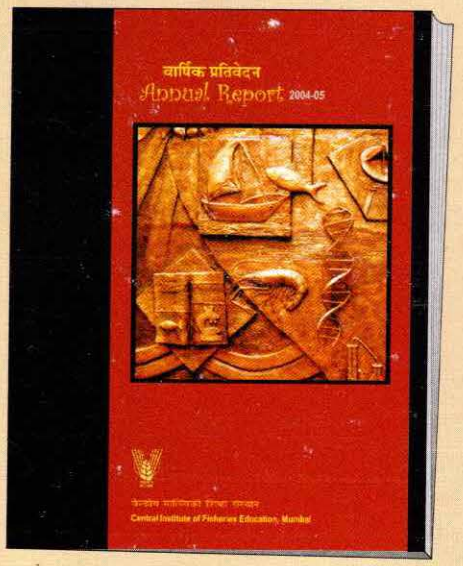
वार्षिक प्रतिवेदन
Annual Report 2004-05

भाकृअनुप
ICAR

केन्द्रीय मात्स्यिकी शिक्षा संस्थान, मुंबई

Central Institute of Fisheries Education, Mumbai



Published by
Dr. S.C. Mukherjee
Director

Compiled & Edited by
Dr. K. Venkateshvaran
Dr. K. Pani Prasad
Ms. Nalini Poojary

Cover Design
Mr. Dasari Bhoomaiah

Word Processing
Ms. Sujata Pawar
Ms. Anaga Joshi

Hindi Translation
Mr. R.P. Uniyal
Mr. Pratap Kumar Das

Photographs
Mr. D.L. Sawant
Mr. Dasari Bhoomaiah

वार्षिक प्रतिवेदन

Annual Report 2004-05

केन्द्रीय मात्स्यिकी शिक्षा संस्थान, मुंबई

Central Institute of Fisheries Education, Mumbai

Contents

I .PREFACE

The institute, which is the country's fist and foremost for Education Research and Extension in the field of fisheries, forged ahead in its educational ventures with different streams of specialization, including the recently started done on Fisheries Business Management that continues to grow in popularity, and its Diploma Programme at Kolkata, Necessary infrastructural facilities are in position to initiate the first-ever Ph.D programme in Fisheries Business Management from October 2004, a logical extension of the M.F.Sc in Fisheries Business Management that was commenced in 2002, in line with the National Agricultural Policy emphasizing agri-business and self-employment ventures. Additional financial and infrastructural support came forth from the Education Division, especially under the CAS in Fishery Science Scheme as also from the Sir Dorabji Tata Endearment,and the TIFAC , all of which are gratefully acknowledged.

Research activities at CIFE made new inroads in the intellectual arena with further refinement of recently developed technologies in the areas immunodiagnostics for detection of pathogenic virus and bacteria, and an anesthetic formulation & to reduce stress for finfishes and shellfishes during handling and transport. Both these products have already been commercialized. Value addition to deep-sea fishes as also other fish that are currently underutilized for their better utilization has been carried out. The technology of cage culture in reservoirs, for rearing of fry to fingerlings, and fingerlings to advanced fingerlings, continued to rise in popularity and the Fisheries Departments of various States are clamoring to adopt the same. The hatchery technology developed for giant freshwater prawn using inland Ground Saline Water (IGSW) continued to attract attention from both within the country and afar. These and other research endeavors of the institute found expression in about 100 and odd publications of varied technical categories. New research and educational/training were initiated in accordance with the earlier signed Memoranda of Understanding with the Ineractive Research School of Health Affairs (IRSHA) Pune for the development of "Diet Fish" and with the CAS in Marine Biology, Parangipettai for research and training in areas of Marine Biology and Oceanography.

The Kisan Call Centre Stage II at CIFE, for fisheries has been attracting the attention of the fish farmers from all over the country. CIFE has been identified as one of the 12 Kisan Call Centres to provide various short term training programs, Exhibitions, Radio & TV talks, and technical guidance through Fishery Advisory

Faculty members won accolades for their contributions to science and technology and brought laurels to the institute. My congratulations in this regard to all the concerned staff of CIFE. The Hindi Cell bagged the prestigious Rajbasha Puraskar for the Hindi Publication, as also the Ashirwad Chal Vaijayanti award for commendable Hindi implementation work. The Institute bagged the prestigious Rajshree Tandon Award for Hindi implementation and the Kisan shresht Magazine Award for the Hindi Publication Jalchari for which due credit must be given to the entire staff of the Hindi Cell.

The institute's sports team as usual came out with flying colors in the ICAR Inter Institutional Sports Meet. Three cheers to the entire team, especially the Kabaddi Team.

The Post Graduate School Students Union took up many culture and extracurricular activities. AIDS Awareness program was celebrated. to contribute their mite to social causes. Creative talents of the students were expressed through the wall magazine and thorugh Student Talk programmes, and a web site exclusively that of the PGSSU. Kudos to Dr. S.K.Chakraborty, Dean (Students Welfare); Mr. Suresh Kumar, Warden; Mr. Chandrakant M.H., and Ms. Asha T. Landge, Deputy Wardens; and Mr. Shahnawaz Ali, and his entire team of the PGSSU. Campus related developmental activities received a new fillip.

My sincere thanks are due to Dr. Mangala Rai. Secretary, DARE and Director General, ICAR; Dr.S.Ayyappan, Deputy Director General (Fisheries), Dr.J.C.Katyal, Deputy Director General (Education), Dr.A.D.Diwan, Assistant Director General (Marine Fisheries), Dr.V.R.Chitranshi, Assistant Director General (Inland Fisheries), ICAR, for their unstinted cooperation, support and guidance without which none of these would have been possible. I am extremely thankful to the Chairman and Members of the RAC and the QRT, as also the distinguished Members, both external and internal, of the Board of Management, Academic Council, Staff Research Council, Extension Council, Board of Examiners, and various other in-house Committees for their constructive criticism and guidance. I gratefully acknowledge the support received from various agencies viz. Department of Biotechnology, Department of Atomic Energy, Department of Ocean Development , Department of Science and Technology, Department of Environment and Forest, Council of Scientific and industrial Research, Bhabha Atomic Research Centre, Tata Institute of Fundamental Research, Therapeutic Drug Monitoring Laboratory, National Institute of Oceanography, Indian National Centre for Ocean Information

Sciences, National Bank for Agriculture and Rural Development, Centre Drug Research, Industrial Toxicology Research Centre, Fisheries CAS in Marine Biology, and a host of other organizations including INRA, NORAD, ACIAR, ICLARM, DFID, NACA, AKVAFORSK, SARDI and well wishers of this Deemed University. I thank all my faculty and students, the Senior Administrative Office and his staff, the Finance and accounts Office and his staff, and the Sailing staff of the vessels, for everything during this wonderful year. Last but not the least, my special thanks are due to Mr. K. Venkateashvaran, Dr. K. Pani Prasad, Mr. D.Bhoomiah, Ms. Nalini Poojary, Mr. Angha Joshi and Ms. Sujata Pawar as also Mr. R.P. Uniyal for all their strenuous efforts in the timely release of this Report.

2.EXECUTIVE SUMMARY

The academic programmes at Masters' and Doctoral levels, offered by the institute at its Head quarters and Centers, as also at the Central Marine Fisheries Research institute, Kochi; the Central institute of Fisheries Technology, Kochi; and the Central Institute of Freshwater Aquaculture, Bhubneshwar progressed 15 their Ph.D. degrees; 15 trainees successfully completed the one-year PG Certificate Programme in inland Fisheries Development and Administration.

45 students enrolled under the nine Master' programmes, while 24 students enrolled for the Ph.D. programmes. 25 trainees were admitted to the PG Diploma Programme in Inland Fisheries Development and Administration at Kolkata Centre. Eight guest lectures were arranged for the benefit of the students while the CIFE faculty delivered two guest lectures at other institutes.

Twenty Institutional Projects and 19 Externally Funded Projects were in operation. Notable research achievements during the year were the practical utility of cage culture technology in reservoirs; continued inputs to the database of the marine fisheries of Maharashtra; development of immunodiagnostics kits for detection of virual and bacterial pathogens of fish; value addition to low cost fish; further refinement of hatchery technology for giant freshwater prawn using Inland Ground Saline Water(IGSW); mapping the dynamics of cyanobacterial secondary metabolites in a freshwater lake, etc.

45 dissertations were submitted by the M.F.Sc students. A total of 125 research/educational publications of various technical categories were made. A total of 8 Seminar/symposia/Brainstorming Sessions were conducted on various aspects of research in fisheries sciences. The institute conducted 37 Training Programmes of varying durations and a total of 632 were trained.

3.INTRODUCTION

Ever since its establishment in 1961, the Central Institute of Fisheries Education (CIFE), Mumbai, has played a pivotal role in post-graduate fisheries education and training. Research and extension endeavours were strengthened with the transfer of administrative control of CIFE from the Government of India to the Indian Council of Agricultural Research (ICAR) in 1979. In due recognition of its yeomen services to the development of Indian fisheries in general and human resource development for the purpose in particular, CIFE was deservingly conferred the coveted status of Deemed University in 1989, and has registered remarkable progress since then. Today, CIFE stands tall as a premier alma mater in the global fisheries map. The present campus of CIFE is located in a lush green campus of about 2.22 ha at a distance of about half a kilometer from the Versova beach at Mumbai whereas the New academic building of CIFE is located at Yari Road, Versova which is spread over 16.5 acres of land. The Administration section, the Finance & Accounts section and the Library are located in the old campus. All the academic activities are carried out at the New Campus, which has facilities like classrooms, laboratories, auditorium, committee room, conference hall, etc. and further construction work is underway.

3.2 MANDATE

To conduct education and research programmes leading to post-graduate (M.F.Sc.) and doctoral (Ph.D.) degrees in specialized disciplines of fisheries science and technology.

To conduct capsule courses for catering to the refresher training needs of fisheries developmental and extension personnel.

To conduct basic research in frontier areas of fisheries science and technology through institutional and collaborative efforts.

To conduct need-based capsule/vocational training on various technologies related to fisheries and allied disciplines.

To provide institutional support for consultancy and participation in sponsored projects and programmes with other institutions and agencies for fisheries research in inland, coastal and marine (both within EEZ and beyond) sectors.

3.3 SANCTIONED STAFF STRENGTH AS ON MARCH 31, 2005

Name of the Post	Sanctioned	Filled	Vacant	Pay Scale
SCIENTIFIC RMP -Director RMP – Jt. Director	 01 01	 - 01	 01 -	 25000/- 16400-22400
PRINCIPAL SCIENTIST	10	07	03	16400-22400
SENIOR SCIENTIST/	20	11	09	12000-18300
SCIENTIST	60	35	25	8000-13500
TOTAL	92	54	38	
TECHNICAL T-7	04	03	01	10000 -15200
T-6	03	03	-	8000 -13500
T-5	13	13	-	6500 -10500
T-4	12	12	-	5500 -9000
T-II-3	39	37	02	4500 -7000
T-2	12	12	-	4000 -6000
T-1	44	43	01	3200 -4950
TOTAL	127	123	04	
NON -MINISTERIAL	01	01	-	3200 -4950
ADMINISTRATIVE C.A.O.	01	01	-	10000 -15200
A.O.	01	01	-	8000 -13500
F. & A.O.	01	01	-	8000 -13500
AAO	05	05	-	6500 -10500

ASSTT . DIRECTOR (OL)	01	01	-	6500 -10500
PRIVATE SECRETARY	02	02	-	6500 -10500
PERSONAL A SST.	01	01	-	5500 -9000
ASSISTANT	15	15	-	5500 -9000
STENOGRAPHER -III	03	03	-	4000 -6000
UDC	17	17	-	4000 -6000
LDC	21	15	06	3050 -4590
TOTAL	68	62	06	
SUPPORTING S.S.Gr.I	28	19	07	2550 -3200
S.S.Gr.II	33	33	-	2610 -3540
S.S.Gr.III	20	20	-	2660 -4000
S.S.Gr.IV	10	10	-	2750 -4400
S.S.Gr.IV (VESSEL)	03	03	-	2750 -4400
TOTAL	94	87	07	
GRAND TOTAL	382	327	55	

3.4 BUDGET (2004 - 2005)

Heads	Sanctioned	Expenditure
Non P lan	1259.69	1241.58
Plan	1041.00	813.70
NATP	26.09	31.06
CAS	4.67	4.11
SDU	26.00	18.69
SUMMSER INSTITUTE	1.75	2.13
EMERITUS SCIENTIST	2.32	2.23
NEH	50.00	14.96
TOTAL	2411.52	2128.46

4. RESEARCH ACHIEVEMENTS

Institute-funded projects

Documentation of halophilic bacterial diversity in Western Rajasthan

PI: C. S. Purushothaman

Water and sediment samples were collected from Lunkaransar Lake, Pachpadra salt pits, Didwana Lake and Sambhar Lake. The Sambhar Lake samples were collected at Nawa and Jhapok. Around 140 halophils have been isolated on pure cultures by repeated plating of the isolates. Further, the bacterial isolates are being identified using standard protocols and the work has almost been completed.

Development of Nitrogenous Bacterial Fertilizers for Aquaculture

PI: P. K. Pandey

Samples of water and sediment were collected from Mumbai, Kolkata, Somnath, Powarkheda, Chinhat and Kakinada, during pre-monsoon, monsoon and post-monsoon seasons. Different parameters of water and sediment were analysed for brackishwater and freshwater fishponds. One hundred isolates of nitrogen fixing bacterial populations of water and sediments were isolated and are being maintained. Through morphological and biochemical analyses, the nitrogen-fixing bacterial species of Azotobacter chroococcum and A. beijerinckii have been identified and used for testing their efficacy in nitrogen fixation. Bacterial fertilizers were prepared using sawdust, Fuller's earth and charcoal. Bacterial fertilizers prepared using A. chroococcum and saw-dust as the carrier material were used successfully for rearing fry of Indian major carps in freshwater and for raising Chanos chanos in brackishwater to marketable size. Significant differences with regard to length and weight in comparison to control were observed.

Evaluation Of Neuromodulatory Activity of Conopeptides

PI: K. Venkateshvaran

Sleeper and Shaker Peptides were isolated from Conus inscriptus, C. hyaena, and C. lentiginogus have been subjected to Centricon filtration to isolate

peptides less than 7 KDa. Potent analgesic activity has been found in the peptide isolated from Conus inscriptus.

Microcystin-LR and Anacystin in Powai Lake and their Impact on the Zooplankton and Ichthyofauna

PI: A. Vennila

Field Collection for 13 months had been completed and the overall results are as follows: the dominant species were Anabaena, Nostoc, Anacystis, Paediastrum, Oscillatoria which occurred at concentrations of 75,000/l to 2,86,666/l. Histopathological studies of fish from the lake and Tissue residue studies have been completed. Genotoxic studies are in progress.

Refinement of cage Aquaculture for rearing and raising table size fish in open waters, with emphasis on nutrition

PI: Kiran Dube

Cages were made of HDPE (high density poly ethylene) knotless webbing of 6-8 mm mesh size, measuring 3 m X 3 m X 3 m were designed and fabricated at the experiment site. These cages were installed in raft type frame made of wood having different dimensions. The frames were floated on 200 l capacity synthetic sealed barrels. All the four sides and central part of the frames were provided with a working platform made of wooden planks, which served as catwalk for the workers. The nets were fixed with synthetic ropes to four corners and center of the iron poles to keep the net in stretched condition. Each cage was also covered from top by using the same net material to prevent the fishes to escape and to become pray for the birds. The effective water depth in all cages was two meters, having overboard of one meter above the water. Bottom periphery of each cage was provided with sinkers so as to keep it stretched and stationary.

16 cages were installed at the start of experiment during 2003 at Gobinsager reservoir and then 16 more cages were shifted from Halali reservoir (Madhya Pradesh) during 2004. At present, all 32 cages are in operation. The fingerlings reared last year (till 10th February,2004) were kept in the same cage for further culture and final harvest was done on 26th July, 2004. The new experiment was started on 27th July, 2004 and harvested on 27th October, 2004. Then the fish was thinned out from the cages and rest kept for further growth. In addition to this three small new experiments were also conducted.The results are presented below in tabular form

Growth of Carps Catla catla and Labeo rohita in floating Cages at Gobindsagar reservoir, Himachal Pradesh. Fry to Fingerling Stage

Fish Species (No of cages)	Stocking Density/m^3 (Nos/Cage Average)	Duration in days (Period)	Initial Stocking (Average)		Final Harvesting (Average)		Survival (%)	Growth per day (g)	FCR
			Length (mm)	Weight (g)	Length (mm)	Weight (g)			
*Catla catla** (1)	125 (2,250)	92	29.33 ±2.79	0.488 ±0.04	91.30 +6.43	7.35 ±0.41	67.24	0.075	1:2.07
*Catla catla*** (3)	125 (2,250)	92	29.33 ±2.79	0.488 ±0.04	100.03 +6.26	8.63 ±0.57	77.16	0.089	1: 1.54
*Catla catla**** (3)	125 (2,250)	92	29.33 ±2.79	0.488 ±0.04	107.10 ±4.55	9.13 ±0.48	80.96	0.094	1: 1.38
*Catla catla***** (3)	125 (2,250)	92	29.33 ±2.79	0.488 ±0.04	112.33 +7.50	9.85 ±0.85	83.01	0.102	1: 1.25
*Labeo rohita** (1)	125 (2,250)	92	27.80 ±1.93	0.232 ±0.04	93.30 ±2.50	6.20 ±0.26	73.33	0.065	1: 2.45
*Labeo rohita*** (3)	125 (2,250)	92	27.80 ±1.93	0.232 ±0.04	105.43 ±5.10	8.12 ±0.44	75.78	0.086	1: 1.66

Feed-- *R.B+O.C(1:1),** 20% Protein , ***30% Protein and **** 40% Protein

Growth of Carps *Catla catla* and *Labeo rohita* in floating Cages at Gobindsagar reservoir, Himachal Pradesh. Fry to Fingerling Stage

Fish Species (No of cages)	Stocking Density/m^3 (Nos/Cage Average)	Duration In days (Period)	Initial Stocking (Average)		Last Sampling (Average)		Growth per day (g)
			Length (mm)	Weight (g)	Length (mm)	Weight (g)	
*Labeo rohita*** (4)	100 (1,800)	62	43.00 ±3.76	0.707 ±0.06	72.32 ±3.96	6.62 ±0.43	0.095
*Labeo rohita** (2)	100 (1,800)	62	46.33 ±4.24	0.887 ±0.22	115.07 ±6.53	15.27 ±2.86	0.232
*Catla catla** (1)	100 (1,800)	62	49.60 ±3.83	1.47 ±0.23	88.20 +4.86	8.30 ±0.59	0.110

* Karnal Seed ** Nalagarh Seed

Growth of Carps *Catla catla, Labeo rohita* and *Cyprinus carpio* in floating Cages at Gobindsagar reservoir, Himachal Pradesh. Fingerling to Advanced Fingerling Stage

Fish Species (No of cages)	Total Number Stocked (in No of Cages)	Duration in days (Period)	Initial Stocking (Average)		Final Harvesting (Average)		Survival (%)	Growth per day (g)	FCR
			Length (mm)	Weight (g)	Length (mm)	Weight (g)			
Catla catla (2)	3,213 (2)	167	120.60 ± 8.76	13.10 ±3.89	165.00 ±10.44	172.05 ±30.07	95.52	0.95	1: 2.44
Labeo rohita (2)	5,845 (2)	167	116.34 ±12.77	11.62 ±2.65	152.75±10.73	59.55 ±6.98	90.20	0.29	1: 2.68
Labeo rohita (4)	6,195 (4)	167	137.82 ±19.72	13.52 ±2.65	214.63 ±32.29	110.38 ±26.74	97.79	0.58	1: 2.32
Cyprinus carpio (2)	3,312 (2)	167	73.03 ±7.34	4.50 ±1.28	172.75 ±35.57	162.00 ±38.90	87.71	0.94	1: 1.88

Growth of Carps *Catla catla* and *Labeo rohita* in floating Cages at Gobindsagar reservoir, Himachal Pradesh. Fingerling to Advanced Fingerling Stage

Fish Species (No of cages)	Stocking Density/m^3 (Nos/Cage Average)	Duration in days (Period)	Initial Stocking (Average)		Last Sampling (Average)		Growth per day (g)
			Length (mm)	Weight (g)	Length (mm)	Weight (g)	
*Catla catla** (2)	50 (900)	107	107.20 ±11.07	7.77 ±0.78	132.40 ±5.99	28.90 ±3.69	0.197
*Catla catla*** (3)	50 (900)	107	107.20 ±11.07	7.77 ±0.78	143.00 ±6.82	40.53 ±5.12	0.306
*Catla catla**** (3)	50 (900)	107	107.20 ±11.07	7.77 ±0.78	157.33 ±7.16	53.29 ±7.81	0.425
*Labeo rohita** (1)	50 (900)	107	110.87 ±8.57	9.43 ±1.33	111.87 ±7.61	11.53 ±2.85	0.020
*Labeo rohita*** (3)	50 (900)	107	110.87 ±8.57	9.43 ±1.33	124.89 ±8.72	18.93 ±5.51	0.089
*Labeo rohita**** (3)	50 (900)	107	110.87 ±8.57	9.43 ±1.33	124.80 ±7.93	22.35 ±7.03	0.121

Feed-- *R.B+O.C(1:1),** 20% Protein , ***30% Protein and **** 40% Protein

Table 5: Water quality of Gobindsagar Reservoir,Himachal Pradesch
Details of cage aquaculture experiments carried out
at Gobindsagar Reservoir (H.P.)

