

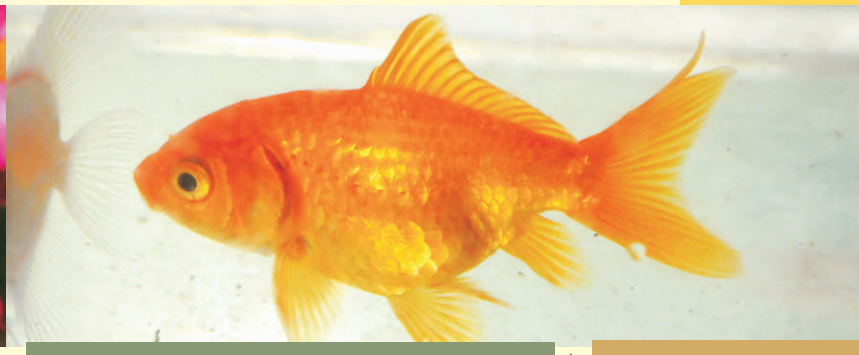
A preliminary survey was conducted in North-east India in the month of October, 2008. The wild stock collected from there was brought to Mumbai. Having acclimatized the fish stock, breeding trials on *Danio aequipinnatus* were conducted and bred successfully. Five thousand numbers of fish seed were stocked in rearing tanks. The absolute fecundity, percentage of fertilized and unfertilized eggs, water quality parameters for breeding and hatching including their further growth are shown in the following tables.

Absolute fecundity, % of fertilized eggs, % of unfertilized eggs and hatching % of five different breeding sets of Danio aequipinnatus

Sl. No.	Weight (g)/ length (mm) of brooders	Absolute fecundity	Percentage of fertilized eggs	Percentage of unfertilized eggs	Percentage of hatching
1	Male- 4.05/80, Female- 4.30/76	2480	90.9	9.1	83.4
2	Male- 4.10/82, Female- 4.20/72	1816	89.2	10.8	84.2
3	Male- 3.85/78, Female- 4.0/70	1183	90.6	9.4	82.7
4	Male- 3.95/78, Female- 4.15/74	2147	90.2	9.8	81.5
5	Male- 3.90/80, Female- 4.0/75	1556	88.7	11.3	82.3

Average length and weight of Danio aequipinnatus

1	60	15.3	0.082
2	90	22.7	0.119
3	120	31.1	0.225



Project title: Extraction of natural carotenoids to use as feed additives in ornamental fish feed

Personnel:

A. Sinha, S. D. Singh, G. H. Pailan

Achievements:

11 different types of ornamental fish feed having various levels of natural carotenoids sources were formulated and prepared by using marigold flower meal and rose petals meal. For the preparation of control diet, selected ingredients *viz*. fish meal 25%, soyabean meal 22%, groundnut oil cake 15%, rice bran 20%, wheat flour 12%, starch powder 3%, soya oil 2% and vitamins & minerals 1% were thoroughly mixed and dough was prepared by adding required amount of water. Ten experimental diets were prepared by supplementing either marigold or rose petal powder at five concentrations *viz*. 1%, 2%, 4%, 6% and 8% of the control diet replacing the same amount of rice bran. Four experimental feeding trials each for 7 weeks duration has been conducted in rosibarb and in dwarf gourami using the experimental feeds.

At the start of the experiment the total carotenoid concentration in the muscle and skin of rosy barb was 1.32 µg/g wet weight. Total carotenoids concentration in the muscle and skin of rosy barb after 7 week of experimental feeding trial clearly showed that the total carotenoid concentration increased with the supplementation of marigold and rose petal meals in the diet, highest being in 4% levels and beyond that no further increase in carotenoids content was found in the fish. The carotenoid concentration increased to 3.74 µg/g and 2.14 µg/g wet weights, respectively with the feeding of marigold and rose petal meal supplementation diets. The statistical analysis of data showed the total carotenoid content in fish fed diet with 4% marigold or rose petals was significantly higher ($P<0.05$) than in other groups. Similar results were also found in dwarf gourami, fed with different levels of marigold or rose petals supplemented diets. Maximum increase of carotenoids concentration from 1.78 to 5.36 µg/g wet weights was observed after 7 weeks of experimental feeding with 4% marigold supplemented diet. Feeding of fish with 6% rose petals supplementation diet showed the increase of carotenoids concentration from 2.05 to 5.11 µg/g wet weights. The results showed that marigold or rose petals meal can safely be supplemented at 4% levels in the diets of rosibarb as well as dwarf gourami to increase their skin coloration.

Thrust Area 4: Sustainable Fisheries Development through Co-management

Project title: Developing strategies for fisheries enhancement of Dimbhe reservoir, Maharashtra through management interventions and community participation

Personnel:

M. P. S. Kohli, N. Saharan, K. Dube, L. Shenoy, V. K. Tiwari and Chandraprakash

Achievements:

The analysis of physico-chemical parameters of soil samples during pre-monsoon, monsoon and post monsoon revealed that Soil pH ranged from 7.4 - 7.5 and water retention capacity ranged from 44.5 - 54.0 %. Organic C was 0.14 - 1.5 % and organic matter was from 0.24 - 2.58 %. Total nitrogen ranged between 14 and 150mg /100 g of soil. Analysis of water samples revealed that the physico-chemical characteristics were in the following range: air temperature 31.0 to 33.5^0 C; water temperature 29.0 to 30.0^{0}C; Secchi disc transparency 152 to 176 cm; turbidity 1.4 to 4.5 ppm; pH 7.2 to 7.5; total alkalinity 38 to 55 mg/l; chloride 13 to 20 mg/l; hardness 40 to 55 mg/l; salinity nil; dissolved oxygen 6.2 to 7.0 mg/l; free carbon dioxide 1.8 to 4.0 mg/l; ammonical nitrogen 0.10 to 0.19 mg/l; nitrite nitrogen 0.04 to 0.08 mg/l; nitrate nitrogen 0.10 to 0.25 mg/l; phosphorus 0.01 to 0.02 mg/l; total organic matter 0.044 to 0.075 mg/l; total dissolved solids 45 to 57 mg/l; total suspended solids 0.053 to 0.066 mg/l; iron nil to 0.015 mg/l; silica 0.10 to 0.16 mg/l, gross primary production 340 to 430 mg C / m^3 / day and net primary production 200 to 260 mg C/m^3/day.

During pre-monsoon, monsoon and post-monsoon samples for phytoplankton, zooplankton, and fish fauna were collected identified and recorded.

Phytoplankton availability

Chlorophyceae :
Scenedesmus, Coelastrum, Pediastrum, Selenastrum, Hydrodictiyon,Sphaerocystis,Closterium, Euastrum, Zygnema, Cladophora, Eudorina

Bacillariophyceae :
Skeletonema, Pinnularia, Chaetoceros,

Sampling in Cages

Community participation in installing the Cages in the reservoir

Navicula, Melosira, Nitzschia, Rhizosolenia, Gyrosigma, Stephanodiscus, Neidium, Fragilaria, Amphiplura, Tetracyclus, Cyclotella, Tabellaria, Diatoma, Synedra, Cymbella, Frustelia.

Zooplankton availability

Protozoa :*Gonium, Actinophyrus, Paramecium*

Cladocera: *Daphnia, Ceriodaphnia, Moina,*

Copepoda : *Cyclops*

Rotifera :

Brachionus, Keratella, Platyias,Asplanchna, Polyarthra, Filinia, Testudinella, Roteria, Philodina

A total of 18 species of fish belonging to Cyprinidae, Cobitidae, Siluridae, Bagaridae, Ambassidae, Gobiidae and Mastacembelidae were recorded. The scientific and local names of the individual species were as follows :

Quarry and Undhawade village ponds were used mainly for rearing of fingerlings. A total of 45000 fingerlings was produced and was stocked in the reservoir. Length-weight and species composition data of the fish catch from the reservoir collected and recorded. During the year 2008-09; 1, 21,000 advance fingerlings of catla, rohu, mrigal and common carp were stocked in the reservoir. Apart from this 3000 mahseer advance fry were grown in cages for releasing in the reservoir. Bigger size (2-3 kg) catla and rohu has been reported in the catch off late as compared to earlier size range of 750g -1 kg.

Scientific name	Local name
(1) Carps and Barbs	
FAMILY - CYPRINIDAE	
Chela sp (Ham.)	*Hambli*
Oxygaster clupeoides (Bl.)	*Gauti hambli*
Puntius ticto (Ham.)	*Lalpari*
Puntius Kulus (Sykes)	*Kolas*
Puntius sarana (Ham.)	*Lalpari*
Labeo fimbriatus (Bl.)	*Tamb*
Labeo calbasu (Ham.)	*Kanas*
Labeo rohita (Ham.)	*Rohu*
Catla catla (Ham.)	*Catla*
(2) Loaches-	
FAMILY- COBITIDAE	
Lepidocephalichthys guntea (Ham.)	*Morrye*
Noemacheilus botia (Ham.)	*Khapari*
(3) Catfishes-	
FAMILY- SILURIDAE	
Ompak bimaculatus (Bl.)	*Waranzi*
FAMILY- BAGARIDAE	
Mystus seenghala (Sykes)	*Sheengat*
(4) Glass fishes -	
FAMILY-AMBASSIDAE	
Ambassis nama (Ham.)	*Chand nama*
Ambassis malabaricus (Ham.)	*Katari*
(5) Gobies-	
FAMILY- GOBIIDAE	
Lepidocephalus sp. (Ham.)	*Malya*
(6) Spiny eels-	
FAMILY-MASTOCEMBELIDAE	
Mastocembelus (Lac.)	*Bam*
Mastocembelus pancalus (Ham.)	*Vaheer*

During the year 2008-09, 11567 kg of *catla* were landed.

About 500 kg of green manure crop *Dhaincha* was planted in about 3-4 hectares in exposed areas of 4 villages to enhance soil productivity of the reservoir. Soil organic carbon got increased from 0.45% to 0.70% and showed some improvement in nutrients quality, which may reflect soon in the water quality, thereby increasing productivity of the reservoir.

One cage was stocked with fry of gold fish, *Carassius auratus*, on trial basis. During the culture period of six months, they grew upto 135 mm/42.37 g with very bright colouration and 90 % survival was recorded. 13200 nos. of common carp fingerlings had been harvested from a cage and sold to M/s Indepesca Pvt Ltd., a company involved in cage culture.

Dhaincha plantation yielded good results at all the places. The growth was good and approximately 50 kg of crops each of wheat and bajra have been taken from the villages Savarli, Kushire Budruk and Bendharwadi (Pokhari) respectively.

Dhaincha plantation in the reservoir

Project title: Development of a fisheries co-management model for selected coastal segments of Maharashtra

Personnel: S. K. Chakraborty, S. N. Ojha, K. Venkateshvaran, G. Deshmukhe, A. K. Jaiswar

Achievements

Revadanda estuary was selected for study. The water quality parameters were studied by collecting the samples from the site. The biodiversity was studied by standard methods. Phytoplankton and Zooplankton was collected and preserved in Lugol and formaldehyde solutions. To make an assessment of the socioeconomic status

Changes in soil properties after planting of Dhaincha

Sl. No.	Particulars	Field planted with Dhaincha	Neighbouring field
1	Colour of soil	Dark brown	Light brown
2	Soil pH	7.50	7.40
3	Sand (%)	40.00	40.00
4	Soil (%)	35.00	40.00
5	Clay (%)	25.00	20.00
6	Water Retention capacity (%)	54.00	44.00
7	Organic carbon (%)	1.54	0.14
8	Organic Matter Content (%)	2.58	0.24
9	Total Nitrogen (mg /100 g of soil)	1.50	0.14
10	Total Phosphorous (mg /100 g of soil)	6.50	2.00

of the villagers PRA study was also conducted.

The problems faced by the villagers have been identified. The catches had declined, threat of pollution from MIDC apparent and, sand mining had reduced the bottom fauna and breeding grounds of the prawns. Sand mining had also destroyed the mangrove vegetation in the area. It was also observed that there social issues invading many of the high profile stakeholders are like the Birla group of industries and functionaries.

Project title: Development of a participatory extension model for aquaculture

Personnel: P. S. Ananthan, S. S. H. Razvi

Achievements

The assessment of present aquaculture extension and service delivery system in Project States (Andhra Pradesh, West Bengal, Madhya Pradesh, Assam, Manipur, Tripura and Mizoram) revealed that unlike the crop sector or livestock sector, aquaculture extension was yet to mature as an institutionalised mechanism with adequate policy support, organizational structure, and professional development. Extension services were mainly organized around the FFDA and BFDA though other agencies such as MPEDA, ICAR, SAUs, KVKs, NGOs, private input manufacturers and consultants were involved. In Andhra Pradesh progressive farmers and their enterprising associations played pivotal role in diffusion of technology across the client system. The major pitfalls of the present fisheries extension system were: Technology and subsidy driven system as a result of treating fishers/farmers as passive takers; Ignorance/oversight of social parameters & conditionalities resulting in lack of innovation & skill to motivate/organise client groups and Isolation of DoF from community/village level organisations, NGOs; inappropriate & ineffective organisational design with conflict between Enforcement vs Extension Service roles, lack of autonomy within executing agency; lack of adequate & skilled staff; lack of coordination for delivery of inputs / services.

The innovative Trickle Down System (TDS) of Aquaculture Extension that came out of an FAO project in Bangladesh was field tested in the project States. The no. of RDFs identified & trained so far were 60 with 15 ha in 4 villages (Tripura), 70 with 17 ha in 6 villages (Mizoram), 80 with 20 ha in 6 villages (Manipur), 11 with 1 ha in 6 villages (W.B.), 2 with 7 ha in 4 villages (M.P.), 2 with 4 ha in 4 villages (A.P.), 250 farmers in 250 blocks (Assam). DoF Staff, Farmers, Credit & Insurance Agencies, Co-op societies, and Experts are being involved in the Project area. Follow up training and visits were carried out in 5 of the 7 project areas except Mizoram and Tripura. Besides, 140 families in two segments of Loktak lake (Manipur) had been selected, mobilised to form a group, given series of demonstration cum training on aquaculture technologies. Result Demonstrations cum trainings on carp

polyculture, carp cum prawn culture, prawn culture, low cost carp culture, crab fattening, fish cum poultry farming, fish cum pig farming were given to RDFs, FFs, Staff of DoFs. Easy to use field manual and co-learning materials with illustrations had been developed on carp culture (play cards, flip charts), carp poly culture (manual) and prawn culture (manual).

Thrust Area 5: Policy Frame Work for Indian Fisheries and Aquaculture

Project title: Developing appropriate policy framework for the development of fisheries and aquaculture

Personnel: Dilip Kumar, R. S. Biradar, S. N. Ojha, L. Shenoy, A. Sharma, B. B. Nayak, S. Salim, P. S. Ananthan, R. P. Raman, A. Vennila

Achievements

The main objective of the project was to prepare a policy framework for the development of fisheries and aquaculture in India. A participatory approach is envisaged in this project to gather opinion of the different stakeholders.

Policy Review: Five zonal level consultative workshops on 'Fisheries and Aquaculture Policy' were successfully conducted under the project at Guwahati for North Eastern States, Hyderabad for East Coast States, at Goa for West Coast States (June 2007), at Chandigarh for Northern States (July 2007), and at Patna for Central States (October 2007). These workshops provided a platform where the policy issues, gaps and HRD needs of the respective zones were addressed and discussed at length in a truly consultative and participatory mode evoking intense interest and introspection among all the stakeholders. The output and recommendations of the workshops provided essential ingredients that would assist the state in developing their own State fisheries policy. The workshops had also brought out several cross sectoral issues confronting the fisheries sector and their interdependent nature. The workshops had yielded some specific inputs for developing the policy framework at Central and State levels. A workshop was held at the Institute during 15-20 December, 2007 for synthesising the proceedings of five zonal workshops conducted earlier.

Policy Support: One significant outcome of the project was interest shown by State Depts. of Fisheries for development and policy support. Accordingly, policy development support was provided to the Fisheries Depts. of Bihar, Tamil Nadu, and Assam.

Policy Framework: Based on the consultative workshops and literature review, a detailed framework consisting of policy issues, policy status, and policy options on 8 sub sectors of fisheries and aquaculture were prepared. A synthesis document incorporating the concerns and issues of fisheries sector and corresponding indicative policy elements which emanated from five zonal workshops on Fisheries and Aquaculture Policy conducted across the country, was prepared.

Proceedings of the five zonal workshops and also synthesis document were released by Shri Sharad Pawar, Hon'ble Union Minister for Agriculture, Consumer Affairs, Food and Public Distribution, Govt. of India, New Delhi.

Project title: An empirical study of patents and patenting activity in the fisheries sector

Personnel: A. Sharma, G. Venkateshwarlu, Gopal Krishna, B. B. Nayak, P. S. Ananthan

Achievements

A total of 177 patents in fisheries were documented in India. Out of this, there were 98 in Processing technology, 38 in Aquaculture and 41 in Fishing technology. In processing technology, firms account for highest percentage of patents (36%) followed by research organizations(31%). Among the research organizations, CSIR accounts for the highest percentage of patents. In aquaculture, majority of applicants were foreign corporations who account for 43.75 % of total patents granted in aquaculture in India followed by individuals. Among individual applicants, Indian applicants account for 28% of total patents in aquaculture. Research organizations account for 21.88% of total aquaculture patents. Taraporewala Marine Biological Research Station, Maharashtra also has patented two technologies on hatchery for carp eggs. One patent granted to ICAR is for the preparation of a composition for use in aquaculture for treatment of Epizootic Ulcerative Syndrome. Majority of applicants are firms accounting for 58.33% of total patents granted in India. French company Ateliers et Chantiers de La Manche and Indian company Garware wall ropes are major players among corporations that have patented technologies in fishing technology. There has been a marginal increase in the number of patents granted in processing technology and aquaculture whereas the number of patents granted in fishing technology shows a decline.

Post-TRIPS Indian patent activity index is greater than one (1.03) compared the foreign patent activity index (0.97) during the same period which is less than one indicating that post TRIPS Indian applicants have a greater proportion of patenting activity relative to total patenting activity in fisheries.

A total of 28, 175 patents were documented in the US and EU. Out of this, total US patents were 24, 652 and total EU patents were 3, 523. In the decade 1991-2000 there were maximum (8,822) patents. Cross IPC codes analysis for set of patents retrieved was also performed and it was found that subclass A 01 **had maximum (58%)** patents followed by subclass **A 23 with 36% of patents and A22 having** 6% of patents.

Project title : Performance Appraisal of Non-Governmental Organizations in Fisheries Development

Personnel : S.K. Mishra, Nalini R. Kumar

Achievements

Two NGOs from Orissa, *viz*, United Artists Association (UAA), Ganjam and MS Swaminathan Research Foundation, Bio-Village Centre, Kendrapara were selected for the study. UAA was established in the year 1964 by a group of youth dedicated and later registered in the year 1967 to help the people affected by natural calamities and for social transformation.

MSSRF was established in the year 1986 in Chennai and registered in the year 1988, where as the Bio-village centre at Kendrapara was started in the year 2000, after the super-cyclone of Orissa during 29-30 October, 1999. The centre's objective is to research, develop and diffuse environmentally sound technologies through innovative delivery models following an inclusive approach that is human-centered, through the bio-village model.

Major sources of fisheries information of field functionaries of these NGOs was their own fellow employees and seniors followed by trainings/workshops and the DoF staff. Field functionaries of both the NGOs perceived funds as major constraint in execution of different programmes followed by their inadequate technical knowledge, poor economic condition and illiteracy of the beneficiary fish farmers. Majority wanted to be trained in the fields of fish processing technologies, fish health management and human resource management techniques. For effective performance of the NGOs, they suggested that their salary should be made at par or nearer to the state officials, followed by induction training for newly recruited staff and regular refresher training programmes at regular intervals.

Major expectations and needs met by majority of the selected beneficiaries from their NGO were (1) fishing technologies and fish processing methods, (2) additional income from fishing activities, (3) social empowerment and (4) family safety after their association with the NGOs. All the beneficiaries expressed their overall satisfaction in the working performance of the NGOs.

Majority of the other stakeholders expressed that the NGOs were doing commendable jobs in the field of community mobilization, livelihood security, social safety network, housing and rehabilitation activities. They were overall satisfied with the performance of the selected NGOs in rural development in general and fisheries development in particular.

Project title : Development of marketing strategy for fish and fish-products for coastal areas

Personnel : Swadesh Prakash

Achievements

The study was planned to be conducted in two east coast states namely Orissa and A.P.

and two west coast states namely Maharastra and Gujarat. One district from each states namely Ratnagiri (Maharastara), Surat (Gujarat), Ganjam (Orissa), Visakhapatnam (A.P.) have been selected. Secondary information was collected from selected states and districts. Interview Schedule for data coolection from market functionaries were developed in consultation with project team and marketing expertise to conduct field studies . Pilot testing were carried out and Interview Schedule was finalized.

Primary data from various marketing functionaries were collected from Ratnagiri district with the help of pre-tested interview schedule, the detials are given in table.

Three Retail Marketing Centers of Ratnagiri reprenting urban areas viz : (i) Dist Machchi Market, (ii) Mirkan Wada Retail Markets, (iii) Maruti Salvi Stop and three representing rural markets viz : (i) Sakhartar, (ii) Kasar veli and (iii) Jaigad were selected and data collected on 27 and 18 consumers respectively.

Attribute of taste emerges as the most important driver for eating fish, followed closely by health. Bones and price constitute the negative attitude factor, which, however, did not directly reduce consumption behavioural intention. Fish consumption increases with increasing age up 50 yrs, while the presence of children in the household leads to lower fish consumption. The lowest income class has the lowest fish consumption frequency. Higher education results in a higher intention to eat fish but has no effect on the consumption frequency itself.

Landing Center	Fishers	Marketing functionaries				
		Auctioneers	Agent	Wholesalers	Retailers	suppliers	Total
(A) Ratnagiri Taluka							
I. Mirkarwada	30	06	06	06	06	06	30
ii. Sakhartar	10	-	02	02	02	06	
ii. Rajiwada	10	04	04	04	04	04	20
(B) Dapoli Taluka							
i. Harne	10	04	04	04	04	04	20
Total	60	14	14	16	16	16	76

Thrust Area 6: Quality Enhancement in Fish

Project title: Development of improved quality ready to eat fish products and study of their storage characteristics in retortable pouches

Personnel: S. Basu, B. B. Nayak, G. Venkateshwarlu

Achievements :

Fish curry : Different recipes were tried to prepare Tilapia fish curry in south Indian style and subjected to sensory evaluation by panel members and a standard recipe was finalized. To standardize the heat process schedule (Fo value), the tilapia steaks of 20 mm uniform pieces was soaked in 10% salt solution for 1 hour and added to curry. The fish curry was subjected to different heat process having Fo value of 6, 7, 8 and 9 for two different temperatures of 116.1°C and121.1°C. The 8 samples thus obtained

were subjected to organoleptic evaluation and commercial sterility test. It was found that heat process schedule of F_0=6.7 at 116.1°C yielding a better acceptable and microbially safe product. Tilapia fish curry thus prepared and standardized was fortified with EPA and DHA using cod liver oil at 1% level with a control for comparison. Then the fish curry was subjected to heat process at 116.1°C for F_0=6.7. Tilapia fish curry fortified with EPA and DHA with control was analysed for organoleptic, biochemical characteristics, fatty acid profile before and after heat processing in retort pouch. The storage study of the heat processed products with EPA and DHA and without EPA and DHA were analysed for changes in organoleptic, biochemical characteristics, fatty acid profile and for commercial sterility at quarterly interval. The products have been in excellent condition for one year.

Sandwich paste : The sandwich paste heat processed at 121.1°C at F_0 value of 4 was analysed for fatty acid profile and other biochemical indices. It was noticed that there was no change in fatty acid content during heat processing. During storage up to one year, there was no significant change in the concentration of EPA and DHA and there was no significant oxidation of the unsaturated fatty acids.

Prawn curry : Different F_0 value of 6, 7 and 8 were tried at 110°C, 116°C and 121.1°C. F_0 of 7 at 116°C was found to be organoleptically acceptable.

Project title: Studies on oxidative stability of polyunsaturated fatty acids during extrusion cooking

Personnel: G. Venkateshwarlu, S. Basu, B. B. Nayak

Achievements :

Prevention of lipid oxidation in fish oil enriched extruded snacks

Aqueous extracts of *Mentha arvensis*, *Zinziber oficinale*, *Capsicum annum* and *Allium sativum* have been incorporated into base material added with fish oil to produce extrudates. To study the protective effect of spices on the oxidation of lipid during extrusion cooking, TBA values of all the samples were measured and the resulting data was analyzed by response surface methodology. All the combinations of extracts had negative effect on TBA value of extrudates indicating the protective effect of the spices on oxidation of lipids during extrusion cooking.

Regression equation derived from the model

TBA: Y = 1.137 - 0.009 X2- 0.01 X3- 0.015 X4 + 0.05 X22 +0.162X32

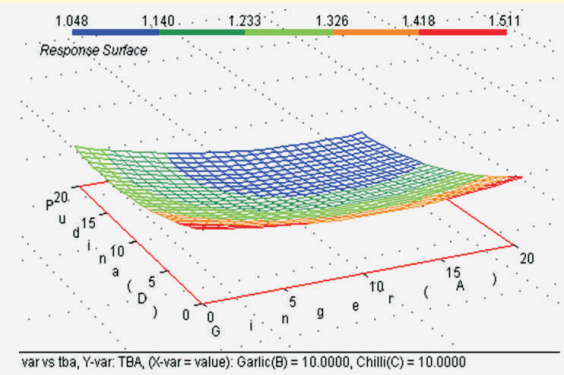
In the present study, among the selected spice extracts, Mentha was found to be the most significant on reducing TBA value. As Mentha is having a good total phenolic and flavanoid content, it exhibited greater protective effect.

ANOVA has been carried out to compare the effect of spice extracts with those of synthetic antioxidants (BHA and BHT) and

control. The highest TBA value was obtained for sample prepared without adding any antioxidants. This means all the spice extract combinations had reduced lipid oxidation. The effect of spice extract combinations in five samples on TBA was comparable to those of synthetic antioxidants.

Sensory evaluation of the extrudates to determine the protective effect of added spice extracts

From the responses of sensory evaluation panel, it was observed that all the spice extracts reduced the fishy off flavour and rancid flavour in extrudates (Table 1). The inherent flavour components in the spices could mask the fishy flavour developed due to the addition of fish oil. Mentha had shown the most significant effect in reducing fishy and rancid off flavour. The leaves of Mentha have a pleasant warm, aromatic sweet flavour due to the presence of essential oil and menthol.



Synergistic effect of Pudina & Ginger on TBA

Regression equations derived from the model

Fishy off flavour:

Y = 2.6 – 0.021 X3 - 0.025 X4+ 0.208 X12+ 0.162 X23

Rancid flavour:

Y = 1.31- 0.02X4 +0.115 X12+ 0.104 X23

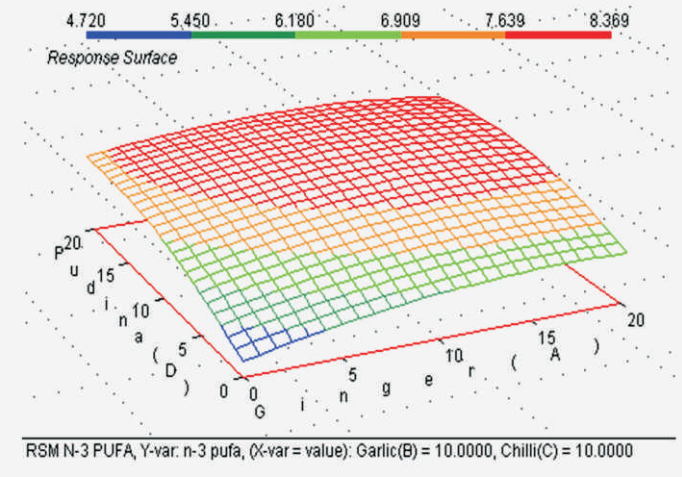
Determination of Fatty acid composition of extrudates: Fatty acid profile of the lipid extracted from extrudates was analyzed by GC- MS to study the effect of added spice extract. Mentha had shown the most protective effect on n-3 PUFA and n-6 PUFA. Except Ginger, the extract of all spices showed a significant protective effect on the EPA content of the extrudates. To compare the individual treatment effect with those of synthetic antioxidants and control, data obtained from all the samples were subjected to ANOVA. It was observed that control had the lowest value for all the parameters studied. It was also observed that four samples have a significant effect on the protection of n-3 PUFA, n-6 PUFA, EPA and DHA contents of the products when compared with the effect of synthetic antioxidants. Moreover, the effect of three samples on TBA was also found to be comparable to those of synthetic antioxidants. All these samples had rich amounts of spice extracts. So the extent of lipid oxidation might be less in these samples and hence showed more protective effect on fatty acids.

Regression equations derived from the model

EPA: Y = 2.057 + 0.0154 X1+ 0.0196 X3+ 0.0233 X4 - 0.082 X22 - 0.0955 X42

DHA: Y = 2.24 + 0.012 X1 + 0.01 X2 + 0.014 X3 + 0.0263 X4 - 0.069 X34 - 0.0805 X22 - 0.0528 X42

Protective effects of Spice extracts on TBA during storage : In order to assess the efficiency of spice extracts on prevention of lipid oxidation during storage, TBA of all the samples were measured after one month of storage at room temperature. TBA of all the samples was found to be increased during storage (Figure 3). As per the result obtained from ANOVA, control showed the highest increment of TBA during storage. Products prepared with synthetic antioxidants did not show much increase in TBA after one month. Effect of spice extracts in sample combinations 4, 22, and 24 on the increment of TBA during storage was found to be comparable to those of synthetic antioxidants. Sample number 24 which contained 15 ml each of all the four spices extract showed a similar protective effect on lipid as those of synthetic antioxidants.



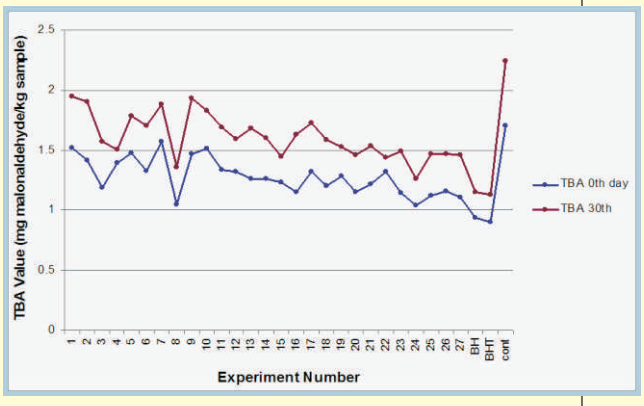
Synergistic effect of Pudina & Ginger on n-3 PUFA

Project title: Studies on safe and effective chemical control measures for floating and submerged aquatic weeds affecting aquaculture

Personnel: S. Datta, B. K. Mahapatra, P. Sardar.

Achievements

Experiments were conducted for screening the effect of herbicides on floating and submerged weeds. On the basis of their effect on water hyacinth, herbicides can be arranged in this order: 2,4-D ester (U-Kill®) > 2,4-D amine salt (Aeromine®)> 2,4-D Na Salt (Killweed®)>Glyphosate(Roundup®)> Chlorimuron (Kloben®). Like water hyacinth best herbicide to control Pistia could not be ascertained. Chlorimuron did not have any effect on Pistia. The other four herbicides showed the ability to control the same. However, application dose varied from 5 - 20



Protective effects of Spice extracts on TBA during storage

herbicides were applied at early vegetative stage of the weed lower dose was required to control. 2,4-D ester was found to be a better choice for controlling water hyacinth than 2,4-D salts, which might be due to difference in its absorption pattern. 2,4-D ester was absorbed mainly by leaves, where as 2,4-D salt was absorbed by roots. 2,4-D Na salt, amine salt, ester and glyphosate could not produce any significant effect on any of the submerged weeds e.g. *Hydrilla, Najas, Vallisneria* and *Ceratophyllum* even at higher dosages @ 10 - 20 g/ha and Chlorimuron at 50-200 g/ha. An experiment was conducted with fluridone standard. Observations were taken for 90 days after treatment. Symptoms of effect started appearing on the leaves and stem of the weeds within 7 days after the treatment. Symptoms were prominent at 25 ppb on *Hydrilla, Najas* and *Vallisneria*. After 90 days of treatment that *Ceratophyllum* was least effected amongst all the weeds. In case of *Najas*, effect was more severe from 18.8 to 25 ppb. *Hydrilla* was almost controlled at 25 ppb in 90 days. But the effect on *Ceratophyllum* and *Vallisneria* was partial at 25 ppb. Effect was much more in *Vallisneria* than *Ceratophyllum*.

Project title: Physico-biochemical effects of arsenic and strategic approaches to reduce residual arsenic in fish.

Personnel: P. Sardar, B. K. Mahapatra, G. H. Pailan, S. Datta

Achievements

The acute toxicity test of an inorganic arsenic compound sodium arsenite ($NaAsO_2$) in mrigal (*Cirrhinus mrigala* H.) and rohu (*Labeo rohita* H.) showed that the LC_{50} values and their 95% confidence limits for different exposure time (calculated by using computer software 'Trimmed Sperman-Karber') were 12.97 ppm (95% confidence limit, 10.12 to 16.62) and 8.53 ppm (95% confidence limit, 5.11 to 14.24), respectively in mrigal and rohu after 96 hours of exposure. Following 48 hour exposure, both species of fish showed hyperactivity with rapid swimming and strucking their head at the side of the treated tank after 48 hours exposure of arsenic. Gradually there was a drastic reduction in the activity and slower swimming of the fishes followed by mortality of fishes at 96 hour exposure. Prominent gross pathological changes were found in gill and liver of arsenic induced fish. Microscopically prominent pathological lesions were found in liver, kidney and gills but muscle did not show any marked pathological changes due to As exposure to both species of carp.

Among four additives tested (methionine, choline chloride, betaine and vitamin C) during chronic arsenicosis induced by 1/20th of LC_{50} value of sodium arsenite comparable to field level in mrigal (*Cirrhinus mrigala H.*) and rohu (*Labeo rohita H.*), betaine showed greatest effects followed by methionine, choline chloride, vitamin C respectively in relation to reduction of residual arsenic in fish of both species. Though vitamin C

showed least effect in relation to reduction of residual arsenic, survival and growth performances were comparable to fishes fed feed supplemented with other feed additives, might be due to the fact that vitamin C protected the harmful oxidative effect of higher concentration of residual arsenic by its antioxidant property.

Project Title: Nutritional strategies to mitigate physio-pathological effects of endosulphan in fish.

Personnel : Sanjay B. Jadhao, Subodh Gupta, S. Munilkumar

Achievements:

Experiment showed special importance of lecithin (2%), betaine (0.5%), and choline (0.1%) in diet of fish (*L rohita*) exposed to low dose of endosulfan alone (i.e. 1/10 th dose of LC 50 i.e. 0.2 ppb) (single stress) or exposed to endosulfan and subsequently infected with bacteria (double stress) for maintaining/overcoming growth, optimizing body composition, maintaining metabolic, histological and chromosomal integrity, efficient neurotransmission, reduced stress level (as judged by cortisol and antioxidant enzymes) and improved immunity (four tests) and survival.

Project title : Mass scale breeding and enhancement of survivality of larvae of magur, C*larias batrachus* (Linn.)

