



हर कदम, हर डगर
किसानों का हमसफर
कृषि कृषि सुखसाधक

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CENTRAL INLAND FISHERIES
RESEARCH INSTITUTE
(Indian Council of Agricultural Research)
Barrackpore - Kolkata



July - December, 2012

Greetings to all the readers!

Director's Column



Global warming and climate change are the potential threats to all the organisms on the earth. Aquatic animals are also not immune to this threat. Increase in marine and inland water temperature may affect the habitat, metabolism, growth and reproduction of the aquatic animals including fishes. The experiments at CIFRI show that species, growth stages and season affects the thermal tolerance of culture fishes like Rohu (*Labeo rohita*), Mrigala (*Cirrhinus mrigala*) and Catla (*Catla catla*). Pollution is another threat to the aquatic life. Phenol and phenolic compounds are some of the common pollutants in aquatic environments and are toxic to bacteria, algae and fish. Biodegradation of these pollutants by bacteria would be one of the best solutions for mitigation of these pollutions. We have

tested eighteen of such bacteria for their survival and efficacy in polluted water. When tested under laboratory simulation, most of the bacteria degraded phenol to a great extent. The bacterial strains showed adaptability, efficacy and potentiality for phenol degradation in polluted aquatic environments.

Mangroves are known for their supportive roles as breeding and nursery grounds for most of the estuarine fishes. Nutrients released from mangrove litterfall play a key role in productivity of an estuary like the Hooghly estuary. The institute initiated works on nutrient release and carbon sequestration of mangroves at Sundarbans. Sustainability of capture fishery in the same estuary is very much at stake due to use of many destructive fishing gears which catch very small fish juveniles and a huge bycatch. Under XII plan, CIFRI and CIFT joined hands to develop some Bycatch Reduction Device (BRD) which will be attached to the bag net to allow escape of juvenile fishes. Initial trial showed some encouraging results. The institute has studied the impact of flow regimes on fish species assemblage in river Mahanadi. The preliminary results showed a distinct fish species diversity characteristic of the habitat and flow conditions of each of the upper, middle and lower zones.

Breeding of ornamental fishes would be a potential source of income generation for the small and marginal farmers in the rural areas. A farmer friendly breeding and rearing technique of Angel fish (*Pterophyllum scalare*) was developed by the institute. The fish was successfully bred without any inducing agents. With some degree of hands on training, a farmer can easily master the technique of breeding and rearing of angel fish which has a huge market demand.

A number of research papers and other documents including three training manuals, one technical bulletin in hindi have been published by the institute scientists. As a recognition of good work CIFRI Scientists have been awarded by various agencies. The institute successfully organized Workshop on the river Ken, Regional training workshop on factoring environmental flow, Training programme-cum-workshop on 'Fish production enhancement from wetlands of Bundelkhand region', An interactive meeting on Ganga river basin management plan, Meeting of core committee on National Plan of action for Hilsa fisheries, Fishermen - Scientists interface meeting, Review meeting on catch assessment methodology in inland fisheries, IMC meeting and workshop-cum training programme on CeRA. Beside these, the institute also celebrated National Fish Farmers' Day, ICAR Foundation Day, Independence Day, Hindi Week, Vigilance Awareness Week and World Fishery Day with great enthusiasm. The institute also organized a number of training programmes, mass awareness campaigns and participated in different exhibitions across the country. All these events achieved grand success and were highly appreciated by the participants. Some of the CIFRI staffs were promoted to higher grades. Five assistants have joined our institute during the period and at the same time 11 staffs including one Principal Scientist superannuated. We cordially welcome the newcomers and wish all the superannuated staffs a happy post retirement life.

Any suggestions from our learned readers for improvement of this Newsletter would be highly appreciated.

Barrackpore
February, 2013

A. P. Sharma

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Research Highlights

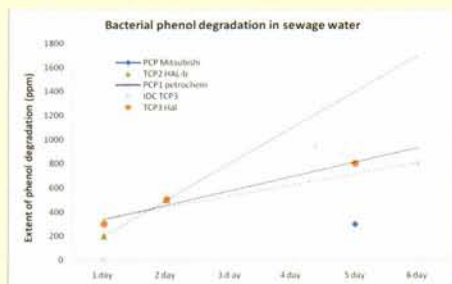
Species, growth stages and season affects thermal tolerance of culture fishes

Increase in marine and inland water temperature due to global warming may alter the habitat of aquatic animals towards hostile or beneficial direction. This will directly affect the habitat, metabolism, growth and reproduction of major inland fishes species like Rohu (*Labeo rohita*), Mrigal (*Cirrhinus mrigala*) and Catla (*Catla catla*). Studies related to their survival at higher temperature will be very promising towards selecting tolerant fish species. Critical temperature maximum (CT_{max}) is the arithmetic mean of temperatures where fishes lose their balance but become normal within few minutes after immediately transferring them to ambient temperature. CT_{max} is very good parameter which indicates thermal tolerance. A study was conducted with the objective of comparing thermal tolerance (CT_{max}) of Indian Major Carps with respect to species, growth stage and seasonal acclimatization temperature of Rohu, Mrigal and Calta fishes. CT_{max} of table size fishes of Rohu, Mrigal and Catla were $41.13 \pm 0.25^\circ\text{C}$, $41.05 \pm 0.43^\circ\text{C}$, $41.27 \pm 0.15^\circ\text{C}$ respectively showing no variation among species. Similarly CT_{max} of growth stages, fingerlings ($41.26 \pm 0.13^\circ\text{C}$) and table size ($41.13 \pm 0.25^\circ\text{C}$) fishes of Rohu showed no variation between growth stage. Table sized *C. mrigala* acclimatized at different temperatures ($29.5 \pm 1^\circ\text{C}$ and $25 \pm 1^\circ\text{C}$) showed varied CT_{max} of $41.05 \pm 0.43^\circ\text{C}$ and $38.8 \pm 0.23^\circ\text{C}$ respectively indicating more thermal tolerance of higher range of temperature at summer compared to other season. Thermal tolerance of such extent in the species and size studied will make them suitable for aquaculture in future climate change regime.

Md Aftabuddin, Prasun Roychowdhury, M K Das and AP Sharma

CIFRI identified phenol biodegrading bacteria in sewage

Phenol and phenolic compounds are some of the common pollutants in aquatic environments and are toxic to bacteria, algae and fish. For biodegradation of these pollutants, a good number of bacteria have been isolated, tested in culture media and identified. Eighteen of such bacteria were tested for their survival and efficacy in polluted water. When tested under laboratory simulation, most of the bacteria degraded up to 800 ppm phenol within 4 days and few strains degraded up to 1000 ppm phenol in a week. The rate of degradation in polluted water was faster than that in culture media showing adaptability, efficacy and potentiality of these strains for phenol degradation in polluted aquatic environments.



S K Manna, S Samanta and P Maurya

Nutrient release and carbon sequestration of mangroves

Mangroves are known for their supportive roles as breeding and nursery grounds for most of the estuarine fishes. Nutrient

released from mangrove litterfall plays a key role in productivity of an estuary like Hooghly. The institute initiated works on nutrient release and carbon sequestration of mangroves of Sundarbans. Litterfall from 9 different mangrove plants from *Jharkhali* in Sunderbans were collected monthly by litter trap nets (1 sq. m.) and the quantity was estimated after drying those at 8°C in laboratory. The mangrove species under study are *Bruguiera gymnorrhiza*, *Ceriops decandra*, *Avicennia officinalis*, *Avicennia alba*, *Avicennia marina*, *Sonneratia apetala*, *Aegiceras rotundifolia*, *Excoecaria agallocha* and *Rhizophora mucronata*. Initial results showed that *Avicennia officinalis* (Jat Bain) and *Avicennia alba* (Kal Bain) generate more litterfall than other mangrove species.



S K Das, R K Manna, Sajina Ali, Deepa Sudheesan and K M Sandhya

CIFRI-CIFT collaborative effort towards fish conservation in Hooghly estuary

Sustainability of capture fishery in Hooghly estuary is very much at stake due to use of many destructive fishing gears. Bag net (locally called *Binti jal*) is one such gear which catch very small fish juveniles having no commercial value. Under XII plan, CIFRI and CIFT join hands to develop some Bycatch Reduction Device (BRD) which will be attached to the bag net to allow escape of juvenile fishes. Three places in Hooghly estuary viz. Tribeni, Godakhali and Fraserganj were selected for experimental trial of BRD attached bag net at those centres. Initial trial showed that fish juveniles including hilsa are able to escape the bag net and pass through BRD. Also, prawns are mostly retained in the main net which is most encouraging as bag net fishers earn mainly from prawn part of the catch.