Fish Species (No of cages)	Duration in days (Period)	Number Stocked	Initial Stocking (Average)		Final Harvesting (Average)		Number Harvested	Survival (%)
			Length (mm)	Weight (g)	Length (mm)	Weight (g)		
Fry to Fingerling stage								
Catla catla (2)	132	3,600	32.60	0.327	120.60	13.10	3,213	89.25
Labeo rohita (4)	132	7,200	33.55	0.349	116.34	11.62	5,845	81.18
Labeo rohita (2)	132	7,200	31.55	0.308	137.82	13.52	6,195	86.04
Cyprinus carpio (2)	132	3,600	34.50	0.686	73.03	4.50	3,312	92.00
Catla catla (10)	92	22,500	29.33	0.488	102.69	8.74	17,789	79.06
Labeo rohita (10)	92	22,500	27.80	0.232	107.26	8.63	17,470	77.64
Fingerlings to Advanced Fingerlings								
Catla catla (2)	167	3,213	120.60	13.10	165.00	172.03	3,069	95.52

Evaluation of Permethrin and Deltamethrin Toxicity and efficacy of Ascorbic Acid in reducing Toxicity related stress in Common Carp

P. I: Dr. Neelam Saharan

Physico-chemical parameters of water were adversely affected as the concentration of synthetic pyrethroids viz. permethrin and deltamethrin increased as shown in tables 1 and 2, There was slight decrease in pH (7.51 7.34) and D.O (7.05 6.74ppm) and increase in total alkalinity (53 58ppm), hardness (55 58ppm) and free CO_2 (1.11 1.69ppm) The adverse impact was greater in case of deltamethrin treated fishes.

The glycogen content in liver showed a gradual decrease with increase in exposure time. The reduction in hepatic glycogen was significant in the initial 12 hours of exposure in comparison with the control followed by a slight recovery and thereafter a gradual fall up to 96 hours.

The glucose level in blood increased concomitantly with increase in exposure time of permethrin and deltamethrin. The glucose level was more in deltamethrin treated fish than in permethrin treated fish.

The ascorbic acid content in liver showed a gradual decrease with increase in exposure time. The reduction in ascorbic acid was significant in the initial 24 hours of exposure in comparison with the control followed by a slight recovery and thereafter a gradual fall up to 96 hours.

Glycogen Content in liver of Common carp exposed to sublethal conc. Of permethrin (mg/ g wet tissue)

Period of exposure (Hours)	Glycogen Content in liver
Control	9.445
12	6.334
24	8.564
48	8.276
72	7.776
96	6.553

Glycogen Content in liver of Common carp exposed to sublethal conc. of deltamethrin (mg/ g wet tissue)

Period of exposure (Hours)	Glycogen Content in liver
Control	10.445
12	6.664
24	8.104
48	7.776
72	6.987
96	6.234

Glucose level in blood (mg / 100 ml) of Common carp exposed to sub-lethal conc. of permethrin

Period of exposure (Hours)	Blood Glucose (mg / 100ml)
Control	35.026
12	41.038
24	46.654
48	55.632
72	58.194
96	62.234

Glucose level in blood (mg / 100 ml) of Common carp exposed to sub-lethal conc. of deltamethring

Period of exposure (Hours)	Blood Glucose (mg / 100ml)
Control	35.782
12	44.030
24	47.694
48	51.732
72	52.994
96	59.432

Ascorbic acid level in blood (ug / 100 ml) of Common carp exposed to sub-lethal conc. of permethrin

Period of exposure (Hours)	Ascorbic acid (ug / 100ml)
Control	99.445
12	86.334
24	81.564
48	85.276
72	79.776
96	76.553

Ascorbic acid level in blood (ug / 100 ml) of Common carp exposed to sub-lethal conc. of deltamethrin

Period of exposure (Hours)	Ascorbic acid (ug / 100ml)
Control	99.445
12	83.734
24	78.444
48	79.247
72	70.776
96	66.553

Studies on Production Potential and Conversion Efficiency of Omega-3 Fatty Acids in Indian Major Carps

PI: G. Venkateshwarlu

In order to study the inherent capacity of rohu to convert essential fatty acids into human health beneficial highly unsaturated fatty acids, a feeding trial has been carried out for 90 days using 280 fingerlings of rohu. The fish were fed with five experimental diets in which the added lipid was from four different vegetable oils and fish oil.

Analysis of fatty acids: The fatty acid profiles of different diets were established by gas chromatography. After 45 days of the experiment, the fatty acid profiles of fish muscle were also studied by gas chromatography to determine the composition of fatty acids in fish fed with different diets.

Activity of lipigenic enzymes: The activity of four lipogenic enzymes has been studied in the fish to understand the activity of enzymes in relation to the diet on which they were fed. The enzymes studied were: ATP citrate lyase, Glucose 6-phosphate dehydrogenase, Malic enzyme, Isocitrate dehydrogenase and intestinal lipase.

Molecular studies on growth enhancer and promoters (genes) of commercially important fish (Asian Seabass)

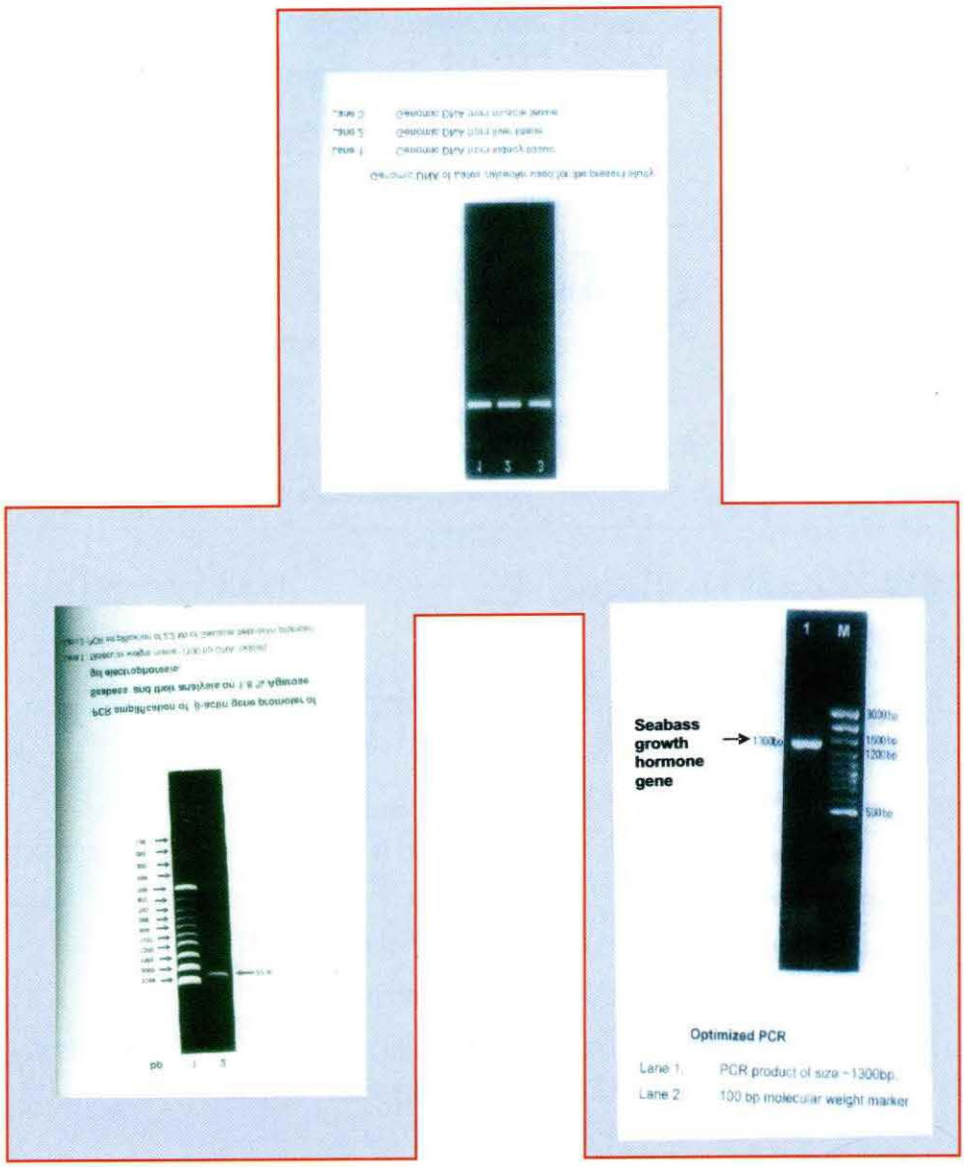
PI: S.D.Singh

Identification and collection of highly productive fish stock (Asian Seabass): Asian seabass of about 1 to 1.5 kg live weight were procured from Mumbai coastal region (Panvel/ Pen areas) and pituitary glands and fin tissues were dissected out, pooled and preserved in ice under hygienic conditions for DNA isolation.

Genomic DNA from Seabass tissue: Isolation, purification and quantification Genomic DNA was isolated using a standard SDS-Phenol-Chloroform method with some modification. RNAse treatment was done if RNA was there in the sample. Quantification and purity was checked by measuring OD at 260 and 280 nm.

Primers for promoter and growth enhancer genes: Design and synthesis thereof Specific primers (Forward and Reverse) consisting of promoter region of B-actin gene, PF and PR and Growth hormone gene, GHF & GHR were designed from published sequences. Additional sites for BamHI and EcoRI were added in GHF and GHR primers for directional cloning.

Analysis and detection of PCR products, i.e. Growth hormone and Promoter gene of Asian Seabass: Electrophoresis in 1% agarose gel showed DNA bands of about 2.3 kb for B-actin promoter and 1.3 kb for Growth hormone gene. These bands are being utilized for cloning into suitable vector/ host cells.



Stock assessment of some of fishery resources of Mumbai coast.

PI: S. K. Chakraborty

The project deals in studies on the stock assessment of eight demersal species of fish belonging to four families 4 species to Sciaenidae, 2 species to Nemipteridae and 2 species each to Priacanthidae amd Serranidae. In addition to these eight species the project envisages stock assessment of three species of cephalopods of which one belongs to the family Loliginidae and the other two to the family Sepiidae. The familywise species breakup is given below:

Sciaenidae	:	*Johnius macrorhynus, Johnieops vogleri, Otolithes cuvieri* and *Johnieops sina*
Nemipteridae	:	*Nemipterus japonicus, N. mesoprion*
Priacanthidae	:	*Priacanthus hamrur*
Serranidae	:	*Ephinephelus diacanthus*
Loliginidae	:	*Loligo duvauceli*
Sepiidae	:	*Sepia aculeata, Sepiella innermis*

Employing standard methods the growth mortality and stock parameters of all the species were worked out. They are presented in Table 1 & 2.

Some Important Observations:

1. The monsoon ban of mechanized fishing was followed from June 10 to 15th August, 2004..
2. Revival of 'Koth' fishery was observed.
3. Heavy recruitment of *N. japonicus* and *N. mesoprion* during December March period.
4. Landing of *N. delagoa* continued upto February, 2005.
5. Landings of *S. glauca* continued till March 2005.
6. Juveniles of oil sardine and Bombay duck landed in huge quantities in September-October, 2004 and January-February, 2005.

Annual size range, number of specimen measured and total catch

April 2004 March 2005

S.No.	Species	Length range (mm)	No. of specimen measured	Total catch (tons)
1	*J. macrorhynus*	95 - 330	3004	782.750
2	*J. vogleri*	110 - 335	3189	882.750
3	*O. cuvieri*	94 - 365	3123	756.275
4	*J. sina*	90 - 220	3291	286.750
5	*N. mesoprion*	40 - 255	3311	826.183
6	*N. japonicus*	62 - 307	3319	696.042
7	*P. hamrur*	110 - 397	1867	251.250
8	*E. diacanthus*	105 - 438	2612	377.725
9	*Loligo duvauceli*	20 - 368	3946	746.705
10	*Sepia aculeata*	20 - 175	2931	823.150
11	*Sepiella inermis- Male*	19 - 44	2007	237.515
12	*Sepiella inermis- Female*	19 - 44	2387	282.485
	Total		34987	6949.58

The mortality, population and stock parameters of all the species.

SPECIES	Z	M	F	E	U	Y	Y/U Total stock	Y/F Standing stock	MS
J . macrorhynus	4.51	1.50	3.01	0.66	0.65	783	1204	260	58(
J. vogleri	5.18	1.47	3.71	0.71	0.70	883	1261	238	61(
O. cuvieri	2.66	1.21	1.45	0.54	0.53	756	1426	521	69
J. sina	9.13	2.01	7.12	0.78	0.77	287	372	40	184
N. japonicus	4.99	1.53	3.46	0.69	0.68	696	1023	201	696
N. mesoprion	5.99	1.64	4.35	0.72	0.71	826	1163	190	567
P. hamrur	1.90	1.30	0.60	0.31	0.29	251	865	418	397
E. diacanthus	2.90	1.14	1.76	0.60	0.59	378	640	214	311
L. duvauceli	3.24	2.21	1.03	0.32	0.30	746	2486	724	1173
S. aculeata	9.49	1.52	7.97	0.84	0.82	823	1003	103	489
S. inermis- Male	4.41	2.61	1.80	0.41	0.40	236	590	131	289
S. inermis - Female	8.22	2.81	5.39	0.65	0.64	283	442	525	216

The mortality, population and stock parameters of all the species.

SPECIES	Z	M	F	E	U	Y	Y/U Total stock	Y/F Standing stock	MS
J . macrorhynus	4.51	1.50	3.01	0.66	0.65	783	1204	260	58(
J. vogleri	5.18	1.47	3.71	0.71	0.70	883	1261	238	61(
O. cuvieri	2.66	1.21	1.45	0.54	0.53	756	1426	521	69
J. sina	9.13	2.01	7.12	0.78	0.77	287	372	40	184
N. japonicus	4.99	1.53	3.46	0.69	0.68	696	1023	201	696
N. mesoprion	5.99	1.64	4.35	0.72	0.71	826	1163	190	567
P. hamrur	1.90	1.30	0.60	0.31	0.29	251	865	418	397
E. diacanthus	2.90	1.14	1.76	0.60	0.59	378	640	214	311
L. duvauceli	3.24	2.21	1.03	0.32	0.30	746	2486	724	1173
S. aculeata	9.49	1.52	7.97	0.84	0.82	823	1003	103	489
S. inermis- Male	4.41	2.61	1.80	0.41	0.40	236	590	131	289
S. inermis - Female	8.22	2.81	5.39	0.65	0.64	283	442	525	216

Fishing Technologies: Optimal designs and economic viability of fishing Craft and Gear along the coast of Maharashtra

PI: Latha Shenoy

The format for questionnaire was prepared, statistics on craft and gear was collected from the Maharashtra State Fisheries Department and an action plan was chalked out for carrying out the survey in the five maritime districts of Maharashtra. The data was collected on craft and gear of Versova, Madh and Worli in the district of Greater Mumbai.

Studies on the influence of different water, soil and organic matter parameters on chemo-toxicological effects of xenobiotics to fish

PI: Dr. Subhendu Datta

Effect of water parameters e.g. Ca, HCO_3, CO_3 content on the toxicity of inorganic (e.g. Hg, Cd and Pb) and organic (e.g. synthetic pyrethroids) xenobiotics to fish, *Cyprinus carpio* var *communis* (Linn.) was studied. It was observed that increase in calcium, carbonate and bicarbonate concentration can reduce the acute and chronic toxicity of metals. But carbonate anion has highest effect among these three ions. For Cypermethrin increase in carbonate and bicarbonate concentration up to certain level (i.e. 30 ppm) can reduce the toxicity. Effect of soil and organic matter factors e.g. clay content, particulate and dissolved organic matter content on the toxicity of above xenobiotics was studied. Complexation of inorganic Pb, Cd and Hg by the dissolved organic carbon retards these metal ions to show their effect and responsible for reducing toxicity. However, the experiment is incomplete and some more time is required to report the details result of the complete experiment. Regarding effect of contamination time of soil and organic matter with xenobiotics on the toxicity it was observed that contact time with soil sediment had significant effect in reducing the toxicity effect of arsenic and mercury. But, the effect was more pronounced in case of mercury than arsenic.