Personnel : B. K. Mahapatra, P. K. Roy, Parimal Sardar, Subhendu Datta, Somdutt, V. K. Tiwari, Rupam Sharma

Achievements:

Mass scale natural breeding grounds of Magur in Jharkhand were studied. More natural breeding of magur observed in areas like Gumla, Sisai and Palkot of Gumla district than Khunti area of Khunti district. This may be due to more agro-chemicals used in Khunti district which hampered breeding of magur and survival of their offspring by altering the suitable ecological condition in breeding and nursery ground for natural breeding of magur. More over, naturally occuring hiding places are less in the area due to less hilly nature of the district as observed. The diversified congenial habitat for harbouring a well as mass scale natural breeding of magur as observed are a) *Weed infested perennial water body*: The weeds infested ditches was congenial for harbouring of magur. During rainy season they migrate to adjoining paddy fields and swampy areas to lay eggs in the flooded area. b) *Rocky river bed:* Rocky river bed also served as good hiding places of brood and juvenile fishes during non-rainy seasons. During rainy seasons they migrated to the adjoining inundated paddy fields and swampy areas for breeding. c) *Rocky deposits in small canals:* Rocky deposits in small canals with rice fields on both sides of small canal in upland and low land areas were also good habitats for magur. During non-rainy seasons when the small canals dried up the juveniles and adults took shelter below the natural hole under the big stone. In rainy seasons they come out from the crevices and they lay eggs in the paddy fields. d) *Big stone in the culture pond bed:* Big stone in the pond bed also good habitat for magur for hiding. e) *Wet Bundh:* Wet bundh also served as good hiding places of brood and juvenile fishes

during non-rainy seasons. During rainy seasons they migrated upstream and to the adjoining inundated paddy fields and swampy areas for breeding. The paddy fields and swampy areas served as good nursery ground for growing spawn and fry. This situation is very common in the studied area.

Project title : Environmental impact of Fipronil : Presence in water and soil, effect of Fipronil and its metabolites on common edible fish *Labeo rohita* (Rohu) and bioremediation studies

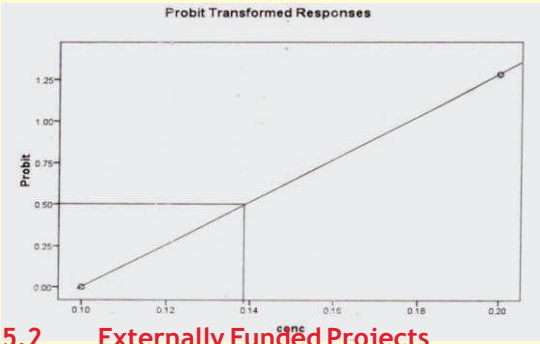
Personnel: N. Saharan, Prem Dureja (IARI, New Delhi), P. K. Pandey and G. Tripathi

Soil and water samples were collected from six experimental sites near agricultural fields where rice and vegetable crops are grown and fipronil is used as a pesticide. The soil and water samples were analysed for residual fipronil by Gas Chromatography and the results revealed that soil samples contained 0.15-0.93 ppm residual fipronil and water samples contained 0.21-0.97 ppm fipronil.

a) Synthesis of Fipronil Sulfone: 200 mg of Fipronil was dissolved in 10 ml. of acetone and was added to a solution of magnesium sulfate (170mg) in water: acetone (50ml.,1:1) was added dropwise with stirring. A solution of potassium permanganate was stirred at room temperature for 2 hours. Then the reaction was quenched by dropwise addition of conc. HCl until the purple reaction colour turned colorless. The sol. was extracted with diethyl ether (50ml X 3) and the combined ether extracts washed with water (50ml.) and brine (50ml.) respectively. After drying over sodium sulfate and evaporation under vacuum, a white amorphous solid was obtained. The sulfone thus obtained was recrystallised twice from CH2Cl2 -hexanes to get product with a final purity > 99.5 %.

b) Synthesis of Fipronil Sulfide: A solution of (1.0 mmol, 437 mg) and sodium iodide (2.4 mmol, 360 mg) was dissolved in 5 ml. of anhydrous acetone. After cooling to 0°C, trifluoroacetic anhydride (0.365 ml, 2.6 mmol was added dropwise slowly. After stirring for 5 hrs at this temparature, the solution was evaporated under vacuum, 10ml of water was added and the mixture was extracted with diethyl ether. The ether extract was washed with dilute sodium thiosulfate solution, water and brine successively. After drying over sodium sulfate and evaporation under vacuum, purification was done by recrystallization from toluene to yield 85 mg of fipronil sulfide.

c) Acute toxicity of fipronil to fish *Labeo rohita*: Acute toxicity of fipronil to fish *Labeo rohita* is presently being studied and 96 Hour LC_{50} values of Fipronil were found to be 0.138 ppm as determined by Probit analysis.



96 Hour LC 50 of Fipronil in Labeo rohita

5.2 Externally Funded Projects

1. Project Title: Development of auto-transgenic Asian Catfish, *Clarias batrachus* (L)

Funding Agency: NFBSRA, NAIP funded CCMB, Hyderabad as collaborating partner

Personnel: G. Venugopal, J. K. Prasanth, K. R. K. Reddy

Achievements :

The fingerlings were brought from different regions of the country viz., Andhra Pradesh, Orissa, Haryana and Madhya Pradesh and stocked in the ponds, the details of which are as follows :

Haryana stock (KNP 5), with an average length and weight of 29.4 cms and 215.0 g , Orissa stock (KNP 6), with an average length and weight of, 26.6 cms, 176.5 g, and Andhra Pradesh stock (KNP 9), with an average length and weight of 25.4 cms and 157.5 g.

The stocks being reared in the earthen ponds for brood stock purposes and seed production in ensuing breeding season. A Molecular Biology lab and live feed culture unit have been established at the Centre. The lead Institute, CCMB, Hyderabad, has developed the growth hormone gene construct for transgenic experiments.

2. Project Title: Nutritional requirement, feed development and feeding strategies of indigenous freshwater ornamental fish having export values

Funding Agency: Indian Council of Agricultural Research (Agricultural Produce Cess Fund)

Personnel : A. Sinha, P. Sardar

Achievements

The experiment was conducted for two species viz. *Botia dario* and *Chanda ranga* with three carotenoids sources such as carrot, marigold petal and rose petal separately for a period of 12 weeks under laboratory condition. Fishes were fed with different experimental diets supplemented with different levels of carrot, marigold petal and rose petal powder as carotenoids sources at inclusion levels of 0.0%, 0.5%, 1%, 2%, 4%, 8% and 16% along with control diet having no supplemented carotenoids sources for each carotenoid source. Supplementation of carrot, marigold and rose petal exponentially increased the skin colour of fishes with the increasing levels of the additives, but after a certain level performances was deteriorated. Water quality parameters did not affect the performances of the fish and were within the acceptable limit of fish culture. From the result it was shown that carrot, marigold and rose petal could be supplemented in the diet of both *Colisa Botia dario* and *Chanda ranga* at 4%, 8% and 8% respectively for enhancement of skin colouration with optimum performances, Among the different carotenoid sources tested, inclusion level of carrot was less possibly due to high fibre content in it.

3. Project title: Ornamental fish breeding and culture, an innovative scheme for the development of rural women

Funding Agency: Department of Biotechnology, Government of India

Personnel: A. Sinha, P. K. Roy

Achievements

Two locations were selected to impart the

training on ornamental fish culture, based on PRA, group discussion and meetings with NGOs, village Panchayat authority and members of the area. (a) Sewli Gram Panchayat, Debpukur, Barrackpore, (b) Raychak, Kamar Pool, Diamond Harbour Road. Groups were formed by identifying the interested women from the selected location. In each group there were 25 women registered for the training. The selected members were introduced to the ornamental fish farms located at Amtala to appraise them about possibilities and viability of the project.

Infrastructure (one set) developed for demonstration and training of ornamental fish breeding to the women group at Sewli Gram Panchayat Debpukur, Barrackpore. Women were trained to breed ornamental fishes.

4. Project title: Bacterial fertilizers for organic aquaculture

Funding Agency: Indian Council of Agricultural Research (Agricultural Produce Cess Fund)

Personnel: P. K. Pandey,
C. S. Purushothaman, A. Vennila

Achievements

Sediment harbours greater number of heterotrophic, nitrogen fixing, phosphatase producing and phosphate solubilizing bacteria in comparison to water. The occurrence of free living aerobic nitrogen-fixing heterotrophic bacteria was low compared to phosphatase-producing and phosphate solubilizing bacteria. Apart from *Azotobacter* spp, a new species of *Stenotrophomonas maltophilia* was found to be capable of fixing atmospheric nitrogen. *S. maltophilia* showed quite comparable nitrogenase activity which is the enzyme which plays vital role in fixation of atmospheric nitrogen. Number of phosphate solubilizing bacteria were isolated and characterized from water and sediment. However, *Citrobacter freundii* showed the highest phosphate solubilizing activity. The highest phosphatase producing activity was showed by *Staphylococcus siuri* followed by *Brevundimonas diminuta* (*Pseudomonas diminuta*). Among three carrier materials tried, charcoal showed the best result with respect to viability and high number of CFUs per g of the carrier material. Charcoal showed the peak of bacterial multiplication and CFUs during 35-45 days after inoculation of bacterial culture. The viability of the bacteria showed good results with alkaline environment. Use of bacterial fertilizers showed fish production on sustainable basis in an eco-friendly manner.

5. Project title: Mapping of microbial diversity in the marine ecosystem in and around Mumbai

Funding Agency: Indian Council of Agricultural Research (Application of Microorganisms in Agriculture and Allied Sectors)

Personnel: C. S. Purushothaman, P. K. Pandey, A. Vennila

Achievements

Under the consensus degenerate hybrid

oligonucleotide primers were constructed using aligned eubacterial protein sequences of betaine aldehyde dehydrogenase from the NCBI databank. Betaine aldehyde dehydrogenase catalyzes the final step of oxidation of betaine aldehyde to betaine in most organisms. Expected size of the amplicons was 700 – 720 bp. The size of the amplicon from *Escherichia coli* was of the expected size. The ability of the primers to retrieve the desired sequences of betaine aldehyde dehydrogenase from community DNA was checked with the community DNA isolated from intertidal seawater community DNA isolated from an algal mat growing in a salt pan in Bhayander, and enrichment cultures from various samples. Amplicons from these areas were all of the expected size.

6. Project title: Development of bacterial consortia for bio-processing agricultural wastes and bioremediation of aquaculture effluents

Funding Agency: Indian Council of Agricultural Research (Application of Microorganisms in Agriculture and Allied Sectors)

Personnel: C. S. Purushothaman, A. Vennila, P. K. Pandey

Achievements

Soil and water samples from Madh Island boat repair yard were collected as the area is rich in wood waste and therefore, in bacteria that decompose such recalcitrant waste material. Total plate count was done on nutrient agar to have an idea of the total bacterial load. Plate count was also done on Monreal and Reese medium with lignin or cellulose as the sole carbon source individually to isolate the bacteria that produce cellulose and ligninase. Distinction of the bacteria was done morphologically. Isolates obtained on lignin plates were checked for their growth on cellulose plates and vice versa. All the isolates (Table 1) grew on both the carbon sources individually. Their qualitative degradation capacity for both the carbon sources was also tested with the Congo red staining method

The plates were incubated for one week at ambient temperature for maximum degradation to occur. The CZ:CS ratio of all ligninase producers was 1.0 since the zone of clearance was the same as the colony size. But the cellulose decomposers gave varying ratios making it apparent that the cellulose activity is more pronounced.

Genomic DNA was extracted from seven out of the nine cellulase producers as two of them secreted a lot of polysaccharide making the isolation of DNA difficult and this would be repeated. Isolates 2, 3, 5, 6 and 7 gave positive results as seen in lanes 3, 4, 6, 8 and 9, respectively. Lane 7 has 1-kb ladder. Lane 10 is the positive control.

The 16s PCR product of some of the isolates were directly sent for sequencing and were

not transformed into *Escherichia coli*. The 16srDNA gene was amplified using eubacterial universal 16srDNA primers for

Lignin and cellulose decomposers isolated from Madh Island

Water sample		Rock sample	
Carbon source	No. of isolates	Carbon source	No. of isolates
Lignin	8	Lignin	6
Cellulose	7	Cellulose	3

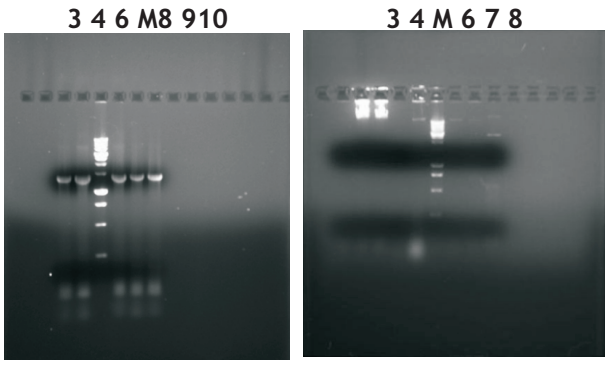
these isolates. Lanes 3, 4, 6, 7 and 8 show the 16srDNA genes of isolates 2, 3, 5, 6 and 7. Lane 5 is 1-kb DNA ladder. Out of the nine isolates, 1, 6, 7 and 8 could be identified as *Bacillus pumilus, B. subtilis, B. selenatarsenatis* and *Shewanella* spp. These four isolates were taken up for further studies. Isolates 1, 6, 7 and 8 were inoculated in Monreal and Reese medium

CZ:CS ratios of cellulase producers isolated from Madh Island

Cellulase producer	CZ:CS	Cellulase producer	CZ:CS
1	7.4	6	4.0
2	8.3	7	6.1
3	5.0	8	1.2
4	1.9	9	1.0
5	1.0		

with cotton boll residue as the sole carbon source and incubated at 30°C under 150 rev/min The result showed that the isolates are capable of degrading cellulose and hemicellulose.

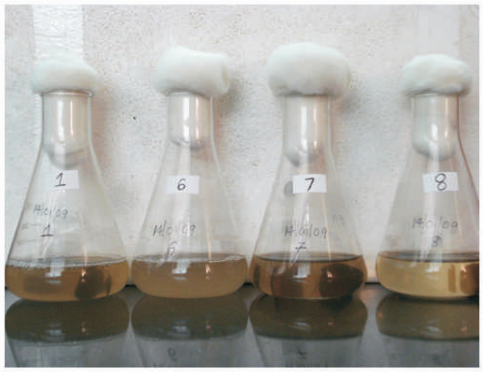
These isolates were further used for xylanase and cellulase assays. The substrates used were (1) pure cellulose, (2) oat spelt xylan and (3) cotton boll residue. Both the assays were done by the DNSA method for estimating reducing sugars. Isolate 6 gave the maximum cellulase activity of 56.6



Genomic DNA (gel 1) and 16srDNA (gel 2) of the isolates from Madh Island

µg/ml/min when pure cellulose was used as the sole carbon source. Xylanase activity with pure xylan varied from 170 µg/ml/min (Isolate 7) to 300 µg/ml/min (Isolate 6) with Isolate 1 giving a value of 286 µg/ml/min. However, the cellulase activities of the isolates were between 10.0 µg/ml/min (isolates 1 and 7) and 16.6 µg/ml/min (isolates 6 and 8) when the substrate was cotton boll residue. With cotton boll residue as the substrate, the xylanase activity also got reduced: Isolate 1 - 45.0 µg/ml/min, Isolate 6 - 43.3 µg/ml/min, Isolate 7 - 43.0 µg/ml/min and Isolate 8 - 56.6 µg/ml/min.

For preliminary consortium studies, the four



Changes in soil properties after planting of Dhaincha

isolates were inoculated overnight in Monreal and Reese medium with cellulose and oat spelt xylan. All the four cultures were individually grown overnight in the medium with one of the two substrates by inoculating 1 ml of all the four cultures in fresh medium with the substrate. This served as the crude consortium. The xylanase and cellulase assays for these media were done in order to compare the enzyme activity of each of the cultures to that of the consortium. The consortium was found to have a cellulase activity of 83.3 µg/ml/min and the xylanase activity was 250 µg/ml/min.

7. Project Title: Utilization of inland saline and sodic soil resources for aquaculture

Funding Agency: Indian Council of Agricultural Research (Niche Area of Excellence)

Personnel: C. S. Purushothaman, V. K. Sharma, U. K. Maheshwari, G. Venugopal, S. Raizada, A. K. Verma, A. Vennila, Hari Krishna

Achievements

An indoor experiment was carried out to assess the survival and growth of tiger shrimp (*Penaeus monodon*) in inland saline water at three salinity levels of 5, 10 and 15‰ with and without amendment of potassium. The experiment was arranged in triplicate in 18 FRP tanks of 300 l capacity in the wet laboratory. The tanks were stocked with hatchery-raised tiger shrimp seed (PL-10) from Kakinada (Andhra Pradesh) at 750 PL/m^3 and fed with commercial shrimp diet ad-libitum. The 60-day culture revealed total mortality in control tanks at all salinity levels and the rates of mortality were found salinity dependent, which was faster at higher salinities. However in potassium treated tanks, survival rates of 63.3% (at 5‰), 88.0% (at 10‰) and 78.6% (15‰) were obtained, which were found to be quite high and acceptable. The growth parameters indicated maximum length/weight of 6.05 cm/1.41 g at 10‰ salinity, which was found to be significantly higher than those at 5 and 15‰ salinities. Thus, the study indicated that the low level of potassium in inland saline water is responsible for the mortality of shrimp and supplementation of potassium can raise the survival and growth of tiger shrimp to a level for commercial production.

Experimental and field trials carried out at CIFE Rohtak Centre revealed that the survival and growth of tiger shrimp are very poor in raw inland sub-surface saline water, if the potassium level is less than 25% of the sea

water of equivalent salinity and the mortality rates were found linked with the overall levels of salinity, potassium and calcium. Salinity of 10‰ along with fortification of potassium was found to give better survival and growth in indoor bioassay trials. Based on these results, *P. monodon* was cultured in 10‰ salinity water in two identical and adjacent ponds of size 0.25 ha each at Lahli-Baniyani Farm of CIFE Rohtak Centre. The pond water was amended with potassium chloride (fertilizer grade muriate of potash) at (50% equivalent to sea water) three days prior to the stocking of seed. The seed of *P. monodon* was procured from a commercial hatchery in Kakinada and properly screened for various diseases of shrimp prior to stocking. The feeding was started from the second day of stocking with commercial graded shrimp diets and the rearing of shrimp was continued for about four days. The water quality and growth monitoring was done regularly. The ponds revealed survival and production rates of 54.5% and 157.7 kg (630 kg/ha), and 65.5% and 177 kg (691 kg/ha) in the first and second ponds, respectively. The survival and growth were found to be sufficiently good for obtaining a commercial crop of this high-profit crop from waste saline water. The results indicated an overall survival of 60% with a net production of 660.0 kg/ha in 115 days of culture duration.

Survival of Penaeus monodon at varying salinity levels

Salinity (‰)	Treatment	Survival (no.)					
		Initial	5 days	15 days	30 days	45 days	60 days
5	Control	150	39	27	6	0	0
	Treatment	150	150	142	137	95	70
10	Control	150	4	0	0	0	0
	Treatment	150	149	141	141	132	117
15	Control	150	0	0	0	0	0
	Treatment	150	149	139	139	118	66

Previous experiments carried out at the centre had shown that milkfish, *Chanos chanos* could be grown successfully to market size using the inland saline water of the region. Hence, the present study was carried out to assess the survival and growth of milkfish in poly-lined and earthen ponds of the centre using inland saline water of 16‰ salinity. The milk fish fry used in the experiment were procured from Mandapam in Tamilnadu through natural collection. A total of 20,000 milk fish fry was collected. Nursery rearing of milkfish was carried out in the earthen ponds of size 0.1 ha for two months. A total of five ponds of size 0 .1 ha each were used for the experiment. Each pond was stocked 2000 fingerlings of milkfish. Out of the five ponds,

two were poly-lined and three were earthen. Average length and weight at the time of stocking the grow-out ponds were 5.4±1.2 cm and 7.4 g. The water quality and growth monitoring was done regularly. The feeding was started from the second day of stocking with a mixture of rice bran and mustard oil cake (50:50) at 3% of the total body weight and the rearing continued for 120 days. Significant differences have not been found in terms of growth rate of milkfish between poly-lined and earthen ponds. Survival rate in the case of earthen ponds was around 60%, whereas it was around 40% in the case of poly-lined ponds. A total of 500 kg have been harvested form 0.5 ha area (1 t/ha). Survival of milkfish was less in the case of poly-lined ponds. Mortalities due to sudden temperature fluctuations and toxic gases (ammonia and sulphide) were also higher in the case of poly-lined ponds indicating the limited metabolite decomposition. The experiments clearly indicate that the earthen ponds are more suitable for milkfish rearing.

An experiment to assess the suitability of inland saline waters for crab rearing was carried out using inland saline waters of 16‰. The study was carried out to asses the adoptability and survival of the crab (*Scylla serrata*) in inland saline waters of the centre. A pond having an area of 200 m^2 had been used for the purpose. A total of 250 crablets having an average length of 8.4 cm and weight of 80 g were obtained from Kakinda. Inland saline water of 16‰ (without potassium amendment) was used for crablet rearing. Crabs were fed with fish meat at 10% of the total body weight. Mortality of crabs was observed from the 10^{th} day onwards till 100% mortality was noticed. This study had revealed that crabs may not survive in the raw inland saline waters. Proper study using indoor cisterns has to be carried out to analyze the ionic amendments that need to be carried out to the raw inland saline waters to get proper survival of crabs as in the case of tiger shrimp. However, keeping in view of the unique nature of the ecosystem that it does not have any carriers of pathogens, it was decided not to try crab culture at Rohtak.

8. Project title: Development of monoclonal antibody-based rapid diagnostic test for the detection of *Macrobrachium rosenbergii* Nodavirus (MrNV) and Extra Small Virus (XSV) of *Macrobrachium rosenbergii*

Funding Agency: Department of Biotechnology, Government of India

Personnel: M. Makesh, K. V. Rajendran

Achieveents

The capsid protein gene of MrNV was amplified with primers designed with restriction sites. The amplified product was digested and inserted into pET23a expression

vector and transformed into DH5α cells. Colonies having the insert was identified by colony PCR and the recombinant plasmid was purified and transformed into BL21(DE3) cells. The capsid protein gene expression was standardized by pilot expression studies. Bulk protein was produced by IPTG induction and the protein was purified by Nickel affinity chromatography.

9. Project title: Indo-Australian bilateral research project on "Aquaculture in degraded inland areas in India and Australia"

Funding Agency: Australian Centre for International Agricultural Research (ACIAR), Australia

Personnel: S. Raizada, N. K. Chadha, A. K. Verma

Achievements

(i) Activity: Rearing of Prawn brooders in open and poly house ponds to mitigate problem of extreme winter

Fresh batch of prawn (*M. rosenbergii*) brooders were raised by procuring prawn post larvae from Nellore, Andhra Pradesh in April 2008. The PL's were initially raised in open earthen pond of size 0.16 ha. The juveniles were then harvested in November and reared in two poly house ponds of size 450m^2 with different stocking densities. Polyhouse pond-I was stocked with 1039 number of prawn juveniles and polyhouse pond-II with 2833 numbers. Both the polyhouse ponds were harvested in March 2009. After a culture of around 4-months, a total survival of 730 numbers (survival 70.25%) from polyhouse pond-I and 1990 numbers (survival 70.24%) was obtained from polyhouse pond-II with plenty of females were in berried condition. The results have repetitively demonstrated that polyhouse ponds are highly suitable for raising prawn brooders during extreme winter climate in northern part of the country and prawn brooders could be raised in high density with a good survival. However, problem of low DO was faced during culture period that could be solved by installation of high capacity air blowers or water agitators/aerators.

(ii) Activity: Polyculture of Prawn and carps with and without potassium supplementation

An experiment on polyculture of prawn and IMC was initiated on 21.06.2008 to evaluate survival and growth in 5 ppt saline water with and without potassium supplementation in duplicate set of 1000 m^2 ponds at the Baniyani Farm. All the four ponds were stocked with prawn seed (PL-10) @ 22,000/ha and fed on commercial diet. The seed of IMC was to be stocked 45 days after prawn seed stocking. However, the ponds were over flooded by adjacent canal water due to breakage of bundhs resulted in loss of prawn stock and entry of large number of wild fishes. Hence the purpose of conducting

experiment failed and the experiment was discarded and will be repeated during 2009.

(iii) Activity: To observe the effect of Artemia enrichment on moult entrapment syndrome in prawn larvae

To enrich artemia with DHA ((Docosahexaenoic acid), commercial Algamac-2000 (DHA 27%) was procured and used for feeding to the prawn larvae. The larvae fed on algamac enrich diet did not showed moult entrapment syndrome in any larval tank. Hence the results were found encouraging. Based on the above results, an experiment in triplicate set was organized in 100 litre plastic tanks with and without Algamac-2000 enrichment during September 2008. The tanks were stocked with prawn larvae (PL-10) @ 50 larvae/litre and fed with both with and without enriched artemia till 6-days and subsequently also fed with egg custard. The larvae grew to VIII-stage but there was heavy mortality in both control and treated tanks and hence the experiment was discontinued. The cause of mortality was likely to be related with brooder quality.

10. Project title: Development and use of specific fluorescent transgenic biosensors for monitoring aquatic heavy metal toxicity

Funding Agency: Department of Biotechnology, Governent of India

Personnel: A. Chaudhari, S. Sivasubbu, Scientist C (IGIB, New Delhi)

Achievements

The project aims at engineering four transgenic zebrafish bioreporters, using gene promoters responsive to genotoxiciy and heavy metals. The human *gadd45a* promoter has been extensively characterized and is known to respond to toxic levels of genotoxic agents that result in formation of thymidine dimers, single and double strand breaks, inter & intra-strand crosslinking and base alkylation. A putative *gadd45a* gene is predicted in the zebrafish genome (www.ensembl.org) too. Here, the zebrafish *gadd45a* promoter was cloned into a GFP reporter vector to confirm if it responds to genotoxins, in a manner similar to its human ortholog. A total of 8 promoter lengths were tested to

determine the minimal promoter length by reporter expression studies in human fibroblast cells. A 1656 bp region gave the highest expression on induction by UV and MMS that are known to cause DNA damage. It was noted that including a portion of the first intron gave better results as it has relevant transcription factor binding sites. Transient assay in zebrafish embryos provided proof of functionality but no conclusive results regarding the optimal promoter length. A broad spectrum heavy metal responsive promoter (Hg> Cu> Cd> Zn) from *Perna viridis* (green mollusc) and Cd/Zn

responsive MT promoter from zebrafish have been previously characterized. These

promoters were amplified and cloned into reporter plasmids for testing induced reporter expression in zebrafish embryos. The mouse MT4 promoter that is known to respond primarily to Cu++ has not been characterized. Four lengths of the promoter were cloned into a GFP reporter plasmid for expression studies to determine the minimal length. Transient assay in zebrafish embryos was done and all promoter lengths tested showed GFP expression and could not provide conclusive results regarding the optimal promoter length.

11. Project title: Genetic improvement of *Penaeus monodon* through selective breeding for growth and white spot disease resistance.

Funding Agency: International Programme of Institutional Cooperation (INPIC), Norway;

Participating Institutions: Central Institute of Brackish Water Aquaculture (CIBA), Chennai, AKVAFORSK, Norway

Personnel: Gopal Krishna, S. Jahageerdar, G. Venugopal

Achievements

The heritability of harvest weight and survival are moderate to high, so response to selection should be large. The heritability of hours to death challenge test was low to moderate. This is significantly greater than the previous batch. This is likely because the challenge test protocol has been improved. Our results show heritability is higher when shrimps are challenged at a later age, and when the virus load is lower. The higher heritability with lower virus load leads to slower build up of challenge, allowing more genetic variation to be expressed. Furthur experimentation is required to determine the optimum protocol for calculating heritability of WSSV resistance and breeding values. However, Andaman (AND) stocks were heavier at harvest than Andhra Pradesh (AP) or Tamil Nadu (TN), the age at harvest was greater for the Andaman stocks. In future the age at harvest should be standardized if possible. Andaman stocks and AP stocks had significantly higher survival than TN stocks. However there was no difference between AND stock and TN stock in time to death in WSSV challenge test in either batch II or III. The fortnightly sampling of shrimp from both broodstock and commercial ponds in batch I shows that the growth rate between the sexes begins to diverge when the shrimp are approximately 15-20g. Although the weight of onset of sexual differentiation was similar between the broodstock and commercial pond, the later age of sex differentiation in commercial pond (90 days of culture cf 70 days of culture) could partly be attributed to higher competition for feed and space which may be an important factor regulating the release of hormones in the body. The high correlation of breeding values for harvest weight for shrimp reared at Kakinada and

shrimp reared at Chennai indicate shrimp which perform well in one location will perform well in the other location.

Recommendations : Breeding goal. Survival and growth should be given equal importance as these are highly heritable and the key traits of economic importance. Major gains could be made for these traits. The challenge test should be given some weight, however to date we have not established a link between pond survival and WSSV challenge test hours to death. Further research is required to establish this link. A limitation to genetic gain is ability to breed from selected shrimp with high breeding values for economic traits. This is a major problem world wide in *P. monodon*. Future research effort should be invested here, particularly given the competition from other species such as *L. vannemei*.

12. Project title: Potential drugs from selected marine invertebrates and plants from Indian waters.

Funding Agency: Ministry of Earth Sciences, Government of India

Personnel: K. Venkateshvaran, G. Deshmukhe

Achievements

Intertidal and subtidal collections were made at Khar Dhanda, Versova, Madh Island, Aksa, and Colaba beaches in Mumbai and along the entire Maharashtra coast; preliminary extraction and bioassays as required were carried out. Protein estimation of treated and untreated seaweed collected from Dahanu and Mumbai waters. 10 samples of marine algae were sent for screening out of which one algal species shows bioreactivity. Extracts of marine sponges and other organisms were sent for further screening.

13. Project Title: Studies on the development of DNA and biochemical markers of seabass, *Lates calcarifer* (Bloch.) from Indian Waters.

Funding Agency: Indian Council of Agricultural Research (Agricultural Produce Cess Fund)

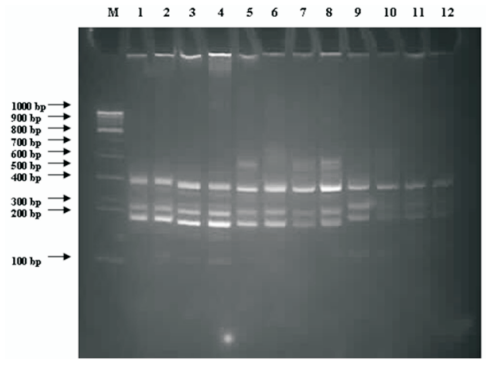
Personnel: S. D. Singh, R. K. Singh (TMBRS, KKV, Mumbai)

Achievements

Population assessment or wild stock discrimination using electrophoresis characterization requires reliable source of biological materials from particular eco-geographical places which may influence their genotype. The development of DNA and protein fingerprinting strategies from fish DNA and protein to obtain biochemical / molecular markers for a particular fish species is an essential step for genetic studies. Specific and unique DNA loci have applications as molecular markers to assess variability in stock identification and there by in selective breeding studies of fishes.

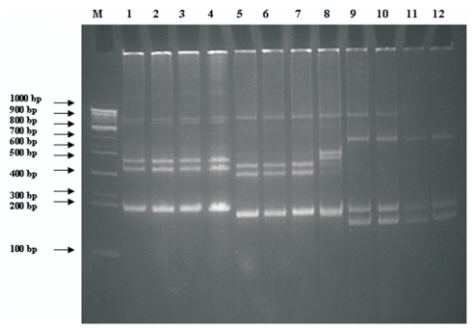
With primer LCMS-11, three prominent bands (190, 210 & 400 bp) were found in each of three coasts viz; East, West and South coasts which were monomorphic in nature. Interestingly, a unique DNA band (dotted arrows) of about 490 bp was found in West coast only which was absent in fishes from East & South coast stocks. So, it may be called as DNA marker for seabass of West Coast stock.

With primer LCMS-32, six bands (190, 430, 460. 820, 870 and 1230 bp) in East Coast, four bands (190, 390, 430 and 870 bp) in West and four bands (170, 190, 600 and 870 bp) in South Coasts were found and out of them only two band of about 190 and 870 bp was monomorphic (common) in each of three coasts viz; East, West and South coasts. Interestingly, two unique DNA band (dotted arrows) of size 820 bp and 1230 bp were found in East coast only which was absent in fishes from West & South coast stocks. So, these may be called as DNA marker for East Coast stock. One unique DNA band of about 390 bp size was found in West Coast stock which was absent in seabass of East and South Coastal stocks which may be called as DNA marker for Seabass of West Coast stock. Two unique bands DNA bands of size 170 bp and 600 bp were found in South Coast stocks which may be DNA markers for seabass from South Coastal stocks. Though, fish no. LCWC8 belonging to West Coast, has shown two bands of size (470bp & 490bp) which is different from the fish no. LCWC5, LCWC6 and LCWC7. Presence of genetic variation



Comparative DNA Fingerprinting of *Lates calcarifer* collected from three coastal regions of India using microsatellite primers
Detection and analysis of Microsatelite primer based PCR products in SDS- PAGE

Lane M: 100 bp DNA molecular weight marker
Lane 1-4: Microsatellite DNA profile of seabass from East Coast
Lane 5-8: Microsatellite DNA profile of seabass from West Coast
Lane 9-12: Microsatellite DNA profile of seabass from South Coast



Comparative DNA Fingerprinting of *Lates calcarifer* collected from three coastal regions of India using microsatellite primer (LCMS - 32).

Lane M: 100 bp DNA molecular weight marker
Lane 1-4: Microsatellite DNA profile of seabass from East Coast
Lane 5-8: Microsatellite DNA profile of seabass from West Coast
Lane 9-12: Microsatellite DNA profile of seabass from South Coast

within stock is also not uncommon as reported for several fishes.

Protein polymorphism in muscle of seabass from different coasts of India : Finally 6 fishes were selected from each of East, West and South Coasts for comparative studies of protein polymorphism and analyzed in the same SDS PAGE gel simultaneously in presence of protein molecular weight marker have exhibited very significant, conspicuous and distinct results.

14. Project Title: Electron radiations from microtron for enhancement of shelf life and nutritional quality of Aqua-feed

Funding Agency: Board of Research in Nuclear Sciences (BRNS), Department of Atomic Energy (DAE), Government of India.

Personnel: A. K. Pal, N. P. Sahu, S. Ganesh

Achievements

A feeding trial was conducted to study the effect of electron beam irradiated feed exposed at 10 kGy on growth of *Labeo rohita* fingerlings. The unirradiated feed was served as control. During 30 days feeding trial treatment groups (irradiated feed) registered 6 and 8 % weight gain in 15 and 30 days, respectively.

MICROTRON

The in vitro digestibility study was carried out in *Labeo rohita* and *Clarius batrachus* considering their different feeding behaviour. The carbohydrate digestibility in *Labeo rohita* was 10% higher than the control group. Similarily the protein digestibility was 8% higher than the control. Similar trend was also found in *Clarius batrachus*. However, the proximate composition of both the feed was similar indicating electron irradiation does not affect the total nutrient quantity. This was also reflected in terms of higher nutrient digestibility and weight gain in *Labeo rohita*. Hence it appears that electron beam radiation is an ideal strategy for utilization of low cost plant based ingredients in aquafeed. However, further feeding trials are required for reproducibility of the findings across the species.

15. Project Title: Potential uses of thermal effluents of nuclear power plants for carp breeding and seed production

Funding Agency: Board of Research in Nuclear Sciences (BRNS), Department of Atomic Energy (DAE), Government of India

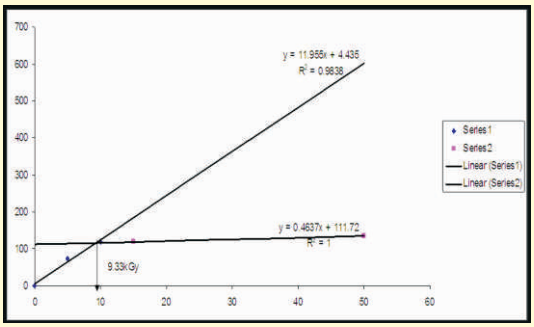
Personnel: A. K. Pal, S. C. Mukherjee

Achievements

Concept of engineering intervention was applied for maintaining optimum temperature round the year at the hatchery complex for fish breeding and seed rearing. The results indicate that maintaining optimum temperature decreases incubation

period and increases growth of fry & fingerlings in IMCs. This is the first of its kind successful fish breeding programme carried out in warm water effluents from nuclear power plant in India.