R K Manna and AK Sahoo

Impact of flow regimes on fish species assemblage in river Mahanadi

The river bed in the upper zone (Hirakud to Satkosha) was characterized by rocks, boulders and gravels and the middle zone (up to Banki) had a rich presence of organic matter in the sandy bottom, while the bed characteristics in the lower stretches (plains up to Naraj) were marked by sand bars and reduced water depth. The winter campaign showed a distinct fish species diversity characteristic of the habitat and flow conditions of each of the aforesaid three zones. The upper zone was dominated by *Tor tor*, locally known as *Kusura*, in varied sizes up to a maximum of 9-10 kg. A predominance of the Indian Major Carps of 5-10 kg size and *Labeo calbasu* was observed in the middle stretches, supported by deep and wide river stream. Largely small bodied fishes, freshwater catfishes and a variety of prawn species were found in the lower





stretches. The lower stretch apparently did not support fishes of larger size due to inadequate flows and depth. There are two hydro-electric power stations at Hirakud and Chipilima at an intervening distance of only 35 km. They exercise drastic control on natural mainstream river flow with a cascading effect on the down-stream deep pools,



A specimen of *Tor tor* at Sonepur, Mahanadi

...serving as the critical component of river habitat for shelter for brooders of a large diversity of fish species. The habitat fragmentation observed for a considerable distance beyond the dam and down-stream barrages is adversely affecting the fishery prospects of Mahanadi river.



Gauge and discharge site and river bed characteristics at Sonepur, Mahanadi river

A K Sahoo, Utpal Bhaumik, B B Satpathy, R K Manna, Roshit CM, and Soma Das

Farmer friendly breeding and rearing technique of angel fish developed

Angel fish (*Pterophyllum scalare*) was successfully bred without use of inducing agents at CIFRI. Following the cue of pairing behaviour, a set of one male and one female fish (18g body weight each) were segregated in a 50 l glass aquarium filled with well oxygenated water with pH 6.5-7, dissolve oxygen 7-7.5 mg/l, temperature 26.5 °C. Feeding was practised twice daily in the morning and evening with live tubifex worm and supplementation of dry feed mixture of rice bran, GNOC, fish meal and vitamin and mineral mixture at 2-5% of body weight. An inclined tile plate was provided as a substratum for attachment, as the eggs are adhesive in nature. Roughly 900-1500 eggs, milky translucent in colour were observed over a period of 2 days. The egg laden strip was removed to a flow-through system in which process of hatching started after 34 h and continued over a period of 3-4 days. The hatching rate was 87%. The spawns were reared in a 3 m long flow-through channel for 15 days and transferred to cement cisterns for raising of fry. A combination of live feed (planktons collected from the ponds and tubifex worm) and dry feed was



P. scalare; releasing of eggs on substratum

provided for the better survival. The major interventions in successful rearing were i) Transfer of 5-7 d hatchlings to flow through system and keeping for 21 d and fed with hatch artemia nauplii and boiled egg yolk. ii) Further transfer of 21d larvae to cement cistern of (4 x 1.5 m²) and fed with live tubifex for 30d iii) Final transfer to outdoor circular plastic tub of 500 lt capacity fed with tubifex and supplement feeding. In order to avoid mass mortality in rearing during winter, thermostats were used maintain the temperature at 20.5 ± 1.0 °C. The critical temperature was observed to be 13.0± 1.0 °C, which the young ones were susceptible to mass mortality. The fish could be bred from May through October, with peak breeding activity occurring in July and August. With some degree of hands on training, a farmer can easily master the technique of breeding and rearing of angel fish which has a huge market demand.



P. scalare mass in outdoor tanks

A K Sahoo and B B Satpathy

Dietary specialization of freshwater spiny eel in Karapuzha reservoir in Wayanad, Kerala



The freshwater spiny eel, *Mastacembelus armatus* is an important constituent in the fishery of Karapuzha reservoir and has a prominent role in the food-web of this ecosystem. The dietary analysis of the spiny eel, *Mastacembelus armatus* showed that

the fish subsisted mainly on small forage fishes. In addition to fishes, the gut content comprised of prawns, insects, aquatic plants and digested matter. The index of relative importance (IRI) values indicated that fishes and prawns were the major diet components. Feeding intensity was high in the early maturity stages and was relatively lower in fishes with ripe gonads. The highest feeding intensity was observed during summer months and the lowest coincided with the monsoon months. The fishes seemed to feed on prey of considerable size range from minute insect larvae to fully formed shrimps and small fishes. The presence of wide variety of organisms reveals effective probing of the environment for the prey. This foraging habit of the spiny eel makes it adaptable to an ecosystem characterised by fluctuations in its food chain components.

Preetha Panikkar, Feroz Khan and M E Vijaykumar

Connectivity of wetland to parent river influences wetland health, biodiversity and productivity

Loss of river connection is one of the major concerns for deterioration of wetland health in terms of changes in water and soil environment, primary nutrient profile and its regeneration potential in soil and water and biotic community in term of





abundance and diversity. Comparative studies were made in open and closed wetland to understand their effect on wetland production process and biodiversity. Monsoon, winter and summer samplings in Chhari Ganga (CG) wetland having round the year connectivity and Bhomra having seasonal connectivity revealed a wide array of changes in health and biodiversity. More water table depth was observed for CG (181-365 cm) compared to Bhomra (23.5 - 97 cm.) and gradual seasonal water table decrease from monsoon to summer was 74 % in closed and 40 % in open wetland. Bhomra wetland showed higher water conductivity, Ca, Mg, silicate and phosphate than CG. Overall sediment microbial activity, phosphorous cycling and carbon cycling enzymes in closed wetlands were 1.25 times, 1.65 times and 1.1 times higher than perennially connected

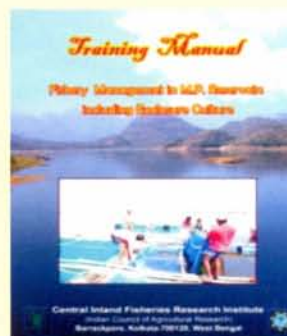
wetlands respectively. Higher aerobic heterotrophic (1.7 times), phosphorous solubilizing (2.75 times), phosphatase producing (1.1 times) and nitrifying bacteria (2.65 times) in Bhomra than CG during different season. Higher sediment organic matter, conductivity, moisture, oxidation reduction potential as well as DNA and column and benthic detritus in closed than open wetland. Distinct variation in distribution and abundance of plankton and benthic population with higher abundance of phytoplankton and benthos were observed in Bhomra than CG with opposite trend for zooplankton.

Md Aftabuddin, MA Hassan and AK Das

Publications

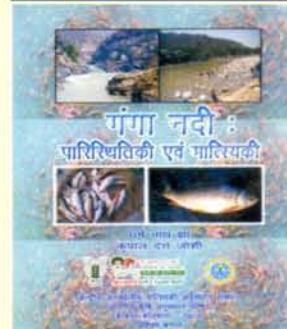
Training manual on 'Fishery management in MP reservoirs including enclosure culture'

The reservoirs are called the 'sleeping giant of fisheries' in India due their immense potential of fish production. One training programme was conducted for the officers and fishermen of Madhya Pradesh reservoirs. This training manual, edited by M K Bandyopadhyay, Aparna Roy and Ganesh Chandra, was published on this occasion. The bulletin covers a wide range of topics of fishery management of reservoirs. An emphasis was given on the enclosure culture techniques like cages and panes and their impacts. Project formulation, disease management and effective extension strategies were also discussed in this manual.



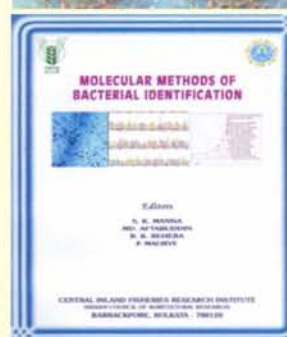
Ganga nadi – Paristhitiki eham matsyiki

This hindi bulletin is the number 181 in the technical bulletin series of CIFRI. The ecosystem of Ganga has gone many changes in the past due to urbanization and other developmental works in the catchment areas. The environmental flows have been reduced and water also polluted to a large extent. These have adversely affected the fisheries of the river. This bulletin, edited by DN Jha and KD Joshi, is the synthesis of five decade researches of CIFRI on Ganga and its tributaries.



