DCFR News

Directorate of Coldwater Fisheries Research

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KVK Interface Meeting 6-7 June 2011

The Hon'ble Union Minister of State for Agriculture and Food Processing Industry, Govt. of India, Shri Harish Rawat Ji inaugurated the KVK interface meeting. More than 200 delegates including Dr. B. Meenakumari, DDG (Fy.), ICAR, the Directors of different ICAR institutes, scientists, KVKs and progressive farmers have participated in this two-day interface meeting. Dr. K.D. Kokate, DDG (Agricultural Extension), ICAR had also attended the meeting and stressed about the resources available in the Himalayan belt and desired exploitation of the resources in effective manner to increase the productivity of the coldwater fish sector. Shri Harish Rawat Ji also inaugurated the newly constructed model fish hatchery at DCFR complex, Bhimtal.

From the *Director's Desk*

Dear Readers,

Coldwater fisheries have a great potential in generating rural income and providing food security to the rurals in Indian uplands. On account of population upsurge and urbanization, upland aquatic resources once considered inexhaustible, are under threat. Hence, sustainable utilization and development of fisheries resources have assumed importance in coldwater regions of the country. In this direction, definite programmes on partnership mode has been conceded in the XI five year plan with the different state fisheries departments, universities and institutes in J&K, Himachal Pradesh, Sikkim, Arunachal Pradesh and Uttarakhand with immense success and encouragement. However, it is felt that, there are good number of functional KVKs in the hill region which work in the similar directions. Therefore, to further strengthen the technical programme through partnership approach in the XII five year plan for the development of coldwater fisheries sector in the hill region, a two-day interface meting was held at this Directorate during 6-7 June, 2011 with the involvement of KVKs and other stakeholders focusing on exploratory research on coldwater fish biodiversity, expansion of rainbow trout breeding and farming in new areas, development of new fish farming system, development of brood bank of important coldwater fishes for seed production, disease surveillance and development of aqua-tourism. I sincerely hope that DCFR will keep touching new heights in all endeavours in future.

(Dr. P.C.Mahanta)

RESEARCH ACHIEVEMENTS

Coldwater Fish health management

The infectious pancreatic virus (IPNV) isolated in BF-2 cells was concentrated and used to raise the anti-IPNV hyper immune serum in Rabbits. Rabbits checked for the antibody titer by using AGPT with Serial dilution of hyper immune serum and IPNV antigen. Test was positive up to 1:4 dilutions of the serum.AGPT test showed a clear line of identity between the HIS raised in the laboratory and referral anti-IPNV serum showing its specificity to IPNV. Further the anti-IPNV-HIS was confirmed by using SDS-PAGE & WESTERN BLOT against viral proteins with referral anti-IPNV serum Agar gel Precipitation test (AGPT) and counter immunoelectrophoresis (CIE) has been standardized for quick diagnosis and screening of field samples for IPNV infection. About 50-field sample has been screened with AGPT and CIE for IPNV infection nearly found to be positive.

A team of DCFR scientists (Dr. Dimpal Thakuria, Scientist; Mr. R.S. Haldar, Technical Officer and Mr. Rohit Kumar,CTA) visited Govt. Mahseer fish farms at Anji, Reasi ditrict, Khurdwah trout farm in Kathua district and Basoli fish landing center besides various natural river systems in Jammu and Kashmir

Fig : Khurdwah trout farm

Fig : Postmortem analysis of moribund fishes

Fig : Enlarged Kidney

Fig : Enlarged pale liver

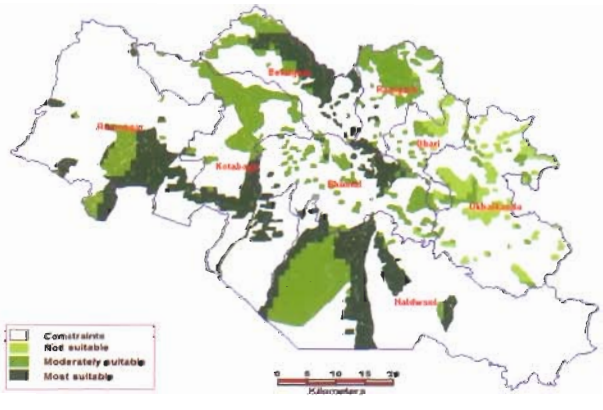
during month of May, 2011. Enlarged kidney and pale enlarged liver were observerd on post-mortem of moribund fishes. Tissue samples were collected for further laboratory analysis.