EIA studies of West Bengal Rivers to identify strategies for the enhancement of fish production in the rivers.

PI: Dr. K. Chandra

Survey work was carried out in Haldi river near Haldia, Ganga River at Farakka barrage and the sewage outfall of old and new Digha town in the shoreline of Bay of Bengal. Water, soil, plankton and benthos samples were collected and analysed. Results showed increased pollutional load in these places.

Improvement in breeding of selected oviparous ornamental fishes through feed manipulation

PI: Dr. Archana Sinha

Feed formulation and manufacturing have been done. Procurement of experimental fishes and their acclimatization is over. Feeding trial on selected experimental fishes-Gold Fish (*Carassius auratus*), Black Angel (*Petrophylum scalare*), Pearl Gourami (*Trichogaster leeri*) and Tiger Barb (*Barbodes hexazona*) is under progress. *Lactobacillus* sp. had been isolated from gut of mrigal and its probiotic effects was tested against some pathogenic organisms like *Pseudomonus* sp. *Edwardsilla* sp. etc. *Lactobacillus* was incorporated @ 10^6, 10^7 and 10^8 numbers per gram of feed. Initial length, weight and proximate composition of experimental fish on 0 day were taken.

Strategical approach for the development of compounded feed for carp and prawn based polyculture system

PI: Dr. Parimal Sardar

Survey work in prawn based polyculture farm around Kolkata for ascertaining existing culture practice, feed and feeding practice has been completed. The results clearly demonstrated that overall poor productivity was found in the ponds where fish and prawn were maintained solely on natural food, with no artificial

feed being supplemented. The same was true in cases where only traditional mixture of rice bran and GNC was provided without fertilization of ponds. In comparison to farm-made feed, commercially manufactured pellets showed better performance. This might be due to the proper nutrient balance and less leaching of nutrients.

Feed, fish, prawn, and plankton from surveyed farm have been collected for assessment of nutritional status of fish and prawn in the existing system. Carcass composition of fish and prawn revealed that the ponds where no artificial feed was used, protein lipid and total ash were significantly lowered Prawns showed better carcass quality than carps.

Three types of pelleted feeds with 0.5 mm particle size having 15, 20 and 25% protein respectively have been manufactured at a cost of Rs. 15.13, 15.44 and 20.04 per kg respectively. All the feeds were having 25 or 0% sinking and 75 or 100% floating pellets with the sinking rate of 5 to 10 cm per minute. All kinds of pellets were sufficiently water stable i.e. more than 5h.

Breeding and mass scale seed raising in three non-conventional fish species in the field condition

PI: Dr. R.C. Das

Brood fishes of *Notopterous chitala* (250 nos.), *Ompok pabda* (670 nos.) and *Labeo bata* (530 nos.) were collected from different sources and stocked at Beldanga, Malda fish farm of Mr. Dipak Roy except *Labeo bata* which were stocked in the farm of Mr. A. Sarkar at Raiganj, West Dinajpur. Conventional feed supplemented with vitamins and minerals are regularly provided @ 3% of the body weight. The breeding work will be undertaken in the ensuing breeding season i.e. June July, 2005.

Development of Alternative Shellfish and finfish for Brackish water aquaculture

PI: G.Venugopal

Culture of *Scylla serrata, Marsupenaeus japonicus, and Mugil cephalus* was carried out.

1. Culture of *Scylla serrata*: *S.serrata* (crablets) were stocked at three different stocking densities i.e., 5,000;7,500; & 10,000 nos/ha in 800 sq.mts each pond. All the experiments were conducted in duplicate. The artificial feed used during the culture period was low priced trash fish procured from fishing harbour. Feed was given at 7% body weight split in two doses twice a day. The results revealed a mean survival of 51.62%; 30.8%; & 29.0% for stocking densities of 5000, 7500 and 10,000 nos/ha respectively and production rates per hectare obtained for corresponding stocking densities were 594 kgs, 510 kgs, and 657 kgs respectively during four months of culture period.

Growth of crabs were observed to be very rapid up to two months period and subsequently slowed. However, the final growth range at harvest was between 150-450 grams. The significant findings of the experiment was male crabs have exhibited higher growth rates than females. Further stocking density of 5000 nos per hectare was observed to be ideal density and viable economically too.

Harvesting particulars of crabs stocked at 5 000 nos. /ha

Particulars	Pond -10	Pond-11
Days of culture	116	126
Total Kgs.	43.92	51.22
ABW	258.4	246
Survival	46	57.25
Production Rate (Kg./ha)	549	640.25

Harvesting particulars of crabs stocked at 7 500 nos. /Ha

Particulars	Pond - 7	Pond - 8
Area (ha)	0.08	0.08
Days of culture	112	127
Total harvested (kg)	48.3	33.29
ABW (g)	270.4	248
Survival (%)	36.66	25
Production rate (kg/ha)	603.75	416.125

Harvesting particulars of crabs stocked at 10 000 nos. /Ha

Particulars	Pond - 5	Pond - 6
Area (ha)	0.08	0.08
Days of culture	118	116
Total production (kg)	57.25	47.978
ABW (g)	249	255
Survival(%)	31.125	27
Production rate (kg/ha)	715.62	599.72

S.serrata culture activities at Brackishwater Fish Farm








2.Culture of *M.japonicus:*

For conducting the culture experiments of *M.japonicus*, CIBA Chennai has extended support by providing seed. The experiments were attempted two times, during the first attempt the PL 15 raised in hatchery was stocked @ 3/ m^2 in 0.1 ha pond has failed after 30 days of rearing. During second attempt nauplii received from CIBA Chennai was reared locally at Kakinada in one of the private hatcheries yielded 6,000 PL-25 (stage). This seed was stocked in 0.2 ha pond at the density of 3/ m^2 at a salinity range of 14-20ppt. The stock was maintained by feeding with commercial pelleted shrimp feed applied 3-4 times a day. After 66 days of culture partial mortality was observed continuously for two days. Immediate remedial measures were adopted and mortality could be controlled. successful rearing for a period of 110 days. The growth of prawn could be achieved in the range of 15-20 grams with a mean of 17 gram and 5% survival.

Brood stock development: About 120 nos of this stock is being maintained for raising brood stock for seed production purposes during the second year of the project.

The major achievements of the project have been :

i) *M.japonicus* could be cultured in brackish waters in the salinity range of 14-19 ppt

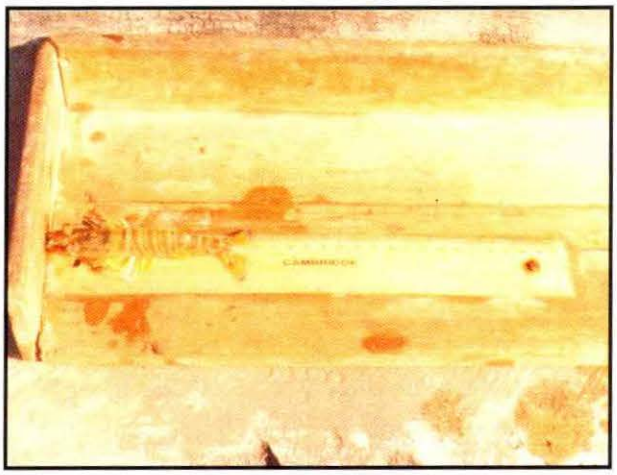
ii) After WSSV attack prawns could be survived.

iii) For the first time culture could be maintained up to 110 days

iv) A growth of above 17 grams is recorded for the first time in brackish water.

Seed of M.japonicus

Sample of M.japonicus (8grams)



M.japonicus sampling and demonstration

3.Culture of *M.cephalus*:

The culture of grey mullet was taken up in two ponds of 0.2 ha each at a stocking density of 7500 nos/ha. Nursery reared fingerlings of 10 grams ABW were stocked and cultured for nine months period. Formulated artificial mash feed and phased fertilization with organic manures were adopted. The harvesting results indicated a production of 1069-1195 kh/ha with a survival of 65.6 - 85% during 9 months culture period.

Harvesting particulars of *M.cephalus*

Particulars	Pond 16	Pond 17
Days of culture	278	283
Total kgs	239	213.94
Avg.Weight(gm)	242.48	166.6
Survival (%)	65.66	85.53
Production rate (kg/ha)	1195	1069.7

Harvest of Mugil cephalus at Brackish water fish farm

II. Development of transgenic carps: With the approval of Director CIFE research support was extended to team of Scientists of CCMB Hyderabad for development of transgenic rohu and catla. The required brood stock of carps and breeding of carps was conducted at Balabhadrapuram farm and required quantity of fertilized eggs was supplied. The stock of spawn produced by CCMB is being reared at freshwater fish farm Balabhadrapuram with atmost care and at regular intervals samples were drawn and growth and survival results were communicated to CCMB, Hyd.

Development and standardization of techniques of grow-out of finfishes and shellfishes and seed production of freshwater prawn and magur using inland underground saline water

PI: Sudhir Raizada

Sub-Project: Development of packages of grow-out practices of finfishes and shellfishes in low and higher saline underground water

PI: Sudhir Raizada

Monoculture of Freshwater Prawn in cement ponds

An experiment was undertaken to assess the survival and growth of Giant Freshwater Prawn, *Macrobrachium rosenbergii* using low saline ground water (4-5 ppt) in two cement lined ponds of size 0.045 ha. Five-days old post-larvae of prawn of size 10-11 mm were procured from M/S Lokesh Aqua, Vishakhapatnam on 12th August 2004 and stocked @ 60,000 per hectare without any aeration system and exchange of water. The larvae were fed on CP Brand commercial pelletized prawn feed and reared up to 83 days. A survival of 34.33 percent was obtained. It was conferred that prawns could be reared up to about 3-months time at the stocking density of 60,000/ha in cement tanks without any artificial substrate, aeration and change of water in 4-5 ppt ground saline water with 30% survival.

Polyculture of milkfish, pearl spot and asian magur

An experiment was carried out to assess compatibility and growth of milkfish, pearl spot and asian magur in a polyculture system with low saline ground water (4-5 ppt). A pond of size 0.16 ha was stocked with 750 fingerling of milkfish (*Chanos chanos*) of average initial size 80 mm length and 3.0 gm weight, 150 fingerling of pearl spot (*Etroplus suratensis*) of average size length 40 mm and 1.0 gm weight and 350 fingerling (40 days old) of magur (*Clarias batrachus*) during 16-18 September 2004. The pond was regularly manured with cattle dung and supplementary feeding was retorted with poultry feed, the quantity of

which was reduced from 10% to 4% per kg body weight from second month onwards. The fishes were reared up to 180 days. A survival of 90% (675 nos) of milkfish of size length 190 mm and weight 75 gm was obtained whereas, pearl spot and magur showed respective sizes of 100 mm length, 25 weight and 150 mm length and 80 gm of weight. The survival was estimated to be around 30%. The physico-chemical characteristics of pond water recorded varied between temperature 8-38 ^{0}C, pH 8.16-8.37, D.O. 8.6-9.4 mg/l, salinity 4-5 ppt, total alkalinity 200-236 mg/l, total hardness 1120-1280 mg/l and chlorides 1325-1730 mg/l. The study thus revealed that magur can be suitably cultured along with milkfish and pearl spot and low saline ground water.

Sub-Project: Development of hatchery technology of Giant freshwater prawn using inland sub-surface water

PI: Sudhir Raizada

The experiments on hatchery seed production of Giant Freshwater Prawn, *Macrobrachium rosenbergii* using ground saline water was continued in the current year. Since, the survival of prawn larvae was very poor (2-11%) in the preceding year, the ionic levels in the ground saline water were further rectified by changing the Ca^{++}/Mg^{++} ratio from 1.9 to between 2.7. The eight prawn larval cycles reared with this water were successfully closed and a total of 29,834 post larvae were produced using ground saline water. The survival of larvae from stage-I to post larvae was between 20-67% with an average of 37.5%, which was quite high considering the rate under indian conditions. A total of 18,000 seed (PL 25-35) was supplied to CIFE Lucknow Centre (7,000), CIFE Powerkhera Centre (2,000) and the M.P. Fisheries Development Corporation, Bhopal (9,000) in order to evaluate the survival and growth potential of the seed produced with ground saline water under different agro-climatic conditions. The preliminary results have indicated that the growth and survival of prawn is at par with the seed produced with coastal seawater. Thus, it is assumed that the technology so developed is standardized and can be transmitted to the industry. In order to disseminate the technology, two short-term training programs were organized during the reporting period, which were attended by the state personnel and the farmers.

which was reduced from 10% to 4% per kg body weight from second month onwards. The fishes were reared up to 180 days. A survival of 90% (675 nos) of milkfish of size length 190 mm and weight 75 gm was obtained whereas, pearl spot and magur showed respective sizes of 100 mm length, 25 weight and 150 mm length and 80 gm of weight. The survival was estimated to be around 30%. The physico-chemical characteristics of pond water recorded varied between temperature 8-38 ^{0}C, pH 8.16-8.37, D.O. 8.6-9.4 mg/l, salinity 4-5 ppt, total alkalinity 200-236 mg/l, total hardness 1120-1280 mg/l and chlorides 1325-1730 mg/l. The study thus revealed that magur can be suitably cultured along with milkfish and pearl spot and low saline ground water.

Sub-Project: Development of hatchery technology of Giant freshwater prawn using inland sub-surface water

PI: Sudhir Raizada

The experiments on hatchery seed production of Giant Freshwater Prawn, *Macrobrachium rosenbergii* using ground saline water was continued in the current year. Since, the survival of prawn larvae was very poor (2-11%) in the preceding year, the ionic levels in the ground saline water were further rectified by changing the Ca^{++}/Mg^{++} ratio from 1.9 to between 2.7. The eight prawn larval cycles reared with this water were successfully closed and a total of 29,834 post larvae were produced using ground saline water. The survival of larvae from stage-I to post larvae was between 20-67% with an average of 37.5%, which was quite high considering the rate under indian conditions. A total of 18,000 seed (PL 25-35) was supplied to CIFE Lucknow Centre (7,000), CIFE Powerkhera Centre (2,000) and the M.P. Fisheries Development Corporation, Bhopal (9,000) in order to evaluate the survival and growth potential of the seed produced with ground saline water under different agro-climatic conditions. The preliminary results have indicated that the growth and survival of prawn is at par with the seed produced with coastal seawater. Thus, it is assumed that the technology so developed is standardized and can be transmitted to the industry. In order to disseminate the technology, two short-term training programs were organized during the reporting period, which were attended by the state personnel and the farmers.

Sub-Project: Seed production of Asian catfish (Magur) in inland saline ecosystem

PI: N.K. Chadha

Raising of broodstock: For raising broodstock of magur, 700 juveniles of average size 40 gm weight reared in situ were further reared in an earthen pond of size 0.045 ha having a central trench of 5' x 3' (W x D) during August 2004 to March 2005. The juveniles were fed with formulated diet @ 5% body weight daily two times. The fish showed average size of 210 mm in length and 80 gm in weight at 8 months rearing with an estimated survival of 50% and it is expected to get matured brooders in the month of May-June 2005. The physico-chemical characteristics of water were recorded as air temperature-0-42 ^{0}C, water temperature-8-37 ^{0}C, pH-8.16-8.41, D.O. 7.8-9.3 mg/l, free CO_2-0-5 mg/l, salinity-2-4 ppt, total alkalinity-190-248 mg/l, total hardness-1010-1260 mg/l and chlorides-1190-1710 mg/l. The study revealed that brooders of magur could be successfully reared in low ground saline water for undertaking seed production program.

Induced Breeding: The breeding experiments were undertaken in the month of August 2004 and 6 females (weight between 90-120 gm) and 4 males (weight 120-140 gm) were injected with Ovaprim. All the males were sacrificed for the collection of milt, which was subsequently diluted with normal saline and used for fertilization of eggs. Subsequently, the females were stripped and the collected eggs were fertilized with the pre-collected milt. A total of 3300 good eggs obtained were shifted in a small Flow-through hatchery having separate units for flow of freshwater and ground saline water (4-5 ppt). The hatching was observed in both type of waters and a total of 500 hatchlings were obtained. The so produced hatchling were subsequently reared for 40 days, of which 350 nos. survived (70% survival) and stocked in a pond for further rearing with 5 ppt ground saline water. The details of induced breeding are given in table-1. The study thus indicated that magur seed could be produced with low saline ground water up to a salinity of 5 ppt.

Table-1: Details of Induced Breeding of magur

S. N.	Female weight (gm)	Male weight (gm)	Total eggs	Good eggs	Survival of eggs (%)		Hatchling produced	
					Fresh Water	Saline water	Fresh water	Saline water
1	90	120	1500	1000	150 (30%)	90 (18%)	110 (73.3%)	70 (77.8)
2	100 120 120 120	140 120	500 700 900 400	400 650 700 250	Not used	80 (20%) 112 (17%) 130 (18.6%) 50 (20%)	Not used	60 (75%) 85 (76% 100 (77%) 35 (70%)
3	100	140	500	300	Not used	80 (27%)	Not used	40 (50%)

Constraints identification in culture of freshwater prawn *(Macrobrachium rosenbergii)* at Powarkheda centre of CIFE.

PI: Somdutt

1[St] set of experiment (hapa no. 1 to 3) was carried out by rearing prawn alone stocked @ 50,000/ha. 2nd set of experiment (hapa 4 to 6) was carried out by rearing prawn (@30,000/ha) and fish *Labeo rohita* (@ 3,000/ha). 3rd set of experiment was done with prawn (@ 20,000/ha) and fish (@ 3,000/ha). The prawn seed PL 15-25 was procured from CIFE centre Rohatak on 8th September 2004 and was acclimatized by gradually lowering the salinity from 4 ppt to 0 ppt within 10 days. Actual rearing experiments were started on 18.09.04 after proper preparation of rearing pond. The rearing pond was prepared by applying the initial dose of lime @ 250 kg/ha and RCD @ 2,500 kg/ha. Another application of RCD @ 1500 kg/ha and mustered oil cake @ 75 kg/ha was done after one week of stocking of prawn *i.e.* on dated 25.09.04. As stated above, prawn culture

experiment were carried out in 3 sets. Total 300 prawn juveniles were stocked in 9 hapas installed in one pond. The culture experiments were terminated on 28.02.05 after a rearing period of 164 days it was found that the growth and survival was compQrQtively low in 1 st set of experiment than 2nd and 3rd set hapas. This indicate that the most suitable stocking density for culture of prawn with fish is 20,000/hapa both for growth (14.460 to 21.35 g) and survival (83.3%) followed by 30,000/hapa (growth 13.18 to 15.57g; survival 78.8%). The growth and survival of prawn when stocked alone @ 50,000/hapa was low. The growth in this case ranged from 10.34 to 15.33 g and survival was only 44%. However, the overall growth for rearing period of 164 days is low because the highest average weight gained by *M rosenbergii* in present case was only 21.35 g and the per ha. production worked out to be only 296.5 kg which is also low. The probable reasons for this slow growth may be their rearing in enclosures, besides the 2 months lean winter period (December and January) when water temperature was fairly low (c 23 C). The overall survival percent percentage (62.33%) in present case seems to be quite good in view of the long winter period (>60 days) and more chances oj cannibalism in a rather enclosed environment of the hapa. The FCR ratio (1 :2) in present case was quite good as total prawn production was 2.669 kg against use of5.399 kg feed.