The new conceptual project proposed to utilize thermal effluents for carp hatcheries and grow-out system. The experiment was carried out in agro-climatic conditions of Kaiga (ambient temperature 29^{0}C). Various experimental procedures were followed to



Broken line graph for optimizing irradiation dose

study early developmental stages in *C. carpio* with respect to the effect of temperature and 0.1 mgL^{-1} chlorine levels. The parameters studied included, CTMax and CTMin values and oxygen consumption rate. Over all results indicate an inhibitory effect on metabolic enzymes and immune status with persistent use of chlorine at higher acclimation temperatures. Similar experiments were conducted to observe the effect of temperature and 0.1 mg L^{-1} chlorine levels in *Labeo rohita* and the results were the same as in *C. carpio*. Hsp70 induction serves as a protective mechanism in combating stress at higher acclimation temperatures. Heat shock (37C) provides higher thermotolerance in *Labeo rohita* spawns whereas presence of chlorine (0.08ppm) fails to elicit the same. The % weight increase in the fish length and weight were calculated for fishes reared in ATP (Ambient temperature pond i.e. less than or equal to 29C) and OTP (Optimum temperature pond i.e. more than 29C). The final weight measured showed increase in fish weight which was found to be 31.43% in OTP and 29.61% in ATP. The percentage weight gain was found to be greater at optimal temperature (31°C).There are also many health management precautions taken up at the hatchery complex to help prevent infection of wounds or any bacterial or fungal diseases of the carps.

16. Project Title: ICAR Mega Seed Project - seed production in agricultural crops and fisheries

Personnel: M. P. S Kohli, S. Raizada

Funding Agency: Indian Council of Agricultural Research (ICAR)

Achievements

The mega seed project saw necessary infrastructure such as 40'x 50' hatchery shed, two numbers of 20 m x 30 m and 20 m x25 m earthen grow out ponds, 1 m x 1 m x 1 m cemented larval rearing tanks for rearing of brood stock, one 2000 l capacity overhead tank, breeding aquariums, bore well including pump, a reverse osmosis pressure filter developed in the current year. Rearing of fry in cages and natural ponds were carried

out to develop natural colouration and pigmentation. Experimental trials on artificial feeds are in progress for different species for improving growth and onset of early maturity. Brooder management is also being carried out. Live-feed culture facilities were set up to feed different species in addition to artificial feeds. Breeding and production of different ornamental species were carried out. Bio-filters are being used in aquarium tanks and cement cisterns for rearing the spawn/fry for better survival and growth, An encouraging results are achieved. An amount of Rs 42,087/- is generated through the sale of fish and other activity under this project. Ornamental fish breeding, culture, aquarium making & its maintenance and other uses were demonstrated to visitors and school children to develop the habit of aquarium keeping in general public and students. A training programme was organized for fisherwomen on ornamental fish rearing and breeding at Dimbe reservoir, Dstt.Pune, Maharastra. At the start of the rearing programme, quality seed is to be given to the fisherwomen to start the culture and breeding practices.

Rohtak Centre Subsidiary of the Mega Seed Project

(I) Activity: production and sale of quality prawn seed using ground saline water.

Produced 1.69 lakh prawn post larvae during the reported period and earned a revenue of Rs. 93,420/-. The prawn seed production was badly hampered due to settling of newly hatched larvae. Various methods were tried to solve the problem but no success could be made. The problem seemed to be related to poor brood quality. ". The supply details of prawn seed are as under

(a) Raj Bhawan, Govt. of Haryana 7,000
(b) Department of Fisheries, Punjab 14,000
(c) NBFGR, Lucknow 8,000

Sl.No.	Item Component	Seed Type Spawn/Fry/ fingerlings/PL	Seed target (Nos.)	Achievement (Nos.)
Name of the fish				
1.	Gold fish (Different stains)	Spawn /Fry		59,642
2.	Angel fish	Spawn /Fry		10,425
3.	Fighter fish	Spawn /Fry		21,064
4.	Paradise fish	Spawn /Fry		2800
5.	Red parrot fish	Spawn /Fry	Egg layers 600000	800
6.	Tetras	Spawn /Fry		3,932
7.	Barbs	Spawn /Fry		1,650
8.	Gourami fish	Spawn /Fry		10250
9.	Oscar	Spawn/Fry		4,389
10.	Zebra fish	Spawn/Fry		2000
11.	Hockey stick	Spawn/Fry		400
12.	Neon Jewel	Spawn/Fry		190
Total Egg layers = 1,17,542 nos.				
13.	Mollies	Spawn /Fry	Live Bearers 96000 Nos.	10,539
14.	Guppies	Spawn /Fry		15,000
Total Livebearers = 25,539 nos.				

(d) Department of Fisheries, Haryana 1,26,700
(e) Seed stocked at Lahli 10,600
(f) GADVASU, Ludhiana 3,000

(ii) Activity: Magur Seed production
Culture of Magur *C. batrachus* for developing the brood stock continued.

17. Project Title: Education Division supported experiential learning project
Funding Agency: Indian Council of Agricultural Research (ICAR)
Personnel: S. Basu, B. B. Nayak
Achievements
The development of facilities for training and experiential learning was achieved. Development of a sales counter, a modular kitchen and renovation of existing facilities were achieved. A walk-in cold room and a can seaming machine were added to the existing facilities.

18. Project Title : Development of appropriate strategies for marine algal cultivation and processing for livelihood generation in coastal areas along Thane and Sindhudurg districts along the Maharashtra coast
Funding Agency: Department of Science and Technology, Govt. of India
Personnel : Geetanjali Deshmukhe, Alkesh Dwivedi

Achievements
Project has been sanctioned by DST in order to empower the fisher community through seaweed cultivation. Two sites selected in Sindhudurg - Malvan and Thane district - Vadhvan, near Dahanu. Manpower recruitment procedure has initiated. First awareness programme conducted at Dahanu.

5.3. NAIP Research Projects

1. Project Title: Livelihood and nutritional security of tribal dominated areas through integrated farming systems and technology model
Personnel: R. S. Biradar, V. K. Tiwari, A. K. Reddy, S. Salim, M. L. Ojha
Achievements
Local fishes of ornamental value like Zebra, Rasbora, Glass fish and Puntius were collected, acclimatized and bred in controlled environment for demonstration and training purposes. In addition live feed organisms and aquatic plants for aquaria collected locally are being cultured. Nine training programs on ornamental fish culture and breeding. Carp culture, fisheries co-management, value added fish products were conducted in the field benefitting about 300 fishers and farmers including

women. A group of 25 fishers/farmers and landless labours were motivated, mobilized, trianed and organized into a SHG for undertaking fish culture in the leased Puttan reservoir. Critical inputs like seed and fishing boat and net were supplied at subsidized/free of cost. About 75,000 carp fingerlings were stocked in 5 water bodies while 25 lakh carp spawns were raised in KVK and community ponds for rising into fry and fingerlings for distribution and sale mainly in Banswara district.

2. Project Title: Vision Policy Analysis and Gender

Personnel : R. S. Biradar, S. P. Tiwari

Achievements

The main objective of the project was impact assessment of technologies with sub-objectives to examine the extent of adoption of Technology, to assess the socioeconomic, ecological and institutional impact of aquaculture technology and to identify the constraints of aquaculture technology and suggest remedial measures. Two technologies namely fresh water prawn hatchery with artificial sea water and Raafres AQ –a non antibiotic growth promoter have been selected to achieve the specific objectives. Several technical meetings of PME cell were also held to review and agree on technologies identified, database design & methodology and to develop questionnaire/interview schedule. Review of literature and secondary socio-economic data have been done. To conduct the study the three states namely Tripura, Manipur , Chattisgarh for fresh water prawn hatchery with artificial sea water, two states namely Maharastra and Gujrat for Raafres AQ –a non antibiotic growth promoter have been selected for collection of data on impact assessment of technologies with adopter and non-adopter from fishers. Interview schedule had been developed to asses the impact of these technologies based [1] Socio-economic (a)-Efficiency,(b) Employments-Direct/ Indirect, (c) Acceptability, (d) Food and Nutritional Security) [2] Environmental [3] Institutional impact. Pilot testing of interview schedule and data collection from the field is in progress.

3. Project Title : A Value Chain on Fish Production in Fragile Agricultural Lands and Unutilized Aquatic Resources in Maharashtra

Personnel : A.K. Reddy, S. R. Kovale, (CoF, Ratnagiri) Chaya Jadhav, D. Jadhav (Vatsalya Mandir, Ratnagiri), V. K. Tiwari, S. Munilkumar, S. P. Shukla, S. P. Tiwari, A. Vennila, P. S. Ananthan, A. K. Verma, M. Sawant, K.Chaudhary, S. Patil, R. Tibile (CoF, Ratnagiri).

Achievements :

Base line data collected from the farmers of saline affected sugarcane fields indicated that the most of the lands are fallow for the last 30 to 50 years. Even in the neighbouring fields where farmers were taking sugarcane crop, the yields were drastically reducing year after the year. The present production

ranges 10 to 20 tons per acre as against the base production of 50 to 60 tons per acre. At present the farmers get a net income of Rs. 10,000/- to Rs. 15,000/- per acre in 15 months period from the sugarcane crop. More than 86.36 % of farmers have land holdings of less than 5 acres. Of the saline affected fields, about 95 % of land was lying fallow and 5% was in use for various agricultural crops. Thereby, the farmers were either becoming labourers or migrating to the neighbouring towns to earn their livelihood. Base line data collected 15 out of 35 reservoirs of Ratnagiri district indicate that most of the reservoirs are not stocked with fish seed because they were under the control of Irrigation Department till 2006-07. Later the reservoirs were handed over to Department of Fisheries. Few of the reservoirs are given on lease for an individual for 5 years, which were stocked with under size fish seed in an unscientific manner. The present production in these reservoirs was about 5.52 Kg per hectare. Efforts are on to make the co-operative societies for taking the reservoirs on long lease (till the societies are interested to continue). Facilities were developed at certain reservoirs for raising of advanced fingerlings of 10-15 cm size in the vicinity. Stocking of advanced fingerlings help in enhancing survival and production of the reservoirs. In order to form cluster based approach, two villages (Shere and Gondi) (where maximum land became saline) were selected at Karad, Satara District. The farmers were brought under a single umbrella by organizing repeated PRA's/ meetings/ discussions/ farmers meets. The farmers whose land became saline formed into co-operative societies in both the selected villages and handed over the land to the CIFE for the development of demonstration units. The demonstration ponds were constructed at Shere and Gondi villages. After the first demonstration, the saline affected land would be developed into a cluster with the help of line departments.

5.4. Contract Projects

1. Project Title: Appraisal of NREGA programme in Maharashtra

Personnel: R. S. Biradar, Arpita Sharma

Achievements

Appraisal of NREGA (MREGS in Maharashtra) processes and procedures in Thane and Akola districts of Maharashtra were undertaken with due consideration to specific issues viz, Awareness Generation, Registration and job cards, Application for employment, Works process, Wage payment, Record maintenance, Staff and training, Monitoring, Social audit and grievance redressal. About 77% villagers were aware about NREGA Scheme in Thane district while it was 89% in Akola. Slogans and posters were used for creating awareness about NREGA at Akola, but not in Thane district. In Akola all most all households received job cards whereas in Thane majority of registered households did not received job cards. There are number of

listed works which could be taken up under NREG Scheme. However, it was found that mostly village pond construction work was undertaken in Thane and Akola. Activities involving materials were discouraged. In Thane, registered households had worked for 33 ± 32.2 days and 18 ± 7.9 days during 2007-08 and 2008-09 respectively while in Akola, households were engaged in NREGA works for 44 ± 14.5 and 32 ± 9.1 days in 2007-08 and 2008-09 respectively. Wages paid to workers as per muster roll in Thane ranged between Rs.39/- and Rs.144/- while in Akola was varied from Rs.46/- to Rs.199/per day. Groups were made to perform the works with adequate representation of women and STs. In Akola the study revealed that payments of wages were made through Bank account.

2. Project Title: Preparing Development Plan and Road Map for Fisheries Development for Rajasthan

Funding Agency: Rajasthan Mission on Livelihood, Jaipur

Personnel: P. S. Ananthan, V.K. Tiwari, A.K. Reddy, S. Munilkumar, Suresh Babu

Achievements

It is a consultancy Project funded by Rajasthan Mission on Livelihood (RMoL), with following objectives namely to review the present status of availability of different fisheries and aquatic resources, extent of their utilization, and the potential for further development in Rajasthan; To evolve the development plan; To suggest appropriate institutional and management reforms; To study the present fisheries marketing arrangement in the State; To develop an enabling policy framework for sustainable fisheries and aquaculture development for the next 10 years. Review workshop with stakeholders was held in Jan 2009. Several issues were flagged which provided lead to frame the survey work and work plan. Active participation from DoF staff from whom a brief survey on their career milestones, trainings undergone, trainings conducted, field constraints etc was conducted. Participation of farmers/fishers was relatively poor and hence a separate workshop needs to be conducted for them. Workshop proceedings were brought out. Secondary data were collected from DoF, Jaipur and Udaipur offices on detailed database on public / govt. owned water resources covering all 32 districts of Rajasthan. Three sets of detailed interview schedules were developed separately for Resources Assessment, Livelihood Assessment and Consumption Pattern that were field tested and refined before date collection. Field survey began simultaneously in five districts from 4/3/09 namely Udaipur, Rajsamand, Bhilwara, Dungarpur and Banswara. The work has been completed in Rajsamand, Bhilwara and Banswara.

6. Extension Achievements

6.1 Short term Training Programmes (STP) / Special Training Programmes

Title	Venue	Period	No. of Trainees
Fish Culture	Banswara, Rajasthan	March 25, 2009	33
Fish Culture	Banswara, Rajasthan	March 24, 2009	60
Aquaculture	Kolkata	March 17-23, 2009	20
Corporate Grooming	Mumbai	March 04-06, 2009	09
Ornamental Fish Culture and Fisheries Co-Management	Banswara, Rajasthan	March 03-07, 2009	14
Fish Culture	Kakinada	February 24-28, 2009	07
Ornamental Fish Breeding, Rearing and Health Management	Mumbai	February 24-March 02, 2009	25
Aquatic Environmental Management	Mumbai	February 23-March 01, 2009	17
Fish Culture	Kakinada	February 20-24, 2009	40
Fish and Prawn Culture	Kakinada	January 27-February 02,2009	19
Fisheries Co-mananagement	Banswara, Rajasthan	January 22, 2009	50
Fish Processing and HACCP Concept	Barrackpore, W.B.	January 19-30, 2009	18
Ornamental Fish Culture	Banswara, Rajasthan	January 20-21, 2009	20
Ornamental Fish Breeding	Mumbai	January 19-24, 2009	10
Freshwater Fish Culture	Powarkheda	January 17-23, 2009	19
Fish Culture Techniques	Kolkata	January 15-24, 2009	10
Fish and Prawn Culture	Kakinada	January 3-12, 2009	40
Fish and Prawn Culture in A.P.	Kakinada	Dec., 29, 2008-Jan.,01, 2009	10
Fish and Prawn Culture	Kakinada	December 19-27, 2008	40
Training Skill Development	Mumbai	December 18-24, 2008	12
Fisheries and Aquaculture Extension	Mumbai	December 16-23, 2008	10
Inland Saline Aquaculture	Rohtak	December 01-06, 2008	13
Management and Development			
Inland Saline Aquaculture, Management and Development	Rohtak	November 24-29, 2008	07
Fish and Prawn Culture	Kakinada	November 13-22, 2008	33
Fisheries Co-Management	Mumbai	November 12-21, 2008	11
Ornamental Fish Breeding, Culture and Disease Control	Kolkata	November 10-20, 2008	06
Fish Culture	Manipur	November 07, 2008	60
Recent Developments in Aquaculture	Kakinada	October 31-November 06, 2008	23
Fish Microbiology and Fish Parasitology	Kolkata	October 17-25, 2008	18
Value Added Fish Products	Kolkata	October 10-16, 2008	15
Scampi Hatchery Management using Underground Sub-saline Water	Rohtak	September 15-24, 2008	09

Ornamental Fish Breeding and Culture	Kolkata	09-13 September, 2008	27
Carp Hatchery Management for Maintaining Genetic Quality	Powarkheda	August 20-29, 2008	05
Mass Scale Seed Production of Magur	Kakinada	August 20-26, 2008	07
Breeding and Culture of Carps and Magur	Kakinada	August 8-16, 2008	27
Fish Culture	Powarkheda	August 05-11, 2008	21
Freshwater and Brackishwater Aquaculture systems	Kakinada	July 21-September 04, 2008	26
Fish Culture	Powarkheda	July 28-August 03, 2008	20
On-Job Training on Ornamental Fish Breeding & Culture and Carp Breeding & Hatchery Management	Kolkata	July 18-August 02, 2008	25
Ornamental Fish Breeding and Culture	Kolkata	July 16-25, 2008	21
Freshwater Fish and Prawn Culture	Powarkheda	July 12-26, 2008	15
Fish and Prawn Culture	Kakinada	July 5-14, 2008	22
Fish and Prawn Culture	Kakinada	June 19-28, 2008	43
PCR Applications in Aquaculture and Fisheries	Kakinada	June 12-13, 2008	21
Fish and Prawn Culture	Muzaffarpur, Bihar	June 10, 2009	20
Management of Chaur	Muzaffarpur, Bihar	June 09, 2008	45
Quality Control and Monitoring Production Process of Value Added Fish Products	CIFE, Mumbai	April 28-30, 2008	10
Fish and Prawn Culture	Kakinada	April 19-28, 2008	39
Freshwater Fish and Prawn Culture	Powarkheda	April 03-May 01, 2008	09
Freshwater Fish and Prawn Culture	Powarkheda	April 15-24, 2008	16
Off-Campus "Specialized Training Course for the Faculty at CIFE, Mumbai" organized by NAARM, Hyderabad	CIFE, Mumbai	March 31- April 02, 2008	24

6.2 Participation in Exhibitions

			Centre/HQrs
Exhibition on Climate Change: Challenges and Mitigation	Kolkata	February 27-28, 2009	Kolkata
INDAQUARIA, 2009 (An International Ornamental Aquatic Event organized by MPEDA)	Kolkata	February 18-20, 2009	Kolkata
MECOS-09 (International Symposium on Marine Eco-system-Challenges and Opportunities)	Kochi	February 09-12, 2009	Kakinada
World Congress on Conservation of Agriculture	New Delhi	February 04-07, 2009	Rohtak
Assam Matsya Mahostava-2009	Guwahati	January 28-30, 2009	Mumbai & Kolkata
Koli Sea Food Festival	Mumbai	January 22-25, 2009	Mumbai
INDAQUA-2009	Bhubaneswar	January 21-23, 2009	Mumbai & Kolkata
Workshop on "Sustainable Livelihood Development though Fisheries and Aquaculture in N.E. Region of India"	Barapani Shillong	January 02, 2009	Kolkata
19th All India Congress of Zoology & Seminar	Guwahati	December 29-31, 2008	Kolkata
All India Seminar on ' Recent Trends in Processing & Marketing of Fishery and Horticultural Products"	Kolkata	December 19-20, 2008	Kolkata
National Exhibition "Kisan - 2008"	Pune	December 17-21, 2008	Mumbai
Krishi 'O' Banijya Mela	Ratnapur, WB	December 09-15, 2008	Kolkata
8th Indian Fisheries Forum	Kolkata	November 22-26, 2008	Kolkata

India International Trade Fair	New Delhi	November 12-14, 2008	Rohtak
Workshop on Uttar Bihar Ka Jal Strota Ka Upyog	Betiya, Bihar	Oct., 31- Nov.,01, 2008	Kolkata & Mumbai
32nd Conference of the Ethological Society & National symposium on Fish Behaviour	CIFE, Mumbai	October 16-17, 08	Mumbai
Second Green Revolution Summit and Expo "Agro Protech 2008"	Kolkata	September 24-26, 2008	Kolkata
12th National Expo organized by Central Calcutta Science and Culture Organization for Youth, Kolkata	Kolkata	September 05-10, 2008	Kolkata
International Meet on Livestock and Dairy Expo 2008	New Delhi	August 22-23, 2008	Rohtak
National level Exhibition and Farmers Meet	Bihar	June 07-10, 2008	Mumbai and Kolkata
Education Fair-cum-Seminar - 08	Kolkata	May 30 - June 01, 2008	Kolkata
Kharif 2008 - District Level Kishan Mela cum Exhibition	Powarkheda	May 28 - June 01, 2008	Powarkheda
National Conference on Aquatic Genetic Resources	Lucknow	April 26-27, 2008	Rohtak

6.3 Media

National

- An article on "Our oceans are running out of fish" authored by Dr. S. K. Chakraborty, in DNA newspaper, Mumbai, Monday, June 9, 2008.

- An article on "Fish swim away from polluted city waters." authored by Dr. S. K. Chakraborty, in Hindustan Times, Mumbai, Monday, February 16, 2009.

- The exhibitions organized on the occasions were widely covered by local television and print media in the local news paper like Dainik Bhaskar, Dainik Nai Dunia, Dainik Jagaran, etc.

- Scientists of Kolkata Centre participated in two television programmes on Krishi Darshan.

- ETV and a local channel broadcasted the programmes on prawn and magur hatchery and overall functioning and activities of Powarkheda centre.

- Demonstration of Tiger Shrimp cultivation in Rohtak Centre, using inland saline waters had been highly appreciated by the media. This news had been highlighted in many Indian news papers like Hindustan Times, Dainik Bhaskar, Hari Bhoomi, Amar Ujala, Dainik Jagaran and several International news reports.

International

- FIS - World news - Prawn experiment spells profits for high saline lands.

- Seafood.com - an online, subscription-based, fisheries news service. The report made headlines as "Growing Tiger Shrimp in Low-Salinity Ponds" - Scientists at the Central Institute of Fisheries Education (CIFE) in Mumbai have successfully farmed tiger shrimp (*penaeus monodon*) in low salinity water (10 parts per thousand salinity), in Haryana, a state in north central India. V.K. Sharma, a CIFE scientist involved in the research, said, "This technology proves that shrimp can be commercially farmed in inland saline waters with cost-effective ionic management.

6.4. Fish Farmers' Day & Annual Day

The Annual Day of the Institute was celebrated in congruence with National Fish Farmer's Day on 10 July, 2008. On this occasion, *"Dr. Hiralal Chaudhury Fisheries Foundation Best Young Scientist Award"*, *"Dr. Jalihal Endowment Award for the Best Thesis"* at Masters level, Best Farmer Awards, various annual awards to scientists and staff members for excellence in sporting, literary and cultural competitive events organized at the Deemed University were presented. The occasion concluded with a gala cultural evening *"Jhankar"*, organized and conducted by and for the staff, their families and friends.

6.5 Fish Farmers' Day at Centres

Kolkata Centre

The Fish Farmers' Day was celebrated at the Kolkata Centre on 10 July, 2008. This special occasion became memorable as Prof. Hiralal Chaudhury, the Father of Induced breeding inaugurated the programme as Chief Guest, Dignitaries like Dr. P. Das, Former Director. NBFGR, Lucknow, Dr. C. Saha, Former Director., CIFA, Bhubaneshwar, Prof. Kuldip Singh, Former Principal, CIFE Kolkata Centre, Dr. K.C. Dora, Dean, WBUAF&S, Kolkata and Dr. K.R. Naskar, Officer-in-Charge, CIFRI Centre, Salt Lake City, Kolkata were present. At this occasion a pamphlet in Bengali on "Integrated Fish Farming" was released. Eleven progressive fish farmers of the region including Shri Babloo Ghosh, Shri Ashish Sarkar, Shri Nirmal Biswas were felicitated. A demonstration session was also organized in which the progressive fish farmers discussed their technology and success with the small fish farmers and visitors. An exhibition based on different technology of aquaculture was arranged for them. More than 100 farmers including progressive fish farmers from Meghalaya participated in the discussion and got benefited.

Kakinada Centre

The Fish Farmers' Day was celebrated at the Centre on 10 July 2008. Two farmers *viz.*, Shri V. Rambabu of Polavaram village, East Godavari and Shri S. Shyamala Rao from Krishna district were felicitated as Best Farmers. A total of 100 fish farmers from both the districts and Fisheries officials attended the function. Shri Mootha Gopalakrishna, M.L.A. of Kakinada, Shri Kumara Swamy, Project Director, DRDA, Kakinada and Shri G.P. Singh, Asst., General Manager, Coromondal Fertilizers Ltd., Kakinada were the Chief Guests on the occasion.

6.6 First Alumni Meet of CIFE

The first Alumni Meet of CIFE, held on 25 December, 2008, bringing together a diverse diaspora and long lost friends of CIFEANS on a common platform, fostering brotherhood with sharing of talent and expertise in the professional work arena. The Alumni Meet was aimed to strengthen the existing network of Fisheries Professionals, provide support to the academia and contribute towards employment generation and development of the fisheries sector as a whole. The mandate and vision of the Association were formulated on the occasion and the interim Governing Body was constituted under the Chairmanship of the Director and Vice Chancellor, Dr. Dilip Kumar. The event turned out to be a grand success with panel discussions among the faculty, ex-students and future alumnis, the PGSSU office bearers. About 80 ex-students attended the programme which concluded with a gala cultural programme in the evening.

6.7 Visit Coordination:

Date/Period	Organization/University	Category/ Type of Visitors	No. of Visitors
07 March 2009	A.E.C.& R.I, TNAU, Coimbatore	B. Tech students (Food Processing Engineering)	10
28 February 2009	Kirti M. D. College, Mumbai	PG & UG students	18
27 February 2009	V.N.S.G. University	M.Sc. students	20
25 February 2009	C. G. B.I. of Biotechnology, Surat	M.Sc. students	39
21 February 2009	R. K. Talreja College, Thane	S.Y.B.Sc students	20
20 February 2008	B. N. N. College, Bhiwandi	B.Sc. students	35
19-20 February 2008	CAS in M.B.O, Annamalai University	M.Sc. students	31
10 February 2009	Dept. of Fisheries, Chhatisgarh	Officers	10
30 Jan.,- 02 Feb., 2008	College of Fisheries, Raha, Assam	B.F.Sc. students	15
29 January 2009	M. D. College, Mumbai	S.Y.B.Sc. students	70
24 January 2009	Ramnarain Ruia College, Mumbai	M.Sc. students	12
22 January 2008	Veer Wajekar College, Mumbai	B.Sc. students	31
21 January 2009	Mithibhai College, Mumbai	M.Sc.&T.Y. B.Sc.students	25
17 January 2009	Bhavan's College, Mumsbai	T.Y.B.Sc. students	15
15 January 2009	R. D. National College, Mumbai	S.Y.B.Sc. students	9
14 January 2009	D. G. Ruparel College, Mumbai	B.Sc. students	20
11 January 2008	R. D. National College, Mumbai	B.Sc. students	25
4 January 2008	Sathaye College, Mumbai	B.Sc. students	16

3 January 2008	Ramnarain Ruia College, Mumbai	M.Sc. students	10
22-23 December 2008	Pariwartan Santhan Kherdi, Chiplun Ratnagiri	SHG Fisherwomen/ Entrepreneurs	33
15 December 2008	Maharashtra College, Mumbai	B.Sc. Students	22
3-4 December 2008	College of Fisheries, G.B.P.U.A.&T , Uttarakhand	B.F.Sc. students	16
24 November 2008	College of Fisheries, Muzaffarpur	B.F.Sc. students	3
23 November 2008	U.A.S., Dharwad	B.F.Sc. students	63
22 November 2008	Abhinav College, Bhayander, Thane	B.Sc. students	20
21 November 2008	Madras Christian College, Chennai	M.Sc. students	48
19 November 2008	College of Agriculture, Bijapur	B.Sc. Students	63
11 November 2008	Sathye College, Mumbai	B.Sc. students	15
12 October 2008	Science College, Nanded	M. Sc. students	15
10 September 2008	Dept. of Fisheries, Govt. of Bhutan	Senior officers	6
25-26 May 2008	W.B.U.A.F.S., Kolkata	Students	12
15-16 April 2008	College of Fisheries, Veraval	Students	6
07-13 April 2008	CIFE Kolkata Centre, Kolkata	Trainee Officers	22
01-07 April 2008	College of Fisheries, Udaipur	Students	18
CIFE Kolkata Centre			
20-23 March 2009	Fisheries Staff Training Institute, Dept. of Fisheries, Chennai	Fish Farmers	29

17-23 March 2009	Dept. of Fisheries, Govt. of Bihar	Farmers	109
03 March 2009	Dept. of Fisheries, Govt. of M.P.	Farmers	10
26-27 February 2009	Fisheries College & Research Institute, Thoothkudi	Students	25
18-25 February 2009	NABARD Regional Office, Guwahati	Farmers	22
13-15 February 2009	Fisheries Staff Training Institute, Dept. of Fisheries, Chennai.	Farmers	31
12-15 February 2009	College of Fisheries, C.A.U., Tripura	Students	19
02-04 February 2009	Dept. of Fisheries, Chennai.	Farmers	36
28 Jan.,-03 Feb., 2009	State Fisheries Dept. of Tripura	Farmers / Officials	20
04-08 December 2008	Fisheries Dept. of Sikkim	Farmers	09
06-08 August 2008	NADP Scheme, Tamil Nadu	Farmers	30
09-12 July 2008	Fish Farmers from Meghalaya	Farmers	20
05-09 July 2008	Fish Farmers from Assam	Farmers	21
05-06 May 2008	Progressive fish farmers of Tripura	Farmers	15
27 March-1 April 2008	F. C. S, ATMA., Karimnagar, A.P.	Farmers, Representative and Officials	20
CIFE Kakinada Centre			
13 February 2009	Govt. College, Bhadrachalam	Students	32
12 February 2009	P. R. Govt. College, Kakinada	Students	110

18 June 19 Nov., 2008	Cauvery Delta region,	Fish Farmers	87
31 January 2009	NATP Field Exposure Training, Fish Farmers and Training Institute, Department of Fisheries, Govt. of Tamil Nadu		
31 January 2009	Dept. of Fisheries, Tamil Nadu	Fish Farmers along with two officials	25
29 January 2009	Shri Venkateswara Veterinary University, Avanigadda, A.P	Polytechnic(Fisheries) Students	25
19 November 2008	Dept. of Fisheries, Tamil Nadu	Fish Farmers along with two officers	32
09 June 2008	Layola Academy, Secunderabad	Students	20
05 June 2008	Andhra University, Visakhapatnam	Students	17
01-04 April 2008	CIFE Kolkata Centre	60th batch of PGDIF Students	22

CIFE Powarkheda Centre

31 January 2009	Govt. Home Science College, Hoshangabad	Students	3
06 December 2008	Carrier College, B.H.E.L. Bhopal	Students	20
21 November 2008	Agriculture College, Sehore (under JNKVV, Jabalpur)	Students	11
21 October 2008	Vardhman College, Itarsi, M. P.	Students	4
18 September 2008	Indira Gandhi Girls College, Sarani	Students & Assistant Professors	49
16 September 2008	Nodal Centre of DPIP, Chattarpure	Farmers	25

11 September 2008	'ATMA' project, Dist. Harda	Farmers	15
31 July 2008	Dist. Neemach (M. P.), BU, Bhopal	Farmers	11
19 July 2008	MGM School, Itarsi, M. P.	Students	127
18 June 2008	SDO office, Babai, Hoshangabad	Farmers	30

6.8 Transfer of Technology and Demonstration

The Institute conducted action research on aquaculture and fisheries extension programmes, as a result of which new demand driven programmes were introduced. Innovative aquaculture extension strategy and approaches in NE states and Bihar including result demonstrations, development of innovative modules and tools for training were carried out. Scientists of Aquaculture Division also conducted demonstration of "Raising carp fingerlings in cages" at the Dimbhe reservoir where technology of Installation of cages and practicing cage aquaculture for *in situ* rearing of fingerlings of IMC was practiced in Dimbhe reservoir with community participation at each step of operation.

6.8.1. North Eastern Region

Innovative aquaculture extension strategy and approaches were demonstrated in North-Eastern states by Dr. A. K. Reddy, Sr. Scientist and Dr. V. K. Tiwari, Sr. Scientist, under the guidance of Dr. Dilip Kumar, Director, CIFE.

Manipur

Result Demonstration on Carp Polyculture: Result demonstration on carp polyculture was undertaken in i.e., Imphal West, Bishnupur and Thoubal Districts. In each district one village was selected i.e., Mayang Imphal in Imphal West District, Wabgai in Thoubal District and Oinam in Bishnupur District. Each of these three villages has 400-500 ha pond area which helped to follow cluster approach aquaculture development. 46 demonstration farmers were selected from three villages. The size of ponds ranged from 0.2 to 1.0 ha. The ponds were stocked with yearlings at the rate of 5,000 to 10,000 Nos. per hectare depending on the pond depth. In these ponds the production ranged between 2500 to 5000 kg/ha/yr. For faster dissemination of technology Trickle Down System (TDS) of aquaculture extension approach was followed. The TDS aquaculture extension is well established in two villages i.e., Wabgai and Oinam where farmers

formed into organized groups for management of input and outputs, related to particular raising of carp fingerlings, manures, fertilizers, feeds, etc. The Officials of Department of Fisheries visit these villages from time to time to impart technical guidance and to discuss with the farmer groups. The CIFE used to organize farmers' meets to discuss the progress and problems, if any.

Result Demonstration on House Hold Fish-cum-Pig Integrated Farming: Result demonstration on house hold fish-cum-pig integrated farming was demonstrated in 5 ponds of size ranging from 0.25 to 0.50 ha. The ponds were stocked with carp yearlings at the rate of 10,000 Nos. per hectare and pig-lets released @ 40 Nos. per hectare in the pig-sties constructed on the pond dykes. The production ranged from 2450 to 3670 kg of fish/ha/ year and 2600 to 2880 kg of live pig/ha/8 months.

Result Demonstration on Monoculture of Giant Freshwater Prawn: 75,000 Nos. of giant freshwater prawn seed were supplied to Department of Fisheries, Govt. of Manipur to stock in the result demonstration ponds during the year 2008-09. The prawns grew to 35- 70 g in 7 months. The production ranged from 570 to 850 kg/ha/8 months.

Fisheries Co-management in Loktak Lake: Fisheries Co-management programme was undertaken in 45 hectare segment of Loktak Lake at Kola Village, Moirang Taluka, Bishnupur District. In this programme, 20 fisher families were involved to take up various developmental programmes like separation of 45 hectare with fencing from the lake, raising of yearlings, feeding, watch and ward, etc. 50,000 Nos. of yearlings(150-350 g) raised in 0.50 hectare pond were stocked in the 45 hectare segment in the month of August 2008. The yearlings consisted of catla, rohu, mrigal, grass carp and common carp. The fishes grew to 0.85-1.5 kg in 7 months. The fishers started harvesting of fish which had grown above 1.0 kg. The fishing activity is in progress.

Mizoram

Result Demonstration on Carp Polyculture: Result demonstration on carp polyculture was undertaken in 10 ponds of each 0.40 hectare during 2008-09. The ponds were stocked with carp advance fingerlings at the rate of 15,000 Nos. per hectare in the month of August, 2008. The fishes have grown to 450 to 700 g in 7 months. The result demonstration ponds (10 Nos. of each 0.40 ha.) of 2007- 08 were harvested in the month of May, 2008 and achieved production ranging from 2750 to 4300 kg/ha/10 months.