Development of GIS based decision support system for aquaculture in selected coldwater region

The study encapsulates the GIS based decision support system meant for aquaculture in the Kumaon region of Uttarakhand. An attempt has been made to put forward issues of Geoinformatics, Decision Support System (DSS) tools with regard to application domain of fisheries. A comprehensive study has been carried out in this regard. A Decision Support System was developed for retrieving intelligent inference much to the utility of the planners and people at large. In this context, Nainital district of Uttarakhand was

selected that has geographical area of approximately 401,992 ha and lying between latitudes 280 59' to 290 36' N and longitudes 780 52' to 790 58' E.

The DSS is based on the spatial database on physico-chemical parameters of soil, water and infrastructure facilities. The site suitability for aquaculture can be selected in the unexplored area of hills. The need was felt due to a number of constraints such as availability of water, quality of water with reference to physico-chemical parameters, quality of soil and protected areas that exist in the hilly region. In addition to it, there are number of infrastructural issues such as road connectivity, technical know-how, availability of seed, availability of feed etc. recognised as major parameters. It was felt that if a GIS based software made available for common man use, it will enhance the possibility of developing aquaculture in hills.



Site suitability map for aquaculture in Nainital district

Customized GUI based DSS for aquaculture

A customized GIS based decision support system was developed for aquaculture in Kumaon Hills. While opening the application, it automatically starts in a Welcome window where the title of the application appears with two active buttons in order to "ENTER" or "EXIT" from the Database as shown in the graphical user interface (GUI) hereunder.

Welcome menu of the GIS based DSS

After entering into the database, another window for aquaculture development opens with option to enter the village name of Nainital district. A combo box was created for clicking the village name, as there are more than thousand villages in the Nainital district. After selecting the village name, the general information like latitude, longitude, masl, population density, nearest hatchery and market will be displayed.

Village Information Windows

Nutrient composition of rainbow trout

Proximate analyses

The moisture, crude protein, crude lipid and ash contents of the rainbow trout were 74.00, 19.44, 5.18 and 1.37%, respectively. These values are almost

similar to those for *Salmo gairdneri,* reported as 76.23, 18.57, 3.71 and 1.47%, for moisture, protein, fat and ash, respectively, except crude lipid content which was slightly higher (5.18%). Based on the moisture and fat contents, the rainbow trout is a medium-fat fish, with a fat content of 5-10% by weight. However, the values in the present study are well comparable with the earlier reports in different salmonid species. Conversely, González-Fandos *et al.* (2004) reported higher lipid content (6.55%) and lower protein content (16.04%) in rainbow trout (*O. mykiss*) when compared to findings of the present study. This may be due to geographical location or maturity stage of rainbow trout as it has been indicated that the lipid content of fish changes due to species, gender, maturity stage, geographical location and season.

Amino acid composition and score

Rainbow trout protein had a well-balanced amino acid composition, with high amounts of proline (96.37 mg/g crude protein), aspartic acid (85.23 mg/g crude protein), tyrosine (83.84 mg/g crude protein), glycine (69.87 mg/g crude protein), serine (66.63 mg/g crude protein), arginine (65.26 mg/g crude protein), isoleucine (64.56 mg/g crude protein) and tryptophan (61.63 mg/g crude protein). The major amino acids are glutamic acid, aspartic acid and lysine (Ranging from 9.7% to 21.7% of total). Levels of different amino acids are from 0.9% to 21.7% in *C. striatus,* 0.1% to 19.4% in *C. micropeltes* and 0.6% to 21.2% in *C. lucius.* Proline, which is one of the major components of human skin collagen, together with other amino acids such as glycine, alanine, arginine, serine, isoleucine and phenyl alanine form a polypeptide that will promote regrowth and tissue healing. The efflux of glutamine from muscle in critical illness serves as an important carrier of ammonia (nitrogen) to the splanchnic area and the immune system as well as helps in synthesis of purines and pyrimidines essential for the proliferation of cells.