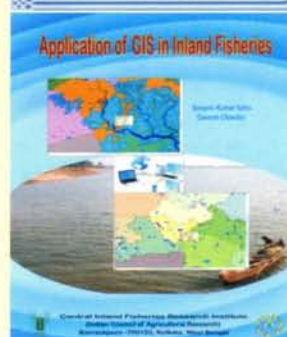
CIFRI Training Manual No. 5: Molecular methods of bacterial identification

Bacterial taxonomy and identification methods have undergone rapid changes in last one decade with inclusion of 16S rDNA homology at the heart of the identification methods. With the aim of disseminating knowledge on current molecular methods of bacterial identification and manpower development in the country, a training programme on Molecular Methods of Bacterial Identification was organized at CIFRI, Barrackpore during December 10-15, 2012. On this occasion this training manual was published. The manual will be highly useful to the trainees as it deals with the fundamental knowledge and practice of current molecular bacterial identification methods. Essentials of modern molecular methods in bacterial identification and taxonomy and hands on practice of bacterial DNA extraction and quantification, PCR, PCR purification, electrophoresis, Sanger sequencing, analysis and editing of chromatogram, were among the chapters in the manual.



Training Manual on 'Application of GIS in inland fisheries'

The Geographical Information System (GIS) have emerged as an essential tool in various applications. The capacity to store, retrieve, analyse, model and map large areas with huge volumes of spatial data has led to an extraordinary proliferation of applications. In the inland fisheries sector also it has the potential to be useful in many ways, like land use planning, ecosystem modeling, transportation, market analysis, fish species distribution mapping, inland water resources mapping etc. A model training course, sponsored by Directorate of Extension, Department of Agriculture, Govt. of India was organized during November 2012 on 'Application of GIS in inland fisheries'. This manual is the collection of lecture notes and practical methodologies using different softwares conducted during the training.





Trainings

Name of the training	Date	Venue	Participants
Training for staff of CIFRI/CDA-ICZM Consultancy Project	August 21-30, 2012	CIFRI, Barrackpore	Ecology and Fisheries of Chilika Lake project staff
Inland fisheries production and resource management	September 11-17, 2012	CIFRI, Barrackpore	30 fish farmers of Vaishali District, Bihar
Fishery management in MP Reservoirs including enclosure culture	September 21-27, 2012	CIFRI, Barrackpore	11 Officials of M.P. Fisheries Federation, Bhopal, M P
Training for staffs of CSS scheme on sampling methodologies of inland catch and IFMS	October 9, 2012	CIFRI, Barrackpore	4 fishery officials from Govt of Sikkim
Model Training Course on Application of GIS in inland fisheries	November 8-12, 2012	CIFRI, Barrackpore	18 Fishery Officers from Chhattisgarh, Bihar, MP, UP, Sikkim and Meghalaya
Inland fisheries production and resource management	December 4-10, 2012	CIFRI, Barrackpore	30 fish farmers of Gopalganj District, Bihar
Molecular methods of bacterial identification	December 10-15, 2012	CIFRI, Barrackpore	Scientists, Assistant Professor, Post-Doctoral Fellows, UGC JRFs, Ph.D. Scholars
Inland fisheries production and resource management	December 14-20, 2012	CIFRI, Barrackpore	30 fish farmers from Saharsha District, Bihar



Trainees at biotechnology Laboratory



Fishery Officers of State Governments for Model Training Course



Training programme under CIFRI/CDA-ICZM Consultancy Project





Mass Awareness Campaigns

Name of the Camp	Date	Venue	Participants
Restoration of Hilsha fishery in Hooghly river	July 25, 2012	Netaji Nagar, Hooghly, West Bengal	100 fishermen and 30 fisherwomen
Fishery development in irrigation canal	August 15, 2012	Jagulipara, Burdwan, West Bengal	70 SC & ST fish farmers
Enclosure culture of fishes in wetlands	September 20, 2012	Saguna Beel, West Bengal	100 Saguna Fishermen Cooperative Society Members
Mass Awareness –cum –workshop on the occasion of World Fisheries Day	November 21, 2012	CIFRI, Allahabad Centre	100 fish farmers
Conservation of Hilsha fishery	November 24, 2012	Namkhana, West Bengal	80fishers, among them 16 fisherwomen
Importance of cage culture	December 01, 2012	Pookote Lake, Wayanad District, Kerala	130 fishermen
Need for conservation of Hilsa fishery in Hooghly river	December 11, 2012	Banpur haat, Kolaghat, West Bengal	100 fishers
Conservation and propagation of Mahseer in river Cauvery	December 15, 2012	Harangi, Kodagu District of Karnataka	Officers of State Fisheries Department, members of Coorg Wildlife Society, fishers from Kodagu and neighbouring districts and scientists of CIFRI.
Need for estuarine fish protection from unwanted destruction	December 22, 2012	Taldi, South 24 Parganas, West Bengal	80 fishermen
Conservation of Hilsha fishery	December 28, 2012	Nabadwip, West Bengal	65 fishermen and 15 fisherwomen



Mass awareness campaign for conservation of Mahseer



Mahseer ranching programme in Cauvery



Mass awareness camp for conservation of juvenile Hilsa in Hooghly estuary





Exhibitions

Name of the exhibition	Date	Venue
National Convention Exhibition	September 03-06, 2012	Gandhinagar, Gujarat
16 th National Exhibition	September 07-11, 2012	Nazrul Maidan, Baguihati, Kolkata
Exhibition on the occasion of World Fishery Day	September 21, 2012	CIFRI, Allahabad
Fish festival exhibition of CIFE	September 22, 2012	Rohtak, Haryana
BIC inauguration exhibition of NIRJAFT	September 25-26, 2012	NIRJAFT, Kolkata
Exhibition on Hindi implementation in connection with Hindi Parliamentary committee visit	October 01, 2012	Hotel Sheraton, Bangalore
Exhibition at Global Symposium on aquatic resources for eradicating hunger and malnutrition – Opportunities and challenges	December 04-06, 2012	Mangalore
Exhibition in DCFR Bhimtal	November 05-06, 2012	DCFR Bhimtal
PCSL exhibition	December 13-15, 2012	IARI, Pusa, New Delhi
9 th Jatiya Sanhati Utsav O Bharat Mela 2012	December 08-15	Canning, West Bengal
Sundarban Krishi Mela O Loko-Sanskriti Utsav	December 20-29, 2012	Basanti, South 24 Parganas, West Bengal
Sundarban Yuva Mela	December 22-31, 2012	Taldi, South 24 Parganas, West Bengal



Visitors at CIFRI Stall, Rohtak



DDG(FY) visits CIFRI Stall at Bhimtal



CIFRI Stall at National Exhibition, Kolkata



Exhibition at NIRJAFT, Kolkata





Foreign Visits

Prof AP Sharma, Director; Dr Utpal Bhaumik, Head, REF Division; Dr BK Behera, Senior Scientist and Dr A K Sahoo, Scientist visited Dhaka, Bangladesh for attending the Regional Workshop on "Hilsa fish & its potential for aquaculture" from September 16-18, 2012.

Awards/Recognitions

- Dr Utpal Bhaumik, Head, REF Division was awarded the Fellowship of Zoological Survey of India, Kolkata, India.
- M Feroz Khan, Officer-in-Charge, Research Centre, CIFRI, Bangalore received "Excellence in Fisheries" award from Industrial Fisheries Alumni Association at Department of Industrial Fisheries, Cochin University of Science and Technology on August 15, 2012.
- CIFRI 'Neelanjali' was adjudged the best magazine among the magazines published by ICAR institutes and was awarded 'Ganesh Shankar Vidyanthi Hindi Krishi Patrika Puraskar' for the year 2011.



