DCFR News

Vol. 16 No. 2 October 2013–March 2014

FROM DIRECTOR'S DESK

In the research front, DCFR has been striving hard to improve the economic condition of fish growers and to provide nutritional security to the upland rural community of the country through field oriented research activities and programmes. The research initiatives of the DCFR encompassed screening for presence of viral and bacterial pathogens in coldwater fish species of different hill states, under the fish health monitoring and management programmes and complete mitochondrial genome sequencing of different species of snow trout. A supplementary feed was also developed for chocolate mahseer, which was formulated and fortified with *Spirulina*. Larval rearing of *Labeo dyocheilus* and *Labeo dero* in small polytanks and FRP tank was carried out successfully. A project on high altitude lakes of north-eastern hill region was initiated, to study its biodiversity and physico-chemical parameters. Further, several golden mahseer seed ranching programmes were undertaken by DCFR, for propogation of this endangered fish species.

Aquaculture interventions under the Tribal Sub-Plan (TSP) and Northeastern Hill Region (NEH) plan were adequately addressed in the hilly regions of West Bengal, Uttarakhand, Assam, Himachal Pradesh, Arunachal Pradesh, Meghalaya and Nagaland, with an objective to popularize coldwater fisheries for socio-economic development of rural communities by organizing various demonstrations and training programs. It was the steady efforts of all scientists and the staff of this Directorate that made the significant progress and achievements possible. I sincerely wish, persuade and encourage the entire research team of DCFR for touching new heights in all its endeavours in the coming days.

(A. K. Singh)
Director

Research highlights

Growth performance of *Labeo dyocheilus* in field conditions

Stunted yearlings of *Labeo dyocheilus* of the size 20-24 g were stocked in the polytanks at Dharonch and Dudholi in polyculture system with grass carp and silver carp during April 2013. The stocking density was 3 fish/m^3 water volume with species composition of 30: 40: 30 for silver carp (*Hypophthalmichthys molitrix*), grass carp (*Ctenopharyngodon idella*) and minor carp, *Labeo dyocheilus,* respectively. The tested species, *L. dyocheilus* showed a weight gain of 230-240 g in 11 months, while silver carp and grass carp recorded the weight gain of 314-380 g and 320-650 g respectively.