When compared to the reference amino acid pattern of pre-school children (2- 5 years old), all of the amino acid scores were >100, except for leucine and lysine. The highest amino acid score was observed for tryptophan (560) followed by isoleucine (230). According to the amino acid score, the amounts of leucine and lysine were the lower amongst amino acids in rainbow trout. However, in this study, cysteine was not detected which may be due total loss of cysteine when the muscle tissue was hydrolyzed without performing acid oxidation. The protein in rainbow trout muscle was well balanced in essential amino acid composition and is of high quality.

Fatty acid profile

The fatty acids analyzed were grouped as saturated fatty acids (SFAs), monounsaturated fatty acids (MUFAs) and polyunsaturated fatty acids (PUFAs). In the present study, fatty acid profile showed that total monounsaturated fatty acids (MUFAs) were the highest (35.88%) followed by saturated fatty acids (34.51%) and polyunsaturated fatty acids (31.39%). Palmitic acid (C16:0) was the predominant fatty acid in rainbow trout, accounting for about 63.28% of all SFAs followed by stearic acid (C18:0) (22%). Among MUFAs, oleic (C18: 1) and palmitoleic (16:1) acids were the predominant fatty acids, accounting for almost 67.69 and 22.85% of total MUFA, respectively. Linoleic acid (C18: 2n-6), docosahexaenoic acid (DHA) (C22: 6 n-3), linolenic (C18: 3n-3), arachidonic acid (AA) (C20: 4n-6) and eicosapantaenoic acid (EPA) (C20: 5 n-3) were the dominant PUFAs which were accounted for 43.93, 20.52, 15.42, 7.65 and 7.45 % of total PUFAs respectively.

In general, the fatty acid composition distribution of the rainbow trout analyzed is in agreement with the data available on the fatty acid composition of the same fish species. Among PUFAs, DHA and EPA have an important role in nutrition for human health.

Arachidonic acid is a precursor for prostaglandins and thromboxanes, which influence clotting of blood and the healing process. Apart from this function, it also plays a role in growth. Therefore, fish have been suggested as a key component for a healthy diet of humans. In the present study, we observed that DHA, AA and EPA accounted for 20.52, 7.65 and 7.45 % of the total PUFAs in the muscle of the rainbow trout.

Minerals

Among the minerals analyzed, K was the highest followed by Ca, Na, Fe, Zn, Se and Mn. The results, especially K (1447.0 mg g/100 g), Ca (359.33 mg 100g), Na (208.0mg/100g) and Fe (5.17mg/100g) values, show that rainbow trout is suitable for human nutrition. All macro-mineral data fell within the range reported by the USDA (2005) for rainbow trout (*S. gairdneri*) meat. The main functions of essential minerals include skeletal structure, maintenance of colloidal system and regulation of acid-base equilibrium. Minerals also constitute important components of hormones, enzymes and enzyme activators. Calcium is necessary to maintain an optimal bone development. Iron has several vital functions in the body. It serves as a carrier of oxygen to the tissues from the lungs by red blood cell hemoglobin, as a transport medium for electrons within cells, and as an integrated part of important enzyme systems in various tissues. Adequate iron in the diet is very important for decreasing the incidence of anemia, which is considered a major health problem, especially in young, children. Iron deficiency occurs when the demand for iron is high, e.g., in growth, high menstrual loss, and pregnancy, and the intake is quantitatively inadequate or contains elements that render the iron unavailable for absorption. In the present study, it is revealed that rainbow trout muscle is reasonably a good source of iron, supplying 5.17mg/100 g muscle. Zinc is known to be involved in most metabolic pathways in plants, animals including humans. Zinc deficiency can lead to loss of appetite, growth retardation, skin changes and immunological abnormalities. In the present investigation, zinc level of rainbow trout was found to be 1.79mg/100g of muscle, which is sufficient to maintain good health in humans. Selenium plays a protective role in preventing carcinogenesis and other chronic diseases and act as an antioxidant in man. The selenium content (1.66 mg/100g) in rainbow trout in our study is higher than many other species like sea bass, 0.227 mg/kg, herring, 0.347 mg/kg; mackerel, 0.498 mg/kg; turbot, 0.473 mg/ kg; flounder, 0.371 mg/kg. This suggests the nutritional good quality of rainbow trout muscle.