Superannuations

Name & Designation	Last place of posting	Date of superannuation
Shri U K Chatterjee, T-5 (Driver)	Barrackpore	July 31, 2012
Shri M C Gharami, SSS	Barrackpore	July 31, 2012
Shri Umesh Ghoudhury, SSS	Barrackpore	July 31, 2012
Smt. Mina Rani Bahadur, SSS	Barrackpore	July 31, 2012
Dr V Kolekar, Principal Scientist	Guwahati	August 31, 2012
Shri S B Ray, A.A.O.	Barrackpore	September 31, 2012
Shri T Chatterjee, T-5	Barrackpore	October 31, 2012
Shri K P Singh, T-5	Barrackpore	October 31, 2012
Shri G C Paramanick, SSS	Barrackpore	November 31, 2012
Shri M C Das, SSS	Guwahati	November 31, 2012
Shri N K Saha, T-4	Barrackpore	December 31, 2012

Promotions

Name & Designation	Promoted to	With effect from
Dr A K Das, Sr. Scientist	Principal Scientist	January 01, 2009
Dr B P Mohanty, Sr. Scientist	Principal Scientist	January 01, 2009
Dr B K Bhattacharjya, Sr. Scientist	Principal Scientist	January 01, 2009
Dr M K Bandyopadhyay, Sr. Scientist	Principal Scientist	July 27, 2009
Dr B B Satpathy, Sr. Scientist	Principal Scientist	March 17, 2010
Dr S K Das, Sr. Scientist	Principal Scientist	February 20, 2010
Dr Subir Kumar Nag, Sr. Scientist	Principal Scientist	August 31, 2010
Shri K Manjhi, Assistant	Asstt. Adm. Officer	October 01, 2012

New Appointments

Name & Designation	Place of posting	With effect from
Shri Subir Das, Assistant	Barrackpore	July 31, 2012 (FN)
Ms Payel Chaudhury, Assistant	Barrackpore	August 31, 2012 (FN)
Ms Pausali Mukherjee, Assistant	Barrackpore	September 26, 2012 (FN)
Shri Pratyay Sarkar, Assistant	Barrackpore	October 25, 2012 (FN)
Shri Satyabrata Biswas, Assistant	Barrackpore	November 24, 2012 (AN)





Meetings

Training programme cum workshop at CIFRI, Allahabad

CIFRI, Allahabad centre has conducted a training programme cum workshop on "Fish production enhancement from wetlands of Bundelkhand region" on August 23, 2012. A large number of participants including the officials and members of the fisher's societies operating on Jagatsagar and Dhabela wetlands in Chhatarpur district of MP participated in the programme. The participants were acquainted with the latest developments of wetland fisheries management.



Workshop on the river Ken

Allahabad Regional Centre of CIFRI organized a workshop on the "Aquatic biodiversity of the river Ken" on October 3, 2012 on completion of the NWDA's consultancy project. Engineers from National Water Development Authority, Gwalior and Lucknow; EIA Consultant; Professors from Allahabad University; Scientists from BSI, Allahabad; NGO representatives; retired scientists and staffs of CIFRI participated in the workshop.



An interactive meeting on Ganga River Basin Management Plan (GRBMP)

A two days interactive meeting on Ganga River Basin Management Plan was organized among CIFRI (GRBMP) and IITs Kanpur and Kharagpur at CIFRI Barrackpore on September 3-5, 2012. The core of discussion focused on formulation of future research projects on biological monitoring and environmental flows in the Ganga river basin. Several presentations were made by the Director, Heads of the Divisions and Scientists of CIFRI on ecological status, fisheries, livelihood and institutional issues of Inland fisheries resources in India. In addition, issues on environmental flows and biodiversity were discussed vividly for future research collaboration with IITs on GRBMP.



E-Flow working group meeting

Every *Mahakumbh* at Allahabad attracts millions of devotees across the world. The crowd need sufficient quantity of quality water for the holy dip and related rituals. Besides bathing requirements for pilgrims, sufficient flow with desired depth and velocity is also required to sustain the aquatic life in the river. WWF-India in collaboration with IIT Kanpur & Varanasi; Peoples Science Institute, Dehradun and CIFRI, Allahabad initiated a highly desired effort to estimate environmental flow at Triveni Sangam Allahabad during Mahakumbh 2013 to fulfil above socio-cultural and ecological needs. The working group meeting was organized on November 11, 2012 in which the participants presented their views and ideas about the flow requirements for religious purpose at the Sangam area.



Meeting of core committee on National Plan of action for hilsa fisheries

Declining hilsa catch is a serious concern in the country. Meeting of core committee on national plan of action for hilsa fisheries was held at CIFRI, Barrackpore on September 4, 2012. The meeting was chaired by Shri Tarun Sridhar, IAS, Joint Secretary, Deptt of Animal Husbandry Dairying & Fisheries, Ministry of Agriculture, Govt of India. The issues of sustainability and conservation of hilsa fisheries were discussed at length. It was felt that more awareness on conservation of brood hilsa is the need of the hour. It was felt that the focus should be on scientific information, institutional action, ecosystem based management and alternative livelihood to the fishers during conservation period. Prof A P Sharma, Director, CIFRI; Dr Y S Yadava, BOBP; Dr V Raghothama Swamy, Deptt of Fisheries, Govt of A P; Dr Bharat Saha, Deptt of Fisheries, Govt of WB and Dr Vijay Kumaran, FSI were among the other dignitaries attending the meeting.



Review meeting on catch assessment methodology in inland fisheries

One day review meeting on catch assessment methodology in inland fisheries under the Central Sector Scheme on "Strengthening of database and GIS for Fisheries Sector" was held on November 17, 2012. The meeting was attended by Dr D Chaudhury, DDG, DAHD&F, Dr Sud, Head IASRI, Dr N Roy NSSO, Kartikeyan, Y P Singh, M K Das, S K Sahu, M Naskar from CIFRI and State Fishery Officers from West Bengal, Sikkim, Jharkhand, Chattisgarh, Bihar, Uttar Pradesh and Meghalaya. This meeting followed the TMC meeting convened in Hyderabad to review the methodology as some states had confusion on schedules. Various decisions were taken for implementation of catch methodology. The complications of the present survey schedule were discussed. It also discussed on data monitoring.





Fishermen – Scientists interface meeting at Kakdwip, West Bengal

Small indigenous fish species provide valuable nutrients to the poor and vulnerable section of the society. However, they are often ignored and left to their peril. A Fishermen – Scientists interface meeting as a part of the project 'Population characteristics of small indigenous fishes in coastal waters of Sundarbans in relation to rural livelihood and nutritional security' was organized at Kakdwip, West Bengal on Nov 23, 2012. CIFRI scientists Drs Archana Sinha, S K Das, Arun Pandit, Aparna Roy and Anjana Ekka participated in the meeting. Initially the fishermen were made aware of the importance of small indigenous fishes and need of their conservation. In addition to these, a number of issues raised by the fishermen were discussed in the meeting.



Workshop-cum training programme on CeRA

Consortium for e-Resources in Agriculture (CeRA) has been established under the NAIP for providing online access to e-journals and resources in over 120 ICAR libraries. Objective is to expand the existing R & D information resource base of ICAR Institutions/Universities, etc. A



workshop-cum-training programme was organized at Barrackpore on December 01, 2012. Dr AK Mishra from IARI, New Delhi explained the details of CeRA. He informed that the journals of major publishers of the world like Springer, Annual Reviews, CSIRO, Elsevier, Taylor and Francis and a number of Indian Journals are included in the CeRA database. The director also informed that most of the agriculture related journals from selected publishers are available in CeRA. At present, more than 2900 journals are accessible. Request the Article' link is meant for providing a particular article of a journal which is not subscribed by CeRA under the Consortia, but available in the library of an institution. Such Articles can be obtained through Document Delivery Request (DDR).

A Regional training workshop on factoring environmental flow

The workshop on 'Factoring environmental flow in integrated water resource management' was organized at Department of Zoology and Environmental Sciences, Gurukul Kangri Vishwavidyalaya, Haridwar (Uttarakhand) during December 6-11, 2012 by National Institute of Ecology, New Delhi in association with CIFRI, Barrackpore and SaciWaters, Hyderabad. The Workshop was supported by Cap-Net, Pretoria, South Africa. The workshop was attended by scientists from research organizations, engineers from hydropower projects, academicians from Universities, and NGO representatives. Many renowned personnel having experience in river flow delivered lectures on different aspects of environmental flow especially downstream of the dam. A field tour to selected dams and barrages in Uttarakhand was performed for an on-field experience about the real issues regarding environmental flow. Dr KD Joshi, Pr. Scientist, CIFRI and Dr KK Vass, Ex-Director shared their experiences regarding different flow related issues in Indian rivers especially Ganga. Four scientists from CIFRI, viz. Dr RK Manna, Dr AK Sahoo, Dr DN Jha and Dr Soma Das participated in the Workshop.