Picture of table sized *Labeo dyocheilus*

Complete mitochondrial genomes of snow trout species

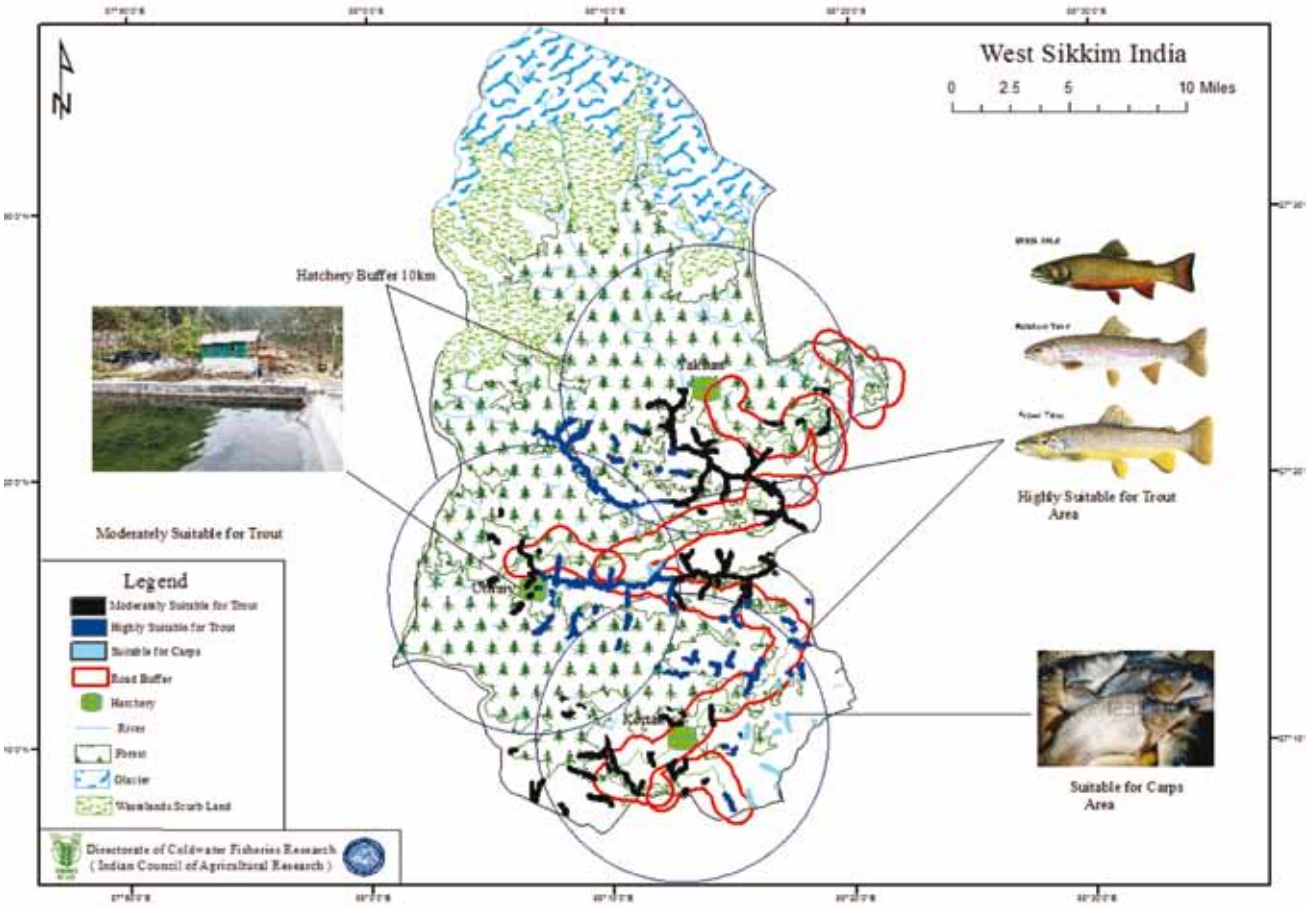
- Total mitochondrial DNA of five snow trout species *Schizothorax esocinus, S. plagiostomus, S. labiatus, S. progastus* and *Schizopyge niger* was sequenced. The mitochondrial genome of all the fish species was about 16 kb in size and comprised of 13 protein coding genes, 22 tRNA genes, 2 rRNA genes and 1 non-coding d-loop region. *Schizopyge niger*, Accession no. NC_022866.1 was validated by NCBI and included in Refseq database.

Selection of suitable sites for aquaculture using GIS

West Sikkim district was selected to demonstrate selection of suitable sites for aquaculture planning and development using Geographical Information System (GIS) based on physico-chemical parameters of water and infrastructure facilities. The output map can support in making authentic decision, based on ground realities and can be used for scientific management of water bodies. Following data were used to carry out the study:

Data	Source
Village boundary Map (1:50000)	Survey of India
Open Excess SRTM Satellite data (28 m resolution)	USGS Earth Explorer (NASA)
Land Use Land Cover	India Waris (ISRO)

Different usable thematic maps were prepared for the study area using spatial analysis including drainage map with 200 meter buffer using SRTM data. Criteria based analysis was carried out for the different parameters which intern into a map that indicates suitability of site for aquaculture. It was found that 41 km^2 areas were found suitable for water quality parameters while 31 km^2 areas was suitable for soil quality. Considering, water & soil quality and infrastructure facilities, 12.3 km^2 areas was found suitable for fish culture of which 7.2 km^2 area under most suitable for trout, 4.0 km^2 area under moderately suitable and 1.1 km^2 area under suitable for carp culture.



Aquaculture suitability map

Fish Germplasm exploration

Under the ornamental fish brood banking initiatives Dr R.S. Patiyal surveyed various river system of Kumoun, Uttarakhand during the reporting period. Various fish species were collected and reared in LFGB. In ornamental Brood Bank so far 400 live fishes of *Tor putitora, Tor chillinoides, Barilius species, Nemachilus species, Garra species,* Koi carp *and* Gold fish are being reared. These species were collected from various rivers *viz* Gola, Chafee, upper Kosi, lower Kosi, Kali, Gomati and Saryu river. Regular monitoring, management and study in biology of *Barilius species* is being carried out.