Fisherwomen and Livelihoods- An Ergonomics Perspective

PI : Dr. Arpita Sharma, Scientist (SS)]

Field data on socio-economic profile of women fishers in Versova was collected and analysed. Summary of the results are as follows: Average age of women was 37.7 years and all were married. Average family size was 6. 7.4% of households had women as economic head of the family; 11.1% women married before age of 18 years. No difference was reported as regards to immunization for girl/boy child. Few women (7.4%) were found to be illiterate, though all of them reported that their children were going to school. The total family income was Rs.10,546 and total expenditure Rs. 7,092/month. It was reported that in all households the decision to use money was a combined decision of husband and wife.

It was observed that women were involved in a number of activities related to fisheries, most of these being unpaid work. A detailed study was done in order to find the monetary value the respondent would associate for

completion of a particular work by hired help. Further, women gave lower monetary value to domestic work in comparison to fisheries related work. Women had 60% of share in the household decision-making and 30% decision making in the fisheries activities other than post harvest sector. Workload study has revealed that the work of fish drying is a moderately heavy activity. A total of 16 activities are part of fish drying work. In addition, high blood pressure (Versova), Overweight (Versova), Pain in knee, lower leg, high temperature and humidity at work place was also recorded and reported. Correlations between age, weight, resting heart rate, resting blood pressure were found to be negligible.

Impact of trade liberalization & WTO agreements on exports of Indian fish products

PI : P. S. Ananthan

Liberalisation of trade, in terms of reduction of tariffs for seafood products, has led to significant growth in export since early 1990s in terms of quantity, export value and unit value for major fish products. Export Volume (4.12 lakh tons) and value (Rs.6091 Crores) were all time high in 2003-04 but fluctuating since 1998. The international seafood market has become increasingly a *buyers' market* with more and more being expected of the exporters in terms of product varieties, sizes, quantity, health standards and continuity in supply. Rate of Indian shrimp production is less as compared to the world total. RCA analysis has suggested better performance of Indian fisheries export compared to world fisheries export per se. However, *our competitors* (Thailand, Vietnam) have *performed far better* taking a major share of the growing cake. Constant market share (CMS) also shows a similar trend. The Indian squid and cuttlefish export has grown enormously between 1976 and 2001 at an annual compound growth rate of 19.7 percent (quantity) and 29.8 percent (value). Indian S & C.F exports have high degree of market (50 markets) and product (17 products) diversification. In spite of declining average unit value for squid and cuttlefish in the world market since 1995, Spain, USA and Indian prices were relatively more stable.

As the impact of Anti Dumping petition began to be felt since April 2004, there was a marked decline in export volume from the six target countries. The Indian exports volume declined by 64% in April-May 2004 compared to April-May

2003. This has meant a loss of $40 million (Rs.180 crore) to Indian exports. This also meant a decline in farm gate/landing price in India from Rs.320 to Rs.250-280/kg of 30 counts i.e. a loss of nearly Rs. 400 crore/year for farmers/fishermen if this trend continues. Based on the research work a research paper titled 'The Economics and Politics of US Anti-dumping Case against Indian Shrimp Exports' was presented at CIFT, Vizag Conference on Sustainable fisheries Development, July 2004.

Geographical Information System for Sustainable Brackishwater Aquaculture Development in Maharashtra and Gujarat

PI : Dr. R. S. Biradar, Principal Scientist)

Aliabet in Vagra Taluk in Bharuch district of Gujarat was selected as the study area. Twenty eight soil samples from 14 locations and five water samples were collected from the study area. Soil samples were collected at two depths viz : 6" below the surface and 2' below the surface. Various soil and water quality parameters are being estimated for these samples.

A Pilot Study on Supply Chain Management in Fisheries

PI : S. N. Ojha

As per the technical programme for the first year, two sets of extensive questionnaires were prepared, field tested and validated through pilot study. One questionnaire is to gather the general information of the individual markets, while the other is to interview the individual retailer from the selected sample. As per the survey, there are around 80 retail fish markets under the Mumbai Municipality Corporation (BMC). The markets were further classified into Large, Medium and Small markets primarily based on the number of retailers. Around 10% of the retailers from each category of the market will be interviewed in the next year.

5. EDUCATIONAL ACHIEVEMENTS

M.F.Sc. Students passed in 2004

FNB	**5 Nos.**
FNB-06	Mr. Manas Ranjan Biswal
FNB-07	Mr. Shivendra Kumar
FNB-08	Mr. Kartik Baurah
FNB-09	Ms. Dharitri Choudhary
FNB-10	Mr. Umesha D

PHT	**5 Nos.**
PHT-22	Mr. Parthiban F.
PHT-23	Mr. Prasanna S
PHT-24	Ms. Sneha Susan Simon
PHT-25	Mr. Mohan C.O.
PHT-26	Mr. Kiran B.D.

FBM	**5 Nos.**
FBM-01	Ms.Mary Wesna S.
FBM-02	Ms. Smitha R. Nair
FBM-03	Ms. Fathima K.B.
FBM-04	Ms. Sunitha Ninan T.
FBM-05	Ms. Hena O.

MC	**5 Nos.**
MC-80	Ms. Mary Sophia J.
MC-81	Ms. Pretthi Prasad
MC-82	Mr. Vinoj Kumar V.
MC-83	Ms. Annie Selva Sonya
MC-84	Mr. Debadas Bhatnagar

IAC	**5 Nos.**
IAC-159	Ms.Babitha Rani A.M.
IAC-160	Mr. Prem Kumar
IAC-161	Mr. Raghuveer K.R.
IAC-162	Mr. Khuntia Murmu
IAC-163	Ms. Sajitha Sukumaran

FGB	**5 Nos.**
FGB-06	Mr. Niraj Kumar
FGB-07	Mr. Chethan P. Shetty
FGB-08	Mr. Sunil Kumar Nayak
FGB-09	Mr. Manas Ranjan Behera
FGB-10	Mr. Janmejay Parhi

FPM	**6 Nos.**
FPM-06	Mr. Sidhartha Sankar Das
FPM-07	Mr. Jeffy George
FPM-08	Ms. Lopamudra Sahoo
FPM-09	Mr. Rajesh Kumar
FPM-10	Mr. Tulasidas G.
FPM-11	Ms. Nander Aye Winn

FRM	**5 Nos.**
FRM-180	Ms. Vidya R.
FRM-181	Mr. Purushottama G.B.
FRM-182	Ms. Rani Dhanya V.M.
FRM-183	Mr. Niranjan Kumar
FRM-184	Mr. Yassar Saker

FWA	**6 Nos.**
FWA -20	Mr. Dadasaheb B. Akolkar
FWA -21	Mr. Babin Bopanna K.
FWA -22	Mr. Arup Kumar Choudhary
FWA -23	Mr. Shailesh Saurabh
FWA -24	Ms. Swagatika Sahu
FWA -25	Mr. Niraj Kumar

During the period 15 PhD theses were awarded the degree

ADMISSIONS

Course	M.F.Sc. 2004 – 06	Ph.D. 2004 - 07
FRM	5	4
FPM	5	2
FNB	5	2
IAC	5	6
FGB	5	-
FBM	5	1
PHT	5	3
FWA	5	-
MC	5	2
FISH BIOTECH	-	2
FISH GENETICS	-	2
TOTAL	45	24

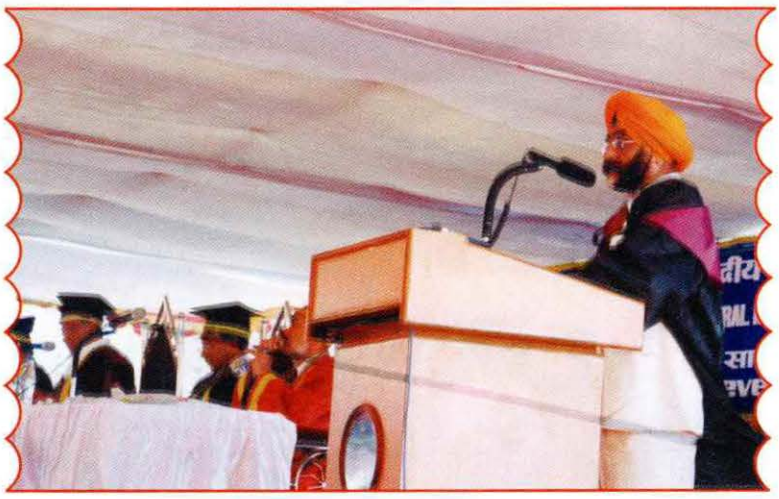
Guest Lectures Delivered by the Faculty

SNo	Title, Venue and Date	Faculty
1	*Sustainable Shrimp Farming* 11th Aquaculture Expo, 2004 at Surat, 5th May, 2004	Mr. A. K. Reddy
2	*Giant Freshwater Prawn Culture* Workshop on Issues Related to Problems Faced by Prawn Farmers in Haryana at Hissar on 27th October, 2004	Mr. A. K. Reddy

Seventh Convocation

Seventh Convocation of the Deemed University was held on 18th January, 2005 and Hon'ble Union Minister for Agriculture, Consumer Affairs, Food & Public Distribution Shri Sharad Pawarji delivered the convocation address. On this occasion Dr. S.C. Mukherjee, Director / Vice Chancellor (CIFE) welcomed the distinguished guests, recipients of degrees, awards and medals at this convocation. In his welcome address Dr. Mukherjee mentioned fisheries sector is contributing 1.4% in Gross Domestic Product (GDP). He has also mentioned that being in the firefront of Human Resource Development (HRD) the Institute has trained more than 4500 students from India and 120 foreign students and trainees.

Mr. Sharad Pawarji in his convocation address has mentioned that India, with its vast inland and marine resources is a major producer of fish and shellfish, with an annual production of over 60 lakh tones and export earnings of over Rs.6,000 crores and the sector providing employment to over 70 lakh people. Providing cheap but quality protein to the masses in `the country, the fisheries sector has also emerged as one of the largest foreign exchange earners. We are seriously looking at fisheries and aquaculture development as an important area for agricultural diversification. He has also mentioned that the pass out students would contribute lot for the betterment of the farmers and entrepreneurs through their gathered knowledge at this premiere institute in their disciplines.



Dr. Mangala Rai, Secretary, Department of Agricultural Research & Education (DARE) and Director General (DG), Indian Council of Agricultural Research (ICAR), New Delhi delivered the Presidential address. He has shown his satisfaction on the work carried out by the Institute for the fisheries development through modern technologies and has expressed that the pass out

students will contribute to the betterment in production and show entrepreneurship development skill and self in employment generation.

Dr. S. Ayyappan, Deputy Director General (Fisheries), ICAR, empasised on preparedness for disaster management in fisheries, particularly in the context of recent Tsunami and out lined the details for HRD in this aspect.

On this occasion, Shri Sharad Pawar, Chief Guest, awarded gold medals to 17 students, for their outstanding academic performance in the M.F.Sc. and Ph.D. In all 103 M.F.Sc. and 43 Ph.D. students were awarded degrees in different disciplines of Fisheries.

An exhibition `PARICHAY' depicting various activities of fisheries was also inaugurated by Shri Sharad Pawarji. More than 300 people visited the exhibition.

Vote of thanks was proposed by Dr. M.P.Singh Kohli, Principal Scientists and Dean, (Academics), CIFE, at the end of the function.

6. EXTENSION ACHIEVEMENTS

Kisan Call Center:

The institute is recognized as a response center (Level II) for fisheries in the Maharashtra Zone. The farmers from Maharashtra, Goa and Gujarat can contact the the Level 1Kisan Call Center through the toll free number 1551. The questions related to fisheries are then diverted to CIFE.

The institute also provided literature and guidance to the staff of Level 1 Centre. Most of the farmers were interested in aspects of site selection and selection of species. A FAQ was further developed in Marathi along with their answers and was supplied to the Level 1 to further refine their responses.

Television shows

Dr. S. N. Ojha, Senior Scientist and Mr. Deepak Khogre, Technical Officer coordinated the production and telecasting of video film on *Neeli Kranti; Ek Navi Disha* over the Sahyadri Channel, Mumbai on 26th August, 2004.

Radio Talks by staff of Kakinada Centre through All India Radio, Visakhapatnam:

SNo	Name of Faculty	Topic	Date of broadcast
1	Dr. P. Rami Reddy, Techical Officer T-6	*Royala pempakamlo manchi yajamanya melakavalu*	16.4.2004
2.	Sh. V.Narasimhacharyulu, Techical Officer T-5	*Uppuneeti royyala, chepala pempakamlo neeti yajamanyam*	11.5.2004
3.	Sh. R.Ravi Shankar Patnaik, T-4	*Scampi backyard hatchereela Yajamanyam*	26.9.2004
4	Dr. P. Rami Reddy, T-6	*Uppuneeti cheruvulalo mandapeethala pempakam*	27.2.2005
5.	Sh. R.Ravi Shankar Patnaik, T-4	*Scampi royyala nursery pempakamlo melukavalu*	10.3.2005

v) Television programmes:

Five Television programmes were given by the faculty of this centre in E-TV Channel (Telugu) in *Annadata* and *Jai Kisan* programmes

Dr. G. Venugopal, Principal Scientist & Officer In charge

1. Magur breeding , Hatchery and seed production techniques
2. Alternate cropping of shrimp and scampi in low saline waters.
3. Selection of quality shrimp seed and scampi seed
4. Pond growout techniques for crabs

Shri J. Krishna Prasad, Technical Officer (T-6)

1.Carpu chepala pempakamulo melukavalu

Exhibitions held:

The CIFE Rohtak centre participated in the following exhibitions:

India International Trade Fare at New Delhi held during 14-27 November 2004.

Fourth Indian Fisheries Congress at PUSA, New Delhi held on 4-6 November 2004

Utthan 2005, an exhibition organized by the NGO's at Faridabad, Haryana on 18.02.2005.

Kisan Mela organized by IARI, New Delhi from 12-13 February 2005.

Exhibitions-cum-Awareness Programmes

Sr. No.	Title	Date	Venue
1.	National Exhibition during the Third Indian Fisheries Science Congress.	4-6 Nov., 2004	New Delhi
2.	Maharashtra Agri Food Expo	8-10 Nov., 2004	World Trade Center, Cuffe Pared, Mumba
3.	Science Expo – 2004	20-24 Nov.,2004	Nehru Science Center, Mumbai - 4
4.	Kisan Mela, 2004	15-19 Dec.,2004	Pune
5.	Vice Chancellors Conference of SAU/CU(s) and Director's of Deemed Universities.	05 Feb.,2005	Mumbai
6.	Agro – Industry Exhibition during the 7th Agricultural Science Congress.	16-18 Feb.,2005	College of Agriculture, Pune.

A. Fisheries Advisory Service was rendered to 119 clients. To highlight the achievements and activities of the Institute / Division, a visitor friendly facility called "Parichay" has been put up in the reception of New Academic building.

7.HONOURS AND AWARDS

Dr. S. C. Mukherjee,

Director was awarded VASVIK AWARD (2004) for contribution to Research in Agricultural Sciences and Technology. Received on 18.09.2004

Higher Education and Development Award 2004 by International Association of Education for World Peace : October, 2004

Dr. K. Pani Prasad, Scientist(SS)

Best Transfer of Technology Award 2004 by Dr. Hiralal Chaudhuri Fisheries Foundation

- Dr. Rajendra Prasad Purushkar of Indian Council of Agricultural Research, New Delhi for the year 2001 2002 was received on 19th October 2004 for the Hindi book FISH GENETICS AND BIOTECHNOLOGY by W S Lakra, Gopal Krishna and R P Uniyal Published by CIFE, Mumbai. The award contained a citation and cash prize

- Fisheries Informatics, Technology Evaluation and Transfer Division received Hiralal Chaudhari Foundation "BEST DIVISION AWARD" for 2003-04 on 43rd Annual Day of CIFE on 9th July, 2004 at the Institute.

Life membership of scientific societies awarded to Dr.S.D.Singh

1. Global Fisheries Environment Management Network(GFEMN) American Fisheries Society.
2. Nature Conservators, Muzaffarnagar.
3. Society of Food Scientists and Technologists of India- annual
4. Bioved Research Society, Allahabad.

Dr. Arpita Sharma, Scientist (SS) received Young Scientist Award by CIFE, Hiralal Chaudhari Foundation in 2004.

Best Division
Fisheries Informatics, Technology Evaluation and Transfer Division

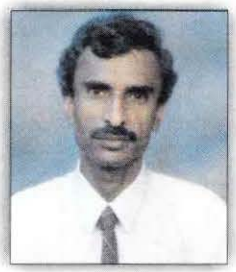
Best Scientist
Dr. A. K. Pal
Sr. Scientist (Biochemistry)

Best Scientist
Dr. Sudhir Raizada
Sr. Scientist, Rohtak Centre

Best Technical Staff
Dr. P. Rami Reddy
Technical Officer (T-6)

Best Supporting Staff
Mr. Surajbali R. Jaiswar
Fisherman (SSC-III)

Best Administrative Staff
Mr. Bhumeshwar L. Kokkula
(Assistant)



Best Work in Hindi
Dr. C. S. Chaturvedi
Technical Officer (T-6)

Best School Children
Master Sanjog S. Gajbhiye
Son of Mrs. S.S.Gajbhiye X th Std.

8. Linkages and Collaboration

Linkages and collaboration

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

International institutions

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

GOI Organizations

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

ICAR Institutes

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

CSIR Institutes

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

Other Institutes

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

9. PUBLICATIONS

A) Papers in International & National, Peer-reviewed Journals

Aanand, S., Rajendran, K. V., Purushothaman, C. S., Saharan, N. and Venkateshvaran, K., (2003) Copper, zinc, iron and manganese in sediments, and in the rock oyster *Saccostrea cucullata* in Mumbai coast. *J. Indian Fish. Assoc.*, **30**: 23-29. (Published in the year 2004-05).

Alagappan M., Vijula K. and Sinha Archana, 2004. Utilization of spirulina algae as a source of carotenoid pigment for blue gouramis (*Trichogaster trichopterus* Pallas). *Journal of Aquariculture and Aquatic Sciences*, **X** (1): 1-11.

Anandan, K., Varshney, P.K., Jaiswar, A. K., and Chandraprakash. (2003). Macrobenthos of Intertidal zone of Versova along the Coast of Mumbai. *J. Indian Fish. Ass.*, **30**:9-11. (Published in the year 2004-05).