Events

National fish farmers' day

National fish farmers day is being celebrated every year on July 10 to mark the occasion of the first success of induced breeding technique in India by Dr Hiralal Choudhary in the year 1957. This was one of the remarkable milestones in the annals of Indian fisheries, which created revolution in aquaculture and subsequently the country witnessed blue revolution in fisheries, increasing fisheries production manifold. Like every year, the day was celebrated at CIFRI on July 10, 2012. Honourable Minister for Fisheries, Aquaculture, Aquatic Resources and Fisheries Harbour, Govt. of West Bengal, Shri Subrata Saha was the Chief Guest of this function. Eight fish farmers from West Bengal,



Bihar and Jharkhand were awarded for their outstanding contribution in inland fisheries development of the country.

ICAR foundation day

The Indian Council of Agricultural Research (ICAR) was established on July 16, 1929. With 97 ICAR institutes and 47 Agricultural Universities, India has the largest National Agricultural Research Systems (NARS) in the world. The ICAR has played a pioneering role in ushering Green Revolution and subsequent developments in agriculture in India making the nation food and nutritionally secured. It has played a major role in promoting excellence in higher education in agriculture. Like every





year CIFRI celebrated ICAR foundation day on July 16. Prof Amalesh Choudhury, retired Professor, Calcutta University; Dr C K Mukherjee, Professor, IIT Kharagpur; Prof A P Sharma, Director, CIFRI; Head of Divisions, Scientists and other staff members of CIFRI and CIFRI retired Scientists attended the programme. Prof Amalesh Choudhury delivered the foundation day lecture. On the occasion the dignitaries distributed prizes to the winners of various competitions. In his speech Prof Sharma remembered the contributions of ICAR to the nation and inspired the staffs to work to their fullest potential.

Independence day celebration

Following the tradition CIFRI celebrated the Independence Day with great zeal and enthusiasm on August 15, 2012. Prof A P Sharma, Director of the institute hoisted the tri-colour and paid rich tribute to the nation. He remembered the achievements of CIFRI. He urged the staff to work hard with dignity. Prof. Sharma gave a motivational speech to work meticulously and gave 100% to contribute towards development of fisheries sector. All the CIFRI staff and members of the family were present on the occasion. The staffs enjoyed the cultural programme in the auditorium of the institute.



Hindi week celebration

The institute observed 'Hindi Saptah' during September 14-20, 2012. During this week a number of Hindi competitions like *nibandh lekhan*, *tippany lekhan*, *Shabdawali*, *Viyakhyan*, *Hindi Patra lekhan*, Quiz etc were conducted. A large number of staff members and their family members participated in these competitions and won many prizes. Request was made to use more and more Hindi in the office.



IMC meeting

The 41st meeting of the Institute Management Committee of CIFRI was held at Barrackpore on September 24, 2012. The meeting was attended by the Chairman and all the 10 members. The Chairman briefed the members about activities carried out by the institute in the field of research, extension, overall institute management and linkages establishes with other stake holders. He



governance in administration and to develop excellence in research in the institute. The Action taken report, financial achievements, purchase of spillover equipments, status report of audit paras, progress of spillover works, research activities were also presented. Overall, the committee expressed satisfaction on the achievements on all fronts.

Dr Charan Das Mahant visited Allahabad Regional Centre of CIFRI

Minister of State for Agriculture and Food Processing Industry, Government of India Dr Charan Das Mahant visited CIFRI, Allahabad on September 28, 2012. He visited different laboratories and facilities of the institute. He also interacted with CIFRI scientists and thanked CIFRI for its contribution to the nation. He was impressed with the achievements and progress of the regional centre and urged the scientists to work hard to maintain the rich tradition of CIFRI.



Vigilance awareness week

CIFRI observed 'Vigilance Awareness Week' during the period October 29 - November 03, 2012. Vigilance Awareness week started with the pledge taking ceremony by all the employees of the institute. The pledge is aimed at sensitizing and educating the public servants about the dangers of corruption. During the week different competitions related to curbing of corruptions were organized. on the concluding day Shri Shankar Kumar Dutta Gupta, Ex-DAG, CAG of India was the Chief Guest. He mentioned that the theme of this year 'Transparency in Public Procurement' is extremely important as the public procurement is vulnerable to corruption. His lecture was very inspiring and thought provoking where he emphasized that public officials should work with sincerity and integrity in their public actions without fear or favour.



Cambodian delegates visited CIFRI

Cambodian delegation of 7 administrators and 6 progressive fish seed producers led by Dr Hav Viseth, Director, Department of Aquaculture Development visited CIFRI, Barrackpore on November 9, 2012. Prof A P Sharma, Director, CIFRI apprised the delegation with the CIFRI





research activities and achievement. The delegation showed keen interest in various research works undertaken by CIFRI. Dr Utpal Bhoumik, Head, REF Division delivered a lecture on 'Rice-cum-fish culture in seasonal water bodies'. Sri Ganesh Chandra, Scientist coordinated the international delegation visit. This study tour of Cambodian delegation was sponsored by Japan International Cooperation Agency (JICA).

World Fishery Day celebration

World Fishery Day was celebrated with much fanfare and enthusiasm both at headquarters and Allahabad Regional Centre on November 21, 2012. A workshop (in Hindi) entitled "Nadiyon Main Videshee Matsya Prajatiyon Ka



Atikraman: Karan Evam Nivaran" was organised to mark the important occasion of fishery fraternity and sensitize the stakeholders on alarming issue of rapid invasion of exotic fishes on major river systems including the river Ganga at Allahabad. More than 120 participants including fishermen and fish traders from Sadiyapur, Daraganj, Mehdauri; progressive fish farmers; retired and serving scientists of CIFRI; representatives of the state fisheries department; representatives of All India Radio, Allahabad; NGO's and students actively participated in the World Fishery Day programme. The participants in general and fishers and fish farmers in particular appreciated the efforts of CIFRI in celebrating World Fishery Day.



Small indigenous fishes (SIFs) may be small but they are no way small in nutritional quality

A SIF *Amblypharyngodon mola* contains 16% crude protein and 8416 mg/kg Calcium. Mola is also very rich in vitamin A (31668 µg/100g) as well as other fat soluble vitamins like vitamin D (23280 µg/100g), E (20017 µg/100g) and K (4092 µg/100g).



Puntius sophore, another SIF, contains 16% crude protein and 9748 mg/kg Calcium and is also very rich in vitamin E (3068 µg/100g).



(Courtesy : Outreach Activity on Nutrient Profiling and Evaluation of Fish as a Dietary Component - CIFRI)

FISH FACT





हर कदम, हर डगर
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आप सभी को नये वर्ष की हार्दिक शुभकामनायें!

निदेशक की ओर से



वर्तमान में धरतीवासियों के लिये सबसे बड़ा खतरा है – वैश्विक तापमान में वृद्धि और जलवायु परिवर्तन। जलीय प्राणी भी इस खतरे से अछूते नहीं हैं। समुद्री और अंतरस्थलीय जल के तापमान वृद्धि का प्रत्यक्ष प्रभाव इसमें वास करने वाले जीवों विशेषकर मछलियों के आवास, मेटाबोलिज्म, विकास और प्रजनन पर पड़ता है। संस्थान द्वारा किये गये परीक्षण में यह पता चला कि रोहू (लेबियो रोहिता), मृगला (सिरहिनस मृगला) और कतला (कतला कतला) प्रजातियों के विकास और दाब सहन क्षमता पर इसका प्रतिकूल प्रभाव पड़ता है। जलीय प्राणियों के लिये प्रदूषण एक अन्य खतरा है। जल में उपस्थित फेनॉल और इसके तत्व जीवाणु, अल्गी और मछलियों के लिये विषकारक हैं। इसका निदान जीवाणु द्वारा बायोडिग्रेडेशन प्रक्रिया है। इसके लिये उत्तरदायी बैक्टीरिया की पहचान कर इनका परीक्षण किया गया। कुल 18 बैक्टीरिया की पहचान कर प्रदूषित जल में इनकी सहनक्षमता और उत्तरजीविता को जाना गया। अधिकतर बैक्टीरिया प्रदूषण के प्रभाव को निष्क्रिय करने में सक्षम थे।