Fish collection at kali river

During 25-28th December with the help of local fishermen a team of DCFR Champawat center under Dr S. Chandra conducted a survey in Kedar and Masi area in district Almora. Kedar area of western Ramganga, total three fishe were caught, two were mahseer (*Tor putitora*) and one *Labeo dero*. Size of mahseer was 270-310 g. while *Labeo* was 190 g. Collected water samples were analyzed where we found pH 7.5-8.0, DO 7.2-9.0 ppm, hardness 75-80ppm, Nitrate 0.1ppm, Iron 0.2-0.3ppm, free CO_2 2.0-3.6 ppm, water depth of the river at shallower site was 1.5-3.0'. Larvae of some insects and copepods were observed beneath stones. The collected fishes were examined for health status and no parasites were found on the gills and skin. However, few specimens were found emaciated. The sediments of the sampled site were blackish with foul smell showing presence of higher organic matter in the area.

Mahseer catch from Ramganga

Packing for live transportation

Awareness Programme

Awareness campaign on conservation of golden mahseer and seed ranching in Kumaun Lakes

Mahseer, which enjoyed the status of a fighting opponent to the fishers for quite a long time, is presently struggling for its mere existence in different lakes and rivers of India in general and in Kumaun region in particular. Development of captive breeding and culture techniques and its up scaling have been adopted as the means for conservation, and promotion of this mighty species. The Directorate of Coldwater Fisheries Research, Bhimtal, ICAR initiated a very bold step for mass seed production of golden mahseer and ranching it in different streams/rivers/ lakes of Kumaun region for stock enhancement of the fish in the natural habitat and also to conserve the germplasm.

Action photograph of Mahseer Bachao Jagrati Abhiyan and Golden Mahseer Seed Ranching Program at Naukuchiatal Lake

In this direction "**Mahseer Bachao Jagrukti Abhiyan"** as well as **"Golden Mahseer Seed Ranching Program"** was organized on 10.10.2013 at Naukuchiatal Lake where 25000 Nos. of hatchery produced seed (fry) and 1000 Nos. of cage reared advanced fingerlings of golden mahseer was released in the Naukuchiatal Lake on the occasion. More than 200 participants including local authorities, scientists and staffs of DCFR, and local people were present on the occasion and expressed their concern.

Training programme

Training Program at ICAR Research Complex, Barapani, Meghalaya

A training program on "Coldwater Fish Farming in Meghalaya: New Approaches" was organized on 24-25 October, 2013 at Shillong in collaboration with ICAR Research Complex, Barapani and Department of Fisheries, Govt. of Meghalaya. A total of 100 participants from the state fisheries department, KVK's as well as fish farmers' from the different districts of Meghalaya participated in the programme. The program aimed at imparting training to the farmers, so as to increase the fish production in the state and thereby improve the socio economic status and livelihood security of the rural farmers. Dr. Debajit Sarma, Principal Scientist, Dr. S.K. Gupta, Scientist, DCFR and Dr. Arnab Sen, Head, Animal Science Division (ICAR, Barapani) delivered lectures on culture and breeding of trout, mahseer as well as integrated fish farming in hills. The response of the participants was overwhelming and all the participants interacted intensively and discussed various practical ideas for the development of fisheries in the state.A field visit was arranged in different villages of Laitkyrhong, Laitmawroh, Umshning, Umran, Kyrdem, Upper Shillong, Zirang, Umkteih involving fish farmers of the local vicinity. A practical demonstration was also given at the farmer's field regarding scientific management of the aquaculture pond.

A field visit of the training program at Shillong

Farmer's Training programme at Sikkim

A need felt Farmer's Training on "Culture and Breeding of Rainbow Trout" was conducted with practical demonstration to the farmers of West Sikkim on 28th November 2013.

Dr. N. N. Pandey (Sr. Scientist) and Dr. R. S. Haldar (Sr. Technical Officer) demonstrated the trout breeding technique at State trout farm, Uttarey (West Sikkim) and bred about 100 female brooders with the production of 1.75 lakh fertilized eggs. Twenty five trout growers from Shree

Egg counting

Egg arrangement in troughs

Badam, Simphok, Begha, Dhampaley, Uttarey, Lingay and Sopakha areas along with Departmental personnel participated in the training programme. A constant technical support has been provided by the DCFR to the State with the hope that the State would be a hub of trout seed and feed for the entire North-East region.