Baruah Kartik, Pal, A. K., Sahu, N.P., Jain, K.K., Mukherjee, S.C. and Debnath, D. (2005). Dietary protein level, microbial phytase, citric acid and their interactions on bone mineralization of *Labeo rohita* (Hamilton) juveniles. *Aquaculture Research,* **36**: 803-812.

Chatterjee N., Pal, A. K., Manush, S. M., Das, T., and Mukherjee, S.C. (2004). Thermal tolerance and oxygen consumption of *Labeo rohita* and *Cyprinus carpio* early fingerlings acclimated to three different temperatures. *Journal of Thermal Biology*, **29**: 265-270.

Choudhury Dharitri, Pal, A. K., Sahu, N.P., Kumar, S., Das, S.S. Mukherjee. S.C. (2005). Dietary yeast RNA supplementation reduces mortality by *Aeromonas hydrophila* in rohu (*Labeo rohita* L.) juveniles. *Fish & Shellfish Immunology* **19**: 281-291.

Das T., Pal, A.K., Chakraborty, S.K., Manush, S.M., Chatterjee, N. and Mukherjee S.C. (2004). Thermal tolerance and oxygen consumption of Indian Major Carps acclimated to four temperatures. *Journal of Thermal Biology* **29** : 157-163.

Das, T., Pal, A. K Chakraborty S. K., Manush S. M., Sahu N. P. and Mukherjee, S. C. (2005). Thermal tolerance, growth and oxygen consumption of *Labeo rohita* fry (Hamilton, 1822) acclimated to four temperatures. *Journal of Thermal Biology*, **30**: 378-383.

Datta, S. and Das, R.C. (2003). Influence of some abiotic environmental factors on the acute toxicity of inorganic lead to *Cyprinus carpio* var. *communis* (Linn.) and *Catla catla* (Ham.) in simulated toxic aquatic environment. *Toxicol. Environ. Chem.* **85**(4-6): 203-219.

Datta, S., Kent, Y., Shah, P.S. and Das, R.C. (2003). Effect of some environmental factors on the acute toxicity of Deltamethrin to common carp: A laboratory study under aerobic condition. *J. Indian Fish Assoc.* **30**: 31-40. (Published in the year 2004-05).

Datta, S., Masala, S.H. and Das, R.C. (2003). Influence of some abiotic factors on the acute toxicity of Cadmium to *Cyprinus carpio*. *J. Indian Fish Assoc.* **30**: 41-52. (Published in the year 2004-05).

Debnath, D., Pal, A. K., Sahu, N.P., Jain, K.K., Yengkokpam Sona and S.C. Mukherjee. (2005) Effect of dietary microbial phytase supplementation on growth and nutrient digestibility of *Pangasius pangasius* (Hamilton) fingerlings. *Aquaculture Research,* **36** : 180-187.

Debnath, D., Sahu, N.P., Pal, A.K., Jain, K.K., Yengkokpam Sona and S.C. Mukherjee. (2005). Mineral status of *Pangasius pangasius* (Hamilton) fingerlings in relation to supplemental phytase: Absorption, whole body and bone mineral content. *Aquaculture Research,* **36** : 326-335.

Dharmendra, S. B., Lakra, W. S. and Rao, G. P. S. (2004). Altered sex ratio in giant freshwater prawn, *Macrobrachium rosenbergii* using hormone bioencapsulated live Artemia feed. *Aquaculture Research,* **35**: 943-947.

Ghosh, S., Sinha, A., Yhome, V. and Sahu, C. (2005). Bacterial load associated with culture of ornamental fishes in glass aquarium. *Environment & Ecology*, **23**(1): 118-123.

Jaiswar, A. K., Parida, P. K., Chakraborty, S. K., and Palaniswamy, R. (2004) Morphometry and lengthweight relationship of obtuse barracuda, *Sphyraena obtusata* (Cuvier) (Teleostomi/ Actinopterygii/ Sphyraenidae) from Bombay waters, west coast of India, *Indian J. Mari. Sci.*, **33**(3) 307-309.

Karthik, M., Suri, J., Saharan, N. and Biradar, R. S. (2005) Brackishwater aquaculture site selection in Palgar Taluk, Thane district of Maharashtra, India, using the techniques of Remote Sensing and GIS. *Aquacultural Engineering,* **32**: 285 302.

Khan, M. A., Jafri, A. K., and Chadha, N. K. (2004) Growth and body composition of rohu, *Labeo rohita* (Hamilton), fed compound diet: winter feeding and rearing to marketable size. *Journal of Applied Ichthyology,* **20**: 265-270.

Khan, M. A., Jafri, A. K., and Chadha, N. K. (2004) Growth, reproductive performance, muscle and egg composition in grass carp, *Ctenopharyngodon idella* (Valenciennes), fed hydrilla or formulated diets with varying protein levels. *Aquaculture Research,* **35**: 1277-1285.

Kumar Shivendra, Sahu, N.P., Pal, A.K., Choudhury Dharitri, Yengkokpam Sona, and Mukherjee S.C. (2005). Effect of dietary carbohydrate on haematology, respiratory burst activity and histological changes in *L. rohita* juveniles. *Fish & Shellfish Immunology*, **19**: 331-344.

Meter, S.Y., Srivastava, P.P., Jain, K. K., Manush, S.M., Raizada, S., and Ayyappan, S. (2003) Effects of physiological doses of vitamin D_3 (Cholecalciferol) on induced molting and growth in Giant Freshwater Prawn, *Macrobrachium rosenbergii* (de Man). *J. Indian Fish. Ass.* **30**: 121-129 (Published in the year 2004-05).

Misra C.K., Das, B.K., Pradhan, J., Pattnaik, P., Sethi, S. and Mukherjee, S.C (2004). Changes in lysosomal enzyme activity and protection against *Vibrio* infection in *Macrobrachium rosenbergii* (de Man) post larvae after bath immunostimulation with -glucan. *Fish & Shellfish Immunology* , **17**: 389-395.

Nayak A.K., B.K. Das, M.P.S. Kohli, S.C. Mukherjee (2004). The immunosuppressive effect of -permethrin on Indian major carp, rohu (*Labeo rohita* Ham.). *Fish & Shellfish Immunology* , **19**:41-50.

Pagarkar, A. U., Raman, R. P., Balange, A. K. and Ali, S. (2004). Occurrence of myxozoan parasite *Thelohanellus catlae* in the Indian major carp *Catla catla* (Ham.) in Maharashtra. Asian Journal of Microbiology, Biotechnology and Environmental Science, **6**(2): 277-279.

Pradeep, B., Pandey, P. K., and Ayyappan, S. (2003) Effects of probiotics and antibiotics on biofilms. *J. Indian Fish. Assoc.,* **30**: 19-22. (Published in the year 2004-05).

Pradeep, B., Pandey, P. K., and Ayyappan, S. (2004) Variations in bacterial biofilms with reference to nutrient levels. *Asian J. Microbiol. Biotech. Env. Sc.*, **6** (4): 649-652.

Prajapati, S., Pandey, P. K., Prasad, H., and Singh, R. V. (2004) A study on physico-chemical characteristics of ground water of Jaipur city (Rajasthan). *Aquacult.*, **5**(1): 37-41.

Purushothaman, C. S. and Dhevendaran, K., (2004) Alkaline-phosphatase producing bacteria in a brackishwater lagoon on the southwest coast of India. *J. Inland Fish. Soc. India,* **36**(2): 1-6.

Raizada, S., Chadha, N.K., Hasan, J., and Maheshwari, U.K. (2003) Physical soil characteristics of waterlogged and saline lands of five districts of Haryana, *J. Indian Fish. Ass.* **30**:1-8 (Published in the year 2004-05).

Raizada S., Chadha, N.K., Ali, M., Kumar, A. and Javed, H. (2004) Length-weight relationship of milkfish, *Chanos chanos* (Forskal) reared in inland saline

ground water. *Indian Journal of Fisheries,* **51**:21-24

Rana, R.S., Bhatt K.V., Lakhanpal, S. and Lakra, W. S. (2004) Comparative genetic diversity in natural and hatchery populations of Indian major carps (*Catla catla* and *Labeo rohita*) . *Asian Aust. J .Anim. Sci.* **17** (9): 1197- 1203.

Saharan, N., Srivastava, P. P., Chandraprakash and Dureja, P. (2004) Impact of two organophosphorus pesticides on water quality parameters and evaluation of their toxicity to fish. *Journal of Water Management*, **11** (2): 108 112.

Saharan, N., Srivastava, P. P., Chandraprakash and Dureja, P. (2004) Histopathological changes in the kidney, liver and gill of a common teleost, *Labeo rohita* caused by sub-lethal exposure to phosphamidon and its metabolites. *Applied Fisheries and Aquaculture Journal,* **6**:131-133.

Saker, Y., Jaiswar, A. K., Chakraborty, S. K. and Palaniswamy, R. (2004) Morphometry and length weight relationship of *Megalaspis cordyla* (Linnaeus, 1758) from Mumbai coast. *Indian J. Fish.,* **51** (4): 481-486.

Sarma, S, Bhattacharjya, B. K., Zaidi, S. G. S., Landge, A. T., and Goswami, M. (2004) Indigenous ornamental fish biodiversity of Central Brahmaputra valley zone, Assam. *J. Inland Fish. Soc. India,* **36** (1): 29-35.

Tandon, S.S.,.Srivastava, P.P., Mukherjee, S.C. and Saharan, N. (2005). Acute Toxicity of Synthetic Pyrethroids to Indian Major Carp. *Catla catla* L. *Bull. Environ. Contam. Toxicol.*, **74**:610-613.

Tiwari, V. K., and Qureshi, T. A. (2003) Morphometric characters of the catfish, *Rita pavimentata* (Gunther) from the river Narmada. *Journal of the Inland Fisheries Society of India*, **35** (1): 68-72.

B) Papers Presented to Seminars /Symposia

Biswal M. R. , and S.D.Singh (2005) Poential of beta-actin gene promoter of Asian seabass, L. calcarifer in fish transgenesis. Indian Science Congress, Nirma University, Ahmedabad, Jan 3-7, 2005

Biswal M. R., S.D.Singh, P.P. Srivastava and D. Umesha (2005) Molecular cloning and characterization of DNA encoding beta- actin gene promoter sequence in Asian seabass, L. calcarifer. 7th International Marine Biotechnology Conference, St. John's, Canada, June 7-12, 2005.

Chatterjee Somnath, A.K.Reddy and V.K.Tiwari 2004 Comparative study on larval rearing of *M.rosenbergii* (de Man) in artificial seawater, brine water and underground brackishwater. (Ibid) pp.47.

Chaturvedi, C.S. and Yadav, A. K.. 2004. Induced breeding of *Heteropneutes fossilis* (Bloch) Singhi under hatchery system in U. P. Nat. Seminar Indian Soc. Fish. Professionals. P:1 November.2004, IARI New Delhi.

Chaturvedi, C. S., Ayyappan, S. and Yadav, A. K. 2004. Successful induced breeding of Desi magur *Clarias batrachus*, Nat. Seminar CIFRI Allahabad, 15-16 March. P:1-3.(Hindi).

Datta, S. Zargar, B.A. and Das, R.C. (2004). Effect of changing salt concentration on the toxicity Cypermethrin to *Cyprinus carpio*. In *Abstracts of All India Seminar on "Sustainable Aquaculture for Augmentation of Export with Special Reference to Environment, Engineering and Value Addition"*. p.69. Organised by Agricultural Engineering Division. The Institute of Engineers (India), West Bengal State Centre, held on 3-4 Sept, 2004 at Kolkata.

Datta, S., Lone, N.A., Bhatt, S.A. and Das, R.C. (2004). Comparative toxicity study of three pyrethroid insecticides to fish under the influence of different abiotic environmental parameters. In *Abstracts of National Sympozium on Pesticides: Myths, Realities and Remedies*. p.162. Organised by Society of Pesticide Science India, IARI, New Delhi, held on 1-3 December, 2004 at India habitat Centre, New Delhi.

Datta, S., Rongsenkumzuk and Das, R.C. (2004). Impact of calcium, carbonate and bicarbonate on the toxicity of inorganic lead to freshwater fish in simulated toxic aquatic environment. In *Abstracts of All India Seminar on "Sustainable Aquaculture for Augmentation of Export with Special Reference to Environment, Engineering and Value Addition"*. p.67. Organised by Agricultural Engineering Division. The Institute of Engineers (India), West Bengal State Centre, held on 3-4 Sept, 2004 at Kolkata.

Datta, S., Shah, S.I.G. and Das, R.C. (2004). The significance of calcium, carbonate and bicarbonate ions on the toxicity of cadmium to a freshwater teleost. In *Abstracts of All India Seminar on "Sustainable Aquaculture for Augmentation of Export with Special Reference to Environment, Engineering and Value Addition"*. p.70. Organised by Agricultural Engineering Division. The Institute of Engineers (India), West Bengal State Centre, held on 3-4 Sept, 2004 at Kolkata.

Datta, S., Singh, K.D. and Das, R.C. (2004). Influence of some ions (Ca^{2+}, CO_3^{2-}, HCO_3^-) on the toxicity of inorganic mercury to scale carp. In *Abstracts of*

All India Seminar on "Sustainable Aquaculture for Augmentation of Export with Special Reference to Environment, Engineering and Value Addition". p.68. Organised by Agricultural Engineering Division. The Institute of Engineers (India), West Bengal State Centre, held on 3-4 Sept, 2004 at Kolkata

Gopal R.N., S.D. Singh and P. Smitha, (2004) Nucleotide polymorphism in alleles of growth hormone gene containing microsatellite in Asian seabass, Lates calcarifer. 4th World Fisheries Congress, Vancouver, Canada, May 2-6, 2004.

Kathiresan M., A.K.Reddy, P.Rami Reddy and G.Venugopal (2004) "Efficacy of eco friendly organic compound Shivanistan" on growth and survival of Penaeus monodon larvae" Abstract published in International symposium on "Improved SUSTAIN ability of FISH production systems and appropriate technologies for utilization" conducted by School of Industrial Fisheries, Cochin University of Science and Technology Fine Arts Avenue, Cochin during 16-18 March 2005.

Kohli, M.P.S, Langer, R.K., Dube, K., Tiwari, V.K., Chandra Prakash, Reddy, A. K., and Upadhaya, R.K. (2004). Second National Workshop on Cage aquaculture in open waters. CIFE, Versova, Mumbai. 9-10 September, 2004 at Chandigarh & Bhakhra: p.26.

Kohli, M.P.S., Dube, K., Langer,R.K., Chandra Prakash, A.K.Reddy, Tiwari, V. K., and Upadhaya, R.K. (2004). Report and recommendations on Second Workshop on Cage aquaculture in open waters.CIFE, Versova, Mumbai. 9-10 September, 2004 at Chandigarh & Bhakhra :p. 12.

Kohli, M. P. S., R. K. Langer; Kiran Dube; Chandra Prakash; V. K. Tiwari and A. K.Reddy, "Results of Experiments Conducted by CIFE on Cage Aquaculture", Procd. Workshop on Cage Aquauclture in Open Waters, CIFE, Mumbai. 9-10 September, 2004 at Chandigarh & Bhakhra: 14-26

Kohli, M.P.Singh; R. K. Langer ; Chandra Prakash; Kiran Dube; and A.K.Reddy. Rearing of Indian endangered game fish (Tor pitutora and Tor khudree) in floating cages for stocking in Walwan reservoir, Lonavla, India. Fourth World Fisheries Congress, May 2-6,2004, Vancouver,British Columbia,Canada ; P-135 (Q-4)

Kohli, M. P. Singh; Kiran Dube; R. K. Langer; Chandra Prakash and A.K.Reddy. An effot for rehabilitation of carp fishery of Halali reservoir, M.P., India, through cage aquaculture. Ibid :P 135 (Q-5).

Kohli, M. P. Singh; S.C.Mukherjee; R. K. Langer and Kiran Dube. Application of bamboo and its products in aquaculture and fisheries, International

Policy Workshop on Bamboo in Fiseries, 30th September 1st October, 2004, National Institute of Oceanography, Goa, India Organised by CIBART, India ans Sociey for Ocean Studies (SIOS),India. (Abst. 15)

Kohli, M. P. Singh; R. K. Langer; Kiran Dube; Chandra Prakash and A. K. Reddy, "Trials on Cage Aquauclture in Different Parts of Country",5th All India Congress of Zoology, 29-31 October, 2004,PG Dept. of Zoology, Univ. of Jammu, Jammu.

Kohli, M. P. Singh; R. K. Langer; Kiran Dube; Chandra Prakash; R.K.Upadhyaya and A.K. Reddy, "Trials on Rearing of Fry to the Fingerlings size in cages for in situ stocking in Halali Reservoir in Madhya Pradesh", Third Indian Fisheries Science Congress,4-6 November, 2004, NASC, Pusa, New Delhi, organized by Indian Society of Fisheries Professionals, Mumbai (pp.39)

Kohli, M.P.S., S.C.Mukherjee, R. K. Langer and Kiran Dube, 2004. Application of bamboo and its products in aquaculture and fisheries. In: International Policy workshop on "Bamboo in Fisheries", 30 September to 1st October, 2004 at NIO, Goa, organized by Centre for Indian Bamboo Resource and Technology (CIBART), India, Abstract No.15.

Kohli, M.P.S., R. K. Langer, Chandra Prakash, Kiran Dube, and A. K. Reddy, 2004. Rearing of Indian Endangered game fish (Tor putitora and Tor khudree) in floating cages for stocking in Walwan reservoir, Lonavla, India. In : Fourth World Fisheries Congress, May 2-6, 2004. Vancourver, British Coulambia, Canada, Abstract p.139.

Kohli, M.P.S, Kiran Dube, R.K. Langer, Chandra Prakash, A.K. Reddy, Somdutt and R.K. Upadhyay, 2004. Impact of stocking density on survival and growth of fry and fingerling of carps in floating net cages. In: Ibid.

Kohli, M.P.S., Kiran Dube, R. K. Langer, Chandra Prakash and A. K. Reddy, 2004. An effect for rehabilitation of carp fishery of Halali reservoir, M.P. India, through Cage Aquaculture. Ibid, Abstract p139-140.

Kohli, M.P.S., R. K. Langer, Kiran Dube, Chandra Prakash, A. K. Reddy and R. K. Upadhyay, 2004. Trials on Cage Aquaculture in different parts of country. In : 15th All India Congress of Zoology and National Symposium on "Status of cold water fisheries with reference to fragile Himalayan Aquatic Ecosystems" held on 29-31 October, 2004 at Jammu University, Jammu, Abstract p.

Kohli, M.P.S., R. K. Langer, Kiran Dube, Chandra Prakash, R. K. Upadhyay and A. K. Reddy, 2004. Trials on rearing of fry to the fingerling size in cages for in situ stocking in Halali reservoir, Madhya Pradesh. In : Third Indian Fisheries Science Congress, November 4-6, 2004, IARI, Pusa, New

Delhi, organized by Indian Society of Fisheries Professionals, Mumbai, Abstract p.39.