Result Demonstration on Polyculture of Carps and Giant Freshwater Prawns: Result demonstration on polyculture of carps and giant freshwater was undertaken in 12 ponds of each 0.25 ha during 2007-8 and harvested

in the month of April, 2008. The production in these ponds ranged from 2650 to 3200 kg fish and 265 to 450 kg prawn per hectare per 9 months. During the year 2008-09, the result demonstration on polyculture of carps and giant freshwater prawns is undertaken in 10 ponds of each 0.25 ha. The CIFE, Mumbai has supplied 1.0 lakh giant freshwater seed to the Govt. of Mizoram during 2008-09. The demonstration ponds were stocked with carp advanced fingerlings and prawn seed at the rate of 15,000 and 20,000 Nos. per hectare respectively in the month of August, 2008. The production ranged from 2850 to 3500 kg fish and 325 to 535 kg per hectare in 8 months.

Result Demonstration on House Hold Fish-cum-Pig Integrated Farming: Result demonstration on house hold fish-cum-pig integrated was initiated in 4 ponds of each 0.25 ha in the month of August 2007. Each pond was stocked with 6250 Nos. of carp fingerlings (in August, 2007) and 8 Nos. of pig-lets (5.25 kg each) in each pig-sty (in December, 2007) constructed on pond dyke. The production in these ponds ranged from 3280 (820 kg/ pond) to 3640 (910 kg/pond) kg and 3120 (78 kg each) to 3360 (84 kg each) kg live pig per hectare in 10 and 8 months respectively.

Result Demonstration on Manure Based Low Cost Carp Polyculture: Result demonstration on manure based low cost carp polyculture was undertaken in 10 ponds of each 0.40 ha. Each pond was stocked 4000 Nos. (10,000 Nos. /ha.) of carp fingerlings (90 mm) in the last week of November, 2007. The stocking was delayed due to natural calamity (floods). The ponds were applied phase manure at an interval of 3 to 4 days. Whenever thick algal blooms were noticed the manuring was discontinued. No feed was given to the fish. The production in these ponds ranged from 1100 to 1200 kg/ ha / 5-6 months. The production was very low due to late stocking and low water temperature in winter.

Tripura

Result Demonstration on Carp Polyculture: Result demonstration on carp polyculture was undertaken in 10 ponds of size ranging 0.14-0.28 ha in Dhalai and South Tripura Districts. The ponds were stocked with carp advance fingerlings/yearlings at the rate of 10,000 Nos. per ha during 15-25 August, 2009. Partial harvesting method was followed and the ponds were completely harvested in May, 2008.

Result Demonstration on House Hold Fish-cum-Pig Integrated Farming: Result demonstration on fish-cum-pig integrated farming was undertaken in 6 ponds of size ranging from 0.12 to 0.26 ha in Dhalai and South Tripura Districts. The ponds were stocked with carp advanced fingerlings / yearlings at the rate of 10,000 Nos./ha during 15-25 August, 2007. Partial harvesting method was followed and the ponds were

completely harvested in the month of May, 2008.

Result Demonstration on Manure Based Low Cost Carp Polyculture: Result demonstration on manure based low cost carp polyculture was taken up in 14 ponds of size ranging from 0.08 to 0.40 ha Dalai and South Tripura Districts. The ponds were stocked with carp advanced fingerlings/yearlings at the rate of 10,000 Nos. per ha during 15-25 August, 2009. With carp advance fingerlings/yearlings at the rate of 10,000 Nos. per ha during 15-25 August, 2007. Partial harvesting method was followed and the ponds were completely harvested in May, 2008.

Result Demonstration on Monoculture of Giant Freshwater Prawn: Result demonstration on monoculture of giant freshwater prawn was undertaken in two ponds of each 0.25 ha in Dhalai and West Tripura Districts. The ponds were stocked with prawn juveniles supplied from CIFE, Mumbai at the rate of 30,000 Nos./ha between 28 August 2007 and 6 September 2007. The ponds were harvested in May, 2008.

Result Demonstration on Polyculture of Carps and Giant Freshwater Prawn: Result demonstration on polyculture of carps and giant freshwater prawn was undertaken in 12 ponds of size ranging from 0.10 to 0.28 ha in Dalai and South Tripura Districts. The ponds were stocked with carp advance fingerlings/yearlings and prawn juveniles at the rate of 10,000 Nos./ha each between 28 August 2007 and 6th September 2007. The ponds were harvested in May, 2008.

Nagaland

Giant Freshwater Prawn Culture: Giant freshwater prawn culture was initiated in Nagaland with the technical guidance of CIFE, Mumbai since 2006-07. A small scale hatchery with seed production capacity of 1.0 million was established at Natanglu Fish Farm of Govt. of Nagaland in the year 2007. The CIFE, Mumbai has supplied 50,000 Nos. of giant freshwater prawn seed during May-June 2008.

Assam

As per the request of Department of Fisheries, Govt. of Assam, a site was selected at Meen Bhavan, Guwahati for establishment of giant freshwater prawn hatchery in the month of November, 2008. The hatchery design, lay-out and list of infrastructure facilities required were provided to DoF, Assam. A draft MoU was prepared which was mutually agreed by CIFE, Mumbai and DoF, Assam. The hatchery construction is in progress.

Bihar

Government of Bihar had shown keen interest in establishment of commercial

hatcheries for magur, prawn and ornamental fish. In this connection as per the request of Secretary, Department of Animal Husbandry & Fisheries, Govt. of Bihar and Director of Fisheries, Govt. Bihar a common site was selected at Fisheries Training Institute, Mithapur, and Patna during the August, 2008. Team of Scientists which included Dr G. Venugopal, Dr. V. K. Tiwari, Dr. A. K. Reddy and Dr. S. G. S. Zaidi made a visit. Three hatchery designs, lay-out plans and list of items required for the establishment of hatcheries were given to Dept. of Fisheries. A combined project report was prepared and submitted to the Director of Fisheries, Govt. of Bihar in the month of September, 2008. In order to have modern design for hatcheries, architect and Dr. A.K. Reddy, Sr. Scientist visited the proposed hatchery site during November, 2008. During the visit, a meeting was held with Secretary, Director, Executive Engineer, Joint Director, Deputy Director and other Officials and finalized to have a MoU between CIFE, Mumbai and DoF, Govt. of Bihar. Accordingly a draft MoU was prepared and sent to DoF, Govt. of Bihar for finalization in December, 2008. A revised draft copy of MoU was received from DoF, Bihar in the month of February, 2009. The finalization of MoU is under process.

6.8.2. Kolkata Centre

Various technologies on "On Farm Feeds and Feeding Management for Sustainable Aquaculture", "Preventive measures of fish diseases during aquaculture", "Live Feed Culture Techniques" and "Production of value added fish products from low value fish" were demonstrated to local fish farmers at the center. Emphasis were given on judicious application of manure and fertilizers for natural food production, formulation and preparation of artificial feed and right ways of feeding methods for proper feed management, economizing operations by employing appropriate measures to prevent outbreak of diseases. Besides the above, "Fish processing and HACCP concept" and various techniques of fish processing were demonstrated for maximum quality assurance, at the centre and various fish processing plants located at kolkata. Keeping in view the potential of ornamental fish culture and export in the state of West Bengal, various demonstrations on "Ornamental fish breeding and culture and aquarium construction and maintainence" were held at Village Raichak, South 24-Parganas, W.B., Betiah, West Champaran, Bihar, CIFE, Kolkata Centre & various ornamental fish farms located at Kolkata. Training also provided on domestic and export markets, licensing system, methods for approval of bank loan etc.

6.8.3. Rohtak Centre

Scientists and Officer In-charge of the Rohtak center visited the Aquaculture Research and Training Institute (ARTI) Hisar, Haryana

regularly to deliver lectures to the Fisheries Officers of Haryana and gave necessary inputs on various technologies of the fish and prawn culture and breeding. A demonstration on "Commercial shrimp culture using inland saline water" was organized at the CIFE Rohtak Centre on 8th November 2008. Tiger shrimp did not survive in raw inland saline waters due to ionic difference with seawater. Scientists of Rohtak centre demonstrated that shrimp can be commercially farmed in inland saline waters with cost effective ionic management. In a recent trial, the seed of tiger shrimp was stocked into two identical ponds of 0.25 ha with seed imported from Kakinada (Andhra pradesh) at the rate of 44,000/ha (PL-10) for 4 months culture duration in 10 ppt saliniy. The results indicated an overall survival of 65% with a net production of 661.0 Kg in 110 days culture duration.

6.8.4. Kakinada Centre

Dr. G .Venugopal, Principal Scientist & OIC was assigned to establish Magur hatchery in Bihar for conducting result demonstration. He identified the farm where hatchery is proposed to be established and has submitted project proposal with tentative budget estimate after suitable discussions with the Principal Secretary. Two result demonstration identified farmers started "Crab culture" at village Karvaka near Amalapuram as a fruitful outcome of method demonstration by Scientists of Kakinada Centre as part of the project outcome on Development of Participatory model for Aquaculture. Four fish farmers from Nandora Obaidullah Gunj, Madhya Pradesh, provided technical guidance on "Carp nursery pond management, prawn culture and aquarium fish breeding and culture at Balabhadrapuram fish farm, under the Kakinada centre". Field and farm demonstrations were held at the centre for fish farmers from Cauvery Delta region, NATP Field Exposure Training, Fish Farmers Training Institute, Department of Fisheries, Govt. of Tamil Nadu.

6.8.5. Powarkheda Centre

Demonstrations on fish and prawn culture, carp seed production and rearing, hatchery management and farm management were carried out through the training programs and also through demonstrations to the students/ visitors who visited this centre during the reported period.

6.9 Other Extension Activities

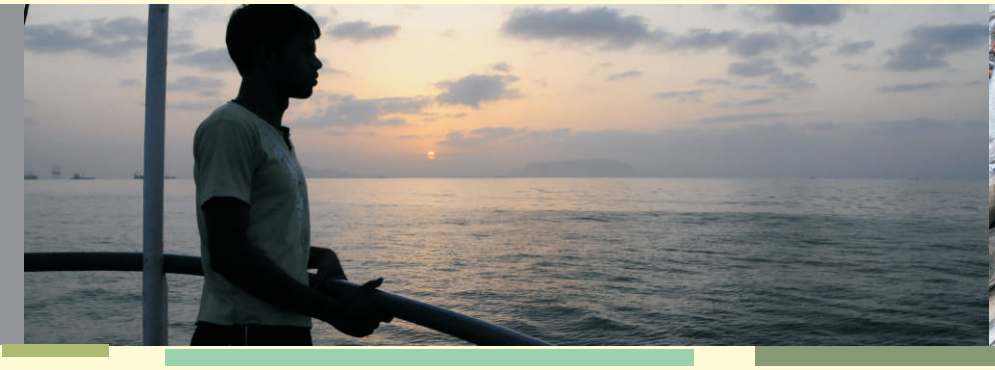
A fisher folk meet was organized at Dimbhe reservoir, Phulewadi village, on 4th October 2008 to demonstrate livelihood options through ornamental fish culture and breeding which was also attended by State Fisheries Dept, Maharashtra Indepesca

International, Mumbai (Corporate House). Dr. Chandraprakash, Senior Scientist, Division of Aquaculture prepared six reports on testing and recommendation of water, wastewater and soil in relation to their effects on culture and fishery resources and generated revenue under institutional consultancy/extension services programme.

6.10 Cruise Programmes organised

Research/Training programme onboard Vessel, MFV Narmada

Date	Name	Division	Purpose
13.05.2008	Dr. V.V. Singh	CMFRI, Mumbai	To carry out Fishing and Sampling work.
27.09.2008	Dr. K. Venkateshvaran	FRM Division	For practicals and hands on training of the FRM 505 (2+1) course of MFSc.
10.10.2008	Dr. K. Venkateshvaran	FRM Division	For practicals and hand on training of the FRM 505 (2+1) course of MFSc.
18.10.2008	Dr. K. Venkateshvaran	FRM Division	Experimental fishing at various dept zone of the FRM 505 (2+1) course of MFSc.



25.10.2008	Dr. K. Venkateshvaran	FRM Division	Experimental fishing at various dept zone of the FRM 505 (2+1) course of MFSc
01.11.2008	Dr. K. Venkateshvaran	FRM Division	Operation of samplers to major Vertical distribution of temperature, oxygen and nutrients of the FRM 505 (2+1) course of MFSc.
22.11.2008	Shri S .S. Kamat	PHT Division	Carrying out fishing as part of the onboard training work of PHT 511 course of MFSc.
29.11.2008	Shri S. S. Kamat	PHT Division	Carrying out fishing as part of the onboard training work of PHT 511 course of MFSc.
27.12.2008	Dr. Chandra Prakash	Aquaculture	For Training work of MFSc Aquaculture students.
03.01.2009	Dr. Chandra Prakash	Aquaculture	For Training work of MFSc Aquaculture students.

6.9 Cruise Programmes organised

Research/Training Programme onboard Vessel, MFV Saraswati

Date	Days	Division	Purpose
06.04.2008	1	FNBP	As part of one day Sea Cruise Programme

07.04.2008 to 11.04.2008	5	FRM, FNB and FPM Dr. Ashok Kumar Jaiswar (Cruise Leader)	To carry out onboard training for the 2nd Semester Students of FRM, FNB & FPM 2007-09 batch.
19.04.2008 to 23.04.2008	5	Aquaculture, AEM and FRM Dr. Chandra Prakash (Cruise Leader)	To carry out onboard training for the 2nd Semester Students of Aquaculture & AEM 2007-09 batch.
30.04.2008 to 04.05.2008	5	FEES, FGB and FBM Dr. Swadesh Prakash (Cruise Leader)	To carry out onboard training for the 2nd Semester Students of FGB, FBM & FEx 2007-09 batch.
12.03.009 To 16.03.2009	5	FRM, PHT and FExtn.	To carry out onboard training for the M.F.Sc 2nd Semester Students of FRM, PHT & FExt. Division
21.03.2009 to 22.03.2009	1	IIT Bombay Dr. Narendra G. Shah, CTARA IIT Bombay Students	To gain experience on onboard vessel activities
24.03.2009 To 27.03.2009	4	Aquaculture and FExtn. Dr. P. P. Suresh Babu (Cruise Leader)	To Carry out onboard training for the Aquaculture and Fish Extension Students
30.03.2009 To 02.04.2009	4	FPHPT, AEHM, FGB and FEES Dr. A. Venilla (Cruise Leader)	To Carry out onboard training for the 2nd Semester Students of FNB FGB Students.

7. Honour and awards

Dr . Dilip Kumar , Director, CIFE , was elected as *Sectional President (Animal Sciences , Veterinary and Fisheries)* of the 96th Session of prestigious Indian Science Congress ,held at Shillong during 03 - 07 January ,2009 .

Dr . Dilip Kumar , Director, CIFE , was ZSI *Dorabjee Tata Gold Medal* and *Dr .Meghnad Saha Award* during 32nd Annual International Conference on Oriental Heritage at the Indian Institute of Oriental Heritage ,Kolkata on 05 February , 2009 .

CIFE received *Second Prize* for outstanding contribution in Hindi by Ashirwad Sansthan Mumbai during 2008 - 2009 .

Dr .A .K .Pal ,Principal Scientist ,Division of

Fish Nutrition ,Biochemistry and Physiology , was admitted as *"Fellow of National Academy of Agricultural Sciences"* at NAAS Complex , New Delhi on 04June ,2008 .

Dr .A .K .Pal ,Principal Scientist, Division of Fish Nutrition ,Biochemistry and Physiology was awarded the *M .S .Swaminathan Award* for *"Best Indian Fisheries Scientist 2008 "*by Professional Fisheries Graduates Forum (PFGF) .

Dr .K .K .Jain, Principal Scientist ,Division of Fish Nutrition ,Biochemistry and Physiology awarded the Third *Aashirwad Rajbhasha Puruskar & Samman 2008* by *Aashirwad Sanstha* ,Mumbai on 25September, 2008 .

Dr .S .D .Singh ,Principal Scientist ,Division of Fish Nutrition ,Biochemistry and Physiology received *International C.R.Sullivan Endowment Award* given by International Fisheries Section , American Fisheries Society ,Bethesda ,USA , August, 2008 .

Dr .S .D .Singh ,Principal Scientist , Division of Fish Nutrition , Biochemistry and Physiology was awarded *International Membership* by International Fisheries Section , American Fisheries Society ,

Bethesda, USA.

Dr. S. D. Singh, Principal Scientist, Division of Fish Nutrition, Biochemistry and Physiology was nominated as a member in Executive Committee of Asian Fisheries Society-Indian Branch 2008.

Dr. Somdutt, Principal Scientist and O.I.C, Powarkheda Centre, was felicitated by the District Collector, and Governor (ATMA) Board, West Champaran District, Bihar at the occasion of two days seminar on *Uttar Bihar Ke Jal stroton Ke upyog avam matsya utpadan* (*in Hindi*) held on 31 October and 1 November 2008 at Betia in recognition of the HRD programs conducted for Fish Farmers of West Champaran District Bihar, at CIFE Centre Powarkheda.

Dr. V. K. Sharma, Principal Scientist and O.I.C, Rohtak Centre, **Dr. C. S. Purushottaman**, **Dr. Sudhir Raizada**, **Dr. G. Venugopal**, Principal Scientists, **Shri V. Harikrishna**, Scientist and **Shri Ashok Kumar**, T-5, received a letter of appreciation from Dr. S. Ayyappan, DDG (Fy.), ICAR, for the successful demonstration of commercial shrimp culture using inland saline water at the Centre.

Dr. V. K. Tiwari, Senior Scientist, Division of Aquaculture, was awarded the BIOVED Fellowship, 2009 for his outstanding contribution in the field of Fisheries by the Bioved Research Society, Allahabad during the 11th Indian Agricultural Scientists and Farmers' Congress, Allahabad on 14-15 February, 2009.

Dr. R. P. Raman, Senior Scientist, Division of Aquatic Environment and Health Management received the *Young Scientist Associate Award-2009* by the Bioved Research Society, Allahabad during the 11th Indian Agricultural Scientists and Farmers' Congress, Allahabad on 14-15 February, 2009.

Dr. B. B. Nayak, Senior Scientist, Division of Fisheries Resources, Harvest and Post-harvest Management, nominated as coordinator to coordinate 7th EU Framework Programme Consortia with the nodal point-Food-N-Co at Jawarharlal Nehru University.

Dr. B. B. Nayak, Senior Scientist, Division of Fisheries Resources, Harvest and Post-harvest Management, was nominated as Member, Expert Group to review standard conditions for sanitary import of fish and fishery products by Department of Animal Husbandary, Dairying and Fisheries.

Dr .S .K .Mishra ,Senior Scientist ,Division of Fisheries Extension ,Economics and Statistics was awarded "ISEE Fellow - 2 0"0 8y the Indian Society of Extension Education (SEE) , IARI ,New Delhi on 2 0ecember ,2 0 0 8 .

Dr .Sanjay B .Jadhao ,Scientist (S) D,ivision of Fish Nutrition , Biochemistry and Physiology received Animal Nutrition Association (ANA) Dr U B . Singh Memorial Young Scientist Award for the biennium 2 0 0 7 - 0 8at the ANA World Conference Inaugural Ceremony held on 1 4February, 2 0 0 at9NASC Complex, New Delhi .

Shri Dasari Bhoomaiah , Technical Officer , Division of Fisheries Extension ,Economics and Statistics , received a certificate of appreciation from Tamilnadu Fisheries Graduates Association , Chennai for the outstanding contributions in designing logo during the reported period .

ICAR
Zonal Sports Meet
February 02-06, 2009

The ICAR Zonal (West) Sports meet was organized by the institute during February 02-06, 2009 in Mumbai. The tournament was held at two venues *i.e* Andheri Sports Complex and Bhavan's College Campus. The tournament was conducted in 12 Athletic events for men and Cycle race for men, 7 Athletic events for women, 4 indoor games events for men and women. All these events were held Andheri Sports Complex, Andheri. 4 events of outdoor sports conducted at Bhavan's college campus, Andheri. The sports meet was inaugurated by Mr. Henry Menezes, Former India Football Player and Manager, Mumbai Football Club as Chief Guest and Dr.S. Shrinivasan, Director, CIRCOT, Mumbai, as Guest of Honour and Co host. There were 615 participants, which included 39 women. The Sports' meet was conducted by qualified Referees and Umpires belonging to various official sports' associations based in Mumbai.

A seventy six member strong contingent led by Dr. S. Munilkumar as *Chief De Mission* participated in the zonal sports organized by the institute.

The meet was successfully concluded on 06 February 2009 with a solemn closing ceremony in which the Chief Guest was Dr. H. P. Singh, DDG (Horticulture) and the Guest of Honour was Mr. Sunil Prasad, Indian Boxer who gave away the prizes to the winners

The following are the ICAR zonal winners from this institute

Event	Participant (s)	Position
Kabaddi	CIFE Team captained by Shri Bhaskar Mandhare	Winner
Badminton (Single - women)	Ms. Pragati Gadre	Winner
Badminton (Double- women)	Ms. Pragati Gadre & Ms. A. Vennila	Winner
High Jump (Women)	Ms. Nalini Poojari	Winner
100 m race (Women)	Ms. Nalini Poojari	Runner up
200 m race (Women)	Ms. Nalini Poojari	Runner up
Carrom (Single - Women)	Ms. S. M. Bagwe	Runner up
Table Tennis (Women -Double)	Ms. Aparna Chaudhari & Ms. K. Chanda	Runner up
Javelin Throw (Women)	Ms. Valsa Pavitran	3rd position
Discuss Throw (Women)	Ms. Vilasini Bagwe	3rd position
Long Jump (Women)	Ms. Nalini Poojari	3rd position


Shri Bhaskar Mandhare


Ms. Pragati Gadre


Ms. A. Vennila


Ms. Nalini Poojari


Ms. S. M. Bagwe


Ms. Aparna Chaudhar


Ms. K. Chanda


Ms. Valsa Pavitran

Annual Awards 2008-09

Best Scientist	Dr. P. S. Ananthan, *Scientist (SS)*
Best Teacher	Dr. Shyam Salim, *Scientist (SS)*
Best Technical Staff	Dr. P. Srinivasa Rao, *Technical Officer (T-6), Kakinada Centre*
Best Administrative Staff	Shri B. Laxman Rao, *UDC, Kakinada Centre*
Best Work in Hindi	Dr. Archana Sinha, *Pr. Scientist, Kolkata Centre*
Best Supporting Staff	Shri Shaik Vallisha, *SSG-II, Kakinada Centre*
Best School Children	1. Master Banishetty Harish *(Std. XII)*
	S/o Shri B. Laxman Rao, *Kakinada Centre*
	2. Master Syed Nazish Zaidi, *(Std. X)*
	S/o Dr. S.G.S. Zaidi, *Technical Officer, CIFE, Mumbai*
Best Thesis	1. Mr. C. S. Tejpal, *CIFE, Mumbai*
(Dr. Jalihal endowment awards)	
Best Young Scientist	1. Dr. S. Shabrinath, *College of Fisheries, Mangalore*
(Dr. Hiralal Chaudhuri Fisheries Foundation Award)	2. Dr. Jitendra Soundarray, *Sr. Scientist,CIBA, Chennai*
Best Fish Farmers	1. Shri Bablu Kumar Ghosh
(Dr. Hiralal Chaudhuri Fisheries Foundation Award)	*K. D. Road, Ranjendrapur, Naihati, 24 Parganas (N), W.B*
	2. Shri Sangram Singh Rathore, *Maloal, Rajasthan*






8. Linkages and collaborations

The Institute maintains linkages and collaborations with various national and international institutions and agencies for educational, research and development.

8.1. Linkages

Government of India Organizations

- Integrated Fisheries Project, Kochi
- Central Institute for Coastal Engineering for Fishery, Bangalore
- Central Institute of Fisheries Nautical and Engineering Training, Kochi
- Fishery Survey of India, Mumbai
- Marine Products Export Development Authority, Kochi
- National Institute of Nutrition, Hyderabad
- Zoological Survey of India, Kolkata
- Indian Institute of Technology, Kharagpur
- Department of Earth Sciences, Government of India
- Department of Science and Technology, Government of India
- Department of Biotechnology, Government of India
- Indian National Center for Ocean Information Services (INCOIS), Hyderabad
- Satellite Application Centre, Ahmedabad in the utilization of *OCEANSAT II*
- Bhaba Atomic Research Centre, Mumbai
- Tata Cancer Research Center, Mumbai

ICAR Institutes

- Central Marine Fisheries Research Institute, Kochi
- Central Institute of Brachishwater Aquaculture, Chennai
- Central Institute of Freshwater Aquaculture, Bhubaneshwar
- Central Inland Fisheries Research Institute, Barrackpore
- Central Institute of Fisheries Technology, Kochi
- National Bureau of Fish Gentic Resources, Lucknow
- Directorate of Coldwater Fisheries Research, Bhimtal
- ICAR Research Complex for Goa, Goa
- ICAR Research Complex for Eastern Region, Patna

CSIR Institutes

- Industrial Toxicology Research Centre, Lucknow
- Central Drug Research Institute, Lucknow
- Central Institute of Medicinal and Aromatic Plants, Lucknow
- Central Food Technological Research Institute, Mysore
- National Institute of Oceanography, Goa
- Centre for Cellular and Molecular Biology, Hyderabad
- National Botanical Research Institue, Lucknow
- Institute of Genomics and Integrative Biology, Delhi

Universities

- Cochin University of Science and Technology, Kochi
- Annamalai University, Chidambaram
- Adikavi Nannaya University, Rajahmundry
- University of Goa, Goa
- Acharya N.G. Ranga University, Guntur
- B.S. Konkan Krishi Vidyapeeth, Dapoli
- Maharana Pratap University of Agriculture and Technology, Udaipur
- Jawaharlal Nehru University, New Delhi
- Microtron Centre, Mangalore University, Mangalore
- Bhartiyar University, Coimbatore
- West Bengal University of Animal & Fishery Sciences, Kolkata
- Mumbai University, Mumbai

State Governments

- Department of Fisheries of the following states:
  - Haryana
  - Uttar Pradesh
  - Bihar
  - Tamil Nadu
  - Andhra Pradesh
  - Tripura
  - Arunachal Pradesh
  - Meghalaya
  - Nagaland
  - Assam
  - Manipur
  - Mizoram
- State Institute of Fisheries Technology, Kakinada

Other Organizations

- Tata Power Company, Lonavala & Mumbai
- Action Aid International, Port Blair
- M. S. Swaminathan Research Foundation, Chennai

NGOs:

- Interactive Research School in Health Affairs, Pune
- SHASHWAT, Manchar, District Pune
- Yusuf Meherally Centre, Kutch, Gujarat
- United Artists' Association, Ganjam, Orissa

8.2. Collaborations

Institute of Aquaculture Research (AKVAFORSK), Norway :
For the project "Genetic improvement of Penaeus monodon through selective breeding for growth and white spot disease resistence" along with the Central Institute of Brackishwater Aquaculture (CIBA), Chennai.

Australian Centre for International Agricultural Research (ACIAR):
For the Indo-Australian bilateral research project on "Aquaculture in degraded inland areas in India and Australia".

MoU with Ramkrishna Mission KVK, Nimpith, West Bengal and CIFE:

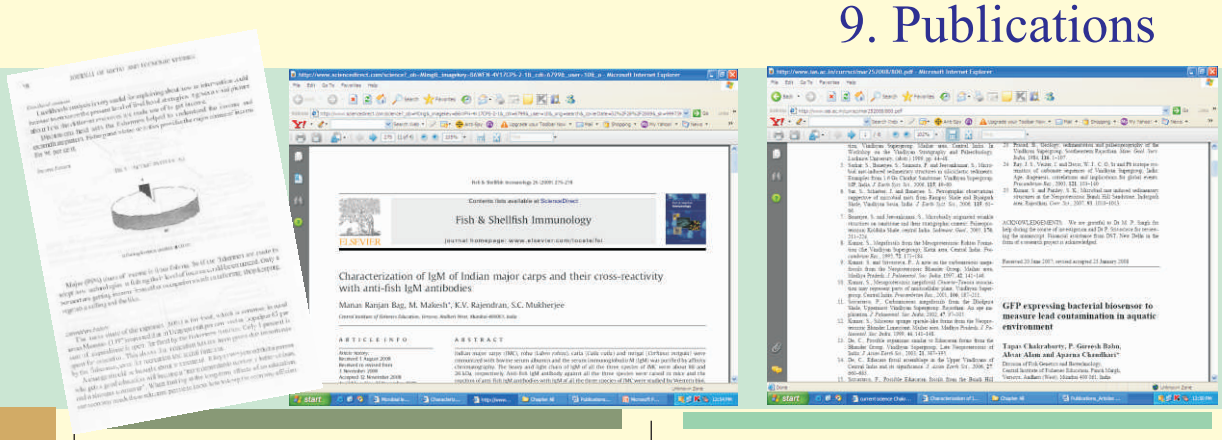
CIFE inked a pact with Ramkrishna Mission KVK, Nimpith, West Bengal on 22 July, 2008 on educational and research collaborations specially related to ornamental fish culture and other types of aquaculture practices.

Indian National Center for Ocean Information Services (INCOIS), Hyderabad for installation of electronic display board for dissemination of information on potential fishing zones (PFZ) and weather warnings to fishermen of Versova.

Indian Institute of Technology, (B), Mumbai through implementation of a course on "Entrepreneural Opportunities in Fisheries" for students of IIT, Mumbai through a series of 15 lectures by CIFE faculty.

Satellite Application Centre, Ahmedabad in the utilization of OCEANSAT II.

9. Publications



9.1 Research Articles in Refereed Journals

Ashaletha, S. and Immanuel, S., 2008. Scope of ethno fisheries and sustainable marine fisheries management in India. *Indian J. Traditional Knowl.*, 7(2): 226-232.

Bag, M. R., Makesh, M., Rajendran, K. V., Mukherjee, S. C., 2009. Characterization of IgM of Indian major carps and their cross-reactivity with anti-fish IgM antibodies. *Fish Shellfish Immunol.*, 26: 275-278.

Balasubramanian, A., Chakraborty, S. K., Venkateshvaran, K., Meenakumari, B., Boopendranath, M. R. and Pravin, P., 2008. Certain biological aspects of *Carangoides ferdau* (Forsskal, 1775) and *Scomberoides lysan (*Forsskal, 1775) caught from drift gillnets off Kanyakumari coast. *Fishery Technol.*, 45(2): 155-162.

Bose Dasgupta, S., Das, B. B., Sengupta, S., Ganguly, A. Roy, A. Dey, S., Tripathi, G., Dinda, B., Majumder, H. K., 2008. The caspase-independent algorithm of programmed cell death in *Leishmania* induced by baicalein: the role of LdEndoG, LdFEN-1 and LdTatD as a DNA degradesome. *Cell death differentiation*, 15(10): 1629-1640.

Chakraborty, S. K., Biradar, R. S., Jaiswar, A. K. and Palaniswamy. R., 2009. Growth, mortality and yield per recruit of *Johnieops vogleri* (Bleeker) from Mumbai waters. *Fishery Technol.*, 46(1): 1-6.

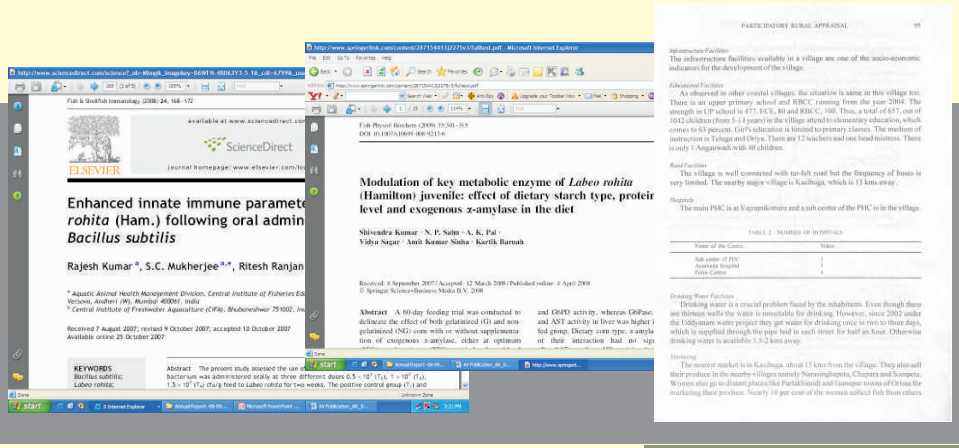
Chakraborty, T., Babu, P. G., and Chaudhari, A.,2008. GFP expressing bacterial biosensor to measure lead contamination in aquatic environment. *Curr. Sci.*, 94: 800-805.

Das Gupta, S. B., Das, B. B., Sengupta, S., Ganguly, A., Roy, A., Tripathi, G. and Majumdar, H. K., 2008. Amino acid 39-456 of the large subunit 210-262 of the small sub unit constitute the minimal functionally interacting fragments of the unusual heterodimeric topoisomerase IB of *Leishmania*. *Biochemical J.*, 409: 481-489.

Das, T., Pal, A. K., Chakraborty, S. K., Manush, S. M., Dalvi, R. S., Apte, S. K., Sahu, N. P. and Baruah, K., 2009. Biochemical and stress responses of *Labeo rohita* (Hamilton) and *Cirrhinus mrigala* (Hamilton) in relation to acclimation temperatures. *J. Fish Biol.*, 74: 1487–1498.

Datta, S. N., Chakraborty, S. K., Jaiswar, A. K. and Saker, Y., 2009. Plankton dynamics in coastal waters of NCPA, Mumbai, India. *Environ. Ecol.*, 27(1): 190-195.

Datta, S. N., Chakraborty, S. K., Jaiswar, A. K. and Venkateshvaran, K., 2008.



Temporal and spatial differences in relation to species diversity in the intertidal region of South Mumbai. *J. Mar. Biol. Assoc. India*, 50(1): 29-37.

Dubey, D., Parashar, A. and Somdutt, 2008. Length weight relationship and condition factor of Indian Major Carps wiz. *Catla catla, Labeo rohita* and *Cirhinus mrigala* in a rearing pond. *Indian J. Appl. Pure Biol.*, 23(2): 375-378.

Gupta, S. K., Pal, A. K., Sahu, N. P., Dalvi, R., Kumar, V and Mukherjee, S. C. 2008. Microbial levan in the diet of *Labeo rohita* (Hamilton) juveniles: Effect on non-specific immunity and histopathological changes after challenge with *Aeromonas hydrophilla*. *J. Fish Dis.*, 31: 649-657.

Immanuel, S. and Rao, G. S., 2008. Profile of a fishing community in Andhra Pradesh. *Social action*, 58(1): 49-58.

Immanuel, S., 2008. Adoption of oyster culture by women in Kerala. *Fishery Technol.*, 45(2): 237-242.

Immanuel, S., NarayanaKumar, R. and Ayyappan, S., 2008. Sustainable alternate livelihood avocations for coastal women in India. *Agric. Situation*, 66(2): 83-88.

Kanagarajan, U., Bragadeeswaran, S. and Venkateshvaran, K., 2008. Some toxinological aspects of starfish *Stellaster equestris* (Retzius). *J. Venom. Anim. Toxins Incl. Trop. Dis.*, 14: 435-449.