ज्वारनदमुख में वास करने वाली मछलियों के पालन और प्रजनन के लिये मैंग्रोव का महत्वपूर्ण भूमिका है। मैंग्रोव से प्रवाहित पोषक पदार्थों की हुगली ज्वारनदमुख की उत्पादकता वृद्धि में महत्वपूर्ण भूमिका है। संस्थान ने सुन्दरवन के मैंग्रोव के पोषक तत्वों के प्रवाह और कार्बन सिक्वेस्ट्रेशन पर कार्य आरंभ किया है। इस ज्वारनदमुख में छोटी मछलियों एवं अन्य उपज प्राप्ति के लिये ऐसे गियर लगाये गये हैं जिनसे अंतस्थलीय प्रग्रहण मात्स्यिकी पर भी प्रतिकूल प्रभाव पड़ता है। 12वीं योजना के अंतर्गत केन्द्रीय अंतस्थलीय मात्स्यिकी अनुसंधान संस्थान और केन्द्रीय मात्स्यिकी प्रौद्योगिकी संस्थान के संयुक्त उद्यम से बाइकैच रिडक्शन डिवाइस (Bycatch Reduction Device) नामक यंत्र का विकास किया गया है जिसे बैगनेट के साथ लगाने से अवांछित छोटी मछलियों की अंगुलिकायें बाहर निकल जाती हैं। प्रारंभिक प्रयोग में उत्साहवर्द्धक परिणाम प्राप्त हुये हैं। महानदी में मत्स्य प्रजातियों पर धारा प्रवाह के प्रभाव का अध्ययन किया गया। प्रारंभिक परिणाम से मत्स्य प्रजातियों की अलग-अलग आवास संबंधी विशेषताओं एवं ऊपर, मध्य और निचले स्तर के धारा प्रवाह संबंधी आंकड़ें एकत्रित किये गये।

ग्रामीण क्षेत्रों में छोटे और अल्प आय वाले कृषकों के लिये रंग-बिरंगी मछली पालन आजीविका का एक आधार हो सकते हैं। संस्थान ने एंजेल फिश, *Pterophyllum scalare* के प्रजनन और पालन तकनीक, जो कृषक-उन्मुख है, का विकास किया है। इस मछली का प्रजनन कृत्रिम कारकों के प्रयोग के बिना ही सफल हुआ है। इससे यह पता चला कि केवल अल्प प्रशिक्षण से ही एंजेल फिश का पालन किया जा सकता है। व्यावसायिक तौर पर इस मछली की मांग बहुत अधिक है।

रिपोर्ट अवधि के दौरान अनेक शोध पत्रों, प्रशिक्षण मैनुअल और एक हिन्दी बुलेटिन का प्रकाशन हुआ। संस्थान के वैज्ञानिकों को उत्कृष्ट कार्यों के लिये पुरस्कृत किया गया। संस्थान एवं इसके केन्द्रों में कार्यशालाओं एवं संगोष्ठी का आयोजन किया गया – केन नदी, पर्यावरणीय धारा प्रवाह एवं 'बुंदेलखण्ड के आर्द्रक्षेत्रों में मत्स्य उत्पादन का संवर्द्धन' आदि। साथ ही कई बैठकों का आयोजन भी हुआ जैसे, गंगा नदी बेसिन प्रबंधन योजना, हिल्सा मात्स्यिकी पर राष्ट्रीय योजना संबंधी बैठक, मछुआरा-वैज्ञानिक इंटरफेस बैठक, अंतस्थलीय मात्स्यिकी के उपज आंकलन पर पुनरीक्षण बैठक, संस्थान प्रबंधन बैठक और CeRA पर कार्यशाला-सह-प्रशिक्षण कार्यक्रम आदि।

इस दौरान संस्थान में राष्ट्रीय मत्स्य पालक दिवस, भा. कृ. अनु. परिषद् संस्थापना दिवस, स्वाधीनता दिवस, हिन्दी सप्ताह, सतर्कता जागरूक सप्ताह एवं विश्व मात्स्यिकी दिवस मनाया गया। कई प्रशिक्षण कार्यक्रमों, जन जागरूकता अभियान, प्रदर्शनी आदि का आयोजन किया गया जिसमें देश के कोने-कोने से आये प्रशिक्षणार्थियों ने भाग लिया। संस्थान के कई अधिकारियों एवं कर्मचारियों को पदोन्नति दी गई है और कुछ अधिकारियों एवं कर्मचारियों का संस्थान के अन्य केन्द्रों में स्थानांतरण हुआ। पांच सहायकों को संस्थान मुख्यालय में नियुक्ति हुई है। मैं अधिकारियों एवं कर्मचारियों के सुनहरे भविष्य की कामना करता हूँ, साथ ही सेवानिवृत्त हुये अधिकारियों एवं कर्मचारियों के खुशहाल जीवन के लिये ईश्वर से प्रार्थना करता हूँ।

यह न्यूजलेटर आपके समक्ष प्रस्तुत है, इसे और भी उपयोगी एवं आकर्षक बनाने हेतु आपके सुझाव आमंत्रित हैं।

बैरकपुर, फरवरी 2013

अनिल प्रकाश शर्मा



अनुसंधान उपलब्धियाँ

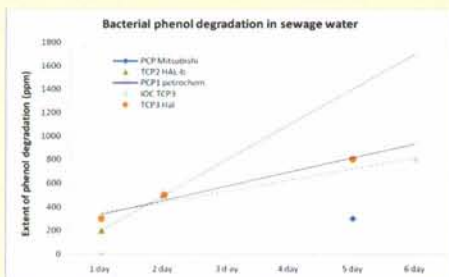
पालित मछलियों की थर्मल सहनशीलता पर प्रजाति विशेषता, विकास एवं ऋतु परिवर्तन का प्रभाव

समुद्री और अंतर्स्थलीय जल के तापमान वृद्धि का प्रत्यक्ष प्रभाव इसमें वास करने वाले जीवों विशेषकर मछलियों के आवास, मेटाबोलिज्म, विकास और प्रजनन पर पड़ता है। संस्थान द्वारा किये गये परीक्षण में यह पता चला कि रोहू (*लेबियो रोहिता*), मृगला (*सिरहिनस मृगला*) और कतला (*कतला कतला*) प्रजातियों के विकास और दाब सहन क्षमता पर इसका प्रतिकूल प्रभाव पड़ता है। अध्ययन यह बताते हैं कि ऐसी परिस्थिति में ऐसी प्रजातियों का चयन किया जाय जिनकी सहन क्षमता अधिक हो। अधिकतम तापमान (Critical temperature maximum - CT_{max}) में मछलियों की शारीरिक स्थिति का संतुलन बिगड़ जाता है पर अगर तुरंत इन्हें अनुकूल तापमान वाली जगह में रखा जाय तो इनकी शारीरिक स्थिति सामान्य हो जाती है। थर्मल टोलरेन्स का सूचक CT_{max} है। अतः रोहू (*लेबियो रोहिता*), मृगला (*सिरहिनस मृगला*) और कतला (*कतला कतला*) प्रजातियों के थर्मल टोलरेन्स का तुलनात्मक अध्ययन किया गया। रोहू, मृगल और कतला का थर्मल टोलरेन्स क्रमशः 41.13 ± 0.25 डिग्री से. ग्रे., 41.05 ± 0.43 डिग्री से. ग्रे. और 41.27 ± 0.15 डिग्री से. ग्रे. दर्ज किया गया। इनमें विशेष भिन्नता नहीं देखी गयी। इसी प्रकार, इनके विभिन्न चरणों पर इस थर्मल टोलरेन्स का अध्ययन किया गया। अंगुलिकाओं में यह 41.26 ± 0.13 डिग्री से. ग्रे. और टेबुल साइज वाली मछलियों में 41.13 ± 0.25 डिग्री से. ग्रे. था। रोहू मछली के अलग-अलग विकास चरणों में विभिन्नता नहीं देखी गयी। टेबुल साइज वाली मृगल मछली को अलग-अलग तापमान (29.5 ± 1 डिग्री से. ग्रे. और 25 ± 1 डिग्री से. ग्रे.) में रखा गया। इनका CT_{max} क्रमशः 41.05 ± 0.43 डिग्री से. ग्रे. और 38.8 ± 0.23 डिग्री से. ग्रे. दर्ज किया गया। इससे यह पता चला कि अधिक तापमान में भी ये प्रजातियां रह सकती हैं और भविष्य में जलवायु परिवर्तन के खतरे का सामना करने में ये प्रजातियां सक्षम हैं।

मो. अफताबुद्दीन, प्रसून रायचौधरी, एम के दास एवं ए पी शर्मा

अवशिष्ट पदार्थों में फेनोल बायोडिग्रेडिंग बैक्टीरिया की पहचान

जलीय पर्यावरण में सामान्यतः दो ऐसे प्रदूषक पदार्थ, फेनोल एवं फेनोलिक तत्व पाये जाते हैं जिनका जहरीला प्रभाव बैक्टीरिया, अल्गी और मछलियों पर पड़ता है। इन प्रदूषक पदार्थों के बायोडिग्रेडेशन के लिये उत्तरदायी बैक्टीरिया को अलग कर परीक्षण द्वारा इनकी पहचान की गई। ऐसे कुल 18 बैक्टीरिया की पहचान की गई जो प्रदूषित जल में रह सकते हैं। परीक्षण के दौरान अधिकतर बैक्टीरिया को चार दिनों तक 800 पी पी एम फेनोल में