Enhancement of Livelihood Security through Sustainable Farming System and related farm Enterprises in North-West Himalaya under NAIP component -3

Champawat is one of disadvantaged districts of Uttarakhand due to extreme climate and undulating terrains. Agriculture development has its own limits such as non-availability of the flat land and infrastructure facilities for intensive farming. The multi-tier model for fish culture was developed for which the polycum irrigation tanks were used for fish culture. The ponds were stocked with Chinese carps and Common carps and were fed with rice polish and mustard oil cake @ 2% of body weight. The significant production was achieved of 0.3 kg - 0.7 kg/ m^3 of water in comparison to 0.12-0.36 kg /m2 in earthen ponds.

The reason of the higher production was the difference in temperature of 2-6 °C than that of the earthen tanks. Moreover the water was used for the crop production as shown in the figure. These types of ponds were created in the three clusters of Champawat district such as Dharauj, Mudyani and Makot.

Polytank used for irrigation and fish culture

DST Project on "Genome- Scale Mining of *Schizothorax richardsonii* Fish species for Formulation of Selective Breeding Programme"

The different sizes of Indian snow trout, *Schizothorax richardsonii* were collected from different areas viz., river Kosi (Ratighat), Gola (Ranibagh) and Chirapani stream (Champawat). The fin samples were collected in 75% ethanol, processed and stored at -20 °C for DNA isolation for studying the genetic relationship among the different parental stock. mtDNA with highly conserved protein coding genes are less prone to homoplasy, ease of designing universal primers and easy to align for analysis. Primer for Cytochrome b (Cyt b) was designed to achieve larger product (1140bp) consisting F'-TGACTTGAAAAACCACCGTTG&R'-CTCCGATCTCCGGATTACAAGAC.

Mitochondrial gene Cyt b about 1140 bp size has been successfully amplified from five populations. The cytb gene sequence was submitted to NCBI GENBANK Accession No: **HM636805-HM636828.**

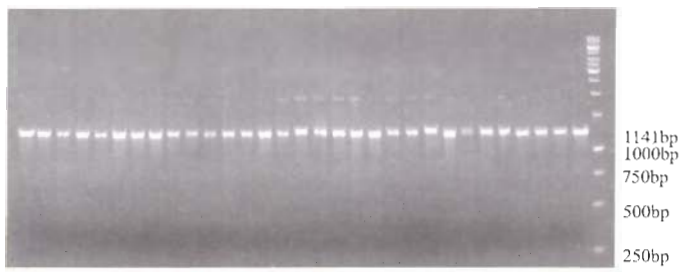


Fig: Cytochrome b (1141bp)

Fig. Collection of Tissue samples of *Tor putitora*

Beneficiaries of Champawat district, Uttarakhand

Outreach Project on Fish Genetic Stock

A total of 123 Mahseer (*Tor putitora*) fin tissue samples were collected May 2011 from two locations of J & K (Anji, Basoli) and two locations of Himachal Pradesh (Badon, Near Jogindernagar and Bhakara). The fin tissues are preserved in 70% ethanol for DNA isolation. The mahaseer images were digitized for truss morphometeric analysis. DNA was isolated from all the samples using phenol-chloroform extraction method. Quantitative and qualitative estimation of the

DNA samples has been carried out by spectrophotometer at 260 & 280 nm and on 0.8% Agarose gel electrophorcsis. 20 PCR products of each populations (e.g. Bhalukpong, Jogindernagar, Bhakara, Ramnagar, Lonawala, Anji and Basoli) were sequenced (Bangalore Genei). The above sequences were analyzed using NCBI BLAST and gene confirmation. Analysis of sequences will be carried out during 2011-12.