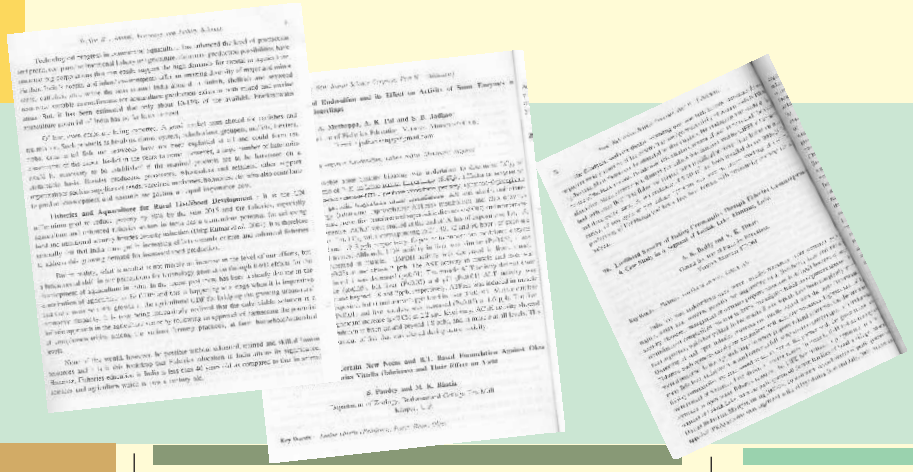
Karanth, S., Sharma, P., Pal, A. K., Venkateshwarlu, G., 2009. Effect of different vegetable oils on growth and fatty acid profile of rohu (*Labeo rohita*, Hamilton); evaluation of a return fish oil diet to restore human cardio-protective fatty acids. *Asian Austral. J. Anim. Sci.*, 22(4): 565-575.

Kithsiri, H. M. P. and Venkateshwarlu, G., 2008. Evaluation of potential use of feeder guppies as a source of highly unsaturated fatty acids for high value fishes. *Sri Lanka J. Aquat. Sci.*, 13: 51-62.

Kumar, N. R., N. K. Pandey and Rana, R. K., 2008. Production and marketing of potato in Banskantha District of Gujarat, *Indian J. Agric. Marketing*, 22(1): 99-110.

Kumar, N. R., Rai, A. B. and Rai, M., 2008. Export of cucumber and gherkins from India: Performance, destinations, competitiveness and determinants, *Agric. Econ. Res.*, 21(1): 551-562.

Kumar, R., Mukherjee, S. C., Ranjan, R. and Nayak, S. K., 2008. Enhanced innate immune parameters in *Labeo rohita* (Ham.) following oral administration of *Bacillus subtilis*. *Fish Shellfish*



Immunol., 24(2): 168-172.

Kumar, S., Sahu, N. P., Pal, A. K., Sagar, V., Sinha, A. K. and Baruah, K., 2008. Modulation of key metabolic enzyme of *Labeo rohita* (Hamilton) juvenile: Effect of dietary starch type, protein level and exogenous α-amylase in the diet. *Fish Physiol. Biochem.*, 35(2): 301-315.

Kumar, V., Sahu, N. P., Pal, A. K., Kumar, S., Gupta, S. K., 2008. Gelatinized to non-gelatinized starch ratio in the diet of *Labeo rohita*: effect on digestive and metabolic response and on growth. *J. Anim. Physiol. Anim. Nutr.*, 92: 492-501.

Kumar, V., Sahu, N. P., Pal, A. K., Kumar, S., Sharma, P., Chettri, J. K., Sinha, A. K.. 2008. Non-gelatinized starch influences the deposition of n-3 fatty acids in the muscle of a tropical fresh water fish *Labeo rohita*. *J. Anim. Physiol. Anim. Nutr.*, DOI: 10.1111/j.1439-0396.2008.00853.x.

Majumdar, R. K., Nayak, B. B., and Basu, S., 2008. Involvement of *Bacillus licheniformis* and *Micrococcus kristinae* during ripening of salt fermented Indian Shad (*Tenualosa ilisha*). *J. Aquat. Food Products Technol.*, 17(4): 423-440.

Mookherjee, B. J., Mookherjee, A., Banerjee, R., Saha, M., Singh, S., Naskar, K., Tripathi, G., Sinha, P. K., Pandey, K., Sundar, S., Bimal, S., Das, P. K., Choudhuri, S. K. and Roy, S., 2008. Inhibition of ABC transporters abolishes Antimony resistance in *Leishmania* infection. *J. Antimicrob. Agents Chemot.*, 52(3): 1080-1093.

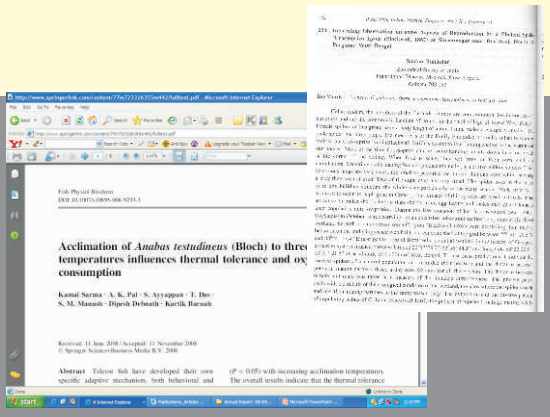
Pandey, B. D., Yeragi, S. G., Reddy, A. K. and Hagiwara, A., 2008. Life strategies and aquacultural usability of hypersaline ciliate, *Fabrea salina*. *Curr. Sci.*, 94(3): 307-309.

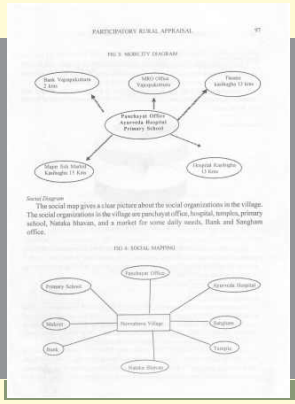
Pandit, A., Kumar, A., Rana, R. K., Pandey, N. K. and Kumar, N. R., 2008. A comparative socio-economic analysis of potato cultivation under irrigated and rain-fed agriculture of Himachal Pradesh, *Indian J. Agric. Econ.*, 63(3): 537-538.

Prasad, U., Singh, S. D. Deshmukhe, G. and Dwivedi, A. 2009. Genetic variation among *Ulva* species along the Maharashtra coast, *Indian J. Mar. Sci.*, 38: 52-55.

Samanta, A. K., Singh, K. K., Das, M. M., Pailan, G. H. and Rai, S., 2008. Description of goat rumen anaerobic fungi and their potentiality as probiotic. *Indian Vet. J.*, 85(8): 859-863.

Sardar, P., 2008. Effect of different diets and feeding methods on the growth performance and body composition of





carps and giant freshwater prawn under polyculture system. *J. Inland Fish. Soc. India*, 40: 46-53.

Sardar, P., Abid, M., Randhawa, H. S. and Prabhakar, S. K., 2009. Effect of dietary lysine and methionine supplementation on growth, nutrient utilization, carcass composition and haematobiochemical status in Indian Major Carp, Rohu (*Labeo rohita* H.) fed soy protein based diet. *Aquacult. Nutr.*, 15(4): 339-346.

Sardar, P., Kumar, R., Datta, S., Sinha, A., Das, R. C. and Patra, P. K., 2008. Assessment of production potential and nutritional status of Indian major carps and giant freshwater prawn under polyculture system in relation to feeds and feeding methods. *Environ. Ecol.*, 26(2): 632-636.

Sarma, K., Pal, A. K., Ayyappan, S., Das, T., Manush, S. M., Debnath, D., Baruah, K., 2008. Acclimation of *Anabas testudineus* (Bloch) to three test temperatures influences thermal tolerance and oxygen consumption. *Fish Physiol. Biochem.*, DOI: 10.1007/s10695-008-9293-3.

Sarma, K., Pal, A. K., Sahu, N. P., Ayyappan, S. and Baruah, K., 2009. Dietary high protein and vitamin C mitigates endosulfan toxicity in the Spotted Murrel, *Channa punctatus* (Bloch, 1793). *Sci. Total Environ.*, 407(12): 3668-3673.

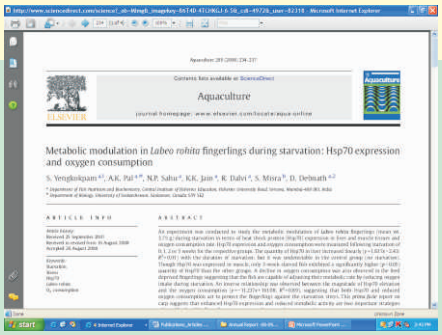
Sharma, R., 2008. Chromosomal studies on two endangered catfishes – *Ompok bimaculatus* (Bloch) and *Ompok pabda* (Hamilton-Buchanan). *Indian J. Anim. Sci.*, 78(2): 102-104.

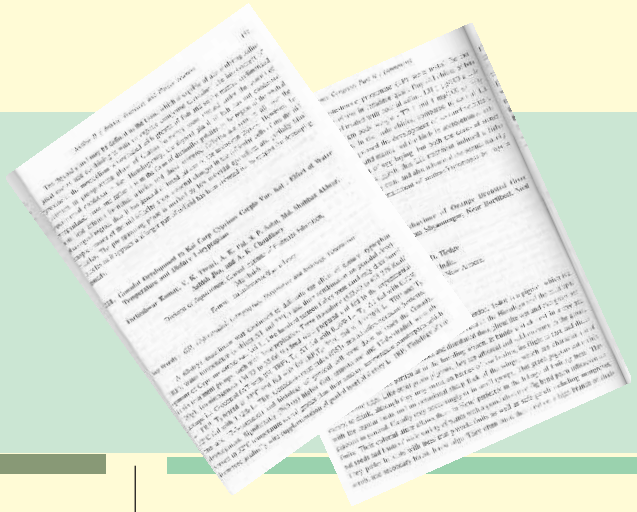
Sukumaran, K., Pal, A. K., Sahu, N. P., Dalvi, R., Debnath, D., 2008. Haemato-biochemical responses and induction of Hsp70 to dietary phosphorus in *Catla catla* (Hamilton) fingerlings. *Fish Physiol. Biochem.*, 34(4): 299-306.

Sukumaran, K., Pal, A. K., Sahu, N. P., Debnath, D., 2009. Phosphorus requirement of Catla (*Catla catla* Hamilton) fingerlings based on growth, whole body phosphorus concentration and non-fecal phosphorus excretion, *Aquacult. Res.*, 40: 139-147.

Tejpal, C. S., Pal, A. K., Sahu N. P., Jha, A. K., Muthappa, N. A., Sagar, V. and Rajan, M. G., 2008. Dietary supplementation of L-tryptophan mitigates crowding stress and augments the growth in *Cirrhinus mrigala* fingerlings. *Aquaculture*, DOI: 10.1016/j.aquaculture. 2008.09.014.

Vartak, V. R., Lakra, W. S., Chaudhari, A. and Mukherjee, S. C., 2008. Genetic characterization of portunid crabs





Scylla serrata and *Scylla tranquebarica* from the west coast of India using random amplified polymorphic DNA markers. *Asian Fish. Sci.*, 21: 275-284.

Yengkokpam, S., Pal, A. K., Sahu, N. P., Jain, K. K., Dalvi, R., Misra, S., Debnath, D., 2008. Metabolic modulation in *Labeo rohita* fingerlings during starvation: Hsp70 expression and oxygen consumption, *Aquaculture*, DOI: 10.1016/j.aquaculture.2008.08.034.

9.2 Popular Articles

Das, M. M., Singh, K. K., Maity, S. B. and Pailan, G. H., 2008. Management of summer stress for milk production and reproduction in dairy animals. Indian Dairyman, 60: 5.

Kakoti, B. K., Sharma, R., Chakraborty, R. and Pal, S., 2007. The Winter Migratory Bag Net Fishery of West Bengal, India. INFOFISH International, 6: 60-63.

Langer, R. K., Kohli, M. P. S., Dube, K. and Chandraprakash, 2008. *Gobindsagar Jalashay mein Aquaculture Takneek dwara fry se fingerling jalkrishi - ek adhyayan. In: Uttar Parvateeya Rajyon mein matsya vividhata: Sanrakshan evam Prabandhan.* pp. 319-320.

Mukherjee, S. C., 2008. Health Management in Aquaculture through Application of Biotechnology. Fishing chimes, 28(6): 34-36.

Narasimhacharyulu, V., Venugopal, G., Patnaik, R. R. S. and Rao, P. S., 2008, *Scampi royal pempakam lo Neeti yajamanyam. Agrigold Swarna* Sedyam, October, 36-38.

Patnaik, R. R., Venugopal, G., Reddy, P. R. and Narasimhacharyulu, V., 2008. *Scampi royyala nursery yahjamanyam*. Aquastar, September, 7-9.

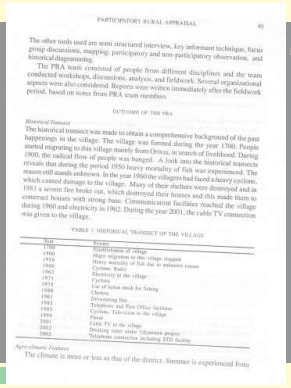
Singh, S. D., Nayak, S. K., Sekar, M. and Behera, B. K., 2008. Applications of Nutritional Biotechnology in Aquaculture. Aquaculture Asia, XIII(4): 17-23.

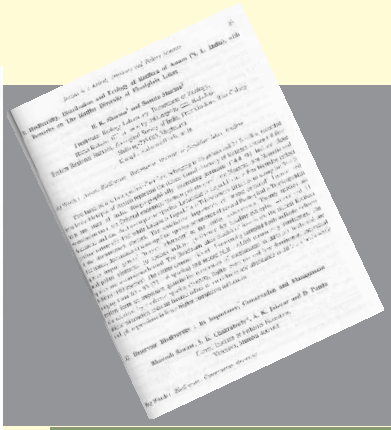
Sinha, A., 2008. *Rangin machhkliyon ke palan ke liye aquarium banayen*. *Jalchari*, 5: 29-34.

Fielder, S., Raizada, S. and Chadha, N. K., 2009. India's 'fish-out-of groundwater' story. Partners in research for development, Australia, November 2008 - February 2009: 14-16.

Venugopal, G., Prasad, J. K., Reddy, K. R. K. and Patnaik, R. R. S., 2008. *Maarpu chepalao prerita prajananamu*. Aquastar, June, 6-8.

Venugopal, G., Muralimohan, K., Rao, P. S., Narasimhacharyulu, V. and Patnaik, R.





R. S., 2008. *Uppuneeti Royya kshetralalo Matti Mariyu neeti Yaajamanyam*. Aquatech, September, 46-48.

Venugopal, G., Narasimhacharyulu, V., Patnaik, R. R. and Muralimohan, K., 2008. Soil and water quality management in brackishwater centres. Aquastar, September, 45.

9.3 Abstracts/Presentations in Conferences/Symposia/Seminars/Workshops etc.

Babu, P. G., Krishnan, P., Sivasubbu, S. and Chaudhari, A. 2009. Putative zebrafish *gadd45*α promoter responsive to genotoxins. *In*: Proc. 96th Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, pp. 118-119.

Bajpai, G. and S. D. Singh, 2008. Biotechnological Strategy to enhance human health beneficial omega- 3 Highly Unsaturated Fatty Acids in fishes. *In*: Proc. 138th Annual Meeting, 17-21 August 2008, American Fisheries Society, Ottawa, Canada.

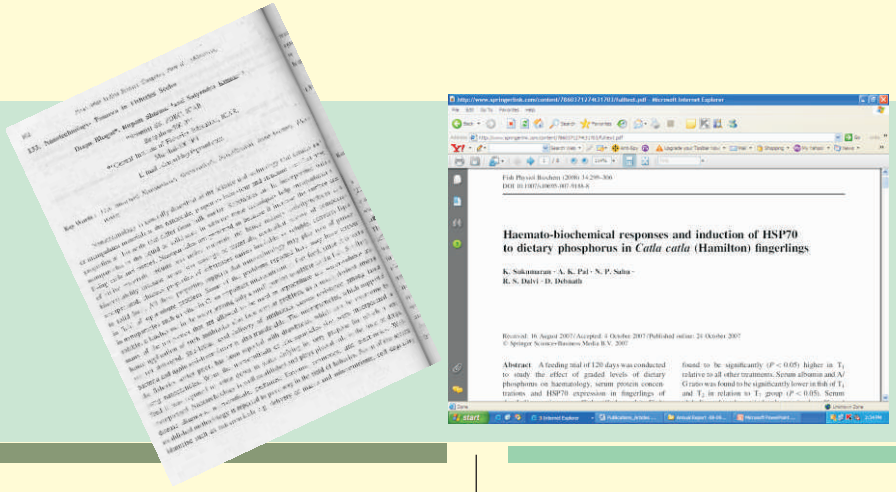
Bhagat, D., Sharma, R. and Kumar, S., 2009. Nanotechnology- Panacea in Fisheries Sector. *In*: Proc. 96th Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, p. 102.

Biradar, R. S. and Kumar, D., 2009. Human Resources Development in Aquaculture. *In:* Indaqua souvenior, 2009, Marine Products Export Development Authority, 21-23 January 2009, Bhubaneswar, pp. 93-98.

Chaudhari, A., Alam, A., Priyadarshi, H., Ahmed, I. and Babu, P. G., 2009. Genome integrated fluorescent bacterial mercury biosensor. In: Book of Abstracts - International conference on Fluorescence in Biology, 16-19 March 2009, TIFR, Mumbai, p. 98.

Datta, S. N., Chakraborty, S. K. and Jaiswar, A. K., 2009. Plankton dynamics in coastal waters off Mumbai, India. *In*: Proc. 96th Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, pp.10-11.

Deshmukhe, G., Dwivedi, A., and Chakraborty, S. K., 2009. Changes in the marine algal canopy of Maharashtrs coast – an effect of environmental changes. *In*: Proc. 96th



Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, pp. 59-60.

Dev, T. and Sharma, A., 2008. Swayam Seva Samuh Evam Matsiki Mahilaye. *In:* Book of Abstracts - *National Seminar on Machuara Kendrit Matsya Sansadhan Prabhandh, Central Institute of Fisheries Education Evam Dept. of Fisheries, Ranchi, Pashu Chikitsalaya Evam Pashupalan Mahavidhyalay, Birsa Krishi Vishva Vidhyalaya, Ranchi.*

Ghatge, S. S., Biradar, R. S. and Kumar, L., 2009. Thematic mapping of infrastructural facilities in Greater Mumbai region. Geomatrix 09, CSRE, Indian Institute of Technology, Mumbai, p. 86.

Krishna, G. and Kohli, M. P. S., 2009. A review of the Fisheries Education Programs under ICAR. *In*: Proc. 96th Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, pp. 3-5.

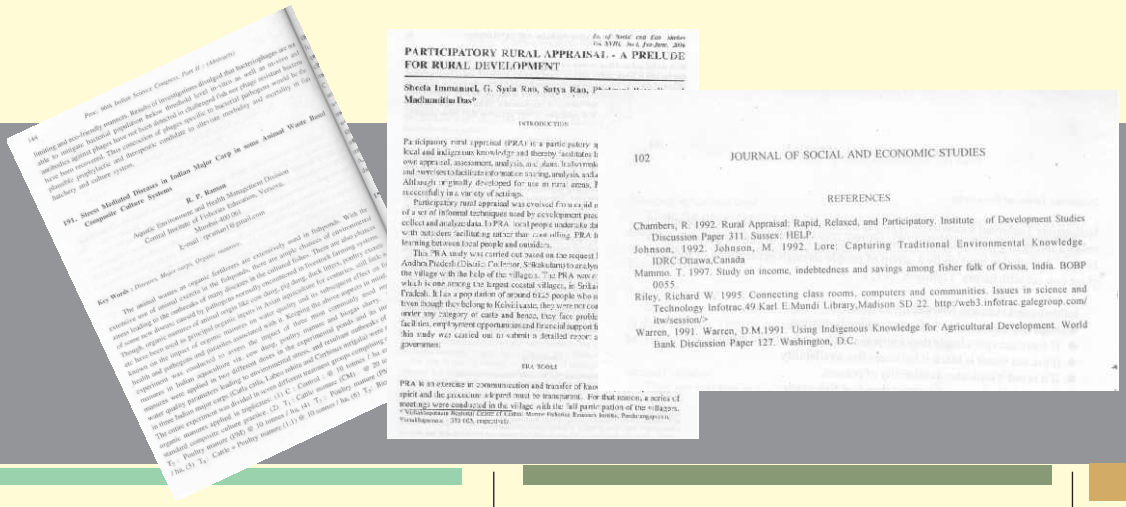
Krishnan, P., Babu, P. G., Makesh, M. Rajendran, K. V. and Chaudhari, A., 2009. Double stranded DNA synthesized in vivo suppresses WSSV in shrimp through RNA interference. *In*: Proc. 96th Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, pp. 119-120.

Kumar, D. and Biradar, R. S., 2008. Harmonising supporting policies crucial for sustainable resource management. *In*: Asia-Pacific Fisheries Committee meeting, Manado, Indonesia, 06-09 August 2008.

Kumar, D. and Biradar, R. S., 2009. HRD in Fisheries. Paper presented at the National Seminar on Marine Fisheries and Fisheries Harbour Infrastructure, 08 February 2009, Fisheries Survey of India, Mumbai.

Kumar, D., Biradar, R. S., Sharma, A. and Ananthan, P. S., 2009. Aquacultural extension in India – Need for a paradigm shift. Souvenir article, Assam Matsya Mahotsav, 2009, 28-30 January 2009, Department of Fisheries, Assam, pp. 1-5.

Kumar, R., Mukherjee, S. C. and Ranjan, R., 2008. Changes in haematological and serum parameters following *Bacillus subtilis* administration in *Catla catla*.



In: Book of Abstracts - 8th Indian Fisheries Forum, CIFRI, Barrackpore, 22-26 November 2008, Asian Fisheries Society (Indian Branch) and Inland Fisheries Society of India, Kolkata.

Kumar, S., Purushothaman, C. S., Venugopal, G., Muralimohan, K. and Jahageerdar, S., 2009. Genetic variation in mineral contents of muscle tissue of *Penaeus monodon*. *In*: Proc. 96th Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, pp. 114-115.

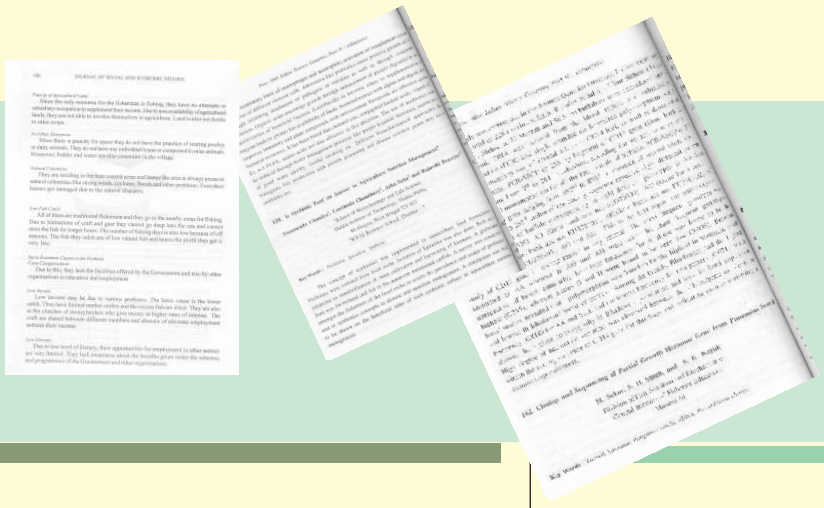
Kumar, T., Tiwari, V. K., Pal, A. K., Sahu, N. P., Akhtar, M. S., Jha, A. and Choudhary, A. K., 2009. Gonadal development in Koi carp *Cyprinus carpio* Var. Koi: Effect of water temperature and dietary L-tryptophan. *In*: Proc. 96th Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, pp. 167-168.

Makesh, M., Rajendran, K. V. and Tripathi, G., 2009. Cloning and Expression of the capsid protein gene of *Macrobrachium rosenbergii* nodavirus. *In*: Proc. 96th Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, pp. 147-148.

Metar, S. Y., Chakraborty, S. K., Jaiswar, A. K., Palaniswamy, R. and Telvekar, P. A., 2009. Studies on growth and stock assessment of *Saurida undosquamis* (Richardson, 1848) from Mumbai coast, India. *In*: Proc. 96th Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, p. 17.

Mishra, S. K., Ojha, S.N., Sharma, A. and Das, L., 2008. Framework for improving the effectiveness of Non-Governmental Organizations (NGOs) in fisheries development. *In:* Book of Abstracts - National Seminar on Innovative Extension Strategies for Agricultural Development and Rural Prosperity, 18-20 December 2008, RAU, Pusa, Sasmastipur, Bihar.

Mishra, S.K., Ojha, S. N. and Das, L., 2008. Fisheries co-management: A participatory approach for sustainable fisheries development. *In*: Book of Abstracts - National Seminar on Innovative Extension Strategies for Agricultural Development and Rural Prosperity, 18-20 December, 2008, RAU, Pusa, Sasmastipur, Bihar.



Misra, S., Sanil, N. K., Mukherjee, S. C. and Rajendran, K. V., 2008. Characterization of a myxozoan infecting freshwater fish, *Labeo rohita* (Hamilton). *In*: Proc. 96th Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, p. 136.

Mukherjee, S. C. Status of research on bacterial and viral diseases of fish. *In:* Special Symposia, 8th Indian Fisheries Forum, CIFRI, Barrackpore, 22-26 November 2008, Asian Fisheries Society (Indian Branch) and Inland Fisheries Society of India, Kolkata.

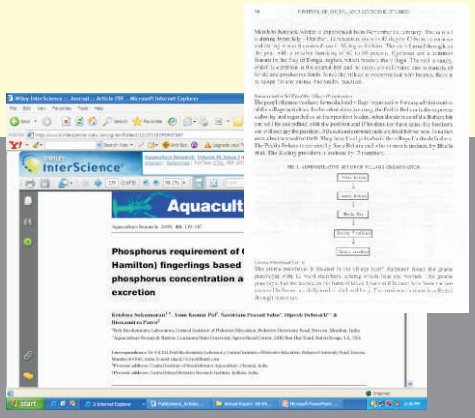
Muthappa, N. A., Pal, A. K. and Jadhao, S. B., 2009. Acute toxicity of endosulfan and its effect on activity of some enzymes in *L. rohita* fingerlings. *In*: Proc. 96th Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, p. 214.

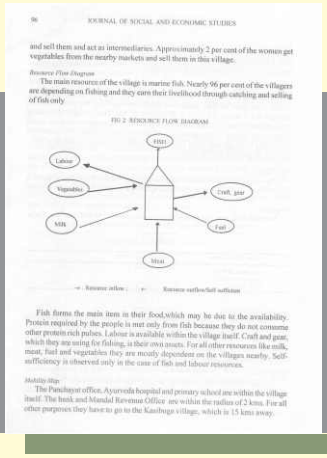
Narayanam, P., Biradar, R. S. and Pandey, S. K., 2008. Marketing of low-value fish and scope for value-added fish products in Thane district of Maharashtra. *In*: Book of Abstracts - 8th Indian Fisheries Forum, CIFRI, Barrackpore, 22-26 November 2008, Asian Fisheries Society (Indian Branch) and Inland Fisheries Society of India, Kolkata, p. 164.

Purushothaman, C. S. and P. K. Pandey., 2009. Microbial extremophiles associated with aquatic environments. *In*: Proc. 96th Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, pp. 34-35.

Raizada, S., Harikrishna, V., Sharma, V. K., Purushothaman, C. S., Venugopal, G., Maheshwari, U. K., Kumar, R., Rahman, M., Hasan, J. and Kumar, A., 2009. Commercial farming of tiger shrimp *(Penaeus monodon)* in inland saline water. *In*: Proc. 96th Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, pp. 85-86.

Raizada, S., Rahman, M., Kumar, R., Harikrishna, V., Sharma, V. K., Purushothaman, C. S., Maheshwari, U. K., Hasan, J. and Kumar, A., 2009. Survival and growth of tiger shrimp *(Penaeus monodon)* in different salinity inland sub-surface water with and without potassium





supplementation. *In*: Proc. 96th Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, pp. 87-88.

Raizada, S., Sharma, V. K., Mahehswari, U. K. and Harikrishna, V., 2008. Mitigating inland salinity problems through aquaculture. *In*: Book of Abstracts - 22nd National Symposium on Recent Advances in Zoological Sciences: Application to Agriculture, Environment and Human Health, 06-07 November 2008, PAU, Ludhiana.

Raman, R. P. and Brahmchari, R. K., 2008. Environmental stress induced diseases in Indian major carps associated with high levels of organic manuring. *In*: Book of Abstracts - 8th Indian Fisheries Forum, CIFRI, Barrackpore, 22-26 November 2008, Asian Fisheries Society (Indian Branch) and Inland Fisheries Society of India, Kolkata.

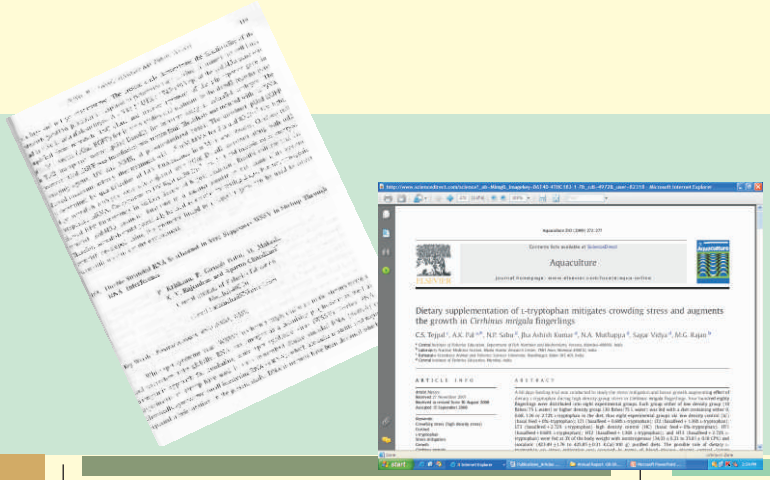
Raman, R. P., 2009. Stress mediated diseases in Indian major carp in some animal waste based composite culture systems. *In*: Proc. 96th Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, pp. 144-145.

Rani, B. A. M., Basavraju, Y., Kumar, P. and Jahageerdar, S., 2009. Growth models in three stocks of *Cyprinus carpio*. *In*: Proc. 96th Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, p. 83.

Reddy, A. K and Tiwari, V. K., 2009. Livelihood security of fishing communities through fisheries comangement- A case study in a segment of Loktak lake, Manipur, India. *In*: Proc. 96th Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, pp. 72-73.

Saharan, N., Dube, K., Srivastava, P. P. and Chandraprakash, 2008. Impact of Pyrethroid toxicity on ecosystem parameters and efficacy of Ascorbic acid in its amelioration. *In*: Book of Abstracts - 8th Indian Fisheries Forum, CIFRI, Barrackpore, 22-26 November 2008, Asian Fisheries Society (Indian Branch) and Inland Fisheries Society of India, Kolkata.

Sajina, A. M., Chakraborty, S. K., Jaiswar, A. K. and Deepa, S., 2009. Morphometric variation of Indian mackerel along the west coast of India. *In*: Proc. 96th



Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, pp. 20-21.

Sawant, B., Chakraborty, S. K., Jaiswar, A. K. and Panda, D., 2009. Reservoir biodiversity: Its importance, conservation and management. *In*: Proc. 96th Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, pp. 23-24.

Sekar, M., Singh, S. D. and Nayak, S. K., 2009. Cloning and sequencing of partial growth hormone gene from *Pangasius sutchi*. *In*: Proc. 96th Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, pp. 124-125.

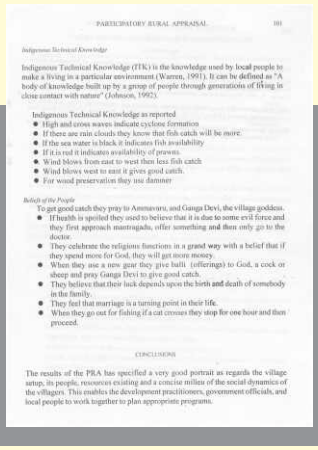
Sharma, A., 2008. Quantitative Analysis of US & EPO patents as per selected IPC codes relevant to fisheries sector – A Case from Commercial Database. *In*: Proc. 96th Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, pp. 52-53.

Sharma, R., Kumar, D., Kumar, S. Durai, R. and Bhagat, D., 2009. Pheromones and its role in Fisheries. *In*: Proc. 96th Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, pp. 191-192.

Singh, R. and Pandey, P. K., 2008. *Bhougalik Suchana Tantra (GIS) ke madhyam se Maharashtra rajya ke tatiya matsyiki sansadhanon ka adhyayan. In:* Book of Abstracts - *National Seminar on Machhuara Kendrit Matsya Sansadhan Prabandhan. Central Institute of Fisheries Education Evam Dept. of Fisheries, Ranchi, Pashu Chikitsalaya Evam Pashupalan Mahavidhyalay, Virsa Krishi Vidhva Vidhyalaya,* Ranchi, p. 69.

Singh, R., Pandey, P. K. and Ram, N., 2009. Geospatial mapping of fisheries profile of Andaman Nicobar Islands of India through GIS. *In*: Proc. 96th Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, pp. 25-26.

Singh, R., Sharma, R., Sharma, A., Salim, S.



S., Pandey, P. K. and Biradar, R. S., 2008, Embedding GIS Application into Geospatial Mapping of Shrimp Farming to Coastal Locations in India. Paper presented *In:* XXVIII[th] INCA International Congress, Space Application Centre, ISRO, Ahmedabad, 04-06 November 2008.

Singh, S. D., Kishor, B., Khan, M. A., Suman, S. K. and Singh, R. K. 2008. Studies on edible muscle protein polymorphism in Asian Seabass of Indian coasts by SDS-PAGE. *In*: Book of Abstracts - 8[th] Indian Fisheries Forum, CIFRI, Barrackpore, 22-26 November 2008, Asian Fisheries Society (Indian Branch) and Inland Fisheries Society of India, Kolkata.

Singh, S. D., Kishor, B., Khan, M. A., Suman, S. K. and Singh, R. K. 2008. Studies of Seasonal variation in Hydro Biological Parameters of Indian coastal waters. *In*: Book of Abstracts - 8[th] Indian Fisheries Forum, CIFRI, Barrackpore, 22-26 November 2008, Asian Fisheries Society (Indian Branch) and Inland Fisheries Society of India, Kolkata.

Somdutt and Upadhyay, R. K., 2009. A case study on culture of *Macrobrachium rosenbergii* in relation to environmental suitability in Madhya Pradesh. *In*: Proc. 96[th] Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, p. 84-85.

Somdutt, 2008. Ghatia matsya beej sanchay ke dusprabhav. *In: National Seminar on Uttar Bihar ke Jal sroton ke upyog evam matsya utpadan,* West Champaran, Bihar, 31 October to 1 November 2008.

Tripathi, G., Makesh, M. and Mukherjee, S. C., 2008. Sequential ultrastructural changes of the pancreas in acute aflatoxicosis in rohu (*Labeo rohita*). *In*: Book of Abstracts - 8[th] Indian Fisheries Forum, CIFRI, Barrackpore, 22-26 November 2008, Asian Fisheries Society (Indian Branch) and Inland Fisheries Society of India, Kolkata.

Vennila, A., Verma, A. K. and Purushothaman, C. S., 2009. A study on seepage management in salt-affected soils for aquaculture. *In*: Proc. 96[th] Indian Science Congress, Part II - Animal, Veterinary and Fisheries Sciences, North Eastern Hill University, Shillong, 03-07 January 2009, Indian Science Congress Association, Kolkata, p. 97.

9.4 Training Manuals

CIFE, 2008. Nutritional Biotechnology for Qualitative and Quantitative Enhancement of Food Fishes. Training

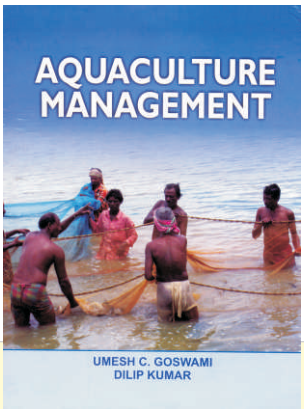
Manual, Center for Advanced Studies in Fishery Sciences, Central Institute of Fisheries Education, Mumbai, 202 pp.

CIFE, 2009. Alternative Aquaculture Technologies in the Context of the Present Aquaculture Scenario. Training Manual, Center for Advanced Studies in Fishery Sciences, Central Institute of Fisheries Education, Mumbai, 177pp.