डिग्रेड किया गया। एक सप्ताह तक 1000 पी पी एम तक स्ट्रेन को डिग्रेड किया गया। डिग्रेडेशन दर पालन क्षेत्र की तुलना में प्रदूषित जल में अधिक तीव्र थी। इस परीक्षण से फेनोल डिग्रेडेशन के लिये स्ट्रेन की प्रदूषित जल में अनुकूलता, प्रभाव और संभावनाओं के बारे में जानकारी प्राप्त की गई।

एस के मन्ना, एस सामन्ता एवं पी मौय

मैंग्रोव के पोषक तत्व एवं कार्बन सिक्वेस्ट्रेशन

ज्वारनदमुखी मात्स्यिकी में मैंग्रोव की भूमिका अभिन्न है क्योंकि ये मछलियों के प्रजनन एवं उनकी नर्सरी में अत्यंत सहायक होते हैं। साथ ही, मैंग्रोव से प्राप्त पोषक तत्वों के कारण ज्वारनदमुखों, विशेषकर हुगली ज्वारनदमुख के मत्स्य उत्पादन में वृद्धि होती है। संस्थान ने इस दिशा में मैंग्रोव से पोषक पदार्थों के प्रवाह और कार्बन सिक्वेस्ट्रेशन पर कार्य करना प्रारंभ किया है। सुन्दरवन के झारखाली क्षेत्र के 9 विभिन्न मैंग्रोव से प्रति माह लिटर जाल (ट्रैप) द्वारा पोषक पदार्थों का संग्रह किया गया। फिर इसे 80 डिग्री से. ग्रे. तापमान पर सुखाकर इसका परिमाण लिया गया। संग्रहित मैंग्रोव प्रजातियां हैं – *Bruguiera gymnorrhiza*, *Ceriops decandra*, *Avicennia officinalis*, *Avicennia alba*, *Avicennia marina*, *Sonneratia apetala*, *Aegiceras rotundifolia*, *Excoecaria agallocha* और *Rhizophora mucronata*। प्रारंभिक परिणाम यह बताते हैं कि अन्य मैंग्रोव प्रजातियों की तुलना में *Avicennia officinalis* (*Jat Bain*) और *Avicennia alba* (*Kal Bain*) पोषक तत्वों से अधिक समृद्ध हैं।



एस के दास, आर के मन्ना, सजिना अली, दीपा सुधीशन और के एम संध्या

हुगली ज्वारनदमुख में मछलियों के संवर्द्धन हेतु सिफरी-सी आई एफ टी का संयुक्त प्रयास

हुगली ज्वारनदमुख में बहुत से ऐसे गियर लगाये गये हैं जो मात्स्यिकी हेतु विनाशकारी हैं। अतः इस ज्वारनदमुख की मात्स्यिकी को बचाने के लिये कारगर उपाय अपनाये गये हैं। मछलियों को पकड़ने के लिये लगाये गये बैगनेट, जिन्हें स्थानीय तौर पर बिन्ती जाल के नाम से जाना जाता है, में बहुत सी छोटी मछलियों की अंगुलिकायें फंस जाती हैं जिनका व्यावसायिक मूल्य अत्यंत ही कम है। 12वीं योजना के अंतर्गत सिफरी-सी आई एफ टी के संयुक्त प्रयास द्वारा ऐसे यंत्रों (बाईकैच रिडक्शन डिवाइस) का



विकास किया गया है जिससे बैगनेट से इन अवांछित छोटी मछलियों की अंगुलिकायें बाहर निकल जाती हैं। इस ज्वारनदमुख के तीन केन्द्रों, त्रिवेणी, गोदाखाली और फ्रेजरगंज में बैगनेट के साथ इस यंत्र को लगाया गया है। प्रारंभिक परिणाम यह बताते हैं कि अवांछित छोटी मछलियों की अंगुलिकाओं के साथ-साथ हिल्सा की अंगुलिकायें भी बाहर निकल जाती हैं और बैगनेट में केवल झींगा की अंगुलिकायें रह जाती हैं जो बैगनेट मात्स्यकी का मुख्य आधार है। यह एक उत्साहवर्द्धक परिणाम है।

आर के मन्ना एवं ए के साहू

महानदी की मत्स्य प्रजातियों पर धारा प्रवाह का प्रभाव

महानदी को तीन स्तरों में बांटा गया है— ऊपरी क्षेत्र (हीराकुड़ से सतकोसिया तक), मध्य क्षेत्र (बांकी क्षेत्र में स्थित गहरे झील) और निचला क्षेत्र (नराज के मैदानी क्षेत्र)। ऊपरी क्षेत्र मुख्यतः पहाड़ी क्षेत्र



है। मध्य क्षेत्र में जैविक तत्वों की भरमार है और निचला क्षेत्र बलुई है एवं इसमें जल की गहराई कम है। शीत ऋतु में इन तीनों क्षेत्रों की मत्स्य प्रजाति विविधता और धारा प्रवाह का अध्ययन किया गया। ऊपरी क्षेत्र में टोर टोर प्रजाति, जिसे स्थानीय तौर पर कुसुरा के नाम से जाना जाता है, की प्रधानता थी। इनका अधिकतम भार 9-10 कि.ग्रा. दर्ज किया गया। मध्य क्षेत्र में भारतीय मेजर कार्प प्रजातियों (5-10 कि.ग्रा.) और लेबियो कलबसु की प्रधानता देखी गई और निचले क्षेत्र में छोटी मछलियों, मीठाजल कैटफिश प्रजातियों और कई झींगा प्रजातियों को दर्ज किया गया। निचले क्षेत्र में जलप्रवाह की कमी और जल निकायों की कम गहराई के कारण बड़े आकार की मछलियों का अभाव देखा गया। इस क्षेत्र में केवल 35 कि.मी. के अंतराल पर दो जलविद्युत पावर संयंत्र, हीराकुड़ और चिपिलिमा में स्थापित किये गये



हैं। ये जलविद्युत संयंत्र इस क्षेत्र के जल निकायों के जलप्रवाह पर गंभीर प्रभाव डालते हैं जिससे इन जलनिकायों में उपस्थित मत्स्य प्रजातियों के प्रजनकों का आवास प्रभावित होता है और महानदी की मात्स्यकी पर प्रतिकूल प्रभाव पड़ता है।

ए के साहू, उत्पल भौमिक, बी बी सत्पथी, आर के मन्ना, रोशिथ सी एम और सोमा दास

एंजेल फिश, *Pterophyllum scalare* के प्रजनन एवं पालन तकनीक का विकास

ग्रामीण क्षेत्रों में छोटे और अल्प आय वाले कृषकों के लिये रंग-बिरंगी मछली पालन आजीविका का एक आधार हो सकते हैं। संस्थान ने एंजेल फिश, *Pterophyllum scalare* के प्रजनन और पालन तकनीक का

विकास किया है जो कृषक-उन्मुख है। इस मछली का प्रजनन कृत्रिम कारकों के प्रयोग के बिना ही सफल हुआ है। इस प्रजाति के एक नर और मादा मछली (दोनों का शारीरिक भार - 18 ग्रा.) को 50 ली. वाले शीशे के बर्तन में रखा गया। इसमें ऑक्सीजेनेट जल भरा गया



जिसका पी एच 6.5-7, घुलित ऑक्सीजन 7-7.5 मि.ग्रा/ली. और तापमान 26.5 डिग्री से. ग्रे. था। मछलियों को भोजन दिन में दो बार, सुबह और संध्या के समय दिया गया। जीवित ट्युबिफेक्स कीड़े, चावल का आटा, जी एन ओ सी, मछली का आटा, विटामिन और खनिज तत्वों से मिश्रित भोजन को मछली के शारीरिक भार का 2:5 प्रतिशत की दर से दिया गया। एक टाइल प्लेट को इस बर्तन में रखा गया जिससे अण्डे इसके साथ चिपक जायें। लगभग 900-1500 अण्डों दो दिनों में प्राप्त हुये। इन अण्डों का रंग दूधिया पारदर्शी था। 2 दिनों बाद अण्डों को हैचिंग प्रक्रिया के लिये निकाल लिया गया। इसके 34 घण्टों के पश्चात् हैचिंग की प्रक्रिया आरंभ हुई और लगभग 3 से 4 दिनों तक चलती रही। हैचिंग दर 87 प्रतिशत हुआ। इन अण्डों को 3 मी. लंबे चैनल में 15 दिनों तक रखा गया और इसके बाद सीमेंट के हौज में अंगुलिका बनने के लिये रखा गया। उत्तम अतिजीवता हेतु पोखर के पादप प्लवक और ट्युबिफेक्स कीड़ों से बना सूखा भोजन दिया गया। सफल रियरिंग के लिये महत्वपूर्ण उपाय अपनाये गये हैं -