Cryopreservation of Rainbow trout, (Oncorhynchus mykiss) Spermatozoa Using Different Cryoprotectants

The protocol for the cryopreservation of the spermatozoa of Rainbow trout (Oncorhynchus mykiss) was standardized and fresh seminal plasma was analyzed for biochemical composition. In this investigation, the volume of the fresh milt of less than two-year brooders of Rainbow trout (Oncorhynchus mykiss) of Chhirapani Fish Farm Champawat were collected (2.66 ± 0.30 ml having pH range of 8.0 - 8.4). The concentration of the spermatozoa in the fresh milt was observed to be 7.07 ± 0.22 x 106 spermatozoa/ml and the motility percentage of spermatozoa in the fresh milt was observed to be 91.73 ± 0.54 %. Among the seven extenders tested the combination of Zhang and Liu, 0.6 M Sucrose and TRIS buffer as extenders were found to be the most suitable that gave comparatively higher motility percentages whereas combination of Fish Ringer's solution, 0.3 M Glucose, and 0.9% NaCl extenders which resulted into low motility percentage. In this trial for testing the suitability of cryoprotectants, Glycerol with 0.6 M Sucrose extender and DMSO with 0.6 M Sucrose extender observed to have higher motility percentage when compared to DMA cryoprotectant.

In the present work, significantly higher percentage of fertilization was observed in a 8% DMSO + Zhang & Liu extender (90.27 ± 0.71) followed by 10% DMSO + Zhang & Liu (89.21 ± 0.88), 12% DMSO + Zhang & Liu (89.20 ± 0.42), 8% Glycerol + 0.6 M Sucrose (88.64 ± 0.25), 8% Glycerol + Zhang & Liu (88.60 ± 1.10), 10% Glycerol + Zhang & Liu (86.46 ± 1.16), 8% DMSO + 0.6 M Sucrose (84.14 ± 0.47), and 10% DMSO + 0.6 M Sucrose (81.63 ± 2.00).

The highest mean percentage of hatching was record for Rainbow trout in 8% DMSO + Zhang & Liu extender (48.17 ± 2.27) followed by 10% DMSO + Zhang & Liu (43.04 ± 2.50), 12% DMSO + Zhang & Liu (36.21 ± 1.52), 8% Glycerol + 0.6 M Sucrose (31.32 ± 2.61), 8% Glycerol + Zhang & Liu (28.58 ± 1.78), 10% Glycerol + Zhang & Liu (22.18 ± 2.58) and 8% DMSO + 0.6 M Sucrose (21.78 ± 0.67).

The biochemical composition of the seminal plasma of fresh milt of Rainbow trout (Oncorhynchus mykiss) was analysed for the elements total proteins, Glucose, Calcium, Phosphorus, GOT and LDH. The concentration of the above elements were 5.56 ± 0.68 mg/dL, 49.96 ± 5.66 mg/dL, 9.68 ± 0.20 mg/dL, 4.33 ± 0.13 mg/dL, 37.97 ± 4.31 units/lit, and 172.44 ± 19.62 units/lit respectively.

The ultra structure of the fresh spermatozoa of the Rainbow trout (Oncorhynchus mykiss) using Scanning Electron Micrroscope and Transmission Electron Microscope revealed the microstructure of the spermatozoa. The morphological features include almost spherical head followed by a small mid-piece and a long tail. The mid-piece was not clearly distinct in TEM; head was completely filled with nucleous.

The ultrastructure of spermatozoa after adding diluents and after cryopreserved by using SEM revealed various several morphological deformities like loss of tail, winding of tail, shrunken mid-piece. And the damaged spermatozoa exhibited irregular shape in TEM.

The work has been completed under the co-guidence of Dr. S.K. Srivastava and Dr. S.K. Gupta, Champawat.

Mr. Makwana Nayan working in the laboratory of Champawat for Cryopreservation work

Infrastructure Developed at Champawat

Four Type-1 residential quarters completed at Chhirapani Fish farm Champawat.

Office cum farmers training hall under construction

New Residential building

Fencing across the road and boundaries

Constructions of GI fencing along with the roads of Pocket-A and pocket-B completed which will prevent unwanted entry of persons and wild animals for the safety of Office, laboratories and livestock of at Chhirapani Fish farm Champawat.