Hands on training under NEH activity

A "Hands-on-Training on laboratory procedure, diagnosis & control of coldwater fish diseases" was organized from 28th February - 6th March, 2014 by Fish Health Section of DCFR. Total 14 participants of State Fisheries Departments, faculties and research scholars of Gauhati and RGU university participated in this training. The course program covered theoretical as well as practical aspects of viral, bacterial, fungal and parasitic diseases in coldwater fish species, diagnosis, identification of causative agents, treatment methods and therapeutics. A training

manual was prepared and released on this occasion. Mr. Sumanta Kumar Mallik, Dr Amit Pande, Dr Neetu Shahi, Dr R. S. Haldar, Dr Suresh Chandra and Dr Debajit Sarma, Nodal officer for NEH activity coordinated the program. Dr A. K. Singh, Director, DCFR, Bhimtal chaired the valedictory session of the program and congratulated all the participants for their successful completion of the training.

The Hon'ble Chief Minister of Arunachal Pradesh, Sri Nabam Tuki interacted with DCFR Scientists.

Farmers' Training on"Culture, Processing & Value addition of Trout"

A training was conducted for the trout growers of Himachal Pradesh in collaboration with CIFT, Cochin and KVK, Bajoura during 11- 13th Dec. 2013.

Training was conducted at KVK, Bajoura and coordinated by Dr. N. N. Pandey, Sr. Scientist and Dr. S. Ali, Scientist, DCFR Bhimtal. Dr. A. Barat, Director (Act.) DCFR and Dr. C. N. Ravishankar, Principal Scientist & HOD, CIFT, Cochin inaugurated the programme on 11th Dec, 2013. Dr. Chandrakanta (SMS) and Dr. Deepali Kapoor (SMS) extended full support for the training. Demonstration for the preparation of Trout fillet, trout streak, trout cutlets, trout ball, trout fingers, trout wafers and feed preparation by using trout silage was given by Dr. Bindu. J. Sr. Scientist and Dr. Mohan, C. O., Scientist from CIFT and their technical staff. 50 farmers of the distt. Kullu and LahaulSpiti participated in the training programme and prepared the value added products of trout. This was learning by doing exercise for the participants and they took keen interest in learning different recipes of the trout.

Demonstration for filleting

Demonstration for value added products

- A training on "Culture and Breeding of Rainbow Trout" was organized by DCFR scientist Dr. N.N. Pandey and Dr. R.S. Haldar to the farmers of West Sikkim on 28th November 2013. Training was imparted on various aspects of trout farming with practical demonstration to Twenty five trout growers from Shree Badam, Simphok, Begha, Dhampaley, Uttarey, Lingay and Sopakha area along with Departmental personnel who participated in the training programme.

- DCFR Field Centre at Champawat organized Farmers Field Day on 12th February, 2014 at village Katarh in Champawat District. The farmers were explained the trout culture practices. Sampling was under taken to observe for growth and health conditions and to elaborate the management practices of trout culture.

Arunachal Meen Mahotsav, 2013

DCFR participated at the Arunachal Meen Mahotsav, 2013 organized by Department of Fisheries, Govt. of Arunachal Pradesh at Itanagar during 21-22nd November, 2013. The honourable Chief Minister of Arunachal Pradesh, Sri Nabam Tuki graced the occasion as the Chief Guest and visited the DCFR exhibition stall and interacted with the scientists. A lecture was also given by the scientist of DCFR to the participants including farmers of the state regarding development of fisheries in Arunachal Pradesh.

Dr. Debajit Sarma, Principal Scientist delivering a lecture to the participants including farmers.

Extension Activities

A meeting of farmers interest group from village Katharh, Bheti, Toli, and Kharkbagar was organized at DCFR field centre Champawat on 5th October, 2013 by Dr. S.K. Srivastava, Senior scientist, Dr. S. Chandra, senior scientist and Dr. S.K. Gupta, scientist to discuss various health and nutritional deficiency problems in fishes. Scientists of the Champawat centre of DCFR proposed best possible solution to save the stocks in farmers ponds.

Dr. S.K. Srivastava, senior scientist, Dr. S. Chandra, senior scientist and Dr. S.K. Gupta, scientist organized farmer's field school at village Bheti, in Lohaghat on 10th October, 2013. Progressive farmer, Shri R.D. Morari shared his fish farming experience with the fellow farmers of the area and encouraged them to take-up this profitable venture. Demonstration on testing of physico-chemical parameters was also given to the farmers.

Newly renovated fish pond at Balkheda

Front line demonstration on integrated fish farming was conducted at Village Balkheda, Dist. Udhamsingh nagar, on 17th October, 2013 by Dr. S.K. Srivastava, senior scientist, Dr. S. Chandra, senior scientist and Dr. S.K. Gupta, scientist.