CIFE, 2009. Recombinant DNA Technology: Ideas to Products. Training Manual, Center for Advanced Studies in Fishery Sciences, Central Institute of Fisheries Education, Mumbai, 217 pp.

CIFE, 2009. Seafood Microbiology and Quality Control. Training Manual, Center for Advanced Studies in Fishery Sciences, Central Institute of Fisheries Education, Mumbai, 160 pp.

CIFE, 2009. Genome and Protein based Techniques in Aquatic Animal Health Management. Training Manual, Winter School, Central Institute of Fisheries Education, Mumbai, 202 pp.



9.6 Books/Technical bulletins/brochures

Goswami, U. C. and Kumar, D. (ed.), 2009. Aquaculture Management, Narendra Publishing House, New Delhi. 428 pp.

9.5 Book chapters

Chakraborty, S. K., Jaiswar, A. K. and Panda, D., 2008. An overview of world tuna fisheries. *In*: harvest and postharvest technology for tuna (ed. J. Joseph, R. Boopendranath, T. V. Shekhar, J. Charles and R. Kumar), Society of Fisheries Technologists, India. pp. 1-9.

Chandraprakash, Kohli, M. P. S., Raju, K. D. and Jaiswar, A. K., 2009. Environmental degradation of marine ecosystem and its effects on fisheries resources along Maharashtra coast. *In:* Aquaculture Management (ed. U. C. Goswami and D. Kumar), Narendra Publishing House, New Delhi. pp. 357-362.

Kumar, D., Munilkumar, S. and Rani, B., 2009. Concept of Best Management Practices for freshwater aquaculture in India. *In:* Aquaculture Management *(ed.* U. C. Yoswami and D. Kumar), Narendra Publishing House, New Delhi. pp. 1-6.

Kumar, D. and Sharma, R., 2008. Role of local communities in Biodiversity Conservation. *In:* Compendium on Biodiversity Awareness, Editor. pp. 17-21.

Sharma, A., 2008. Fisherwomen and Entrepreneurship. *In*: Empowerment of Women through Entrepreneurship (ed. L. Rathakrishnan), Gyan Publishing House, New Delhi. pp. 347-358.

10. Workshops, Seminars, Conferences, Meetings, Trainings, etc. participated

10.1 Workshops/Seminar/Conferences/Congresses

Programme	Period	Venue / Organized by	Participants
Fulbright Alumni Leaders and Fulbright Campus Representatives Workshop	March 31, 2009	United States- India Educational Foundation (Western Region), Mumbai	C.S. Purushothaman
Seminar on "Selective Breeding and its Application in Aquaculture"	March 29, 2009	ARTI, Hissar, Dept. of Fisheries Govt. of Haryana	V. K. Sharma
International Conference on "Fluorescence in Biology"	March 16-19, 2009	TIFR, Mumbai	A. Chaudhari Gireesh Babu
Workshop on "Recent Trends in Coastal and Marine Environment Research around Mumbai"	March 13, 2009	IIT, Mumbai	C.S. Purushothaman
Final workshop Of "Indo- NORAD project"	March 13, 2009	CIBA, Chennai	G. Venugopal
6th International "Biofuel Conference"	March 04-05, 2009	New Delhi	S. P. Shukla
Final Data Analysis workshop under the AKVAFORSK, (NOFIMA) project on "Genetic improvement of *P. monodon* for growth and white spot disease resistance"	Feb.,27-Mar., 3, 2009	CIFE, Mumbai	G. Venugopal Gopal Krishna S. Jahageerdar
FAO-NACSA workshop on "Good Aquaculture Practices"	Feb.,24-26, 2009	Kakinada	G. Venugopal
National Seminar on "Climate Change: Challenges and Mitigation"	Feb.,27-28, 2009	COYS, Kolkata	Archana Sinha B. K. Mahapatra G.H. Pailan Parimal Sardar P.K. Roy
4th National Seminar on "Status of Bio-Diversity & Conservation"	Feb.,27, 2009	Kangri Gurukula University, Haridwar	Dilip Kumar
Ninth Indian Veterinary Congress (IAAVR)	Feb.,20-21, 2009	Bombay Veterinary College, Mumbai	S. C. Mukherjee
ANA World Conference	Feb.,14-17,2009	NASC Complex New Delhi	A.K. Pal N.P. Sahu
International Symposium on "Marine Ecosystem Challenges and Opportunities"	Feb.,9-12, 2009	CMFRI, Kochi	Dilip Kumar

National Conference on 'Marine Fisheries and Fisheries Harbour Infrastructure"	Feb.,8, 2009	FSI, Mumbai	Sheela Immanuel
32nd Annual International Conference on "Astrology and Oriental Heritage"	Feb.,5, 2009	IIOH, Kolkata	Dilip Kumar Archana Sinha Parimal Sardar
Seminar on " Recent trends in Aquaculture"	Feb.,5, 2009	ARTI, Hissar	V. K. Sharma
Workshop on " NABARD Schemes for Fisheries"	Jan.,31, 2009	NABARD, Guwahati	V. K. Tiwari
Seminar on "Beel Fisheries Management"	Jan.,30, 2009	Guwahati	V. K. Tiwari
Assam Matsya Mahotsava	Jan.,28-30, 2009	Assam Fisheries Department, Guwahati	Dilip Kumar
National Workshop on "Strategy for achieving self sufficiency in Fish Seed Production of the State"	Jan., 23-24, 2009	Department of Fisheries, Jaipur	Dilip Kumar
"Fisheries Information System Network (FISHNET)"	Jan., 21, 2009	DAHD&F, New Delhi	Dilip Kumar
Workshop for DBT nominees and IBSC Members for strengthening regulatory compliance by IBSCs	Jan., 09, 2009	The Orchid Hotel, Mumbai	S. C. Mukherjee
96th Indian Science Congress	Jan., 3-7, 2009	N-E Hill University, Shillong	Dilip Kumar R.S. Biradar G. Venugopal S. D. Singh K. V. Rajendran K. K. Jain Gopal Krishna Archana Sinha B. K.Mahapatra G. K.Pailan V. K. Tiwari R. P. Raman Subhendu Dutta Rupam Sharma Parimal Sardar A. Vennila S. Jahageerdar P. K. Pandey K. Pani Prasad

Workshop on " Sustainable Livelihood Development through Fisheries and Aquaculture in NE Region of India"	Jan., 2, 2009	ICAR Complex Barapani	Dilip Kumar Gopal Krishna S. Jahageerdar V. K. Tiwari
Workshop on "Training Management"	Dec., 29 to Jan., 3, 2009	EEI, Anand, Gujarat	Somdutt S. K. Mishra
19th All India Zoology Congress and Seminar on "Biodiversity and Human Welfare"	Dec., 2-31, 2008	ZSI and Dept. of Zoology, Guwahati	Dilip Kumar S. Jahageerdar P. K. Pandey
The 9th All India Congress on Zoology	Dec., 29-31, 2008	ZSI, Guwahati	P. K. Pandey
All India Seminar on "Recent Trends In Processing And Marketing of Fishery And Horticulture Products"	Dec.,19-20, 2008	Institute of Engineers, Kolkata	Archana Sinha G.H. Pailan Subhendu Datta Parimal Sardar P. K. Roy B. K. Mishra
National Seminar on "Innovative Extension Strategies for Agricultural Development and Rural Prosperity"	Dec.,20, 2008	RAU, Bihar	Dilip Kumar
One day Workshop on "Innovative Approaches for Livelihood Development'	Dec.,19, 2008	Jaipur	P. S. Ananthan
Symposium of "All India Veterinary & Fishery Science Universities Association"	Dec.,19, 2008	MAFSU, Nagpur	C.S. Purushothaman
National Seminar on "Innovative Extension Strategies for Agricultural Development and Rural Prosperity"	Dec.,18-20, 2008	RAU, Pusa	S. K. Mishra
National Seminar on "Strategies for Strengthening of Veterinary Education and Practice Sectors".	Dec.,12-14, 2008	MRCRIHRD, Hyderabad	S. C. Mukherjee
National Seminar on "Recent Trends in Parasitology"	Dec.,11-12, 2008	Sree Narayana College, Kannur	K. V. Rajendran
Participatory Workshop on "NAIP project component on Reservoir Fisheries Development at Ratnagiri"	Dec.,10, 2008	College of Fisheries, Ratnagiri	Dilip Kumar C.S. Purushothaman
One day Workshop on Demonstration of "WSSV Rapid Detection Kit"	Dec.,3, 2008	CIFE, Kakinada	G. Venugopal S. S. H. Razvi

organized by M/S Himalaya India Ltd. Mumbai			M. Shakthivel
International Training Programme on "Genetic Upgradation of Carps through Selective Breeding and Biotechnology Roots"	Dec.,2, 2008	CIFA, Bhubaneswar	Dilip Kumar
The 8th "Indian Fisheries Forum"	Nov.,22-25, 2008	CICFRI, Kolkata	Dilip Kumar G. Venugopal Archana Sinha Somdutt Gopal Krishna A. K. Pal S. D. Singh C.S. Purushothaman K. Pani Prasad R. P. Raman B. B. Nayak B. K. Mahapatra Rupam Sharma Parimal Sardar
Seminar on "GC-MS & LC-MS"	Nov.,13, 2008	SID, Kolkata	Parimal Sardar
National Seminar on "Best Management Practices for Sustainable Freshwater Aquaculture" (BFNSA – 2008)	Nov.,12, 2008	Byrraju Foundation Bhimavaram, A.P	P. Rami Reddy
Workshop on "National Consultative meeting on Marine Fisheries policy" conducted by World Bank and Ministry of Agriculture	Nov.,6-7, 2008	Hyderabad	G. Venugopal
XXVIII INCA, International Congress	Nov.,4-6, 2008	Space Application Centre, Ahmedabad	Ram Singh
Seminar on "Utilization of Water Resources and Fish Production in North Bihar"	Oct.,31- Nov.,1, 2008	Bettiya, Bihar	V. K. Tiwari G. Venugopal
Workshop on "Fisheries Networking"	Oct.,29, 2008	DAHD&F, New Delhi	V. K. Sharma
Workshop on "PME Support for Consortia Based Research Project In Agriculture"	Oct.,21-25, 2008	NAARM, Hyderabad	V.K. Tiwari

32nd Conference of The Ethological Society and National Symposium on "Fish Behaviour"	Oct.,16-17, 2008	The Ethological Society,Bangalore and IFA, Mumbai	All members of the faculty, CIFE, Mumbai
Workshop on "Creation & Dissemination of Knowledge"	Oct.,15-17, 2008	NITTTR, Chandigarh	Archana Sinha
International Seminar on "Strategies for Improving Livelihood Security of Rural Poor"	Sept.,22-27, 2008	ICAR RC for Goa Goa	Dilip Kumar
Workshop on "Saline water Aquaculture & Training Camp"	Sept.,25, 2008	Katli Fish Farm, Ropar, Punjab	V. K. Sharma
Inception Workshop on "ITK in Fisheries Sector"	Sept.,19-20, 2008	NE RC of CIFRI, Guwahati and CIFE, Mumbai	Dilip Kumar R. S. Biradar S. Jahageerdar Arpita Sharma Rupam Sharma A. Suresh Babu
National Brain-storming Workshop on "Performance Assessment of Agricultural Universities"	Sept.,5-6, 2008	NAARM, Hyderabad	Dilip Kumar
Workshop on "Prospects of Murrel farming"	Sept.,6, 2008	NFDB, Hyderabad	G. Venugopal
Two days National Expert Consultation Conference on "Fisheries Lease Policy"	Sept., 4-5, 2008	Dept. of Fisheries Tamil Nadu	P. S. Ananthan
Workshop on "Farm Journalism for Extension functionaries"	Aug.,25-30, 2008	EEI, Anand Gujarat	S. N. Ojha P. S. Ananthan
Workshop on "Prospects of Asian Seabass Farming In India".	Aug., 29,2008	CIBA, Chennai	N. K. Chadha
DBT sponsored Workshop on "Idea Generation in Aquaculture Biotechnology"	Aug.,28-29, 2008	CIFE, Mumbai	All members of the faculty, CIFE, Mumbai
Workshop on "Academia-Industry Interfacing"	Aug.27, 2008	CIFE, Mumbai	All members of the faculty, CIFE, Mumbai
ILDEX International "Livestock, Meat Processing, Fishery and Dairy Expo 2008"	Aug.,23-24, 2008	Pragati Maidan New Delhi	S. C. Mukherjee

138th Annual Meet of "American Fisheries Society"	August 17-21, 2008	Ottawa, Canada	S. D. Singh
"Capacity Building Program for Enhancing the Competitiveness of Fisheries Sector"	Aug.,12-14, 2009	FISHCOPFED, New Delhi and CIFE, Mumbai	S. C. Mukherjee S. K. Mishra M. K. Chouksey
National Conference on Re-Builidng the Libraries "Learning from the past to plan for the Future"	Aug.,7-9 2008	Mahatma Gandhi Central Library Coimbatore	S. Natarajan
Workshop on "National Rural Employment Guarantee Act" (NREGA)	Aug.,1, 2008	New Delhi	R. S. Biradar
Workshop on "Accelerating Awareness About National Rural Employment Guarantee Act (NREGA) Through The Process Of Sensitization, Study And Capacity Building"	July 31- Aug.,1, 2008	New Delhi	S. C. Mukherjee
Participatory Workshop on "Course Restructuring of PGDIF in Fisheries Science (Broad Subject Matter Area:Fisheries)"	July 21-22, 2008	CIFE Kolkata Centre	Dilip Kumar Archana Sinha B. K. Mahapatra G. H. Pailan Subhendu Datta P. K. Roy B. N. Tiwari Parimal Sardar
Technical Workshop on "Advancing Self Sufficiency in Fish Production to 2010-11"	July 2, 2008	RSB, Agartala Govt. of Tripura	Dilip Kumar
ICAR Training- cum - Workshop on "IP and Technology Management- Theme - Drafting specification and claims"	June 10-12, 2008	ICAR and CIFE, Mumbai	N. K. Chadha Arpita Sharma S. K. Mishra
Workshop on "Facilitation of Enhanced Support of FAO to Government Programmes and Strengthening of Linkages between Government Agencies"	May 15-18, 2008	Nagarkot, Kathmandu, Nepal	Dilip Kumar
Workshop on "Leadership for Vice-Chancellors and Senior Level Educational Managers"	May 12 - 14, 2008	ASCI, Hyderabad	G. Venugopal
Workshop on "Ground Water Development in Waterlogged Areas of Canal Command"	May 13, 2008	CSSRI, Karnal	V. K. Sharma N. K. Chadha

Workshop on "Prospects of catfish and ornamental fish culture in Haryana"	May 12, 2008	ARTI, Hissar, Dept. of Fisheries, Govt. of Haryana	V. K. Sharma N. K. Chadha
Workshop on "Monitoring and Evaluation the NAIP projects"	May 9-10, 2008	NAARM, Hyderabad	V. K. Tiwari
Consultative Workshop on "Restructuring PG and Doctoral Programmes in Fisheries Science (Broad Subject Matter Area:Fisheries)"	April 16-17, 2008	CIFE, Mumbai.	All members of the faculty, CIFE, Mumbai
National Hindi Workshop on *"Machuara Kendrit Matsya Sansadhan Prabandhan"*	April 11-12, 2008	BAU, Ranchi	Dilip Kumar Archana Sinha C.S.Purushottaman V. K. Tiwari

10.2 Training Programmes/Summer schools/Winter schools

Programme	Period	Venue / Organized by	Participants
Master Class on "Impact Assessment"	Mar., 20-27, 2009	ICRISAT, Hyderabad	Nalini Ranjan Kumar
MDP on "Public-Private Partnership for Innovation in Agriculture as a part of L&CB Project"	Mar.,16-20, 2009	IIM, Lucknow	Swadesh Prakash
Training Programme on "Recent Advances in Sample Survey & Analysis of Survey Data"	Feb.,10-Mar.,2, 2009	IASRI, New Delhi	Swadesh Prakash
Training Programme on "Agricultural Extension"	Feb.,27-28, 2009	MOA, New Delhi	Sheela Immanuel P. S. Ananthan
Winter School on "Genome and Protein based Techniques In Aquatic Animal Health Management"	Feb.,2-22, 2009	CIFE, Mumbai	Hari Krishna
Training Programme on "Delivering High Quality Services in Guest House"	Feb.,20-21,2009	IIT, Mumbai	Suresh Kumar
DST sponsored Training Workshop on "Dimensions of Nanotechnology: Science, Technology, Business and Society"	Feb.,9-13, 2009	NAIS, Bangalore	Rupam Sharma
UGC sponsored Winter School on "College /University Teachers Training"	Jan.,5-25, 2009	Dept. of Zoology Allahabad University	S. D. Singh
Training on "Application of PRA Tools in Agricultural Extension"	Dec.,15-20, 2008	Extension Education Institute AAU, Anand, Gujarat	Somdutt
Training Program on "Application of Nanotechnology for Energy Applications"	Dec.,1-12,2008	IIT, Mumbai	Rupam Sharma
XXIV National Training Programme on "Electron Microscopy for Scientific Investigators"	Nov.,3 -18, 2008	AIIMS, New Delhi	Gayatri Tripathi
Training Programme on "Finance for Non-Finance Executives	Nov.,7-8, 2008	ASCI, Hyderabad	Suresh Kumar

Training Programme on "Intellectual Property Rights and Related WTO Issues"	Nov.,3-7, 2008	CUTS International, Jaipur	Arpita Sharma Babitha Rani
Programme on "IT Based Decision Support Systems, Multimedia Development"	Sept.,15-24, 2008	NAARM, Hyderabad	Rupam Sharma
Training Programme on "Enhancing Skills in ICT bases DSS for Market and Agri-business Orientation of Research, and Sustaining Rural Livelihoods"	Sept.,8-17, 2008	NAARM, Hyderabad	Swadesh Prakash
"Engineering Orientation Course of Fishery & Aquaculture Scientists, Officer & Teachers"	Sept.,2-12, 2008	IIT, Kharagpur	B. K. Mahapatra
Training Programme on "Protein Structure Prediction & Applications In Agriculture & Veterinary Sciences"	Sept.,9-11, 2008	GBPUAT, Pant Nagar	S. B. Jadhao
Management Development Programme On "Leadership For Innovation In Agriculture"	Sept.,1-5, 2008	IIM, Lucknow	R. S. Biradar
Refresher course on "Concepts, Priorities and Methodologies in Research Management"	Aug.,21- AARM, Sept.,10, 2008	Hisar	Hari Krishna S. P. Singh
Management Development Programme on "Leadership for Innovation in Agriculture"	Aug., 25-29, 2008	NAARM, Hyderabad	G. Venugopal A. K. Reddy
Training Programme on "Senior Level Managerial Skills for Agriculture & Extension Management"	Aug., 4-9, 2008	MANAGE, Hyderabad	V. K. Sharma
Programme on "General Management Programme for Senior Scientists"	July,28- Aug., 8, 2008	NAARM, Hyderabad	K. K. Jain
Training Programme on "Social Etiquette"	June 28, 2008	Soft Skill International Mumbai	Arpita Sharma
Training Programme on "SYSTAT"	May 26-27, 2008	CIFE, Mumbai	Shyam S. Salim
National Residential Convention on "Right to Information Act, 2005"	May 26-27, 2008	Mysore	S. S. Kochrekar Valsa Pavithran

Training Programme on "SPSS"	May 19-20, 2008	CIFE, Mumbai	Shyam S. Salim S. Munilkumar N. P. sahu A. Vennila S. Jahageerdar
"Educational Leadership for Vice-Chancellors and Senior Level Educational Managers"	May 12-14, 2008	ASCI, Hyderabad	R. S. Biradar C. S. Purushottaman G. Venugopal S. D. Singh
Short Term Training Course on "Engineering & Management in Fisheries and Aquaculture"	Apr., 29- May 19, 2008	IIT, Kharagpur	A. K. Verma
Training Programme on "Basic DNA Technologies"	Apr.,26, 2008	Institute of Life Sciences, Mumbai	Gayatri Tripathi
Training Workshop for Consortia Partners to familiarize with "Procurement Procedure of the World Bank"	Apr., 16-17, 2008	BAIF Development Foundation, Pune	R. S. Biradar Sunil Kumar T. Padmavati
CAS Training Programme on "Nutritional Biotechnology for Qualitative and Quantitative Enhancement in Food Fishes"	Mar.,31- Apr.,20, 2008	CIFE, Mumbai	Asha T. Landge
NAARM Off-Campus Specialized Training for CIFE Faculty	Mar.,31-CIFE, Mumbai Apr.,02, 2008		R. S. Biradar C. S. Purushothaman Gopal Krishna G. Venkateshwarlu S. K. Mishra A. Sharma S. P. Shukla A. Vennila

10.3 Brainstroming sessions/Awareness Camps/Farmers' meet

Programme	Period	Venue / Organized by	Participants
Brainstorming session on "Issues Concerning Exotic Aquatic Animals and Quarantine Practices and Trans-Boundary Movement of Aquatic Species'	Feb., 14-15, 2009	NBFGR, Lucknow	Dilip Kumar K. V. Rajendran
"Development of Surveillance Network for Cultured Aquatic Animals"	Feb., 14-15, 2009	NBFGR, Lucknow	Dilip Kumar K. V. Rajendran
"Awareness Camp for Conservation of Fisheries and Fish Ranching"	Oct., 26, 2008	Dadupur, Yamuna Nagar Haryana	V. K. Sharma
Brainstorming Workshop on "Identifying Research Needs for Controlling White Spot Syndrome Disease in Shrimp Aquaculture"	Oct., 17, 2008	CIBA, Chennai	K. V. Rajendran
Brainstorming Session on "Evaluating Research : Concepts, Tools And Analysis"	July 16, 2008	IIT, Mumbai	Arpita Sharma

10.4 Important meetings

Programme	Period	Venue / Organized by	Participants
Viva-voce of Masters and PhD courses	March 23, 2009	B.R. Ambedkar Bihar University, Muzaffarpur	Dilip Kumar
20th Institute Management Meeting of NBFGR, Lucknow	March 21, 2009	NBFGR, Lucknow	S. D. Singh
Meeting on "Development of A Cluster on Ornamental Fish Farming at Laxmikantapur, South 24 Parganas, West Bengal"	March 21, 2009	NABARD, Kolkata	Archana Sinha
Interdisciplinary Dialogue on "Attracting and Retaining Youth in Farming"	March, 14-16, 2009	M.S. Swaminathan Research Foundation, Chennai	Dilip Kumar
Meeting with Dr G. A. Nair, Visiting Professor, Department of Environmental Sciences, University of Kerala, Thiruvananthapuram,	12 March 2009	CIFE, Mumbai	C.S.Purushothaman

on the establishment of the South Asian Centre of Excellence in Aquatic Environments and Monitoring			
Final project meeting of Indo-Norwegian Collaborative NORAD Project "Genetic Improvement of *P. monodon* for disease and white spot disease resistance".	March, 11-12, 2009	CIBA, Chennai	Dilip Kumar Gopal Krishna S. Jahageerdar G. Venugopal
Meeting for reviewing the Academic Programme and strength of faculty	March 6-7, 2009	College of Fisheries, Dholi, RAU, Patna	Dilip Kumar
TIFAC meeting on "Strategies For Marketing of Value Added Aquatic Products from Small Scale Cottage Industries"	March 11, 2009	CIFE, Mumbai	B. B. Nayak
Meeting on" The Joint Project Proposal on Gene Mining for NAIP funding"	Feb.,28, 2009	IARI, New Delhi	A. Chaudhari
ICAR Out-reach activity on "Nutrient Profiling & Evaluation of Fish as a Dietary Component at CIFRI, Barrackpore"	Feb.,26-27, 2009	Fisheries Division ICAR, New Delhi	N. P. Sahu
Meeting with the Director of Fisheries and Principal Secretary	Feb., 18, 2009	Madhya Pradesh	Dilip Kumar
Vice Chancellor's Conference of Agricultural Universities	Feb., 16-17, 2009.	NASC Complex, New Delhi	Dilip Kumar
Meeting to develop national level project proposal to "Assess Harvest and Post Harvest Losses in Fisheries"	Feb., 13, 2009	CIFT, Kochi	B. B. Nayak
Interaction meeting for finalizing the course on "Fish Processing, Quality Assurance and Marketing"	Feb., 11, 2009	CIFE, Kolkata Centre	Archana Sinha G.H. Pailan Subhendu Dutta Parimal Sardar
Interactive meeting with Dr Vincenzo Zonno, regarding collaborative R&D opportunities in Seafood Industry, organized by Marine Aquaculture and Biological Research Centre, University of Salento (Italy)	Feb.,10, 2009	CIFE, Mumbai	C. S. Purushothaman

Launching programme of "National Mission on Education through Information & Communication Technology"	Feb., 3, 2009	SVU, Tirupathi, A.P.	G. Venugopal
Meeting of Microtron Advisory Committee	Feb., 2-3, 2009	Mangalore University Mangalore	A. K. Pal N. P. Sahu
Meeting of the Consortium Advisory Committee of the NAIP project "A value chain on fish production in fragile agricultural lands and unutilized agro-aquatic resources."	Jan., 27, 2009	CIFE, Mumbai	A. K. Reddy S. P. Shukla
Core Group Meeting of the Fisheries Division for Monitoring the Outcome of Foreign-Aided Projects	Jan., 22, 2009 & July 9, 2008	ICAR, PUSA, New Delh	Sudhir Raizada
Directors' Conference	Jan., 15-16, 2009	NASC Complex, New Delhi.	Dilip Kumar
Review Meeting of the ICAR Mega Seed Project	Jan.,5-6, 2009 and Dec., 2, 2008	NASC, New Delhi	Sudhir Raizada
Meeting of the Indian Science Congress	Jan., 3-8, 2009	North Eastern Hill University, Shillong	Dilip Kumar
Meeting of the Zoological Science Congress	Dec., 29-31, 2008	Guwahati	Dilip Kumar
Consultative Meeting with Fisheries Research Organizations of ICAR and Fisheries Development Organizations	Dec., 23-24, 2008	NFDB, Hyderabad	Dilip Kumar
19th Institute Management Meeting of NBFGR, Lucknow	Dec., 22, 2008	NBFGR, Lucknow	S. D. Singh
7th Meeting of the Task Force on "Aquaculture & Marine Biotechnology"	Dec., 18-19, 2008	New Delhi	Dilip Kumar
DBT Task Force Meeting for First year annual progress of DBT project "Development and Use of Flourescent Transgenic Zebrafish for Monitoring Genotoxic Pollutants"	Dec., 18, 2008	DBT, New Delhi	A. Chaudhuri
Meeting of the Directors of Fisheries Research Institutes	Nov., 29-30, 2008	CMFRI, Kochi	Dilip Kumar
Meeting of Local Organizing	Nov., 27, 2008	Institute of Engineers	Archana Sinha

Committee for Seminar of Institution of Engineers, Kolkata on "Recent Trends in Processing and Marketing of Fishery and Horticulture Products"		Kolkata	
Attended the 33rd Meeting of the Board of Management of CIFE	Nov., 11, 2008	CIFE, Kolkata Centre	Dilip Kumar A. K. Pal
Extension Strategies for Fisheries Development : Reorienting the Services Delivery and Support System" during at the Institute	Nov., 7-8, 2008	CIFE, Mumbai	R. S. Biradar
National Level Consultation to finalize the Draft report of the World Bank Sectoral Study on Marine Fisheries.	Nov.,6 & 7, 2008	A.P. F.A.T.C, Dulapally, Hyderabad	K. Venkateshwaran
Meeting on Climate Change in Fisheries and Aquaculture	Nov., 4, 2008	Fisheries Division ICAR, New Delhi	A. K. Pal
ICAR Out-reach activity on Fish Nutrition & Fish Feed	October 27, 2008	Fisheries Division ICAR, New Delhi	A. K. Pal S. D. Singh N. P. Sahu
"Fisheries Executives Conclave" on the theme Fisheries Sector Management in partnership with Fisheries Directorate, Sikkim and ICAR Research Complex for NEH Region, Meghalaya	Oct., 21-23, 2008	Gangtok, Sikkim	Dilip Kumar Gopalkrishna S. D. Singh S. Basu V. K. Tiwari B. B. Nayak P. Ananthan Suresh Kumar
Meeting of the General President with the Sectional Presidents of the 96th Indian Science Congress	Oct., 17-18, 2008	North Eastern Hill University, Shillong	Dilip Kumar
Regional Committee Meeting-II	Sept., 26-27, 2008	OUAT, Bhubaneshwar	Archana Sinha
NAIP Stake-holder's Workshop	Sept., 19-20, 2008	CIFA, Bhubaneswar	K. V. Rajendran
Meeting of Local Organizing Committee of Inland Fisheries Forum	Sept.,19, 2008	CIFRI, Barrackpore	Archana Sinha
Visioning, Policy Analysis and Gender (V-PAGe) - Project meeting	Sept., 15-20, 2008	NCAP, New Delhi at IGIDR, Mumbai	Swadesh Prakash
Australian Rural Leadership Programme	Sept.,11, 2008	Australian High Commission, Mumbai	K. Pani Prasad

Meeting of Local Organizing Committee of All India Seminar on "Recent Trends in processing and marketing of fishery and horticulture products"	Sept., 5, 2008	The Institute of Engineers (India), Kolkata	Archana Sinha
DBT Task Force Meeting on "Biotechnology based Programme for women"	Aug., 21-22, 2008	Deptt.of Biotechnology New Delhi	Archana Sinha
6th Meeting of the Task Force on "Aquaculture & Marine Biotechnology"	Aug., 19-20, 2008	Cochin Univ. of Marine Biotechnology, Cochin	Dilip Kumar
NAIP launching workshop of consortium project on "A value chain on Fish Production in Fragile Agricultural Lands and Unutilized Aquatic Resources in Maharashtra"	Aug., 14, 2008	CIFE, Mumbai	All members of the faculty
DST Concept note presentation meeting	Aug.,8-9, 2008	Trivandrum	A. Chaudhari
Assessment Committee Meeting	July 28, 2008	IVRI, Izatnagar, Bareilly, Uttaranchal	Dilip Kumar
IX meeting of the Accreditation Board	July 28, 2008	NASC Complex New Delhi	Dilip Kumar
DST-European Union Meeting Seminar for research funding to India	July 17, 2008	Mumbai	S. P. Shukla
204th Meeting of the Executive Council of Dr. B.S.K. Krishi Vidyapeeth, Dapoli	July 11, 2008	Dr. B.S.K. Krishi Vidyapeeth, Dapoli	Dilip Kumar
Farmers' Meet	July 10, 2008	Patna	R. S. Biradar
Meeting called by the Chairman, Planning Commission, New Delhi to discuss follow up action on the recommendation made by STFB in the report on "Bihar's Agriculture Development : Opportunities and Challenges".	July 08, 2008	Patna, Jharkhand	Dilip Kumar
User Awareness Program for CeRA	June 25, 2008	CIFE, Mumbai and M/s. Informatics, Bangalore for NAIP, ICAR	All members of the faculty
Meeting of the Council of the	May 25, 2008	ISCA, Kolkata	Dilip Kumar

Indian Science Congress Association			
Workshop entitled "Reaserch projects review and planning of Indian Scientific expedition to Arctic and Antarctic"	May 21-22, 2008	NCAOR, Goa	S. P. Shukla
Annual Review Meeting of AMAAS Projects	May 7, 2008	New Delhi	C. S. Purushothaman
Expert Committee meeting to review the position of faculty	May 2 - 4,-2008	College of Fisheries CAU, Tripura	Dilip Kumar

10.5 Invited Lectures delivered by the faculty

Speaker	Title / occasion	Venue	Date
G. Deshmukhe	"Marine Biodiversity of Maharashtra Coast" at Biodiversity – The Web of Life workshop	Kirti College, Mumbai	March 21-22, 2008
S.C. Mukherjee	Nutraceuticals and Drug Delivery Systems in Fish during Ninth Indian Veterinary Congress (IAAVR)	Bombay Veterinary College, Mumbai	Feb.,20-21, 2009
S. Basu	Value added fish products and their marketing	IIT, Mumbai	Feb., 16, 2009
K. V. Rajendran	"Global scenario of quarantine practices and trans-boundary movement of aquatic species" and "Development of surveillance network for cultured aquatic animals"	NBFGR, Lucknow	Feb., 14-15, 2009
S.C. Mukherjee	HRD Programmes on Capacity Building in Fisheries Sector during training programme / FISHCOPFED, Delhi	CIFT, Kochi	Feb.,24, 2009
S.C. Mukherjee	Fish Health Management and Strategy for Prevention of Diseases to M. Tech students on Entrepreneurial Opportunities in Fisheries programme	IIT-B, Mumbai (CTARA)	Feb., 26, 2009
K. Venkateshvaran	Bioactive Substances from Marine Benthos during the Training-Workshop on Modern Methods in the Study of Mariner Benthos.	CAS in Marine Biology, Parangipettai Tamil Nadu.	Feb., 28, 2009

K. K. Jain	Fish Biodiversity	IIT, Mumbai	Jan., 29, 2009
N. P. Sahu	Fostering the future food through farmed aquaculture in ANA World Conference	NASC Complex, New Delhi	Feb., 14-17, 2009
S. D. Singh	Application of biotechnology in enhancing the production and quality of food fishes	Allahabad, University, Allahabad	January 9-10, 2009
A. T. Landge	*"Samudratil Niryatiyogya Shobhiwant Maslyanchi Olakh"* (in Marathi), during the Training Programme on Aquarium Fish Culture	Taraporewala Marine Biological Research Station, Mumbai	Dec., 19, 2008
G. Venugopal	Best Management Practices for sustainable Scampi culture at the National Seminar on Recent Advances in Veterinary and Fisheries Science	State Institute of Fisheries Technology, Kakinada and ANU,Guntur, A.P.	Dec., 17, 2008
K. V. Rajendran	'Advances in diagnostic procedures used in parasitology' and 'RNA interference in parasites'	S.N. College, Kannur (Kannur University)	Dec., 11-12, 2008
K. Venkateshvaran	"Oceans and Human Health" in SARCON (Indian Society of Arthrosclerosis Annual Conference, 2008).	Annamalai University,Tamil Nadu	Dec., 10, 2008
K. Venkateshvaran	"Drugs from the Sea: the Oceans and Human Health" and "Seasnakes and the Pharmacological Potential of their Venom" in UGC refresher course	School of Natural Product Studies, Jadavpur University Jadavpur, Kolkata.	Dec., 05, 2008
G.Venugopal	Lead lectures on "Magur farming" and "Common Fish diseases of carps" during Workshop on "Utilisation of Water Resources for Fish Culture in North Bihar"	Bettiya, Bihar	October 31-November 1, 2008
S.C. Mukherjee	Seminar lead paper in ILDEX 2008	Pragati Maidan, New Delhi	August 23-24, 2008
Dilip Kumar	"Regional Consultation on Safety at Sea for Small Scale Fisheries in Developing Countries".	BOBP, Chennai	July 5-7, 2008
S. Basu	Marketing of fish and fish products for fishery co-operatives	Dr. V.V. Patil Institute of Co-operative Management	June 11, 2008
Dilip Kumar	*Machuara Kendrit Matsya Sansadhan Prabandhan* in National Hindi Workshop	Birsa Agricultural University, Ranchi	April 11-12, 2008

11. Meetings, Workshops, Seminars, Summer Institutes, etc. Organized

11.1 Meetings

S. No.	Programmme	Period
1.	Board of Examinations	December 03, 2008 September 08, 2008
2.	33rd Meeting of the Board of Management of CIFE	November 21, 2008 May 30, 2008
3.	IPR Meeting	August 08, 2008
4.	Consultative Committee Meeting of Fisheries Survey of India	May 09, 2008
5.	Staff Research Council	May 21-24, 2008 November 12, 2008
6.	Extension Council	November 8, 2008
7.	Academic Council	October 31, 2008
8.	Research Advisory Committee	November 14, 2008
9.	Meeting of the Broad Subject Matter Area (BSMA) Committee of ICAR	November 15, 2008

11.2 Conferences/Symposia/Workshops/Seminars/Brainstorming Sessions/Awareness Camps

S. No.	Programme	Venue	Period
1.	Final Data Analysis workshop under NORAD project "Genetic Improvement of *P. monodon* for Disease and White Spot Disease Resistance"	CIFE, Mumbai	February 27 - March 03, 2009
2.	National Workshop on "Extension Strategies for Fisheries Development: Reorienting the Services Delivery and Support System"	CIFE, Mumbai	November 07-08, 2008
3.	Fisheries Executive Conclave on "Development of Fisheries Policy Frame Work"	Gangtok, Sikkim	October 21-23, 2008
4.	Workshop on "Idea Generation in Aquaculture Biotechnology"	CIFE, Mumbai	August 28-29, 2008
5.	Workshop on Fisheries Sector in the Globalized Economy: Academia Industry Interfacing	CIFE, Mumbai	August 27, 2008
6.	Capacity Building Program on "Enhancing Competitiveness of Indian Fisheries"	CIFE, Mumbai	August 12, 2008
7.	Consultative Workshop on Restructuring PG Programmes in Fisheries Science (Broad Subject Matter Area-Fisheries)	CIFE, Mumbai	April 16-17, 2008

11.3. CAS Training Programmes

S. No.	Programme	Period
1.	Alternative Aquaculture Technologies in the Context of the Present Aquaculture Scenario	March 17-April 04, 2009
2.	Recombinant DNA Technology: Ideas to Products	February 23-14, March, 2009
3.	Seafood Microbiology and Quality Control	January 09-29, 2009

11.4 Winter Schools

S. No.	Programme	Period
1.	Genome and Protein-based Techniques in Aquatic Animal Health Management	February 02-22, 2009

11.5 Conclaves/workshops

11.5.1 Fisheries Executives Conclave

A Conclave of Senior Fisheries Executives form North Easterm States of India was held at Gangtok, Sikkim during 21-23 October 2008. The Conclave was organized by Central Institute of Fisheries Education, Mumbai in partnership with Fisheries Directorate, Sikkim and ICAR Research Complex for NEH Region, Meghalaya. The theme of the Meet was 'Fisheries Sector Management'.