Kumar, N., and Pandey, P. K. (2004). Nitrogen fixation and nitrogenase activity of aerobic bacteria in freshwater lake and fishpond. In: 45th Annual Conference of Association of Microbiologists of India, Karnal, 23-24 November 2004.

Lakra, W. S. and Goswami, M (2005). Marine Bioresources Conservation in India, Paper presented at National Seminar on New Trends in Fishery Development in India organized at Panjab University, Chandigarh during 16-18 February, 2005.

Langer, R.K.. Shhetjal Matsya Palan. Jalchari May, 2004.Central Institute of Fisheries Education, Versova, Mumbai: Vol-8: 8-11.(In Hindi)

Munilkumar, S., C. S. Purushothaman and Pandey, P. K. (2004) Impact of shrimp farming on creek water at Saphale, Maharashtra. In: Third Indian Fisheries Science Congress, New Delhi, 4-6th November 2004.

Pandey, P. K., Purushothaman, C. S. and Landge, A. T. (2004) Characterization and measurement of nitrogenase activity of Azotobacter spp. isolated from fishponds. In: National Seminar on Organic Farming, 30-31 July 2004.

Pradhan Sunil and V.K.Tiwari 2004 Effect of temperature on survival and growth of post larvae of M. rosenbergii (De Man). Pp.46. Third Indian Fisheries Science Congress, November 4-6, 2004 at IARI, Pusa, New Delhi organized by Indian Society of Fisheries Professionals.

Pradeep, B., Pandey, P. K., and Ayyappan, S. (2004) Biofilms substrate in relation to probiotics and antibiotics. In: National Workshop on Integrated Aquafarming for Rural Development, Pantnagar.

Prasad, H. and Singh S.D. (2004) Application of microsattelite markers in stock characterization of Asian seabass, L. calcarifer from India. 3rd Indian Fisheries Congress held at IARI, New Delhi, Nov 4-6, 2004

Prasad H.,S. D. Singh and S.C. Mukherjee (2005) Allelic diversity in microsatellites of Asian seabass, L. calcarifer populations from India. 7th International Marine Biotechnology Conference, St. John's, Canada, June 7-12, 2005.

Raizada S., Hasan Javed, S.C. Mukherjee, S. Ayyappan, U.K. Maheshwari (2004). Hatchery seed production of Giant Freshwater Prawn, Macrobrachium rosenbergii in ground saline water of Rohtak. Published in the Australasian Aquaculture 2004 held at Sydney during 26-29 September 2004.

Rami Reddy P., R.R.S.Patnaik, P.Srinivasa Rao and G.Venugopal (2004) "Mahajhinga Bech utpadhan Mein Backyard hatchery ki bhumika" Abstract published in Pragrhan Aur Samvardhah Matsyaki Par Rashtriya Sangosti" held on 10 Sept 2004 at CIFE, Visakhapatnam

Raghuveer K.R., S.D. Singh, M.P.S. Kohli, and A.K.Reddy (2004) 3rd Indian Fisheries Congress held at IARI, New Delhi, Nov 4-6, 2004

Renubala Devi and Kiran Dube, 2004. Mushroom vermiculture aquaculture integration feasibility and quantification. Ibid, Abstract p66.

Saharan, N., Chandra Prakash, Dureja, P. and Srivastava, P. P. (2004) Impact of chloropyriphos and their metabolites on body tissue of common teleost, Labeo rohita. Third Indian Fisheries Science Congress, New Delhi, 4 6 November, 2004.

Saharan, N., Chandra Prakash, P. Dureja and P. P. Srivastava (2004) Impact of phosphamidon and their metabolites on body tissue of common teleost,Labeo rohita National Seminar of Indian Society of Soil Sciences at Acharya N. C. Ranga Agricultural University, Hyderabad.

Saharan, N., Chandra Prakash, P. Dureja and P. P. Srivastva (2005) Impact of certain pesticides on water quality parameters and evaluation of their toxicity. Paper presented at International Conference on Soil, Water and Environment Quality at N. P. L., New Delhi from Jan.,28 to Feb,2 ,2005

Sajitha S. and Kiran Dube, 2004. 20 hydroxyecydysone enhance moulting in juvenile Macrobrachium rosenbergii. In: 7th Asian Fisheries Forum, Penang, Malaysia, from November 30 to December 4, 2004. Abstract.

Sahu B. and S.D.Singh (2004). Scenario of Salmonella contamination and detection in fish and fishery environment. 45th Annual Conference of Association of Microbiologists of India held at NDRI, Karnal, Nov. 23-25, 2004

Singh S.D., H. Prasad, B. Sahu, R.N.Gopal, B.K.Behera, M.A. Naseem. A.K.Nayak and S.C. Mukherjee (2005) Biodiversity analysis of fish populations and pathogenic microbes from marine environment of India. Indian Ocean Marine Environmental Conference, Perth , Australia, Feb. 14-18, 2005.

Singh S.D., and B. Sahu (2005) Rapid detection of Salmonella contamination in fish and fishery products using molecular techniques. 7th International Marine Biotechnology Conference, St. John's, Canada, June 7-12, 2005.

Singh S. D., B. Sahu and Vikas Kumar (2005). PCR based identification of pathogenic microbes from fish and fisheries environment. National

Symposium on Reassessment of Fish Genetic Resources in India and Need to Evolve Sustainable Methodology for Conservation. To be held at NBFGR, Lucknow, April 26-27, 2005. Communicated.

Singh S. D., Vikas Kumar, H. Prasad, B. K. Behra, Puneet Kumar and D. Umesha, (2005). Use of molecular techniques in characterization of aquatic biodiversity and conservation. National conference in Hindi to be held at Gurukul Kangdi Vishvavidyala, Haridwar, May 11-12, 2005. Communicated.

Smitha P., S.D.Singh, P.P.Srivastava and R.N.Gopal (2004) Development of species specific DNA marker for Tor khudree based on microsatellite and RAPD PCR.4th World Fisheries Congress, Vancouver, Canada, May 2-6, 2004.

Sinha A., Das R.C. and Khan M.A., 2004. A comparative study of indigenous and imported fish feed on the growth of an ornamental fish, Guppy (Poecilia reticulata). In All India seminar on Sustainable aquaculture for augmentation of export with special reference to environment, engineering and value addition. Organized by Agricultural Engineering Division, The Institution of Engineers (India), West Bengal State Center, Kolkata, 3-4 September, 2004.Abstract No. A21, 55p.

Sinha A., Ghosh S., Pandey B.K. and Das R.C., 2004. Probiotic effect of a live bacterial isolate in nutrition of an Indian major carp, rohu (Labeo rohita). In Third Indian Fisheries Science Congress, Indian Society of Fisheries Professionals, 4-6 November 2004. Abstract No. FN 10, p.98.

Sovan Sahu, A.K.Reddy, V.K.Tiwari, M.P.S.Kohli and Chandra Prakash, 2 0 0 4 . Bamboo and its utilization in fishery of Chilka lake a case study. International Policy Workshop on bamboo in Fisheries, 30 September- 1 October, 2004, National Institute of Oceanography, Goa, India. Abstract No. 20.

Umesha D., P.P. Srivastava, S.D.Singh, and M. R. Biswal (2004) Molecular characterization, sequencing and development of species-specific dNA marker probe for sport fish, mahseer (Tor khudree). International conf. on Fish Genome characterization , National Univ of Singapore, December 4-7, 2004.

Vartak, V., Lakra, W. S. and Chaudhari, A. and Mukherjee, S. C. (2005). Genetic characterization of portunid crabs Scylla serrata and S. tranquebarica from west coast of India using RAPD markers. Paper presented at Sustainable Fisheries Development, 16-18 March, 2005, Kochi, India.

Venugopal G. 2004 Strategies for sustainable scampi farming: Abstract published in seminar on "Sustainable fisheries Development on Focus on

Andhra Pradesh". held on 23rd July 2004 at CIFT, Visakhapatnam, A.P.

Venugopal G., R.R.S.Patnaik, J.K.Prasad and K.Radhakrishna Reddy (2004) "Varshabhav Paristiti Mein carp Machiliyon ka Pratymnay Pariskar Desiya Magur Machili palan" Abst. Published in Pragrhan Aur Samvardhah Matsyaki Par Rashtriya Sangosti" held on 10 Sept 2004 at CIFT , Visakhapatnam

Venugopal G and R.R.S.Patnaik (2004) Carp Machiliyon ke sathscampi misrith palan arthiki Abstract published in Pragrhan Aur Samvardhah Matsyaki Par Rashtriya Sangosti" held on 10 Sept 2004 at CIFT , Visakhapatnam

Venugopal G., K.Radha Krishna Reddy & R.R.S.Patnaik (2005) "Magur seed production and culture" was presented as lead paper in the workshop on "Magur seed production" conducted by commissioner of fisheries A.P. during 3-4 February 05 at Hyderabad.

Zaidi S.G.S. , M.P.S. Kohli, V.K.Tiwari and R.K.Langer 2004 Biotechnology and its application in aquaculture (Ibid). pp.89.

Zaidi S.G.S., M.P.S. Kohli, V.K.Tiwari and R.K.Langer, 2004 Daniorerio- A model fish for biotechnology. (Ibid) pp.90.

C) Popular Articles

Abidi, S. A. H., Deshmukhe, G. and Mukherjee, S. C. (2004) Mumbai's Mangroves Srishti, April 2004: 60-61.

Abidi, S. A. H., Deshmukhe, G. and Uniyal, R.P. (2004) "Samudriya Vanaspati Ek Paushtik Aahar" Unnat Krishi, **43** (5):24-25.

Acharyulu, V.N., Patnaik R.R.S. and Venugopal, G. (2004). Chepala chreruvulalo Neti yajamanyam jagrathalu (in Telugu). Agri Gold Swarna Sedyam: Farmers' bilingual magazine, November 2004: 13

Chandra Prakash, Kohli, M.P.S., Reddy, A. K., Capoor, A and Bonde, V.R. (2004) Ozone-oriented water treatment and Montreal Protocol. Fishing Chimes, **24** (3): 31-32.

Kohli, M.P.S., Dube K., Langer, R. K., Chandra Prakash, Reddy, A. K., Tiwari, V.K.,and R. K. Upadhyay, 2004. Second workshop on Cage Aquaculture in Open Waters, Bhakra and Chandigarh, 9-10 September, 2004. Fishing Chimes, November 2004: 22-24 & 61-62.

Kohli, M. P. S., Langer, R. K., Dube, K., Chandra Prakash, Tiwari, V. K. and Reddy, A. K. (2004). Results of experiments conducted by CIFE on Cage Aquaculture. Fishing Chimes, **24**(11): 14-26.

Lakra, W. S., and Goswami, M. (2004) Marine protected areas and biodiversity conservation. In: Fish Diversity in Protected Habitats. Nature Conservators, Publication **8** , 27-38.

Mukherjee, S. C. (2004). Perspective of Fisheries and Manpower Development in India. Fishing Chimes, **24** (1): 79-81

Mukherjee, S.C. and Basu, S. (2004). A good catch. Times Food Processing Journal, **4**(1): 18-21

Mukherjee, S.C., Biradar, R.S. and Salim, Shyam S. (2004). Role of Universities in Socio-economic Development. University News, **42**(46): 60-62 & 74.

Mukherjee, S.C. and Nayak, S.K. (2004) Probiotics: An overview. Science and Culture, **70**(1-2): 46-48.

Mukherjee S. C., Srivastava, P.P. and Jain, K.K. (2004). Use of Conttonseed Meal in Fish Diet. AICOSCA News Letter, All India Cottonseed Crushers' Association. April 2004: 11-16.

Pal A.K., Venkateshwarlu, G., Manush, S.M., Chatterjee, N. and Mukherjee, S.C. (2004). Clove oil: A potential anaesthetic for fish and prawn. Fishing Chimes, **24** (11): 27

Pandey, P. K., 2005. Science and Education. In: Utsav. Rahul Education Society. Mumbai:72-74.

Pani Prasad K. and Mukherjee, S.C. (2004). University Industry Linkage for Promoting Societal Needs. University News, **42**(46): 142-144.

Raizada, S. and Hasan Javed. (2004).Antsthaliya bhumigat namkeen jal mein mahajhinga ka hatchery beej utpadan. Jalchari, Vol. **8**, CIFE, Mumbai

Raizada, S., Maheshwari, U.K., Ali, M. and Hasan Javed. (2004) Antasthaliya namkeen kheton va bhumigat namkeen jal mein matsya palan, Jalchari, Vol. **8** CIFE, Mumbai

Shenoy, L. and Biradar, R.S. (2004). Economic incentives and subsidies for development of marine capture fisheries in India. Fishing Chimes **24**(5): 36-38.

Venugopal, G. (2004). Alternative species culture in Brackishwater and

Freshwater systems. Fishing Chimes, **24** (10): 115

Venugopal G. (2005). Alternative species culture in Brackishwater and Freshwater systems. Aqua Tech, March 2005: 91

Venugopal, G., Krishna Prasad, J., Patnaik, R.R.S. and Reddy, K.R.K. (2005). Deseeya Maarpu (Magur) chepalu pempakam-Yajamanya Melakuvalu (in Telugu). Agri Gold Swarna Sedyam: Farmers' bilingual magazine, February 2005: 25.

Venugopal, G. and Rao, P. Srinivasa (2004). Improved Management methods in Scampi farming. Aqua International, March 2004: 23-27.

D) Chapters in Books

Datta, Subhendu and Pal, A. K. (2005). Environmentally sustainable management techniques for sewage-fed aquaculture. p. 339-350 In: Biotechnology in Environmental Management. Vol. 1. (Eds: T.K. Ghosh, T. Chakraborti and G. Tripathi). APH Publishing Corporation, New Delhi.

Dube, Kiran and Chaturvedi, C. S. (2004). Mridu Jal Mein Moti Samvardhan. p118-122 In : Bharat Mein Aadhunik Jalkrishi (Eds: C. S. Chaturvedi, Ashok Kumar Sharma and Rajeshwar Uniyal), CIFE, Mumbai.

Kohli, M.P.S. and Dube, Kiran (2004). Role of Women in Development Management and Conservation of Fisheries Resources with Specific Reference to North Eastern Region. p.66-72. In : Participatory Approach for Fish Biodiversity Conservation in North East India by (Eds: P.C.Mahanta and L.K.Tyagi). NBGFR, Lucknow.

Pal, A.K. and Datta Subhendu. (2005). Pesticide Residue in Fish and its Regulation. p. 375-388 In: Biotechnology in Environmental Management. Vol. 1. (Eds: T.K. Ghosh, T. Chakraborti and G. Tripathi). A.P.H. Publishing Corporation, New Delhi

Pandey, P. K. and Ayyappan, S. (2004). Bioremediation in Aquaculture. In: Biotechnology in Environmental Management (Eds: G. R. Pathade and P. K. Goel), ABD Publishers, Jaipur.

Sinha Archana and Ghosh, S. 2004. Probiotics: A tool for management of aquaculture environment. p.283-292In: Biotechnology in Environment Management. (Eds: G. R. Pathade and P. K. Goel). ADB Publishers, Jaipur.

E) Books

Ayyappan, S., Reddy, P.V.G.K., Thampy, D.M. and Gopal Krishna (Eds.) (2004), Fish Genetics and Biotechnology. ICAR New Delhi.

Das, R. C. and Sinha, A. (2005). Ornamental Fish Breeding and Culture. CIFE, Kolkata Centre

Dube, K., 2005, Pearl Culture (bilingual pictorial book) Second edition. CIFE, Mumbai.

Dube, K., Reddy, A.K., Hasan, S.S. and Kaicker, G. (2004). Project Guide. BLSP - Project on Aquaculture. IGNOU, New Delhi.

Lakra, W. S., Abidi, S.A. H., Mukherjee, S. C. and Ayyappan, S. (Eds) (2004) Fisheries Biotechnology. Narendra Publishing House, New Delhi.

Sinha, A. and Das, R.C. (2005). Alankari Machhaliyan (in Hindi). CIFE, Mumbai.

Datta, S. and Das, R.C. (2005). Conservation of Aquatic Environment. CIFE, Mumbai.