Dr. S. Chandra, senior scientist and Dr. S.K. Gupta, scientist organized a field day on 11th Nov. 2013 at Village Katharh, Champawat.

Stocking of seed in adopted farmers pond

Exhibition

- Dr. N. N. Pandey, senior scientist and Vijay Kumar Singh, technical officer participated in exhibition in Kisan Mela at IVRI Bareilly on 28th February 2014.
- Dr. N. N. Pandey, senior scientist attended consultation workshop on self sufficient and sustainable aquaculture in NE region, organized by CIFA at Agartala on 5th February 2014.
- Dr. M. S. Akhtar, scientist participated in the ICAR sponsored CAFT training programme on "Development and nano-sizing of biotechnological products for fisheries and aquaculture" at Central Institute of Fisheries Education, Mumbai during 5-25th February 2014.
- Dr. A Barat, principal scientist attended the meeting

Exhibition of DCFR at IVRI

for "National mission on Himalayan ecosystem" chaired by DDG, NRM at NRM division KAB-II, ICAR, New Delhi on 28th February 2014.

- Exhibition in farmer training organised by DCFR, Bhimtal in collaboration with KVK, Bajoura and CIFT, Cochin at Bajoura, Kullu (H.P) during 11-13th Dec. 2013.
- Exhibition in consultation workshop on self sufficient and sustainable aquaculture in NE region, organised by CIFA at Agartala on 5th Feb, 2014.
- Exhibition in Kisanmela, organised by IARI, New Delhi during 26-28th Feb. 2013.
- Exhibition in Meenmahotsavat Itanagar, Arunachal Pradesh during 21-22nd November, 2013.

Interaction with Students

- A group of students from College of Technology, G.B. Pant University of Ag. & Tech Pantnagar visited DCFR and interacted with Scientists on 22nd Nov. 2013.
- Exposure visits were made in two batches of students from MITR, Haldwani to DCFR on 20th & 22nd Nov. 2013.
- A group of 22 students from D.A. College of Agriculture, Ag. University Anand, Gujarat visited DCFR and interacted with Scientists on 29th Nov.
- A group of 20 students from City College Kolkata visited DCFR and interacted with Scientists on 9th Dec. 2013.
- A group of 54 students from Ranyas College, University of Delhi visited DCFR and interacted with Scientists on 13th Dec. 2013.

International visit

- Dr. Neetu Shahi, scientist attended and gave presentation on "Virulence of Pseudomonas koreensis isolated from eye lesions of golden mahseer" at Aquaculture 2013 conference held at Las Palmas, Gran Canaria, Spain from 2-7th November 2013.
- Dr. Sanjay Kumar Gupta, scientist attended 3 months International training programme on "Plant based nutraceutical in feed of aquatic organism" at Ghent University, Belgium from 19th December 2013-3rd March 2014.

Award and Recognition

- Dr. A Barat, principal scientist and Dr. Shahnawaz Ali, scientist were conferred Life Fellow of the Academy of Environmental Biology, India by The Academy of Environmental Biology, Lucknow, India.

- Dr. R S Patiyal, senior scientist received the best paper presentation award during Hindi Seminar organized by DCFR, Bhimtal from 23-24th September 2013 on the topic "Himalay Shetro mai Sajawatee Machliyo ke Palan se Jeewika Suraksha kee Sambhawnayei"

Joining

Dr. A. K. Singh joined DCFR as the new Director on 19th February 2014.

Obituary

The Director and all the Staff of DCFR express their condolence on the sad demise of Shri Prakash Akela, Skilled Supporting Staff, DCFR, Bhimtal who left for heavenly abode on 15th Feb 2014 because of his serious illness.