The Chief Guest of the Conclave was His Excellency Governor of Sikkim, Shri B. P. Singh. Shri T. W. Barphungpa, Principal Secretary, Animal Husbandry and Fisheries Department, Government of Sikkim; Shri Lanungna Lakher, Commissioner of Fisheries, Manipur were the Guest of Honour. Other dignitaries present in the conclave were: Dr. H. Rahman, Joint Director ICAR Research Complex for NEH Region, Dr. P. Paul Pandian from Planning Commission, Dr. M. Sinha, Fisheries Advisor, Government of Tripura, Dr. Dilip Kumar, Director, CIFE, Dr. S. C. Mukherjee, Joint Director, CIFE, Shri Bhutia, Director, Dept. of Fisheries, Sikkim, Directors of NE States; Shri R. N. Chaudhary, Director of Fisheries, Bihar, other delegates from all the North Eastern States, CIFE faculty and Alumni.

The conclave was inaugurated by His Excellency Shri B. P. Singh, Governor of Sikkim. Dr. Dilip Kumar, Director, CIFE Mumbai welcomed the all the dignitaries and delegates. Mr. T. W. Barphungpa, IAS, Principal Secretary, Govt. of Sikkim, said that the major challenges in fisheries are technologies for sustainable fisheries and aquaculture, and infrastructure for post harvest handling. Shri Lanungna Lakher, Commissioner of Fisheries, Manipur, said that fisheries has been neglected in North East States and they are not self sufficient. His Excellency the Governor of Sikkim, Shri B. P. Singh congratulated CIFE for having taken up fine tuning of the Trickle Down System (TDS)

of Aquaculture as a participatory model of aquaculture extension in 250 blocks in Assam, Tripura, Mizoram and Manipur. Dr. S. C. Mukherjee, Joint Director, CIFE, Mumbai, proposed the vote of thanks.

11.5.2. Workshop on "ITK in Fisheries Sector"

An inception workshop on "ITK IN FISHERIES SECTOR" was organized by Central Institute of Fisheries Education at Guwahati (Assam) during 19-20 September, 2008, in recognition of the fact that fishers of India have a rich legacy of indigenous knowledge, traditional practices and customary rules and regulations. This knowledge had been developed from experiences and enriched over centuries which have been embedded in local cultures and traditions from generations to generations. There is a need to understand, respect and tap these social resources for better governance of fisheries. Careful documentation of this knowledge will provide essential elements to formulate management plans towards ecologically sustainable development.

The Chief Guest of the programme was Shri P. K. Barthakurji, IAS, Commissioner and Secretary (Fisheries), Department of Animal Husbandry, Veterinary & Fisheries, Assam. The dignitaries Dr. A. K. Roy, Director (Fisheries), Department of Fisheries, Assam and Shri Debeshwar Malakar, Managing Director, Assam Fisheries Development Corporation Limited, graced the occasion.

Dr. Dilip Kumar, Director, CIFE, Mumbai, while addressing the gathering presented an overview of the workshop and emphasized on documenting of ITKs and recognizing the intellectual property rights of the communities. He also stressed on the importance of sustainability issues. Dr. Kumar stressed that the ownership of a particular ITK rests with the community and credit has to be always given to the community. This was followed by finalizing the thematic areas by participatory discussion.

The programme was attended by 43 resource persons. The participants presented the information on various ITKs being practiced by the local communities as per the open ended format which had been sent to all participants before hand. This was followed by interactions. Following thematic areas were identified: fisheries resources and habitat management, aquaculture (including integrated farming), fish products and production processes, crafts and gears, fish baits and attractants, fishing methods, plant piscicides, and therapeutic applications. Guidelines for preparation of presentations were discussed thoroughly and work and responsibilities were assigned. State coordinator and thematic area wise coordinators were identified. The workshop had representation of resource persons from different states of North East. The

programme was covered by media and an interview of Director CIFE was telecast on a television channel with a wide coverage.

11.5.3. Workshop on Idea Generation in Aquaculture Biotechnology

Central institute of Fisheries Education (CIFE), Mumbai, organized a two-day Workshop on "Idea Generation in Aquaculture Biotechnology" sponsored by the Department of Biotechnology, Govt. of India during 28-29 August, 2008. The major objectives of the workshop were (i) To generate innovative ideas with scientific rationale and clearly defined objectives. (ii) To make a prioritized list of researchable ideas and new project concepts and potential network project proposals in the identified priority areas.

The workshop began with the remark by Dr. S. C. Mukherjee, Joint Director, CIFE, and a brief presentation on idea generation by Dr. George John, Advisor, DBT. The presentation was followed by the remarks from Dr. Dilip Kumar, Director, CIFE, Dr. K. V. Rajendran, Principal Scientist and Dr. S Jahageerdar, Senior Scientist, coordinated the workshop.

A total of thirty-nine invitees including Dr. A. K. Rawat, Principal Scientific Officer, DBT participated in the workshop. The invitees were scientists, researchers, teachers from various public and private research

organizations, universities and other academic institutions of the Country's western region. Forty scientists from the host institute participated in the workshop. In the workshop, workgroups on Aquaculture Production; Post-harvest and non-food organisms; Aquaculture and Marine Biotechnology; Aquatic Environment and Animal Health Management; Aquatic Animal Nutrition and Physiology; and Aquatic Animal Genetics and Breeding were formed and researchable ideas and concepts in the various fields of aquaculture were

formulated and discussed. Each workgroup has generated innovative ideas in their respective area and a prioritized list of researchable ideas and concepts, which was compiled and submitted to the Department of Biotechnology, Govt. of India.

11.5.4. Workshop on Academia-Industry Interfacing

Central Institute of Fisheries Education (CIFE), Mumbai, organized a one-day Workshop on "Academia-Industry Interfacing" on 27 August, 2008. The major objectives of the workshop were (i) To identify specific challenges and opportunities for the fishery industry and the academia in the globalised context (ii) To identify specific areas of linkage and collaboration to exploit these opportunities and address the challenges (iii) To evolve terms and strategies for partnership and the implementation mechanism.

The Workshop began with the remarks by Dr. S. C. Mukherjee, Joint Director followed by Dr. Dilip Kumar, Director, CIFE. Dr. George John, Advisor, DBT, introduced the Small Business Innovation Research Initiative (SBIRI) concepts of DBT. Dr. K. V. Rajendran Principal Scientist and Dr. S. Jahageerdar, Senior Scientist coordinated the workshop.

The design of the workshop was truly interactive and participatory in nature. For an effective outcome towards promoting a

fresh and holistic partnership building, the participants exchanged new perspectives and experiential wisdom of each other. They also came prepared with requisite materials. The workshop had presentations by the experts from the academia and the representatives from twelve fisheries/aquaculture industries. The presentations were followed by an open-house discussion. The expectations of industry, academia and students were revealed through the deliberations in the beginning, and finally the workshop discussed the complementary roles that each partner could play in filling the gaps.

National Science Day 2009

To commemorate the path-breaking discovery of scattering of light by Dr CV

Raman on 28 Feb 1938, nation celebrates the occasion as National Science Day. As part of such celebration, Central Institute of Fisheries Education (CIFE), Mumbai organized an exchange programme of the Institutes students with the M.tech students from the Centre for Technology Alternatives for Rural areas (CTARA), Indian Institute of Technology (IIT), Mumbai on 28th Feb 2009 at its Yari road campus. In the morning, the visiting students from IIT, Mumbai were taken around the various facilities and divisions to brief them about the Institute and its activities. After that an interactive session was hosted by Dr. NK Chadha, Principal Scientist, in the conference hall. Dr. SC Mukherjee, Joint director of this institute welcome the students from IIT, Mumbai and he also threw some light on the overall activities and mandate of the Institute. Students from IIT presented their learning experiences of how appropriate technologies can reach the rural population while working in the field as part of their curriculum. The students also describe about their work on "System dynamics" of Indian villages taking the examples of two villages in Pune district of Maharashtra and East Godavari district of Andhra Pradesh each. They describe the various linkages of ecosystems in the rural settings. Their PRAs and experiential learning in the villages were marked by their stay and interaction with the local communities over a period of 2 and half month and the regular monitoring by a supervising professor to oversee the progress and guide the students during their stay and work in the villages. They shared their experiences of providing simple solutions like use of GPS to design a lift-irrigation for the Kharki village in Pune, setting up of coconut fibre making unit through Byraju Foundation in East Godavari district village in Andhra Pradesh. This was followed by an interesting presentation by Dr Anand B Rao, Asst, Professor, CTARA on Climate Change and Clean Development Mechanism. He presented the facts indicating the global warming phenomenon and dwelled upon various mitigating, adaptive measure which the various countries around the world are taking.

Distinguished Visitors

Visitor Name	Position/Address	Date of Visit
CIFE, Headquarter		
Dr(Ms.). Vrinda Khole	Director, National Institute for Research on Reproductive Health, Parel, Mumbai	February 21, 2009
Dr. Indrani Karunasagar	Professor and Head, Department of Fishery Microbiology & Director, UNESCO Centre for Marine Biotechnology, College of Fisheries, Mangalore Karnataka Veterinary, Animal and Fisheries Sciences University	February 17, 2009
Dr. Thirumurugaan	Associate Professor, Department of Animal Biotechnology Madras Veterinary College, Chennai	February 14, 2009
Dr(Ms.). Devika Pillai	Associate Professor, Department of Aquaculture, College of Fisheries, Panangad, Kochi	February 13, 2009
Dr. K. M. Shankar	Professor & Head, Department of Aquaculture, College of Fisheries, Mangalore Karnataka Veterinary, Animal and Fisheries Sciences University	February 09, 2009
Mr. V. Shivpuri	MD, Plasticraft India Ltd, Mumbai	January 19, 2009
Shri Sharad Pawar	Hon'ble Union Minister for Agriculture, Consumer Affairs, Food and Public Distribution, Govt. of India, New Delhi	November 02, 2008
Dr. Martin Kumar	Principal Scientist and Program Leader (Integrated Biosystems, Integrated Resource Management & Biotechnology, South Australian Aquatic Sciences Centre (South Australian Research and Development Institute), Henley Beach, Australia	November 01, 2008
Dr. Gopalji Trivedi	Former Vice-Chancellor, Rajendra Agricultural University, Pusa	October 30, 2008
Dr. K. Gopakumar	Former Deputy Director General (Fisheries),	October 30, 2008

	ICAR, New Delhi	
Mr. Tae Sun Min and four members	Head, Office of R&D Infrastructure, Korea Science and Engineering Foundation, South Korea	October 17, 2008
Dr. K. C. Majumdar	Deputy Director, Centre for Cellular and Molecular Biology, Hyderabad	September 15, 2008
Mr. Chris King	General Manager (South Asia), Alltech Asia-Pacific Bioscience Centre, USA	July 24, 2008
Dr. Keith Filer	Research Manager, Alltech Asia-Pacific Bioscience Centre, USA	July 24, 2008
Dr. George A. Convay,	Director, CDC/NIOSH Agriculture, Fishing, and Forestry Programme and Alaska/ Pacific Regional Office, USA	July 21, 2008
Mr. T. W. Robert	IRG Group, USA	July 23, 2008
Dr. A. H. Mazumdar	Environment Team Leader, Office of Economic Growth, Food and Environment, USAID, Bangladesh	July 23, 2008
Dr. Lalji Singh	Director, Centre for Cellular and Molecular Biology, Hyderabad	
Dr G. A. Nair	Visiting Professor, Department of Environmental Sciences, University of Kerala, Thiruvananthapuram	March 12, 2008

CIFE, Kakinada Centre

Arvind Kumar, I.A.S.	Comissioner of Fisheries, Govt. of A. P.	March 06, 2009
Dr. K. Janaki Ram	Former Director CIFA, Bhubaneswar	March 06, 2009
Dr. K. Gopal Rao	Former Dean, S. V. V. University, Tirupati	March 06, 2009
Dr. S. Ayyappan	Deputy Director General (Fisheries), ICAR, New Delhi	February 18, 2008
Shri R. S. V. L. N. Rao	Asst. Commissioner of Customs and Central Excise, Govt. of India	September 21, 2008

Dr. M. Satyanarayana	Principal, PR College, Kakinada	September 21, 2008
Dr. Perreddy	Director, G.B.R. Nursing College, Anaparthy, A. P.	September 17, 2008
Dr. Syam Sundar	HOD, Ideal College, Kakinada	September 16, 2008
Dr. Kasem Bee	HOD, Hindi Department, P. R. College, Kakinada	September 15, 2008
Dr. K. L. T. Bhami Reddy	HOD, Hindi, G. B. R. Degree College, Anaparthy, A. P.	September 15, 2008
Shri P. Maneswar Rao	Executive Member, Dakshin Bharat Hindi Prachara Sabha, Chennai	September 14, 2008
Dr. Aditya Kumar	Reader in Zoology, Layola Academy, Secunderabad	September 09, 2008
Smt. Nirupa Rani	Vice-Chancellor, Adikavi Nanayya University, Rajahmundhry	August 12, 2008
Shri M. Gopala Krishna	M. L. A, Andhra Pradesh	July 10, 2008
Shri Kumaraswamy	Project Director, D. R. D. A., East Godavari, A. P.	July 10, 2008
Shri G. P. Singh	G. F. C. L., Kakinada	July 10, 2008

CIFE, Kolkata Centre

Dr. S. A. H. Abidi	Former Member, ASRB, New Delhi	March 09, 2009
Dr. S. Ayyappan	DDG (Fisheries), ICAR, New Delhi	March 08, 2009
Dr. A. K. Singh	DDG (NRM) ICAR, New Delhi	March 08, 2009
Dr. Kirti Singh	Former Chairman, ASRB, New Delhi	March 08, 2009
Dr. V. V. Sugunan	ADG (Inland Fisheries), ICAR, New Delhi	March 08, 2009
Dr. Mangala Rai	Secretary, DARE and Director General, ICAR, New Delhi	March 08, 2009 and January 30, 2009
Dr. B. S. Mahapatra	Director, CRIJAF, Barrackpore	January 30, 2009

Dr. K. K. Vass	Director, CIFRI, Barrackpore	January 30, 2009
Dr. P. Krishnaiah	IAS, Chief Executive, NFDB, Hyderabad	January 29, 2009
Dr. H. P. Singh	DDG (Horticulture), ICAR, New Delhi	January 25, 2009
Dr. Bob Winter Bottom	Chief Manager, USAID, Dhaka	July 25, 2008
Dr. Azhar Mazumdar	Team Leader, USAID, Dhaka	July 25, 2008
Dr. M. R. Sinha	Former Director of CIFRI, Barrackpore	July 21, 2008
Dr(Prof.). H. Choudhury	Eminent Fisheries Scientist	July 10, 2008
Dr. C. S. Singh	Former Dean (Fisheries),Pantnagar, Uttaranchal	May 01, 2008
Dr. H. P. C. Shetty	Former Director, College of Fisheries, Mangalore	April 15, 2008

Rohtak Centre

Dr. P. V. Dehadrai,	Former DDG (ICAR), World Bank Consultant, Bhopal, Madhya Pradesh	March 22, 2009
Dr. V. V. Sugunan	ADG(Fisheries), ICAR, New Delhi	November 25, 2008 and July 25, 2008
Dr. Bonami	Eminent shrimp pathologist, France	November 25, 2008
Dr. Breijil	Eminent prawn pathologist, France	November 25, 2008
Dr. Arun Ninawe	Vice-Chancellor, Maharashtra Animal & Fishery University, Nagpur	November 25, 2008
Dr. Sahul Hameed	OIE Expert, Chennai, Tamil Nadu	November 25, 2008
Dr. S. Ayyappan	DDG(Fisheries), ICAR, New Delhi	November 08, 2008
Dr. B. N. Nanda	Director, Inland Fisheries, Dept. of AHD & Fisheries, Ministry of Agriculture, New Delhi	September 24, 2008

Shri Rao Inderjeet Singh	Hon'ble Union Minister of State for Defence, Govt. of India	July 25, 2008
Mr. P. V. Singh	Director of Fisheries, Government of Haryana	July 24, 2008
Dr. D. S. Sayal	Director of Fisheries, Government of Punjab	July 24, 2008

13. Others

13.1 Quinquennial Review Team

Chairperson

Dr. S. L. Mehta
Former DDG(Edn), ICAR & VC (MPUAT),
Udaipur

Members

Dr. G. R. M. Rao
Ex-Director, CIBA, Visakhapatnam

Dr. K. Devadasan
Ex-Director, CIFT, Kochi

Dr. M. Chandrasekaran
Professor, Department of Biotechnology
Cochin Univ. of Biotechnology,
Cochin

Dr. B. C. Mal
Professor, Indian Institute of Technology,
Kharagpur

Dr. P. G. Chengappa
Vice-Chancellor,
UAS, Bangalore

Member-Secretary

Dr. R. S. Biradar
Principal Scientist, CIFE, Mumbai

13.2 Research Advisory Committee

Chairperson

Dr. E. G. Silas,
Former Vice Chancellor, KAU,
Kochi

Members

Dr. T. R. Rao
Director (Retd), School of Environmental
Studies (Delhi Univ), Delhi

Dr. Sher Ali
Sr. Staff Scientist,
National Institute of Immunology,
New Delhi

Dr. Chandramohan
Scientist G (Retd.), NIO
Chennai

Dr. Rintu Banerjee
Professor, Agricultural and Food Engineering
Department, Indian Institute of
Technology, Kharagpur

Dr. S. K. Pathak
Ex-CGM, NABARD, P-4, Vijay Gadh Society,
Shivtirth Nagar, Paud Road, Pune – 411038

Member-Secretary

Dr. R.S. Biradar
Principal Scientist, CIFE, Mumbai

13.3 Board of Management

Chairperson

Dr. Dilip Kumar
Director, CIFE, Mumbai

Members

Dr. K. K. Vas
Director,
Central Inland Capture Fisheries Research Institute, Barrackpore, Kolkata

Dr. S. C. Mukherjee
Joint Director, CIFE, Mumbai

Dr. C. S. Purushothaman
Principal Scientist, CIFE, Mumbai

Dr. A. K. Pal
Principal Scientist, CIFE, Mumbai

Dr. Gopal Krishna
Principal Scientist, CIFE, Mumbai

Dr. S. N. Ojha
Principal Scientist, CIFE, Mumbai

Dr. (Mrs.) Latha Shenoy
Senior Scientist, CIFE, Mumbai

Dr. G. Venugopal
Principal Scientist and OIC,
CIFE Kakinada Centre, Kakinada

Dr. Somdutt
Principal Scientist and OIC,
CIFE Powerkheda Centre, Powerkheda

Dr. G. Venkateshwarlu
Principal Scientist,CIFE, Mumbai

Dr. M. P. Singh Kohli
Principal Scientist, CIFE, Mumbai

Dr.R.S. Biradar
Principal Scientist, CIFE, Mumbai

Dr. Vijay B. Mehta
Vice-Chancellor,
Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli

Dr. S. Ayyapan
Dy. Director General (Fisheries), ICAR, New Delhi

Dr. W. S. Lakra
Director,
National Bureau of Fish Genetic Resources, Lucknow

Shri M. K. R. Nair
Fisheries Development Commissioner,
Government of India, Ministry of Agriculture,
New Delhi

Dr. M. V. Gupta
World Food Prize Laurate,
Hyderbad

Dr. Nagendra Sharma
Vice Chancellor,
Sher-E-Kashmir University of Agriculture,
Jammu

Shri Deepak P. Gadre
President,
Ratnagiri Sindhudurg Fisheries Development Association, Ratnagiri

Shri Damodar Tandel,
Cuffe Parade, Mumbai

Financial Advisor
Department of Agricultural Research & Education & Addl. Secretary to the Govt. of India, New Delhi
Member-Secretary

Shri Suresh Kumar
Sr. Adminstrative Officer,
CIFE, Mumbai

13.4 Academic Council

Chairperson

Dr. Dilip Kumar
Director, CIFE, Mumbai

Members

Dr. S. C. Mukherjee
Joint Director, CIFE, Mumbai

Dr. M. P. Singh Kohli
Principal Scientist, CIFE, Mumbai

Dr. R. S. Biradar
Principal Scientist, CIFE, Mumbai

Dr. S. N. Dwivedi
Ex. Director, CIFE
Bhopal

Dr. K. Gopakumar
Ex. DDG (Fisheries), Kochi

Prof. (Dr.) Gopaljee Trivedi
Ex. Vice-Chancellor,
At & PO- Matlupur Via- Piar,
Muzaffarpur, Bihar

Dr. B. N. Desai
Ex Director, NIO, Mumbai

Prof. Ramesh Dandge
Head, Department of Economics,
Shivaji University, Vidyanagar,
Kolhapur

Dr. S. P. Tiwari
DDG (Education), ICAR, New Delhi

Dr. S.Basu
Principal Scientist, CIFE, Mumbai

Dr. S. N. Ojha
Principal Scientist, CIFE, Mumbai

Dr. S.D. Singh
Principal Scientist, CIFE, Mumbai

Dr. Gopal Krishna
Principal Scientist, CIFE, Mumbai

Dr. C. S. Purushothaman
Principal Scientist, CIFE, Mumbai

Dr. Kiran Dube Rawat
Principal Scientist, CIFE, Mumbai

Dr. K. V. Rajendran
Principal Scientist, CIFE, Mumbai

President, PGSSU, CIFE, Mumbai

Academic Council Representative of PGSSU
CIFE, Mumbai

Member-Secretary

Shri Suresh Kumar
Sr. Administrative Officer,
CIFE, Mumbai

13.5. Extension Council

Chairperson

Dr. Dilip Kumar
Director, CIFE, Mumbai

Members

Dr. S. C. Mukherjee
Joint Director, CIFE, Mumbai

Dr. P. Das
DDG (Extension Education), ICAR,
New Delhi

Dr. K. Om Prakash
Joint Commissioner of Fisheries,
Ministry of Agriculture, Department of
Animal Husbandry, Dairying & Fisheries,
New Delhi

Dr. Krishna Srinath
Director, National Research Centre for
Women in Agriculture, Bhubaneshwar

Shri H. R. Pawar, IAS
OR his nominee,
Commissioner of Fisheries,
Government of Maharashtra, Mumbai

Dr. C. Prasad
Ex DDG(Extension), New Delhi

Dr. C. S. Purushothaman
Principal Scientist, CIFE, Mumbai

Dr. R. S. Biradar
Principal Scientist, CIFE, Mumbai

Dr. M. P. Singh Kohli
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Dr. V. K. Sharma
Principal Scientist and OIC,
CIFE Centre, Rohtak

Dr. S. K. Chakraborthy
Principal Scientist, CIFE, Mumbai

Dr. K. V. Rajendran
Principal Scientist, CIFE, Mumbai

Dr. P. S. Ananthan
Scientist (S.S.), CIFE, Mumbai

Dr. A. K. Reddy
Senior Scientist, CIFE, Mumbai

Dr. V. K. Tiwari
Senior Scientist, CIFE, Mumbai

Dr. Arpita Sharma
Senior Scientist, CIFE, Mumbai

Dr. Kiran Dube
Principal Scientist, CIFE, Mumbai

Dr. G. Venugopal
Principal Scientist and OIC, CIFE Centre,
Kakinada

Dr. Somdutt
Sr. Scientist and OIC, CIFE Centre,
Powerkheda

Member Secretary

Dr. S. N. Ojha
Principal Scientist, CIFE, Mumbai

14. Personnel

CIFE Mumbai

Director
Dr. Dilip Kumar

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. S. Basu
Dr. S.K. Chakraborty
Dr. P.K.Ghosh
Dr. K.K. Jain
Dr. A.K. Pal
Dr. (Mrs.) Neelam Saharan
Dr. (Mrs.) Kiran Dube Rawat
Dr. S.N. Ojha
Dr. K.V. Rajendran
Dr. G. Venkateshwarlu
Dr. Gopalkrishna
Dr. N.K. Chadha
Dr. K. Venkateshvaran
Dr. Sheela Immanuel
Dr. Nalini Ranjan Kumar

Senior Scientists
Dr. (Mrs.) Latha Shenoy
Dr. (Ms) Geetanjali Deshmukhe
Dr. (Mrs.) Aparna Choudhary
Dr. P.K. Pandey
Dr. N.P. Sahoo
Dr. V.K. Tiwari
Dr. S. Jahageerdar
Dr. B.B. Nayak
Dr. Arpita Sharma
Dr. K. Pani Prasad
Dr. R.P. Raman
Dr. A.K. Reddy
Dr. Ashok Kumar Jaiswar
Dr. R.S. Rana
Dr. Munil Kumar Sukham
Dr. Rupam Sharma
Dr. Chandra Prakash
Dr. Subodh Gupta
Dr. Sumanta Kumar Mishra
Dr. Gayatri Tripathi
Dr. Satya Prakash Shukla
Dr. Swadesh Prakash
Dr. Makesh M.
Dr. Zeba Jaffer Abidi

Scientist (Senior Scale)
Dr. Suryakant Patil
Dr. Shyam S. Salim (Upto 30 June 2008)
Dr. A. Vennila
Dr. P.S. Ananthan
Dr. S.B. Jadhao
Dr. Ajit Kumar Verma

Scientists
Mrs. Vidyashree Bharati
Mrs. Babita Rani
Dr. Shiv Pratap Singh
Mr. Annam Pawan Kumar
Mr. V. Hari Krishna
Mr. Suresh Babu P.P.
Mr. Gireesh Babu P.

Technical Staff

T-9
Mr. S. Natarajan
Mr. N.L. Singh

T(7-8)
Mr. Alkesh Dwivedi
Mr. R.D. Tandel
Dr. S.G.S. Zaidi
Dr. (Mrs.) Rama Sharma
Mr. G.K. Rao
Dr. S.K. Pandey
Ms. Asha T. Landge
Mr. A.D. Ragabhagat
Mr. S.S. Kamat

T-7
Dr. R.K. Langer (Upto 30 December 2008)

T-6
Mr. A.K. Padmanabhan
Dr. M.K. Chouksey
Mr. Chandrakant M.H.
Mr. D. Bhoomaiah
Mr. D.R. Khogare
Mr. P.K. Das
Mrs. Nalini Poojary
Mr. Ram Singh

T-5
Mrs. Madhavi Pikle
Mrs. Rajani H. Khandgale
Mr. J.P. Patil
Mr. R. Palaniswamy
Mrs. S.M. Bagwe
Mr. K.P. Shetty
Mr. S.M. Shinde
Mr. R.G. Kudale
Mr. Bhagat Singh Rawat
Ms. A. Mehta
Mr. C.B. Kareer
Mr. A. Sadanandan (Upto 31 July 2008)
Mr. B.G. Mandhare
Mrs. S.S. Gajbhiye
Mr. J.M. Koli
Mrs. S.P. Nalawade
Ms. Revti B. Dhongde
Mrs. Rekha Nair

T-4
—

T-3
Mr. S.R. Bandkar
Mr. Avinash Sable
Mr. B.T. Phade
Mr. Suryakant L. Koli
Mrs. Bharati Ghagare
Mr. N.K. Aglave
Mr. Baburam Jaiswar
Mr. S.V.Patil
Mr. B.J. Rathod
Mr. Anil Kumar D. Kulsange

T-I-3
Mr. S.R. Vinarkar

T-2

Mr. Sikandar Shaikh Hussain
Mr. Arun Anand Puri Gosavi
Mr. A.L. Kokane
Mr. R.D. Deshmukh
Mr. Dhanpat Singh Rawat
Mr. V.G. Dhindore
Mr. V.K. Bhave
Mrs. V.D. Misale
Mr. A.N. Mahadik
Mr. K. Dhana Raju
Mr. Mohd. Baqar
Mrs. Shahila Iftekhar

T-1
-
Administration and Finance

Sr. Administrative Officer
Mr. Suresh Kumar

Finance & Accounts Officer
-
Administrative Officer
Mr. V.S. Parmar

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

Assistant Administrative Officers
Mr. Sunil Kumar
Mrs. Valsa Pavithran
Mr. S.S. Kocharekar
Mrs. T. Padmavathi
Mrs. Swati S. Parab

Private Secretaries
Mrs. T. Kuruvilla
Mr. G.S. Fernandes

Stenographers (Grade-III)
Mrs. S.R. Arutla
Mr. P.R. Ninawe
Mrs. Pragati R. Gadre

Assistants
Mr. Y.P. Belgaonkar
Mr. B.L. Kokkula
Mrs. N.Y. Raorane
Mrs. Sushma Rani
Mrs. S.R. Wadhavkar
Mrs. D.N. Behl
Mrs. S.V. Kadam
Mrs. A.A. Shukla
Mrs. D.S. Naik
Mrs. F. G. Fernandes
Ms. C.S. Khundol

Upper Division Clerks
Mr. D.S. Ingale
Mr. R.R. Kadam
Mr. R.G. Gamare
Mrs. S.S. Koli
Mr. V.S. Kuveskar
Mr. D.V. Raorane
Mrs. S.V. Pawar
Mrs. A.U. Joshi
Ms. Y.S. Dhatavkar
Mr. A.G. Kolambkar
Mrs. Sanyuja S. Parab
Mr. B.P. Chauhan
Mr. N.L. Ghane

Lower Division Clerks
Mr. P.G. Angne
Mrs. C.C. Raut
Mrs. Anu Grover
Mr. S.H. Bhosale
Mr. K.K. Jagtap
Ms. N.A. Sawant
Mr. M.B. Waghela
Mr. Shirish P. Malvankar
Mr. R.N. Kamble

S.S.Gr.IV
Mr. M.R. Wasnik
Mr. V.P. Tiwari
Mr. S.R. Jaiswar

S.S.Gr.III
Mr. B.S. Tamankar
Mr. A.R. More
Mr. D.B. Gaikwad
Smt. V.J. Tambe

S.S.Gr.II
Smt. K.R. Ahire
Smt. Kamla Jai Kishore
Mr. T.G.Gaikwad
Mr. J.K. Makwana
Mr. A.R. Dore
Mr. B.R. Chavan
Mr. M.P. Kotian
Mr. G.B. Kamble
Mr. A.R. Shingade
Mr. J.N. Dhanu
Mr. V.N. Ondkar

S.S.Gr.I
Mr. Vinod Kumar Yadav
Mrs. R.H. Chavan
Mr. A.N. Joyashi
Mr. G.N. Zendekar
Mr. A.D. Sonawane

Vessel Staff

Skipper (T-7)
Mr. K. Satyanarayana

Engineer FTV (T-9)
Mr. Josey Jacob

Additional Engine Driver (T-6)
Mr. S.L. Kotian

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

Mate (T-4)
Mr. S. Maity

Deckhands (T-2)
Mr. K.V. Rajendran
Mr. A.P. Dhawade

Cook
Mr. S. Kamaraju

S.S.Gr.IV
Mr. B.N. Sukur
Mr. N.A. Bijali
Mr. G.G. Zendekar

S.S.Gr.III
Mr. V.M. Patil
Mr. S.B. Padyal

S.S.Gr.II
Mr. A. Lavande

CIFE Rohtak Centre

Principal Scientist
Dr. V.K. Sharma (Officer-in-charge)
Dr. U.K. Maheshwari

Senior Scientists
Dr. Sudhir Raizada

Technical Staff

T-7
Dr. M. Ali

T-6
Mr. Inderjit Singh

T-5
Mr. Ashok Kumar

T-4
Mr. Sanjeevan Kumar
Mr. Hasan Javed

T-2
Mr. Kishan Kumar

Administrative Staff

Assistant
Mr. V.K. Sinha

Supporting Staff Grade-II
Mr. Gyani Ram
Mr. Gyan Chand
Mr. Lavesh Kumar

CIFE Powarkheda Centre

Principal Scientist
Dr. Somdutt (Officer-in-charge)

Technical Staff

T(7-8)
Dr. R.K. Upadhyay

T-5
Mr. L.P. Bamalia

T-4
Mr. Gurubachan Singh

T-2
Mr. Anup Singh

T-1
Mr. Raghuvir Prasad

Administrative Staff

Assistant
Ms. Asha Dhurve

Lower Division Clerk
Mr. Hari M. Potpose

Supporting Staff

Grade-III
Mr. Hari Singh
Mr. Lallu Prasad
Mr. Vishnu Lal
Mr. Mangli Prasad

Grade-II
Mr. Surendra Kumar
Mr. Ram Keval Prasad
Mr. Shambhu Dayal
Mr. Manoharlal
Mr. Ram Swaroop
Mr. S. Prajapati

CIFE Kakinada Centre

Principal Scientist
Dr. G. Venugopal (Officer-in-charge)

Scientist (Selection Grade)
Mr. S.S.H. Razvi

Scientist
Dr. Sakthivel M. (Dr.M.Abbas)

Technical Staff

T(7-8)
Dr. P. Rami Reddy

T-6
Mr. K.B.S. Murthy
Mr. J. Krishna Prasad
Mr. K. Murali Mohan
Mr. P. Srinivasa Rao
Mr. V.N. Acharyulu

T-5
Mr. K. Radha Krishna Reddy
Mr. B. Krishna Rao
Mr. R.R.S. Patnaik
Mr. P. Satyanarayana

T-I-3
Mr. Y.S. Murty

T-2
Mr. M. Satyanarayana

T-1
Mr. A. Gurraiah
Mr. K. Mallaiah

Administrative Staff

Assistants
Mr. P.V.G. Krishnamurthy
Mr. B. Veera Raju

Upper Division Clerk
Mr. B. Laxman Rao

Lower Division Clerk
Ms. M. Rama Mani

Supporting Staff

Grade-IV
Mr. M.H. Reddy
Mr. M. Krishna
Mr. M. Ch. Appa Rao
Mr. Shivaram Kale

Grade-III
Mr. K. Satyanarayana
Mr. K. Niranjan
Mr. N. Venkata Ramana
Mr. K. Prasad