F) Manuals published by CIFE

Training Manual on Pearl culture

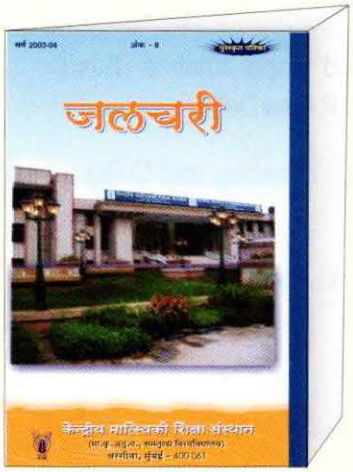
Training Manual on Carp and catfish breeding and culture

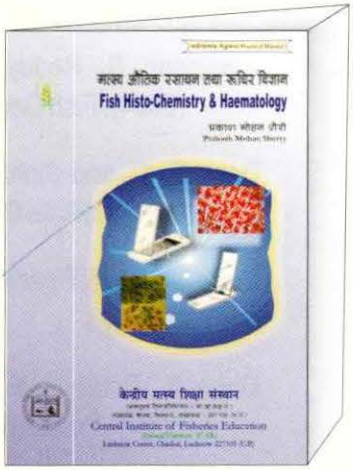
Training Manual on Management of giant freshwater prawn hatchery and growout technology

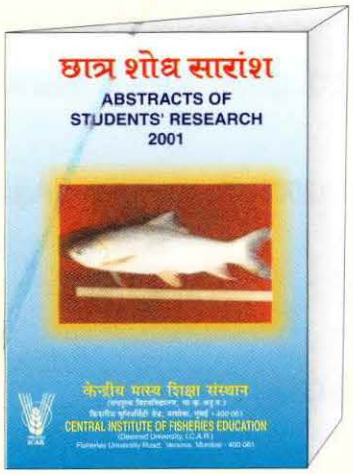
Training Manual on Freshwater aquaculture"

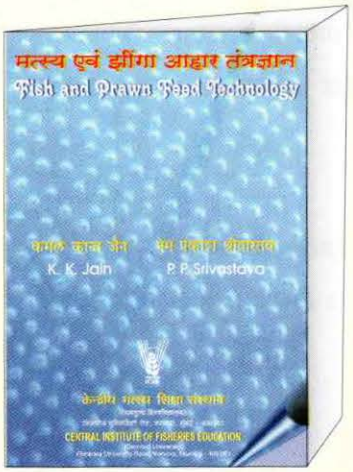
Training Manual on Aquaculture carps, prawns and integrated farming

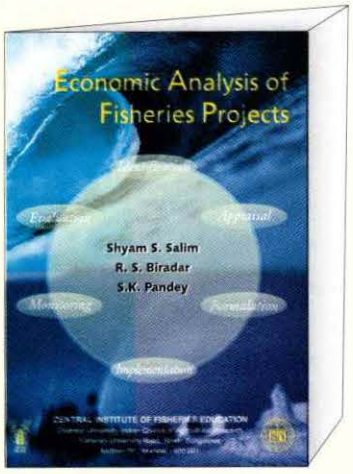
Training Manual on Breeding and culture of carps,prawns and ornamental fishes

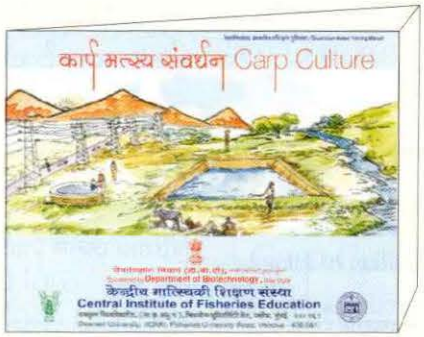

जलचरी
केन्द्रीय मात्स्यिकी शिक्षा संस्थान


मत्स्य औतिक रसायन तथा रुधिर विज्ञान
Fish Histo-Chemistry & Haematology
केन्द्रीय मत्स्य शिक्षा संस्थान
Central Institute of Fisheries Education


छात्र शोध सारांश
ABSTRACTS OF
STUDENTS' RESEARCH
2001
केन्द्रीय मत्स्य शिक्षा संस्थान
CENTRAL INSTITUTE OF FISHERIES EDUCATION

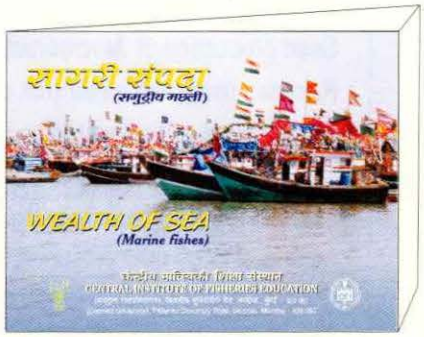

मत्स्य एवं झींगा आहार तंत्रज्ञान
Fish and Prawn Feed Technology
कमल कान्त जैन
K. K. Jain
पी. पी. श्रीवास्तव
P. P. Srivastava
CENTRAL INSTITUTE OF FISHERIES EDUCATION


Economic Analysis of
Fisheries Projects
Shyam S. Salim
R. S. Biradar
S.K. Pandey

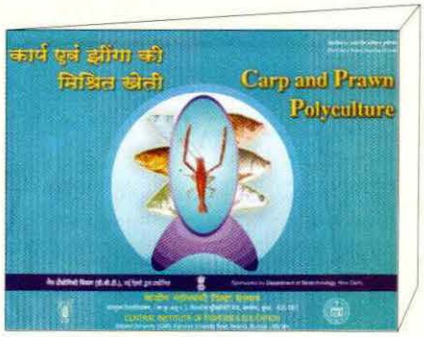

कार्प मत्स्य संवर्धन Carp Culture
केन्द्रीय मात्स्यिकी शिक्षण संस्था
Central Institute of Fisheries Education


समन्वित मत्स्य पालन
Integrated Fish Farming
केन्द्रीय मात्स्यिकी शिक्षा संस्थान
CENTRAL INSTITUTE OF FISHERIES EDUCATION


झींगा बीज उत्पादन तकनीकी
Scampy Seed Production Technique
केन्द्रीय मात्स्यिकी शिक्षा संस्थान
Central Institute of Fisheries Education


सागरी संपदा
(समुद्रीय मछली)
WEALTH OF SEA
(Marine fishes)
CENTRAL INSTITUTE OF FISHERIES EDUCATION


Ornamental Fish Breeding and Culture
केन्द्रीय मात्स्यिकी शिक्षा संस्थान
CENTRAL INSTITUTE OF FISHERIES EDUCATION


कार्प एवं झींगा की मिश्रित खेती
Carp and Prawn Polyculture

10. LIST OF APPROVED ONGOING PROJECTS

Institute Research Projects 2004-05

Sr No.	Project code	Title of the Project
1	CIFE(R)-2002/10ROH-I	Development and standardization of aquaculture techniques for inland underground saline water
1 (i)	CIFE (R)-2002/10-ROH-I (S1)	Development of packages of growout practices of fin fishes and shellfishes in low and higher saline underground water
1 (ii)	CIFE (R)-2002/10-ROH-I (S2)	Development of hatchery technology of giant freshwater prawn using inland sub surface water
1 (iii)	CIFE (R)-2002/10-ROH-I (S3)	Seed production of Asian catfish (magur) in inland saline ecosystem
1 (iv)	CIFE (R)-2002/10-ROH-I (S4)	Recycling of seepage water through sub - surface drainage system in the fishponds for semi - arid region
2	CIFE (M) -2003/1-AQ	Refinement of cage culture for rearing and raising table size fish in open waters with emphasis on nutrition and economics
3	CIFE (M) -2003/2 -AQ	Evaluation of perimethrin and deltamethrin toxicity and efficacy of ascorbic acid in reducing toxicity related stress in common carp
4	CIFE (M) -2003/3 -AQ	Seed production of *Macrobrachium rosenbergii* in Rajastan using sea water (nat ural/artificial) and inland saline ground water, and the demonstration of successful technology to the beneficiaries
5	CIFE (M) -2004/19 -AQ	Induced breeding, hatchery development and seed rearing of large river catfishes, *Aorichthys seenghala, Aorichthys aor* and *Wallagu attu*
6	CIFE (M) -2004/20 -AQ	Aquaculture through rainwater harvesting
7	CIFE (M) -2003/4 -FGB	Estimation of intraspecies variations among the hatchery-bred rohu populations of different states
8	CIFE (M) -2003/5 -FGB	Sperm preservation of the Asian catfish *Clarias batrachus*
9	CIFE (M) -2003/6 -FGB	Development of RAPD markers for the identification of various populations of *Penaeus monodon* of India
10	CIFE (M) -2004/21 -FHM	Evaluation of antibiotic residues in farmed shrimp and prawns of coastal India and antibiotic resistance of different bacteria of aquafarms
11	CIFE (M) -2003/7 -AE	Documentation of halophilic bacterial diversity in Western Rajastan

12	CIFE (M) -2003/8 -AE	Evaluation of the neuromodulatory activity of conopeptides
13	CIFE (M) -2003/9 -AE	Microsystin - LR and anacystin in Powai Lake and their impact on the zooplankton and ichthyofauna
14	CIFE (M) -2003/10 -IT	Women fisheries and livelihoods: An ergonomic perspective
15	CIFE (M) -2003/11 -IT	Impact of trade liberalisation and WTO Agreement on exports of Indian fish products
16	CIFE (M) -2004/22 -IT	Geographical information system for sustainable brackishwater aquaculture development in Maharastra and Gujrat
17	CIFE (M) -2004/23 -IT	A pilot study on supply chain management in fisheries
18	CIFE (M) -2003/12 -FRM	Stock assessment of some fishery resources off Mumbai Coast
19	CIFE (M) -2004/24 -FRM	Fishing technologies: Optimal designs and economic viability of fishing craft and gears along the coast of Maharastra
20	CIFE (M) -2003/15 -PHT	Deve lopment of value - added products from under utilised low - cost fish
21	CIFE (M) -2004/25 -FRM	Role of luminescent bacteria in the formation of histamine in ice stored scombroid fish
22	CIFE (M) -2004/26 -FNB	Studies on production and conversion efficiency of O Mega - 3 fatty acids in Indian major carps
23	CIFE (M) -2004/27 -FNB	Prevalence of aflatoxin in feed ingredients, remedial measures and its effects on growth performance and metabolic responses in Indian major carp Labeo rohita (L.)
24	CIFE (M) -2004/28 -FNB	Studies on nutrient dense micro - particulate diet for hatchery rearing of *Macrobrachium rosenbergii*
25	CIFE (M) -2004/29 -FNB	Molecular studies on promoters and growth enhancers of commercially important fishes
26	CIFE (K) -2003/16	Studies on the influence of different water, soil and organic matter parameters on the chemo-toxicological xenobiotics to fish
27	CIFE (K) -2003/17	EIA studies of the rivers and associated ecosystems of eastern states to identify strategies for the enhancement of fish production in the region
28	CIFE (K) -2004/30	Induced maturation and spawning of egg layer ornamental fishes through artificial feed supplemented with probiotics

29	CIFE (K) -2004/31	Development of compounded feed for carp and prawn based polyculture
30	CIFE (K) -2004/ 32	Breeding and mass scale seed raising in five endangered fish species in field condition
31	CIFE (L) -2003/19	Biodiversity and fisheries potential of River Gomati in relation to the prevailing environmental conditions in Lucknow
32	CIFE (P) -2003/20	Culture of *Macrobrachium rosenbergii* and demonstration to the farmers

11. CONSULTANCY, PATENTS & COMMERCIALIZATION OF TECHNOLOGY

PCR based technology for rapid detection of Fish Pathogens

A multiplex PCR based technology for rapid detection of *Salmonella, Vibrio* and *E. coli* in fish and fishery environment was developed by Dr. S.D.Singh, Principal Scientist & Head, Fish Nutrition & Biochemistry Division, but not submitted for patent.

12.PARTICIPATION OF FACULTY IN CONFERENCES, MEETINGS, TRAINING PROGRAMMES IN INDIA AND ABROAD

S.No	Details of Coference/ Meeting/ Training Programme	Attended by
1	Brain Storming Session organized jointly by the Technology Information, Forecasting & Assessment Council and the CIFE 08-09 June 2004 at CIFE Mumbai	Dr. C. S.Purushothaman
2	Conference on Opportunities in Organic Farming organized by the Confederation of Indian Industry at Chandigarh on 23 July 2004	Dr. C. S.Purushothaman
3	Seminar on "India an Emerging Global Source for Consultancy Services" organized by Consultancy Development Centre, New Delhi, at Y. B. Chavan Centre, Mumbai, on 11 September 2004	Dr. C. S.Purushothaman
4	International Conference for Analytical Instrumentation, Biotechnology and Services: Analytica -Anacon 2004 at the Nehru Centre, Mumbai, on 26 November 2004	Dr. C. S.Purushothaman
5	International Workshop on "Genetics and Health Management in Aquaculture" on 09 February 2005	Dr. C. S.Purushothaman
6	Thirteenth Research Paper Presentation at Bhavan's College under the auspices of Dr Dhala's Felicitation Fund on 26 February 2005	Dr. C. S. Purushothaman
7	National Seminar on Organic Farming during 30-31 July 2004 at Maharana Pratap Agriculture University, Udaipur	Dr. P. K. Pandey
8	3rd Indian Fisheries Science Congress organized at New Delhi during 4-6 November 2004	Dr. P. K. Pandey

9	Summer School on Participatory Integrated Watershed Management from 01 July, 2004 to 21 July 2004 at Central Soil and Water Conservation Research and Training Institute, Dehradun	Dr. (Ms) A. Vennila
10	78th Foundation Course Training for Agricultural Research Service from 10 August to 07 December 2004 at National Academy for Agricultural Research Management, Hyderabad (A. Vennila).	Dr. (Ms) A. Vennila
11	International Seminar on Sustainable Fisheries Development, 16-18 March, 2005, Kochi, India.	Keynote Lecture By Dr. W. S. Lakra
12	Advances in Fisheries Biotechnology, 62nd Indian Science Congress , January 3-5, 2005, at Nirma University, Ahmedabad.	Invited Lecture By Dr. W. S. Lakra
13	International seminar on Biotechnology with focus on Marine Biotechnology organized by Royal Norwegian Embassy at Bangalore on February 5, 2005	Dr. W. S. Lakra
14	Short-Term Training Course on Biotechnology and Intellectual Property Rights Law for Scientists and Officers organized by National Law School of India University in Association with the Ministry of Biotechnology, Govt. of India, from 12th - 17th July, 2004, held at National Law School of India University, Bangalore.	Dr. W. S. Lakra

13. WORKSHOPS, SEMINARS, SUMMER INSTITUTES, MEETINGS, ETC. ORGANIZED

Training programmes

SN	Title	Date	Venue	No. trained
1	Carp and catfish breeding and culture	14 - 20 July, 2004	CIFE, Mumbai	10
2	Pearl Culture	15 - 21Sept. 2004	CIFE, Mumbai	6
3	Management of giant freshwater prawn hatchery and growout technology	17-31 Aug. 2004	CIFE, Mumbai	10
4	Freshwater aquaculture	26-30 Dec. 2004	Agartala, Tripura	15
5	Aquaculture - carps, prawns and integrated farming	27-31 Jan. 2005	Aizawal, Mizoram	15
6	Breeding and culture of carps, prawns and ornamental fishes	23-27 February, 2005	Imphal, Manipur	15
7	International Training Programme on Aquatic Microbiology under the aegis of MIRCEN/ UNESCO American Society for Microbiology	14 - 23 December 2004	CIFE, Mumbai	16
8	Recent Approaches to Aquatic Environmental Management	15 - 21 February 2005	CIFE, Mumbai	6
9	Larval and broodstock nutrition and feeding management	1-8 September 2004	CIFE, Mumbai	10
10	Disease Diagnosis and treatment methods for Shrimp, Scampi and Fish	12-5-05 to 18-5-2004	CIFE, Kakinada	30
11	Farmers of Krishi Vigyana Kendra Sangariya, Hanumangarh Dist, Rajasthan State	21-06-04 to 24-06-04	CIFE, Kakinada	20
12	Culture of Brackishwater Fin fish and shell fish	29-06-04 to 3-07-04	CIFE, Kakinada	6

13	Magur hatchery and culture techniques	14-07-04 to 20-07-04	CIFE, Kakinada	12
14	Breeding and culture techniques of Indian and Exotic carps	4-08-04 to 10-08-04	CIFE, Kakinada	9
15	Fresh water Giant Prawn Farming	20-08-04 to 26-08-04	CIFE, Kakinada	11
16	Alternative Species culture in Brackishwater and Freshwater systems	13-10-04 to 19-10-04	CIFE, Kakinada	6
17	Scampi hatchery management and Grow out Techniques	4-11-04 to 10-11-04	CIFE, Kakinada	9
18	Alternative Species culture in Brackishwater and Freshwater culture systems	27-12-04 to 01-01-05	CIFE, Kakinada	11
19	P.G. Students from Bhopal Nobles P.G.College, Udaipur, Rajasthan State	14-01-05 to 17-01-05	CIFE, Kakinada	20
20	Recent Development in Aquaculture for PG students of Bhudelkhand University, Jhansi, UP,	18-02-05 to 24-02-05	CIFE, Kakinada	22
	STP on "Carp breeding and seed rearing".	22-31 Jul 04	CIFE, Powarkheda	04
21	STP on farm management (for MFSc students from Aquaculture Dept. B.U. Bhopal and Gujarat State Fisheries Officials)	21-30th September 04	CIFE, Powarkheda	13
22	STP on " Carp culture" (for M.Sc. students from M.P)	26 October - 05 November 04	CIFE, Powarkheda	06
23	Intensive field training on induced breeding of carps and nursery pond management (for PG diploma students from CIFE Centre, Kolkata)	04-25 Jul 04	CIFE, Powarkheda	21

24	Demonstrations on farm management and hatchery operation (for trainees from CIAE, Bhopal)	11-12 Janu 05	CIFE, Powarkheda	21
25	Demonstrations on farm management and ornamental fish culture/breeding Ffor B.Sc. students from Holkar Science college, Indore)	15-16 Febru 05	CIFE, Powarkheda	17
26	Demonstrations on farm management, hatchery operation (for Trainees from CIFE centre, Chinhat, Lucknow)	20-22 March 05	CIFE, Powarkheda	12
27	Job-oriented training in Fish and Fisheries to B.Sc. (Hons.) Students of Industrial Fish and Fisheries of M.L.S.M. College, Darbhanga, Bihar	01.04.2004 to 01.05.2004.	CIFE, Rohtak	20
28	Hatchery seed production of freshwater prawn using inland ground saline water	15-21 June 2004	CIFE, Rohtak	09
29	Prawn culture and Hatchery seed production of freshwater prawn in inland saline water	13-19 July 2004	CIFE, Rohtak	02
30	Carp and catfish breeding and culture	17-23 August 2004.	CIFE, Rohtak	03
31	Hatchery seed production of freshwater prawn using inland ground saline water	14-20 September 2004.	CIFE, Rohtak	03
32	Integrated fish farming systems	20 – 25th Sept, 2004	CIFE, Kolkata	36
33	Ornamental fish culture and breeding	10-15th January 2005	CIFE, Kolkata	12

34	Aquaculture-Carps, Prawns, Integrated Farming	27th – 30th January, 2005	Aizwal, Mizorum	60
35	Freshwater Aquaculture	27th – 30th Dec, 2004	Agartala, Tripura	50
36	Breeding and culture of carps, prawn and ornamental fishes.	23 – 26th Feb, 2005	Imphal, Manipur	60
37	Genetics and Molecular Techniques in Fisheries	28th May- 3rd June, 2004	CIFE, Mumbai	14

WORKSHOPS

SNo	Title	Date	Veuue
1	Culture and Breeding of ornamental fishes	13-14 October 2004	GVM Girls College, Sonipat, Haryana (conducted by CIFE, Rohtak)
2	International Workshop on Genetics and Health Management in Aquaculture	Feb 9-10, 2005	CIFE, Mumbai
3	Tagging Workshop of the Indo-Norwegian Project	February 11-12, 2005	CIFE, Mumbai

Conferences/Seminars/Symposium/Workshop/Meetings organized

1	Second National Workshop- Cum – Demonstration on Cage Aquaculture	9-10 September, 2004 at Chandigarh and Bhakhra

Training programmes


Remote Sensing and GIS Applications in
Fisheries Research and Management
January 5-25, 2005
CIFE


PEARL CULTURE

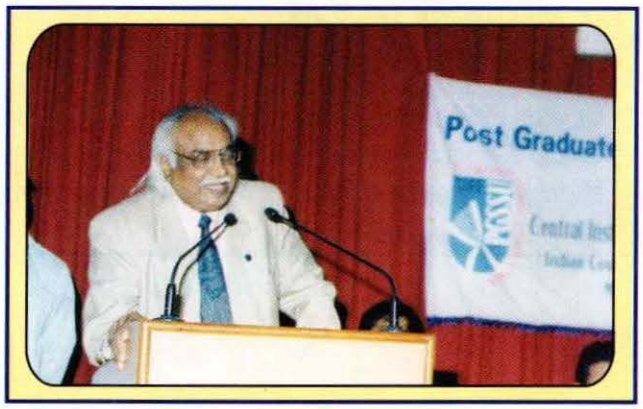

केन्द्रीय
माह्स्यकी
CENTRAL
INSTITUTE OF
FISHERIES
EDUCATION

14. DISTINGUISHED VISITORS

S.No	Dignitaries Visited
1.	Prof J.B. Chaoudhury, Ex - VC, GB Pant Agril Univ. Pantnagar
2.	Prof. K. Pradhan, Ex-VC SAU, Bikaner, Rajasthan
3.	Dr. Mangala Rai, DG, ICAR
4.	Dr. S. Ayyappan, DDG (Fy), ICAR
5	Dr. Jani Pal Mittal. Director, Chemistry and Isotope Group & Bhabha Atomic Research Centre, Trombay, Mumbai President National Academy of Sciences of India 2003 onwards

15.OTHERS

The Post Graduate Students and Scholars Union (PGSSU) arranged / coordinated the following activities



Various literacy and culture activities have been organized in the month of NOV-2004.