अनुसंधान उपलब्धियां

धरौंच तथा दुधोली में पॉलिथीन वाले तालाबों में 30,40 व 30 के अनुपात में ग्रास कार्प व सिल्वर कार्प के साथ लेबियो डायोचिलस के जीरों को मिश्रित रूप में संचयित किया गया। पौलिटैंकों में इनका संचयी घनत्व Q^3 मछली / $मी^3$ था। प्रायोगिक प्रजाति लेवियो डायोचिलस ने 11 माह में 230–240 ग्राम तक की शारीरिक वृद्धि भार प्राप्त की जबकी सिल्वर कार्प एवं ग्रास कार्प ने क्रमशः 314 –380 एवं 320–650 ग्रा. तक वृद्धि प्राप्त की। पांच स्नो ट्राउट प्रजातियों– शाइजोथेरैक्स रिचार्डसोनी, शाइजोथेरैक्स प्लैजियोस्टोमस, शाइजोथेरैक्स लेबिएटस, व शाइजोथेरैक्स नाइगर, शाइजोथेरैक्स प्रोजेस्टस के डी.एन.ए. का पूर्ण माइटोकौन्ड्रियल जीनोम सीक्वेंस किया गया। सभी मत्स्य प्रजातियों का माइटोकौन्ड्रियल जीनोम आकार लगभग 16 kb तथा 13 प्रोटीन कोडिंग जीन्स, 22 tRN। जीन्स, 2 rRN। जीन्स एवं 1 नौन कोडिंग d-loop रिजन था। शाइजोथेरैक्स नाइगर का एसेसन नम्बर NC_022866.1 था जिसको NCBI ने सही माना। चौकलेट महाशीर की अंगुलिकाओं की आंख में पहली बार संक्रमण देखा गया। साथ ही इनमें परजीवी कवक तथा गैर संक्रमणी रोगों का अध्ययन भी किया गया। आंखों के लैंस की विकृति के कारण अंधापन हो जाने से कुछ मर्त्यता भी देखी गयी।

कार्यक्रम

- शी.ज.मा.अनु. निदेशालय ने महाशीर के पुर्नवासन एवं संरक्षण हेतु महाशीर के बीजों का संचय कार्यक्रम दिनांक 10.10.2014 को निदेशालय ने नौकुचियाताल झील में 'महाशीर बचाओ जागृति अभियान' तथा 'सुनहरी बीज संचयन' कार्यक्रम आयोजित किया। इस अवसर पर लगभग 25000 महाशीर अंगुलिकाओं को झील में छोड़ा गया।
- दि. 24–25 अक्टूबर 2013 को भा.कृ.अनु.परि. के बारापानी स्थित परिसर एवं मत्स्य विभाग मेघालय सरकार के तत्वाधान में 'कोल्डवाटर फिश फार्मिंग इन मेघालया : न्यू एप्रोचेज' पर प्रशिक्षण कार्यक्रम आयोजित किया गया। जिसमें लगभग 100 प्रतिभागियों ने भाग लिया।
- दिनांक 28 नवम्बर, 2013 को पश्चिमी सिक्किम में 'कल्चर एण्ड ब्रीडिंग आफ रेन्बो ट्राउट' पर मत्स्य पालकों के लिऐ प्रशिक्षण कार्यक्रम आयोजित किया गया जिसमें निदेशालय के वैज्ञानिकों सहित लगभग 100 कृषकों ने भाग लिया।
- दिनांक 5 अक्टूबर, 2013 को निदेशालय के चम्पावत स्थित केन्द्र में कथारह, भेटी, तोली व खर्कबागर ग्राम के कृषकों के लिए एक संगोष्ठी आयोजित की जिसमें केन्द्र के वैज्ञानिकों सहित विभिन्न लोगों ने भाग लिया। दिनांक 10 अक्टूबर, 2013 को लोहाघाट के भेटी ग्राम, 17 अक्टूबर को उधम सिंह नगर के बालखेड़ा ग्राम में तथा 11 नवम्बर 2013 को चम्पावत के कथार ग्राम में कृषकों के लिए संगोष्ठियां आयोजित की गयीं।

Directorate of Coldwater Fisheries Research
(Indian Council of Agricultural Research)
Bhimtal-263 136, District-Nainital (Uttarakhand)

Direction & Guidance	:	Dr. A. K. Singh, Director
Compilation & Editing	:	Dr. R.S. Patiyal, Dr. Neetu Shahi and Dr. S.K. Gupta
Assistance	:	Shri Amit Kumar Joshi, Sr. Technical Officer Shri Amit Kumar Saxena, Sr. Lab Technician
Published by	:	Director, Directorate of Coldwater Fisheries Research
Tel	:	05942-247279; 247280 Fax: 05942-247693
E-mail	:	dcfrin@rediffmail.com, dcfrin@gmail.com, director@dcfr.res.in
Gram	:	MAHSEER
Printed at	:	M/s Royal Offset Printers, A-89/1, Naraina Industrial Area, Phase-I, New Delhi 110 028