Grade-II
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Mr. O. Veeraraju
Mr. T. Satyanarayana
Mr. P.V.K. Reddy
Mr. P.D. Reddy
Mr. S. Valisha
Mr. A.L. Reddy
Mr. S.S. Reddy
Mr. Y.Buchilingam
Mr. M. Govindu
Mr. M.A. Rao
Mr. G.V.V. Satyanarayana
Mr. S.N. Saheb

CIFE Kolkata Centre

Principal Scientists
Dr. (Mrs.) Archana Sinha
(Officer-in-charge)
Dr. R.C. Das

Senior Scientists
Dr. B.K. Mahapatra
Dr. G.H. Pailan
Dr. Shubendu Dutta

Scientists (Selection Grade)
Mr. B.N. Tiwari
Dr. P.K. Roy

Scientists (Senior Scale)
Dr. Parimal Sardar

Technical Staff

T(7-8)
Dr. Ashok Biswas

T-6
Mr. S.K. Sharma
Mr. Barun Kumar Mishra

T-4
Mr. P.K. Patra
Mr. R.K. Mondal

T-3
Mr. S.K. Das

T-2
Mr. T.K. Ghosh

Administrative Officer

Personal Assistant
Ms. Kaberi Biswas

Promotions

Sr.No.	Name	Designation	Promoted as/ Grant of Adv. Increments	Promotion w.e.f.
DPC for Scientific Staff				
1.	Dr. Sanjay B. Jadhao	Scientist	Scientist (SS)	10.06.2005
2.	Dr. Parimal Sardar	Scientist (SS)	Sr. Scientist	23.12.2006
3.	Dr. Ajit Kumar Verma	Scientist	Scientist (SS)	26.06.2007
4.	Dr. Sudhir Raizada	Sr. Scientist	Principal Scientist	17.10.2007
Five Yearly Assessment Meeting held on 16.04.2008				
5.	Mr. R. Palaniswamy	T-5	3 Adv. increments	18.03.2007
6.	Mrs. S.S. Gajbhiye	T-4	T-5	01.07.2005
7.	Mr. J.M. Koli	T-4	T-5	01.07.2005
8.	Mrs. S.P. Nalawade	T-4	T-5	01.01.2006
Five Yearly Assessment Meeting held on 23.04.2008				
9.	Mr. Ashok Kumar	T-4	T-5	01.09.2007
10.	Smt. Shahila Iftekhar	T-1	T-2	08.01.2007
Five Yearly Assessment Meeting held on 19.05.2008				
11.	Mr. D. Bhoomaiah	T-5	T-6	04.12.2005
Five Yearly Assessment Meeting held on 23.05.2008				
12.	Dr. P. Rami Reddy	T-6	T(7-8)	01.01.2006
13.	Mrs. Nalini Poojary	T-5	T-6	17.12.2006
14.	Mr. S.S. Kamat	T-6	T(7-8)	01.01.2007
15.	Late Shri P.S.Pandey	T-6	T(7-8)	01.01.2007
16.	Dr. R.K. Upadhyay	T-6	T(7-8)	01.01.2007
Five Yearly Assessment Meeting held on 26.05.2008				
17.	Ms. Revati Dhongde	T-4	T-5	28.06.2006
18.	Mr. P.K. Das	T-5	T-6	15.10.2006
19.	Mrs. Rekha Nair	T-4	T-5	28.06.2007

Five Yearly Assessment Meeting held on 28.05.2008				
20.	Mr. N.L. Singh	T-8	T-9	01.01.2006
21.	Mr. Gurubachan Singh	T-3	T-4	01.07.2006
22.	Ms. A. Mehta	T-5	3 Adv. increments	27.06.2007
23.	Mr. K.P. Shetty	T-5	3 Adv. increments	27.06.2007
24.	Mr. Josey Jacob	T-8	T-9	01.01.2008
Five Yearly Assessment Meeting held on 23.09.2008				
25.	Dr. M.K. Chouksey	T-6	T(7-8)	01.01.2007
26.	Mr. Ram Singh	T-5	T-6	01.01.2004
27.	Mr. J.P. Patil	T-5	2 Adv. increments (alongwith one increment)	17.01.2007
Five Yearly Assessment Meeting held on 19.12.2008				
28.	Dr. A.K. Reddy	T-9	3 Adv. increments	01.01.2007
29.	Mr. K.B.S. Murty	T-6	T(7-8)	27.12.2005
30.	Dr. Musharraf Ali	T-7	T-9	01.01.2006
DPC for Administrative & Supporting Staff				
31.	Ms. C.S. Khundol	UDC	Assistant	01.01.2009
32.	Mr. V.K. Sinha	UDC	Assistant	01.01.2009
33.	Mr. N.L. Ghane	LDC	UDC	01.01.2009
34.	Mr. B.P. Chauhan	LDC	UDC	01.01.2009
35.	Mr. R.N. Kamble	SSGr.I	LDC	09.01.2009

Appointments

Sr.No.	Name	Post	Date of appointment
1.	Dr. Suresh Babu P.P.	Scientist	14.07.2008
2.	Dr. M. Makesh	Sr. Scientist	26.07.2008
3.	Mr. Sagar Suresh Sawant	T-3	02.08.2008
4.	Dr. Zeba Jaffer Abidi	Sr.Scientist	15.10.2008
5.	Dr. K. Venkateshvaran	Principal Scientist	29.10.2008
6.	Dr. N.K. Chadha	Principal Scientist	29.10.2008
7.	Mr. Gireesh Babu Pathakota	Scientist	03.11.2008
8.	Dr. Sheela Immanuel	Principal Scientist	14.11.2008
9.	Dr. Nalini Ranjan Kumar	Principal Scientist	05.12.2008

Assured Career Progression

Sr.No.	Name	Existing Scale of Pay	Upgradation Scale of Pay	Date
1.	Mr.S.Kamaraju, Cook	Rs.4000-6000	Rs.4500-7000	05.12.2007
2.	Mr.Gyani Ram, SSGr.I	Rs.2550-3200	Rs.2610-3540	30.08.2007
3.	Mr.Gyan Chand, SSGr.I	Rs.2550-3200	Rs.2610-3540	30.08.2007
4.	Mr.Lavesh Kumar, SSGr.I	Rs.2550-3200	Rs.2610-3540	30.08.2007

Transfers

Sr.No.	Name	Designation	From	To	Date
1.	Dr. Shyam S.Salim	Scientist (SS)	CIFE Mumbai	CPCRI, Kasargod	01.07.2008
2.	Mr. A. Sadanandan	T-5	CIFE Mumbai	CPCRI, Kasargod	01.08.2008
3.	Mr. B.K. Mishra	Farm Manager(T-6)	ICAR Research Complex for NEH Region, Sikkim Centre	CIFE Kolkata	20.10.2008
5.	Dr. S.P. Singh	Scientist	CIFE Kakinada	CIRG, Makhdoom, Mathura (UP)	13.01.2009
6.	Dr. Ashok Biswas	T(7-8)	CIFRI Barrackpore	CIFE Kolkata	26.02.2009

Voluntary Retirements/Retirements

S.No.	Name	Designation	Retired on	Place of posting
1.	Mr.A.D.Ragabhagat	T.O. T(7-8)	31.07.2008	Mumbai
2.	Mrs. T. Kuruvilla	PS	14.11.2008	Mumbai
3.	Mr.Y.P.Belgaonkar	Assistant	31.12.2008	Mumbai
4.	Mr.P.V.G.K.Murty	Assistant	31.12.2008	Kakinada
5.	Mr.B.N.Tiwari	Scientist (SG)	31.12.2008	Kolkata

15 हिन्दी का प्रगति प्रतिवेदन

1. पुरस्कार

- इस संस्थान का हिन्दी में सर्वाधिक कार्य करने पर आशीर्वाद संस्था द्वारा दिनांक 25 सितम्बर 2008 को **द्वितीय पुरस्कार** प्रदान किया गया । इस अवसर पर संस्थान के डा.के.के. ैन, प्रधान वैज्ञानिक एवं श्री सुरेश कुमार, वरिष्ठ प्रशासनिक अधिकारी ने यह पुरस्कार प्राप्त किया ।

- आशीर्वाद संस्था द्वारा इस संस्थान के डा.के.के. ैन, प्रधान वैज्ञानिक को हिन्दी में सर्वोत्कृष्ट कार्य करने पर **राभाषा श्री पुरस्कार** से सम्मानित किया गया ।

2. संगोष्ठी

- केन्द्रीय मात्स्यिकी शिक्षा संस्थान राभाषा हिन्दी में प्रतिवर्ष एक राष्ट्रीय संगोष्ठी का आयो ान करता है । इस वर्ष के.मा.शि.सं. मुंबई ने बिरसा कृषि विश्वविद्यालय, रांची के संयुक्त तत्वावधान में दिनांक 11-12 अप्रैल 2008 को रांची, झारखण्ड़ में **मछुआरा केन्द्रित मत्स्य संसाधन प्रबंधन** विषय पर राभाषा हिन्दी में दो दिवसीय राष्ट्रीय संगोष्ठी आयोि ात की । इस राष्ट्रीय संगोष्ठी में कुल 5 तकनीकी सत्र संचालित किए गए, ि ासमें कुल 44 पेपर प्रस्तुत किए गए । इस अवसर पर संगोष्ठी में प्रस्तुत पेपरों का सारांश प्रकाशित किया गया । संगोष्ठी का उद्घाटन झारखण्ड़ के महामहिम रा यपाल श्री सिब्ते रीी ी के कर - कमलों से किया गया ।

- हिन्दी पखवाड़ा के अन्तर्गत दिनांक 30 सितम्बर 2008 को **मत्स्य विज्ञान दिवस** विषय पर एक संगोष्ठी आयोि ात की गई ि ासमें संस्थान के लगभग 20 वैज्ञानिकों/ तकनीकी अधिकारियों ने अपने पेपर प्रस्तुत किए ।

3. कार्यशाला

- संस्थान के प्रशासनिक अधिकारियों एवं कर्मचारियों हेतु दिनांक 6 ून 2008 को केन्द्रीय मात्स्यिकी शिक्षा संस्थान के निदेशक महोदय की अध्यक्षता में विशेष कार्यशाला का आयो ान किया गया ।

- नगर रा ाभाषा कार्यान्वयन समिति, उत्तर मुंबई (कार्यालय) के तत्वावधान में दिनांक 16 दिसम्बर 2008 को समिति के समस्त सदस्य कार्यालयों में कार्यरत अधिकारियों / कर्मचारियों हेतु एक दिवसीय विशेष हिन्दी कार्यशाला आयोि ात की गई । इस अवसर पर डा. वा ीर सिंह लाकड़ा, निदेशक केन्द्रीय

मत्स्य आनुवंशिकी ब्यूरो, लखनऊ मुख्य अतिथि के रूप में उपस्थित रहे ।

4. प्रकाशन

- दिनांक 11 अप्रैल 2008 को झारखण्ड के महामहिम रा यपाल श्री सिब्ते रा ी ी के कर-कमलों से संस्थान की गृहपत्रिका ालचरी अंक 14 का विमोचन किया गया ।
- संस्थान की हिन्दी गृह पत्रिका ालचरी अंक 15 प्रकाशित की गई ।

- मछुआरा केन्द्रित मत्स्य संसाधन प्रबंधन विषय पर **संगोष्ठी सारांश** प्रकाशित किया गया ।

5. शैक्षणिक

- एम. एफ. एस. सी. के छात्रों के शोध निबंध का सारांश का हिन्दी में अनुवाद किया गया ।
- एम.एफ.एस.सी. के छात्रों हेतु ालवाणी प्रशिक्षण संचालित किया गया ।
- संस्थान के एम.एफ.एस.सी. एवं पी.एच.डी. के छात्रों के शोध निबंधों के सारांशों का हिन्दी अनुवाद कार्य किया गया ।

6. समारोह

- संस्थान में दिनांक 16 सितम्बर से 30 सितम्बर 2008 तक **हिन्दी पखवाड़ा** मनाया गया । इस उपलक्ष में विभिन्न प्रतियोगितांए आयो ित की गई । इसी के साथ दिनांक 30 सितम्बर 2008 को हिन्दी पखवाड़ा के समापन समारोह में विभिन्न प्रतियोगिताओं में वि ोता प्रतिभागियों को पुरस्कृत किया गया एवं इसके बाद हास्य कवि सम्मेलन आयो ित किया गया ।

- संस्थान में नगर रा ाभाषा कार्यान्वयन समिति, उत्तर मुंबई कार्यालय के सदस्य कार्यालयों में कार्यरत कर्मचारियों हेतु इस संस्थान में दिनांक 25 सितम्बर 2008 को नगर स्तर पर लेखन, भाषण, गीत-काव्य प्रतियोगिताओं का आयो ान किया गया ।

- दिनांक 11 फरवरी 2009 को संस्थान के छात्रों एवं संकाय सदस्यों हेतु आयो ित विशेष कार्यक्रम में हिन्दी की लोकप्रिय पत्रिका कुतुबनुमा की सम्पादिका डा. रा ान नटरा ान पिल्लै ी ने अपना रोचक एवं ज्ञानवर्धक व्याख्यान प्रस्तुत किया ।

7. बैठक

- केन्द्रीय मात्स्यिकी शिक्षा संस्थान की रा ाभाषा कार्यान्वयन समिति की 58

वीं बैठक दिनांक 6 ून 2008 संस्थान के निदेशक महोदय की अध्यक्षता में संपन्न हुई ।

- संस्थान के निदेशक डा.दिलीप कुमार ी की अध्यक्षता में संस्थान की राभाषा कार्यान्वयन समिति की 59 वीं बैठक दिनांक 5 दिसम्बर 2008 को सम्पन्न हुई ।

8. नगर राभाषा कार्यान्वयन समिति

- दिनांक 4 ुलाई 2008 को नगर रा ाभाषा कार्यान्वयन समिति, उत्तर मुंबई कार्यालय की 6 वीं छमाही बैठक नराकास के उत्तर मुंबई कार्यालय के अध्यक्ष एवं संस्थान के निदेशक महोदय डा.दिलीप कुमार ी की अध्यक्षता में सम्पन्न हुई ।

- दिनांक 13 मार्च 2009 को नगर राभाषा कार्यान्वयन समिति, उत्तर मुंबई कार्यालय की 7 वीं छमाही बैठक नराकास के उत्तर मुंबई कार्यालय के अध्यक्ष एवं संस्थान के संयुक्त निदेशक महोदय डा.सुभाष चन्द्र मुखर्जी ी की अध्यक्षता में सम्पन्न हुई । इस अवसर पर दिनांक 25 सितम्बर 2008 को इस संस्थान में नराकास के सदस्य कार्यालयों हेतु विभिन्न हिन्दी प्रतियोगिताओं का आयो ान किया गया था । इन प्रतियोगिताओं में वि ायी प्रतिभागियों को सुप्रसिद्ध अभिनेत्री सुश्री नेहा शरद ी के करकमलों से पुरस्कार एवं प्रमाण पत्र प्रदान कर सम्मानित किया गया । इस अवसर पर श्रीमती सुस्मिता भट्टाचार्य, अनुसंधान अधिकारी, क्षेत्रीय कार्यान्वयन कार्यालय (पश्चिम), नवी मुंबई डा.सुनीता यादव, सहायक निदेशक, हिन्दी शिक्षण या`ाना, रा ाभाषा विभाग, नवी मुंबई एवं श्री कलीम उल्लाह खान, प्रतिनिधि, केन्द्रीय सचिवालय हिन्दी परिषद, मुंबई विशेष अतिथि के रुप में उपस्थित थे ।

9. माननीय संसदीय राभाषा समिति

- दिनांक 4 सितम्बर 2008 को आयोि ात संसदीय राभाषा समिति की आलेख एवं साक्ष्य उप समिति विचार विमर्श बैठक में

नगर रा ाभाषा कार्यान्वयन समिति, उत्तर मुंबई (कार्यालय) के समस्त 15 कार्यालयों के प्रमुखों ने इस संस्थान के निदेशक डा.दिलीप कुमार ी के नेतृत्व में भाग लिया।

10. वैज्ञानिक / लोकप्रिय लेख

- केन्द्रीय मात्स्यिकी शिक्षा संस्थान वैज्ञानिकों ने मछुआरा केन्द्रीत मत्स्य संसाधन प्रबंधन विषय पर 14 लेख प्रस्तुत किए गए।

11. साहित्यिक गतिविधियाँ

- श्रुति संवाद एवं इस संस्थान के संयुक्त तत्वावधान में इस संस्थान में दिनांक 8 फरवरी 2009 को एक हास्य-व्यंग्य परिचर्चा आयो ित की गई।

12. आकाशवाणी वार्ता

- आकाशवाणी वार्ता - डा.रा ेश्वर उनियाल, सहायक निदेशक (रा.भा.) ने **वर्तमान समय में साहित्य का स्वरुप** विषय पर आकाशवाणी पर वार्ता दी, िसे दिनांक 8 अगस्त 2008 को प्रसारित किया गया।

- डा.रा ेश्वर उनियाल, सहायक निदेशक (राभाषा) ने दिनांक 16 फरवरी 2009 को **साहित्य और समाा** विषय पर आकाशवाणी पर वार्ता दी।

13. प्रतिनिधित्व

- डा.रोश्वर उनियाल, सहायक निदेशक (रा.भा.) ने 1) दिनांक 15 सितम्बर 2008 को दीपस्तंभ और दीपपोत निदेशालय, घाटकोपर, मुंबई में मुख्य अतिथि के रुप में अपना रोचक व्याख्यान प्रस्तुत किया। इसी के साथ उन्होंने

- विकास आयुक्त का कार्यालय,सीप में दिनांक 20 सितम्बर 2008 को विशेष व्याख्यान प्रस्तुत किया।

- दिनांक 26 सितम्बर 2008 को विविध भारती, बोरिवली (प.) में विशेष व्याख्यान प्रस्तुत किया।

- दिनांक 26 सितम्बर 2008 को राष्ट्रीय समुद्र विज्ञान संस्थान में अतिथि विशेष के रुप में उपस्थित हुए।

- महाराष्ट्र रा य हिन्दी साहित्य अकादमी, सांस्कृतिक कार्य विभाग, महाराष्ट्र शासन, मुंबई 23 द्वारा दिनांक 3.4.5 अक्टूबर 2008 तक प्रभादेवी, मुंबई के रविन्द्र नाटयमंदिर में आयो ित सर्व भारतीय भाषा सम्मेलन में संस्थान के डा.रा ेश्वर उनियाल, सहायक निदेशक

(रा.भा.), श्री प्रताप कुमार दास, तक.अधि.(रा.भा.), सुश्री रेवती धोंगडे, तक.अधि.(रा.भा.), श्रीमती रेखा नायर, तक.अधि.(रा.भा.), श्रीमती स्मिता कोली, वरिष्ठ लिपिक ने भाग लिया। इस समारोह का उद्घाटन मराठी के मूर्धन्य साहित्यकार डा.मंगेश पाडगावकर ी ने किया । साथ ही स्वातंत्र्य सेनानी श्री सुब्बा राव ी ने अपने भाषण रुपी गीत में समस्त भारत का एवं वहां की भाषाओं का दर्शन कराया । यह सम्मेलन तीन दिनों तक चला एवं तीसरे दिन समापन के बाद सभी प्रतिभागियों को प्रमाण पत्र दिए गए।

- श्री प्रताप कुमार दास, तकनीकी अधिकारी (रा ाभाषा) नार्म, हैदराबाद में दिनांक 2-3 दिसम्बर 2008 को रा ाभाषा नीति की प्राथमिकताएं - व्यावहारिकता की परिपेक्ष में विषय पर आयो ित मस्तिष्क मंथन कार्यशाला में ने भाग लिया।

- डा.रा ोश्वर उनियाल, सहायक निदेशक (राभाषा) ने दिनांक 18 फरवरी 2009 को एम.टी.एन.एल., प्रभादेवी में अपना विशेष व्याख्यान प्रस्तुत किया।

- डा.रा ोश्वर उनियाल, सहायक निदेशक (राभाषा) ने दिनांक 25 फरवरी 2009 को भारतीय मात्स्यिकी सर्वेक्षण के कुलाबा में स्थित कार्यालय में अपना व्याख्यान प्रस्तुत किया।

- डा.रोश्वर उनियाल, सहायक निदेशक (राभाषा) ने दिनांक 4 मार्च 2009 को अधीक्षण अभियन्ता, मुंबई केन्द्रीय परिमंडल-2 केन्द्रीय लोक निर्माण विभाग, मुंबई - 86 में स्थित कार्यालय में अपना व्याख्यान प्रस्तुत किया।

14. हिन्दी पुस्तकालय

- संस्थान के हिन्दी पुस्तकालय हेतु इस वर्ष लगभग एक हाार पुस्तकें खरीदी गई एवं उपलब्ध समस्त पुस्तकों को विषयानुसार क्रमबद्ध कर प्रदर्शित किया गया।

15. उपकेन्द्रों में हिन्दी का प्रगति

- संस्थान के कोलकाता, पवारखेड़ा, काकीनाड़ा एवं रोहतक केद्रों में रा ाभाषा हिन्दी की प्रगति हेतु यथोचित कार्रवाई की ा रही है।

कार्यकारी सारांश

वर्ष 2008 - 09 का कार्यकाल **केन्द्रीय मात्स्यिकी शि ा संस्थान**, मुंबई के लिए बहुत ही महत्वपूर्ण रहा है । इस वधि के दौरान संस्थान के प्रत्येक ेत्र में उल्लेखनीय परिवर्तन हुए हैं । नए शै ाणिक सत्र में **कुल 99 छात्रों** का नामांकन किया ाया जिनमें से 27 **छात्र पी.एचडी.** पाठ्यक्रम में तथा 22 **छात्र न्तरस्थलीय मात्स्यिकी** में **स्नातकोत्तर डिप्लोमा** हेतु नामांकित किए ए । संस्थान में चल रहे शै ाणिक पाठ्यक्रमों में 19 **छात्रों ने पी.एचडी.**, 35 **छात्रों ने एम.एससी.** डि ्री एवं 22 **छात्रों ने न्तरस्थलीय मात्स्यिकी** में **स्नातकोत्तर की डि ्री** प्राप्त की ।

संस्थान की नुसंधान उपलब्धियां पूर्णतः संतोषजनक रही है । कुल 26 संस्था ात नुसंधान परियोजना, 16 बाह्य निधि परियोजनाएं, 2 न्तराष्ट्रीय परियोजनाएं, 3 एन.ए. ाई.पी. द्वारा प्रदत्त वित्त परियोजनाएं एवं 2 संविदा नुसंधान परियोजनाएं निरंतर एवं नियमित ातिविधि के साथ चल रही हैं तथा सभी परियोजनाएं स्पष्ट रुप से पने ल य को प्राप्त करने की योजनानुसार चल रही हैं ।

हरियाणा में ंतरस्थलीय लवणीय जल से टाई ार श्रिंप पीनीयस मोनोडोन का व्यावसायिक उत्पादन उल्लेखनीय रुप से प्राप्त किया ाया है, जिसकी जीवितता 60% तथा कुल उत्पादन 115 दिनों के पालन वधि के दौरान 660 कि.ा्रा./ हेक्टेयर पाया ाया है । ानुवंशिक मूल्याकंन के ंत ात तथा ानुवंशिकी विवरणों के नुसार जलकृषि हेतु दो नई प्रजातियां पाई ाई हैं ये हैं – मैक्रोब्रेकियम विलोसिमानस एवं ॉस्ट्रियोब्रामा बेलेन ारी (पें ाबा), जिन्हें चयनित किया ाया है । एम. विलोसिमानस के मादा को **ब्रम्हपुत्र नदी** से इकट्ठा कर हवाई मा ा से के.मा.शि.सं. मुंबई लाया ाया । नुसंधान के परिणामों से यह पता चला कि एम. विलोसिमानस को जीवन चक्र पूरा करने हेतु 10-15 पी.पी.टी. लवणीय जल की ावश्यकता होती है । लेकिन कोई परिपक्वता नहीं देखी ाई । पें ाबा के बीज को इम्फाल से लाया ाया तथा वयस्क वस्था तक पाला ाया । इस मछली की परिपक्वता देखी ाई । एक जोडी पें ाबा (मादा 372 ा्रा/280मीमी) तथा नर 173 ा्रा./252 मीमी) का प्रजनन सफलतापूर्वक किया ाया जिससे कुल 1,82,875 ण्डे प्राप्त किए ए जो 90 उर्वरकता एवं 36% हैचिं ा के साथ था । स्पॉन की कुल संख्या 60,000 प्राप्त की ाई जिन्हें ंगुलिका वस्था तक पाला ाया । संस्थान के पवारखेड़ा केन्द्र पर 5000 ंगुलिका ों का भंडारण किया ाया तथा 500 ंगुलिका ों को पालन हेतु मुंबई लाया ाया ।

प्राकृतिक केरोटिनाइट्स के रं ाबिरं ी मछलियों के ाहार के रुप में इस्तेमाल किए जाने का निष्कर्ष यह दर्शाता है कि ोंदा तथा ुलाब की पंखुरियां रोजी बार्ब के ाहार में 4% स्तर तक सुर ित ापूर्ति की जा सकती है, इसी प्रकार ड्वार्फ ौरामी के रं ो में वृद्धि होती है । महाराष्ट्र के डिम्भे जलाशय में परी ण के तौर पर ोल्डफिश (कैरासियस ौरेटस) को भंडारित किया ाया जिसका ाकार 6 महीनों की पालन वधि में 135 मी.मी / 42.37 ्राम तथा 90 % जीवितता पायी ायी ।

मात्स्यिकी एवं जलकृषि के विकास हेतु उपयुक्त नीति विकसित करने की परियोजना जिसे विभिन्न राज्य सरकारों के मात्स्यिकी विभा ाों ने भी समर्थन किया है, इसे संस्थान के एक महत्वपूर्ण उपलब्धि के रुप में देखा जा सकता है । तद्नुसार, इस जलकृषि एवं मात्स्यिकी विकास नीति का प्रावधान व विकास बिहार, तमिलनाडु एवं सम ादि राज्यों को प्रदान किया ाया । बने बनाए मत्स्याहार जैसे सेंडबिच पेस्ट, मत्स्य करी इत्यादि विभिन्न रेसेपी को पैकिं ा कर उपलब्ध कराया ाया तथा इनके रासायनिक, जैवरासायनिक चित्रण कर, वसा एसिड प्रोफाइल एवं व्यवसायीकरण का तिमाही विश्लेषण किया ाया । इस संस्थान ने नेक प्रसार शि ाा प्रौद्यो ाकी हस्तांतरण से संबंधित पाठ्यक्रम तथा ातिविधियों के माध्यम से च्छे ोत्र स्तर के प्रभाव को सृजित किया है । कुल 45 ल्पकालीन प्रशि ाण कार्यक्रम मां ा के ाधार मुख्यालय में ायोजित किए ाए जिनमें 1121 प्रतिभा ाी प्रशि ित किए ाए । संस्थान ने **त्रिपुरा,मिजोरम,मणिपुर, ांध्रप्रदेश, प. बं ाल एवं सम** में जलकृषि प्रसार के लिए 'ट्रिकल डाउन' सिस्टम का प्रदर्शन किया । किसानों को **कार्प पोलीकल्चर**, न्यूनतम ला ात **कार्प पालन, क्रैब फ्लैटिं ा, मत्स्य सह मु ी पालन, मत्स्य सह सु र पालन** हेतु स्थल प्रशि ाण ायोजित किया ाया । इस संस्थान ने देश के विभिन्न भा ाों में 23 प्रदर्शनियों का भी ायोजन किया । संस्थान की न्य ातिविधियों में दूरदर्शन कवरेज एवं प्रिंट मीडिया कवरेज किया ाया । संस्थान के मुख्यालय एवं इसके उपकेन्द्रों में राष्ट्रीय मत्स्य किसान दिवस मनाया ाया । संस्थान का वार्षिक दिवस एवं राष्ट्रीय दिवस एवं राष्ट्रीय मत्स्य किसान दिवस 10 जुलाई 2008 को ायोजित किया ाया । के.मा.शि.सं., का प्रथम 'भूतपूर्व छात्र मिलन समारोह' 25 दिसम्बर 2008 को ायोजित किया ाया । संस्थान में विभिन्न कालेजों, स्कूलों, संस्थानों एवं विश्वविद्यालयों से कुल 1974 छात्र के.मा.शि.सं एवं इसके उपकेन्द्रों दौरे पर ाए, जिन्हें संस्थान की ातिविधियों से व ात कराया ाया । संस्थान के दो नुसंधान एवं प्रशि ाण जहाज **एम.एफ.वी.सरस्वती एवं एम.एफ.वी. नर्मदा** छात्र एवं प्रशि ाणिथियों को 19 बार समुद्रीय दौरे पर ले ाए । इसके ावा संस्थान में वर्ष 2008-09 के फरवरी माह में भा.कृ. नु.प. ोत्रीय (पश्चिमी) क्रीड़ा प्रतियो िता का भी ायोजन किया ।

इस वर्ष के दौरान **डा. दिलीप कुमार, निदेशक** के.मा.शि.सं. भारत की महत्वपूर्ण 96 वीं भारतीय विज्ञान कांग्रेस में (पशु विज्ञान एवं मात्स्यिकी) के ध्य ा चुने ाए । यह बैठक शिलां ा में 3-8 जनवरी 2009 के दौरान ायोजित किया ाया । **डा. दिलीप कुमार** को 32 वीं वार्षिक **ोरियंटल हेरीटेज** पर न्तराष्ट्रीय सम्मेलन के दौरान जेड. एस. ई सर **'दोराब टाटा ोल्ड मेडल'** तथा **'मेघनाथ साहा पुरस्कार'** से सम्मानित किया ाया । के.मा.शि.सं. को 2008 के दौरान हिन्दी में सर्वाधिक यो ादान देने पर ाशीर्वाद संस्थान द्वारा चल वैजंयती पुरस्कार प्रदान किया ाया ।

संस्थान के **प्रधान वैज्ञानिक डा. ए. के.**

पाल मत्स्य पोषण, जैव रसायन एवं विज्ञान विभा ा को नास कॉम्प्लेक्स नई दिल्ली में 4 जून 2008 को कृषि विज्ञान कादमी का फेलोशिप प्रदान किया ाया । उन्हें **पी. एफ. जी. एफ.** द्वारा **एम.एम. स्वामीनाथन** सर्वश्रेष्ठ भारतीय मात्स्यिकी वैज्ञानिक 2008 पुरस्कार भी प्रदान किया ाया ।

डा. के. के.जैन प्रधान वैज्ञानिक को ाशीर्वाद संस्थान में मुंबई में 25 सितम्बर 2008 को **ाशीर्वाद राजभाषा पुरस्कार** एवं सम्मान के **प्रधान वैज्ञानिक एस.डी. सिंह** को **इन्टरनेशनल फिशरिज सेक्सन, मेरिकन फिशरिज सोसायटी** बेथेस्डा (यू.एस.ए) में ास्त 2008 में 'इन्टरनेशनल सी ार सुलिवन इन्डोमेन्ट वार्ड' प्रदान कर सम्मानित किया तथा **इंडियन फिशरीज सोसायटी के** एक्जिक्युटिव समिति का सदस्य भी नामित किया ाया ।

पवारखेड़ा केन्द्र के प्रभारी धिकारी एवं **प्रधान वैज्ञानिक डा. सोमदत्त** को जिला मत्स्य पालक हेतु एच. ार. डी. कार्यक्रम संचालित करने पर पश्चिमी चंपारण जिला बिहार के ार्वनिं ा बोर्ड (ात्मा) एवं जिला धिकारी द्वारा सम्मनित किया ाया ।

संस्थान के रोहतक केन्द्र के प्रभारी धिकारी एवं **प्रधान वैज्ञानिक डा. के.के. शर्मा** को रोहतक केन्द्र में न्तरस्थलीय लवणीय जल की उपयोा िता से व्यवसायिक श्रिंप के सफल प्रदर्शन करने पर भा.कृ. नु.प. के उपमहानिदेशक मात्स्यिकी ने प्रशंसा पत्र देकर सम्मानित किया । **डा. बी. बी. नायक वरिष्ठ वैज्ञानिक** को सातवें इ.यू. फ्रेम वर्क कार्यक्रम कन्सोर्टिया के नोडल प्वाईंट 'फुड - एन - को' हेतु समन्वयक नामित किया ाया, यह **जवाहरलाल विश्वविद्यालय, नई दिल्ली** में दिसम्बर 2008 में ायोजित किया ाया था । इसी के साथ डा. नायक को फरवरी 2008 में पशुधन डेयरी एवं मात्स्यिकी विभा ा ने निर्यात समूह में मत्स्य एवं मात्स्यिकी उत्पाद के ायात की स्थिति एवं संर ाण सदस्य के रुप में नामित किया । इस वर्ष **डा. ार.पी.रमण, वरिष्ठ वैज्ञानिक** को बायोवेड रिसर्च सोसायटी इलाहाबाद द्वारा **'यं ा साइंटिस्ट एसोसियेट वार्ड - 2009'** प्रदान किया ाया तथा **डा. वी. के. तिवारी वरिष्ठ वैज्ञानिक** को **बायोवेड फैलोशिप 2009** प्रदान किया ाया । ये पुरस्कार एवं फैलोशिप बायोवेड रिसर्च सोसायटी इलाहाबाद द्वारा जलकृषि एवं मात्स्यिकी के ेत्र में इनके उल्लेखनीय यो ादान के हेतु प्रदान किया ाया ।

डा. एस. के मिश्रा, वरिष्ठ वैज्ञानिक को इंडियन सोसायटी ाफ एक्सटेंशन एज्युकेशन नई दिल्ली द्वारा **' ई. एस. ई. ई. फेलोशिप'** प्रदान किया ाया । **डा. संजय जाधव, वैज्ञानिक (एस.एस.)** को नास कॉम्प्लेक्स, नई दिल्ली में **'डा. यू.वी. सिंह मेमोरियल युवा वैज्ञानिक'** पुरस्कार प्रदान किया ाया । हिन्दी में उत्कृष्ट कार्य करने पर **डा. कमल कांत जैन, प्रधान वैज्ञानिक** को **ाशीर्वाद राजभाषा** वार्ड तथा संस्थान को द्वितीय पुरस्कार प्रदान किया । **श्री डी. भूमैया, तकनीकी धिकारी** को तमिलनाडु मात्स्यिकी सोसिएशन चैन्नैई ने इस वर्ष **लो ो डिजाईनिं ा** में उल्लेखनीय यो ादान हेतु प्रशंसा पत्र प्रदान किया

। संदर्भ जर्नल में संस्थान के कुल 22 **नुसंधान पेपर** प्रकाशित किए ए । इस वधि के दौरान 12 **लोकप्रिय लेख**, 38 **सारांश**, 5 **प्रशि ण मैन्यु ल**, 1 **पुस्तक** तथा 5 **पुस्तक ध्याय** प्रकाशित किए ए।

संस्थान के संकाय सदस्यों ने 57 कार्यशाला/सेमिनार/सम्मेलन/कांेस/ इत्यादि में प्रतिनिधित्व किया। संकाय सदस्यों ने 12 प्रशि ण कार्यक्रम, 3 मासिक मंथन सत्र, 38 बैठकें एवं 17 तिथि व्याख्यान हेतु विभिन्न संस्थानों में भा। लिया।

इस संस्थान ने विभिन्न कार्यक्रमों पर कुल 17 बैठकों का ायोजन किया । जिनमें 52 कार्यशाला है, **सी.ए. एस** कार्यक्रम तथा एक विन्टर स्कूल शामिल है।

संस्थान में इसके साथ ही एस. ार.सी., ार.ए.सी, बोर्ड ॅफ मैनेजमेंट, काडिमिक काउन्सिल, एक्सेन्टशन काउन्सिल इत्यादि का भी नियमित रुप ायोजन किए ए ।



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