- I. 5-7 दिनों वाले हैचलिंग को जलप्रवाह वाली जगह पर 21 दिनों के लिये रखना और उन्हें *Artemia nauplii* एवं उबले अण्डे की जर्दी से मिश्रित भोजन देना।
- II. इसके बाद 21 दिनों वाले लार्वा को सीमेंट के हौज (आकार- 4 x 15 वर्ग मी.) में रखना और उन्हें जीवित ट्युबिफेक्स कीड़ों का भोजन देना।
- III. अंत में इन मछलियों को 500 लीटर वाली गोल प्लास्टिक के टब में रखकर भोजन में ट्युबिफेक्स कीड़ों एवं संपूरक आहार देना।

शीत ऋतु में अधिकतर मछलियों को मरने से बचाने के लिये तापमान 20.5 ± 1.0 डिग्री से.ग्रे. से कम होना चाहिये। तापमान को नियंत्रित करने के लिये थर्मोस्टेट का प्रयोग करना चाहिये, क्योंकि 20.5 ± 1.0 डिग्री से.ग्रे. के बीच तापमान होने से अधिक से अधिक मछलियों के बच्चों के मरने का खतरा होता है। इस मछली का पालन मई से अक्टूबर महीनों तक होना चाहिये। सबसे अधिक प्रजनन दर जुलाई से अगस्त महीनों के बीच होती है। अतः मत्स्य कृषक केवल अल्प प्रशिक्षण से ही एंजेल फिश का पालन सफलतम रूप से कर सकते हैं। व्यावसायिक तौर पर इस मछली की मांग बहुत अधिक है।



ए के साहू और बी बी सत्पथी





केरल के वयानाद के कारापुरा जलाशय में मीठाजल प्रजाति, स्पाइनी ईल मछली का आहार

कारापुरा जलाशय में मीठाजल प्रजाति, स्पाइनी ईल मछली,



Mastacembelus armatus की प्रधानता है और इस जलाशय की पारिस्थितिकी के फूड वेब में इसकी अभिन्न भूमिका होती है। इस ईल मछली के आहार के विश्लेषण से पता चलता है कि इसका निर्वाह

मुख्यतः चारा मछलियों पर होता है। साथ ही झींगा मछली, कीड़े और जलीय पौधे भी इसका भोजन हैं। सापेक्ष गुरुता सूचकांक (रिलेटिव इंपोर्टेन्स इंडेक्स) यह बताता है कि इसके आहार के मुख्य तत्व मछली एवं झींगा मछली हैं। इसकी परिपक्वता के आरंभिक चरण में भोजन ग्रहण दर तीव्र होती है पर बाद में इसका गोनाड परिपक्व होने के पश्चात् यह धीमी पड़ जाती है। भोजन ग्रहण की तीव्रता सबसे अधिक ग्रीष्म काल में और सबसे कम वर्षा ऋतु में होती है। इन मछलियों का भोजन कीड़ों का लार्वा, परिपक्व शिंगटी और छोटी मछलियां हैं। इस ईल मछली के आहार प्राप्ति में सरलता एवं सुगम्यता होने के कारण यह किसी भी पारिस्थितिकी हेतु अनुकूल है।

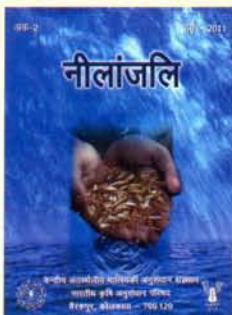
प्रीथा पनिककर, फिरोज खान एवं एम ई विजयकुमार

मूल नदी से आर्द्रक्षेत्रों का जुड़ाव होने से इनके स्वास्थ्य, जैव विविधता और उत्पादन पर प्रभाव

वर्तमान में आर्द्रक्षेत्रों की स्थिति में ह्रास होने का मुख्य कारण है, इनका मूल नदी से जुड़ाव का खतम होना। इससे आर्द्रक्षेत्रों की जल व मृदा, प्रारंभिक पोषक तत्व और जल व मृदा एवं जैव समुदाय द्वारा इनका सपोषण आदि प्रभावित होता है। इस दिशा में बंद एवं खुला आर्द्रक्षेत्रों का तुलनात्मक अध्ययन किया गया जिससे आर्द्रक्षेत्रों की उत्पादन प्रक्रिया और जैवविविधता पर होने वाले प्रभाव को जाना जा सके। छारी गंगा का मूल नदी से वर्षभर संबंध बना रहता है पर भोमरा आर्द्रक्षेत्र का संपर्क केवल कुछ महीनों तक ही रहता है। इससे इस आर्द्रक्षेत्र के स्वास्थ्य और जैवविविधता पर प्रभाव पड़ा है। छारी गंगा के जल की गहराई 181-365 से.मी. है जबकि भोमरा की गहराई 23.5 - 97 से.मी. है। मानसून के महीनों की तुलना में ग्रीष्म काल में बंद आर्द्रक्षेत्रों की गहराई 74 प्रतिशत और खुला आर्द्रक्षेत्रों की 40 प्रतिशत घट जाती है। भोमरा आर्द्रक्षेत्र के जल की चालकता, कैल्शियम, मैगनेशियम, सिलिकेट और फॉस्फेट की मात्रा छारी गंगा से अधिक पाई गई। मूल नदी से वर्षभर जुड़े आर्द्रक्षेत्रों की तुलना में बंद आर्द्रक्षेत्रों में तलछट सूक्ष्मजीव 1.25 गुणा, फॉस्फोरस आवर्तन 1.65 गुणा और कार्बन आवर्तन एनजायम 1.1 गुणा देखे गये। इसी प्रकार विभिन्न ऋतुओं में छारी गंगा से भोमरा आर्द्रक्षेत्र में एरोबिक हेटरोट्रोफिक 1.7 गुणा, फॉस्फोरस घुलनशीलता 2.75 गुणा, फॉस्फेट उत्पादन 1.1 गुणा और बैक्टीरिया का नाइट्रिफिकेशन 2.65 गुणा अधिक था। बंद आर्द्रक्षेत्रों में खुला आर्द्रक्षेत्रों की तुलना में तलछट जैव तत्व, चालकता, नमी, ऑक्सीडेशन कम करने की क्षमता, डी एन ए और कोलुम व बेंथिक अपरद अधिक पाये गये। भोमरा में पादप प्लवक और बेंथोस अधिक थे पर छारी गंगा में जंतु प्लवक अधिक पाये गये।

मो. अफताबुद्दीन, एम ए हसन एवं ए के दाश

पुरस्कार/सम्मान



- डा. उत्पल भौमिक, प्रभागाध्यक्ष, नदीय पारिस्थितिकी व मात्स्यिकी प्रभाग को भारतीय प्राणी विज्ञान सर्वेक्षण, कोलकाता के फेलोशिप से सम्मानित किया गया।
- संस्थान के बेंगलोर केन्द्र के प्रभारी, डा. एम फिरोज खान को दिनांक 15 अगस्त 2012 को कोचीन विज्ञान व प्रौद्योगिकी विश्वविद्यालय के औद्योगिक मात्स्यिकी विभाग द्वारा आयोजित औद्योगिक मात्स्यिकी एलुमनी सम्मेलन में 'उत्कृष्ट मात्स्यिकी' (Excellence in Fisheries) पुरस्कार दिया गया।
- संस्थान द्वारा प्रकाशित वार्षिक हिन्दी गृह पत्रिका 'नीलांजलि' को वर्ष 2011 के लिये भारतीय कृषि अनुसंधान परिषद के सम्मानित प्रथम पुरस्कार 'गणेश शंकर विद्यार्थी हिन्दी कृषि पत्रिका पुरस्कार' से पुरस्कृत किया गया है।