A. Essay Competition-English, Hindi.

b. Poetry Competition-English, Hindi.

c. Debate Competition-English, Hindi.

d. Elocation/Extrapore

e. Rangoli, Singing, dramas, mime, monoacting etc.

- Various sports activities like Volleyball, Badminton, Table Tennis, and Cricket were held.
- Hostel Day "Harmony" was celebrated on 22nd Dec, 2004.
- Students participation in 6th All India Inter Agricultural University sports and games meet 2004-05. in Kerala Agriculture University.
- Two M.F.Sc students Mr. Roshit C.M. and Mr. Arun. R. participated in National Debate Competition held in Mumbai and represented in National Youth Parliament for AIDS Awareness held at New-Delhi-NOV-6 to 7 2004. (Youth Parliament was organized by Govt. of India and UNAIDS)
- World AIDS Day was observed on 1st Dec. 2004 and in this connection a poster making competition was organized
- All festivals like Diwali, Christmas and Holi were celebrated in the campus.

16. PERSONALIA

Central Institute of Fisheries Education
(Deemed University, ICAR)
Seven Bungalows, Versova,
Mumbai 400 061
Maharashtra
Phone: 022-2636 1446/7/8
Fax: 022-2636 1573 & 022-2634 8223
e-Mail: fishinst@bom3.vsnl.net.in

LIST OF STAFF* (AS ON MARCH 31, 2004)
(This is not a seniority list)

Director

Joint Director
Dr. S.C. Mukherjee

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

Senior Scientist
Dr. (Ms.) Kiran Dube
Dr. (Mrs.) Neelam Saharan
Dr. (Ms.) Latha Shenoy
Dr. S.N. Ojha
Dr. K.V. Rajendran (on deputation)
Dr. A.K. Pal
Dr. G. Venkateshwarlu
Dr. Geetanjali Deshmukhe
Dr. Gopal Krishna Saxena
Dr. (Mrs.) Aparna Chaudhari
Dr. K. Venkateshvaran
Dr. M.B. Patel
Dr. S. Jahageerdar
Dr. P.K. Pandey
Dr. N.P. Sahu
Dr. V. K. Tiwari

Scientist (SS)
Mr. R.P. Raman
Dr. S.K. Patil
Dr. K. Pani Prasad
Dr. B.B. Nayak
Dr. Shyam Salim
Dr. Arpita Sharma

Scientist
Dr. Sanjay Jadhav
Dr. Makesh M.
Dr. A. Vennila
Dr. P.S. Ananthan

Technical Officer
T - 8
Mr. Nandlal Singh

T - 7
Mr. A.K. Reddy
Mr. S. Natarajan
Mr. A.R. Warange

T - 6
Mr. R.K. Langer
Dr. Chandra Prakash
Mr. A.K. Padmanabhan
Dr. Ashok Kumar Jaiswar
Dr. R.S. Rana
Mr. Alkesh Dwivedi
Dr. Prem Prakash Srivastava
Mr. R.D. Tandel
Mr. S.G.S. Zaidi
Ms. Rama Sharma
Mr. G.K. Rao
Mr. S.K. Pandey
Mrs. Asha T. Landge
Mr. A.D. Ragabhagat

Mr. M.K. Chouksey
Mr. Satish Kamat
Mr. Chandrakant M.H

T - 5
Mr. D.L. Sawant
Mr. Deepak Khogre
Mr. Dasari Bhoomaiah
Mr. K.P. Khalsa
Mr. J.P. Patil
Ms. Aravindra Mehta
Ms. K. Thilagavathi
Mr. Palaniswamy
Ms. Nalini Poojary
Mr. K.P. Shetty
Mr. P.K. Das
Ms. Madhavi Pikle
Mr. A. Sadanandan
Ms. S.M. Bagwe
Mr. S.M. Shinde
Mr. Chandrakant Kareer
Mr. B.G. Mandhare
Mr. R.G. Kudale
Mr. Bhagat Singh Rawat

Technician
T - 4
Ms. S.P. Nalawade
Ms. S.S. Gajbhiye
Ms. Rajani Pagare
Mr. J.M. Koli
Ms. Revati Dhongde
Ms. Rekha Nair

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

T - 2
Mr. S.R. Vinarkar
Mr. A. L. Kokane
Mr. Arun Puri (Gosavi)
Mr. Sikander Sheikh
Mr. R. D. Deshmukh

T-1
Mr. Dhanpat Singh
Mr. A.N. Mahadik
Ms. V.D. Misale
Mr. V.K. Bhave
Mr. Mohd. Baqar

Administration & Finance
Chief Administrative Officer
Mr. Chironji Lal

Senior Administrative Officer
Mr. Suresh Kumar

Finance & Accounts Officer
Mr. Prem Shankar

Administrative Officer
Mr. P.D. Sonawane

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

Assistant Administrative Officer
Mr. Sunil Kumar
Mr. T.D. Kumar
Ms. Valsa Pavithran
Mr. S.S. Kocharekar
Ms. T. Padmavathi

Private Secretary
Ms. T. Kuruvilla
Mr. G.S. Fernandes

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

Assistant
Ms. S.S. Parab
Mr. Y.P. Belgaonkar
Mr. B.L. Kokkula
Ms. N.Y. Raorane
Ms. Sushma Singh
Ms. S.R. Wadhavkar
Ms. Deepika N. Behl
Ms. S.V. Kadam
Ms. A.A. Shukla
Ms. D.S. Naik

Upper Division Clerks
Mr. J.D. Chandramore
Ms. F. G. Fernandes
Ms. Chandrarekha S. Khundol
Mr. D.S. Ingle
Mr. R.R. Kadam
Mr. R.G. Gamare
Mrs. Swati S. Koli
Mr. Vijay S. Kuveskar
Mr. Devendra Raorane
Ms. Sujata V. Pawar
Ms. Anagha U. Joshi
Ms. Yashoda S. Dhatavkar

Lower Division Clerks
Mr. A.G. Kolambkar
Mr. Bharat Kumar P. Chauhan
Mrs. Sanyuja S. Parab
Mr. Pradeep G. Angane
Ms. Chaitali C. Raut
Ms. Pragati R. Gadre
Ms. Anu Grover
Mr. K.K. Jagtap
Mr. Suresh H. Bhosle
Ms. Nalini A. Sawant
Mr. M.B. Waghela
Mr. Nandu L. Ghane

Supporting Staff
Grade III
Mr. K.D. Solanki
Ms. S.M. Supat
Mr. Madhu Wasnik
Mr. Vinod P. Tiwari
Mr. Surajbali R. Jaiswar
Mr. B.S. Tamankar
Mr. Ashok R. More
Mr. D.B.Gaikwad

Engine Driver (T-6)
Mr. S.K. Chodankar

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

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

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

Cook
Mr. S. Kamaraju

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

Grade II
Ms. Vandana Tambe
Ms. K.R. Ahire
Mr. T.G. Gaikwad
Mr. J.K. Makwana
Mr. Ankush R. Dore
Mr. Bandu R. Chavan
Mr. M.P. Kotian
Mr. G. B. Kamble
Mr. Ashok R. Shingade
Mr. Jagdish Namdev Dhanu
Mr. Vasant N. Ondkar

Grade I
Ms. Shantabai Kamble
Mr. S.P. Malvankar
Ms. R. H. Chavan
Mr. R.N. Kamble
Ms. Siddhi J. Kolambkar
Mr. Ganesh N. Zendekar
Mr. Ankush N. Joyashi
Mr. Anil D. Sonawane

Vessel Staff

Skipper
Mr. K. Satyanarayana(T-7)

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

CIFE Centre
Lahli, Via Anval, Rohtak
Haryana 124 411
Phone: 01258-285506

Principal Scientist
Dr. U.K. Maheshwari (Officer In-charge)

Sr. Scientist
Dr. Sudhir Raizada
Dr. A.K. Jain
Mr. N. K. Chadha

Scientist
Mr. Ajit Kumar Verma

Technical Officer
T-7
Dr. M. Ali

Sr. Scientist
Dr. Somdutt (Officer In-charge)

Scientist-SS
Mr. S.S.H. Razvi

Technical Officer
T-5
Mr. R.K. Upadhyay
Mr. Vijay G. Dubey

Technical Assistant
T-II-3
Mr. L.P. Bamalia

T-2
Mr. Gurbachan Singh

T-1
Mr. Anup Singh

Technical Assistant
T-II-3
Mr. Hasan Javed
Mr. Sanjeevan Kumar

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

Administrative Staff
Mr. V.K. Sinha, UDC

Supporting Staff
Mr. Gyani Ram, Gr. (I)
Mr. Gyan Chand, Gr. (I)
Mr. Lavesh Kumar, Gr. (I)

CIFE Centre
Powerkheda,
Hoshangabad- 461 110
Madhya Pradesh
Phone: 07574-232472
Fax: 07574-252954

Administrative Staff
Assistant
Ms. Asha Dhurve

Supporting Staff
Grade (III)
Mr. Hari Singh

Grade (II)
Mr. Hari M. Potpose
Mr. Lallu Prasad
Mr. Vishnulal
Mr. Mangali Prasad
Mr. Surendra Kumar

Grade (I)
Mr. Ram Kewal Prasad
Mr. Ram Swaroop
Mr. Manoharlal
Mr. Shambhu Dayal
Mr. Satyander Prajapati

CIFE Centre
Chinhat,
Lucknow - 227 105
Uttar Pradesh
Phone: 0522-315844
Fax: 91-0522-315848

Sr. Scientist
Dr. Alok Kumar Jain (Officer In-charge)
Mr. P. M. Sherry
Dr. P.K. Varshney

Technical Officer
T-6
Dr. (Ms.) Zeba Jaffar

T-5
Mr. S.P. Singh
Mr. A.K. Yadav

T-4
Mr. S.K. Upadhyay
Mr. Mohmood Gayas
Mr. P. Satyanarayana

T-3
Mr. Ravi Kumar
Mr. S.K.Singh

Technical Assistant
T-1
Mr. Om Prakash
Mr. P.C. Jaiswar
Mr. Ram Bharosi

Administrative Staff
Assistant
Mr. Pooranchand,
Mr. Jogendra Singh

Upper Division Clerk
Mr. P.K. Awasthi

Lower Division Clerk
Mr. P.C. Verma

Supporting Staff
Mr. Narayan, Gr. (IV)
Mr. K. Dush Raj, Gr. (II)
Mr. Suneet Kumar, Gr. (I)
Mr. Ram Lakhan, Gr. (I)
Mr. Anwar, Gr. (I)
Mr. J.N. Tiwari, Gr. (I)
Mr. Mahesh Chand, Gr. (I)
Ms. Kamla Jai Kishore, Gr. (I)
Mr. Vinod Kumar, (Cook)Gr. (I)

CIFE Centre
Beach Road,
Kakinada -533 007
Andhra Pradesh
Phone: 0884-373 602
Fax: 0884-373 602

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

Technical Officer
T-6
Mr. K.B.S. Murthy
Mr. P. Rami Reddy

Technical Officer
T-5
Mr. J. Krishna Prasad
Mr. K. Murali Mohan
Mr. P. Sreenivasa Rao
Mr. V.N. Acharyulu

Technical Assistant
T-4
Mr. K. Radhakrishna Reddy
Mr. Ravi Shankar Patnaik
Mr. B. Krishna Rao

T-2
Mr. S.S. Murthy
Mr. Y.S. Murthy

T-1
Mr. B. Satyanarayana
Mr. M. Satyanarayana
Mr. K. Malliah, Gr. (II)
Mr. A. Gurriah, Gr.(I)

Administrative Staff
Assistant
Mr. P.V.G.K. Murthy
Mr. B. Veera Raju

Senior Clerk
Mr. B. Laxman Rao

Junior Clerk
Ms. M. Rama Mani

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

CIFE Centre
30, G.N. Block, sector IV/V,
Salt lake
Kolkata, 700 091
West Bengal
Phone: 033 - 3573893
Fax: 033 - 3573469

Principal Scientist
Dr. Radha C. Das(Officer In-charge)
Dr. P.K.Ghosh
Dr. Krishna Chandra

Sr. Scientist
Dr. (Ms.) Archana Sinha

Scientist-SG
Mr. P. K. Roy
Mr. B.N. Tiwari

Scientist-SS
Dr. Shubendhu Datta

Scientist
Dr. Parimal Sardar (on study leave)

Technical Officer
(T - 5)
Mr. P.S. Pandey
Mr. S. K. Sharma
Mr. R.K. Biswas
Mr. A.K. Mondal

Technical Assistant
T-1-3
Mr. R.K. Mondal
Mr. P.K. Patra
Mr. S.K. Das

T-1
Mr. T.K. Ghosh
Mr. M. Satyanarayana

Stenographer
Ms. Kaberi Biswas,

Upper Division Clerks
Mr. C.N. Sahani,

Lower Division Clerks
Mr. P.K. De
Mr. Ram Milan Singh

Supporting Staff
Mr. B. Dhar, Masalchi, Gr. (IV)
Mr. B.D. Mondal, Gr. (III)
Mr. T.C. Balmiki, Gr. (III)
Mr. Manju Paul, Gr. (III)
Mr. Raghunath Das, Gr. (III)
Mr. Ram Narain Prasad, Gr.(III)
Mr. Ramesh Chowdhary Gr.(II)

We mourn the untimely demise of
Mr. P. Brahmananda Rao, SSG-I,
Kakinada Centre of CIFE

I 7. कार्यकारी सारांश

संस्थान के मुख्यालय तथा इसके केन्द्रों व केन्द्रीय समुद्री मात्स्यिकी अनुसंधान संस्थान, कोच्ची एवं केन्द्रीय मात्स्यिकी प्रौद्योगिकी संस्थान, कोच्ची तथा केन्द्रीय मीठाजल जीवपालन अनुसंधान संस्थान, भुवनेश्वर में विभिन्न शैक्षणिक कार्यक्रमों के अन्तर्गत चलाए जाने वाले स्नातकोत्तर व डाक्टरेट स्तर के कार्यक्रम सफलतापूर्वक चल रहे हैं । इस वर्ष 15 छात्रों ने पी.एच.डी. डिग्री, 15 प्रशिक्षणार्थियों ने अन्तरस्थलीय मत्स्य विकास तथा प्रशासन में पी.जी.प्रमाण पत्र पाठ्यक्रम सफलतापूर्वक पूर्ण किया ।

45 छात्रों को नौ विभिन्न स्नातकोत्तर पाठ्यक्रम के अन्तर्गत प्रवेश दिया गया जिनमें 24 छात्र पी.एच.डी. पाठ्यक्रम मे नामांकित किए गए । 25 प्रशिक्षणार्थी कोलकाता केन्द्र से संचालित अन्तरस्थलीय मात्स्यिकी विकास एवं प्रबंध में पी.जी.डिप्लोमा कार्यक्रम में पंजीकृत किए गए । इस वर्ष छात्र हित के लिए 8 अतिथि व्याख्यान आयोजित किए गए जबकि सी.आई.एफ.ई. संकाय ने अन्य संस्थानों में कुल दो अतिथि व्याख्यान दिए ।

संस्थान की अनुसंधान परियोजनाओं के अन्तर्गत 20 संस्थानीय परियोजना एवं 19 निधि परियोजनाओं पर कार्य हो रहा है । इस वर्ष के दौरान मुख्य अनुसंधान उपलब्धियों में रिजवॉयर में केज संवर्धन प्रौद्योगिकी की व्यवहारिक उपयोगिता है । महाराष्ट्र के समुद्री मात्स्यिकी के आंकड़े पर आधारित इनपुट जारी है । प्रतिरक्षण उपयोगी उपकरणेां का विकास जिससे मछलियों के जैविक पैथोजन्स एवं वायरल का पता किया जाता है । अल्प लागत मछलियों की मूल्य धारिता, महाझींगा हेतु हैचरी प्रौद्योगिकी का तत्काल पुर्नवर्धन जिससे अन्तरस्थलीय भूलवणीय जल के उपयोग किया जाता है तथा मीठा पानी झील में सायनोबैक्ट्रियल सेकेन्ड्री उपापचय का मैपिंग डायनामिक्स इत्यादि मुख्य उपलब्धियां है ।

इस वर्ष एम.एफ.एस.सी. के कुल 45 छात्रों ने शोध निबंध प्रस्तुत किया। कुल 125 अनुसंधान शैक्षणिक प्रकाशनों के साथ-साथ कई तकनीकी कोटि के प्रकाशन किए गए। मात्स्यिकी विज्ञान में अनुसंधान के विभिन्न स्तरों पर कुल 8 सेमिनार/संगोष्ठी/ब्रेनस्टॉर्मिंग सेशन का आयोजन किया गया। संस्थान में कुल 37 प्रशिक्षण कार्यक्रम संचालित किए गए जिसमें कुल 632 प्रतिभागियों ने प्रशिक्षण पूरा किया।

CIFE NETWORK

Headquarters

Central Institute of Fisheries Education
(Deemed University), (ICAR)
Seven Bungalows
Versova, Mumbai-400 061

EPABX Lines	:	022 - 26361446/7/8
Director	:	022 - 26363404 (O)
	:	022 - 26361656 (R)
Joint Director	:	022 - 26302232 (O)
Fax:	:	022 - 26361573 (Director)
	:	022 - 26310657 (Joint Director)
	:	022 - 26348223 (Sr.A.O.)
	:	022 - 26351006 (F.A.O.)
e-mail	:	fishinst@bom3.vsnl.net.in

CIFE Centre
30, G.N. Block Sector IV/V,
Salt Lake City, Calcutta- 700 091
West Bengal
Tel: (033)23573893
Fax : (033)23573469

CIFE Centre
Beach Road, Near Old Burmah Shell
Kakinada-533 007
Andhra Pradesh
Tel: (0884)2379146, 2373602

CIFE Centre
Kathota Tal, P.O.Chinhat-227105
Lucknow (U.P)
Tel: (0522) 2315848
Fax : (0522) 2315848

CIFE Centre
Lahli, Via Anwal
Rohtak-124 411
Haryana
Tel: (01258) 256852
(01262) 285506

CIFE Centre
Powarkheda,
Hoshangabad-461 110
Madhya Pradesh