Scientist retiring room with office buildings

Upgradations of laboratories at Chhirapani Fish farm Champawat

Meetings/Conferences/Symposia Training

January to March, 2011

- Attended Asian Pacific Aquaculture - 2011 at College of Fisheries, KAU, Kochi — 18.01.2011
- Meeting of ASRB Selection Committee — 13.01.2011
- - do - — 25.01.2011 & 27.01.2011
- Interface meeting organized by the Govt. of Nagaland at NRC on Mithun, Medziphema (Nagaland) — 04.02.2011
- X Agricultural Science Congress organized by NAAS at NBFGR, Lucknow — 10.02.2011 to 12.02.2011
- National Seminar on Climate Change and its Impact on biological communities (CCIBC-2011) at Department of Environmental Sciences, Dr.R.M.L. Awadh University, Faizabad — 12-13 Feb.,2011
- Vice Chancellors & Directors' Conference attended National Seminar — Feb. 23-24, 2011
- on Conservation and Management of Biodiversity in 21st Century organized by Motilal Vigyan Mahavidyalaya at Regional Museum of Natural History, Bhopal — 26-27 Feb.
- Participated in the Documentary programme On "Eco-fish tourism, its scope and potential" organized by Prasar Bharti, Doordarshan Kendra, Guwahati at Nameri National Park of ABACA, Nameri (Assam) — March 13,2011
- Interaction meeting with the Chairs of RAC under the chairmanship of DG ICAR — March 17, 2011

- 3.4.2010 — Dr. Umesh Srivastava, ADG (Hort.), ICAR, KAB II, New Delhi
- 7.4.2010 — RAC members of IVRI
  All retd VCs Dr.A.T. Sherikar, Dr.R.N. Srinivasagowda, Dr.J.M. Nigam
- 29.05.2010 — Students along with faculty members from S.K.N. College, Jobner, Jaipur (Rajasthan) visited. They were briefed about the various activities of DCFR
- **7.5.2010** — **IMC meeting held at DCFR, Bhimtal**
- **May 18-19, 2010** — **Meeting of Research Advisory Committee**
- 22.06.2010 — Dr. Jay G. Varshney, Director, Directorate of Weed Science Research, Jabalpur
- 22-23 June, 2010 — Dr. B. Meenakumari, Director, CIFT, Kochi
  Meeting on the proposed Fish Processing Plant in Himachal Pradesh was held on 23.6.2010. She visited the Institute, its laboratories and other units.
- 27.08.2010 — Board members of AAU, Assam
- 9.10.2011 — Prof. Suresh S. Honnappagol, Vice Chancellor, KVAFSU, Bidar
- 14.2.2011 — Mr. S. Mall, South Asia Director, Professional Resources Intl. Dehradun, India/Wisconsin USA
  Mr. Mathew Campbell, Owner, ORA Technologies Inc.
- 17.05.2011 — Shri Chaman Kumar, IAS, Addl. Secretary DARE & FA ICAR.

Seminars/training attended:

- Dr Ananda Kumar B. S represented DCFR at "INFISH-2010"- fish food festival organized by NFDB at Hyderabad, from July 9-12th 2010.
- Dr. S. K. Gupta attended and presented a Poster Presentation in International Workshop on "Mountain Diversity and Impact of Climate Change with special reference to Himalayan Biodiversity Hotspot" on Dec., 2010 G.B. Pant Institute of Himalayan Environment & Development at Kosi Katarmal, Almora, Uttrakhand.
- Dr. S. K. Gupta attended International Conference on "Asia pacific Aquaculture and GP 2011" Kochi, India organized by the World Aquaculture Society from 17th to 20th Jan 2011.
- Mr. M. S. Akhtar attended the Training Programme on " Researcher's Training -III: Data Analysis using SAS" organized by Indian Veterinary Research Institute, Izzatnagar, during 15-20 January 2011.
- Mr. M. S. Akhtar delivered a lecture on " Nutrition and Feeding Strategy of Rainbow Trout Farming" during Model Training Course " Breeding, Incubation and Rearing of Rainbow Trout" from 27th December 2010 to 3rd January 2011 at DCFR, Bhimtal.
- Mr. M. S. Akhtar participated in *Kisan Mela* organized by Vivekananda Parvatiya Krishi Anusandhan Sansthan (VPKAS) on 29th March 2011.
- Dr Ananda Kumar B. S attended winter school on "Basic techniques in solid phase peptide synthesis & application of synthetic peptides in animal disease diagnosis and research" from 22nd Sep to 12th Oct 2010 for 21 days at IVRI, izatnagar, Bareilly.
- Dr Ananda Kumar B. S attended National Training Programme on "Intellectual property rights for animal scientists" from 9th to 18th march 2011 at SRS, NDRI, Bangalore.
- Dr Amit Pande participated in **"Asian Pacific Aquaculture -2011",** Kochi, India organized by the World Aquaculture Society from 17th to 20th Jan 2011.
- Dr Amit Pande participated in the Seminar on "Emerging Issues in Asian Aquaculture" organized by NACA and CMFRI, held at CMFRI, Cochin on 12th May 2011.
- Dr. Dimpal Thakuria participated in the three days National Seminar on *"Biodiversity conservation with special reference to Fisheries and its management for food, livelihoods and environmental security and 2nd National Helminthological Congress",* held at CIFRI, Barrackpore, on December 21-23rd 2010.
- Dr. Dimpal Thakuria participated in *"Assam Matsya Mahotsav"* held at Guwahati on January 27-29th 2011.
- Dr Debajit Sarma attended International Conference of Asian Pacific Aquaculture organized by World Aquaculture Society at Cochin on 18.1.2011.
- Dr Debajit Sarma attended National Seminar on Conservation and Management of Biodiversity in 21st Century organized by Government Motilal Vigyan Mahavidyalaya, Bhopal during 26-27 February 2011.
- Dr. S. Ali and Mr. Chirag Goel attended the Training Programme on "Statistical and Computational Genomics Data Analysis" of the NAIP Consortium "Bioprospecting of Genes and Allele Mining for Abiotic Stress Management" funded by NAIP at Indian Agricultural Statistics Research Institute, New Delhi during 11-21 January, 2011.

- X[th] Agricultural Science Congress organized by NBFGR, Lucknow during 10-12 February, 2011. Attended by

  Dr. P.C. Mahanta

  Dr. A. Barat

  Dr. N.N. Pandey

  Dr. S.K. Srivastava

  Dr. S. Ali

Training Programme at Experimental Field center Champawat

The National level Training Programme on " Br ding Incubation and Rearing of rainbow Trout" organized on 2nd Jan 2011by DCFR in which Officers from various state Fisheries Departments visited Champawat field center to view the various activities carried out at the center. Farm visit and practical demonstration of rainbow trout farming at Champawat was organized by Dr. S.K Srivastava, Sr. scientist and Dr. S.K.Gupta, Scientist.

Training at Poly house tank of Champawat field Center

- Dr. P.C. Mahanta Director DCFR and Dr. R.S. Patiyal Senior Scientist participated in Workshop on "Mountain Agriculture in Himalyan Region : Status, Constraints and potentials" on April 2-3, 2011 organised by Central Soil & Water Conservation Research & Training Institute, Dehradun, Uttarakhand.
- Dr. A Barat and R. S. Patiyal participated in Workshop on" Biotechnology : New Dimensions & Application" on 22nd of May 2011 organized by Department of Biotechnology, Devsthali Vidhyapeeth, Lalpur Rudrapur, Uttarakhand.

Publications

- Akhtar, M.S., Pal A.K., Sahu N.P., Alexander C., and Meena, D. K., 2011. Dietary pyridoxine enhances thermal tolerance of *Labeo rohita* (Hamilton) fingerlings reared under endosulfan stress, *Journal of Therma biology,* 36, 84-88
- Akhtar, M.S., Pal A.K., Sahu N.P., Ciji, A. and Kumar, N. 2011. Effects of dietary pyridoxine on haemato-immunological responses of *Labeo rohita* fingerlings reared at higher water temperature. *Journal of animal physiology and animal nutrition* (*accepted:* DOI: 10.1111/j. 1439-0396.2011.01181.x).
- Gupta S.K, Das P., Singh S.K, Akhtar, M.S., Meena D. K and Mandal S.C. (2011). Microbial levan, an ideal prebiotic and immunonutrient in aquaculture. *World Aquaculture,* 42(1): 61-66.
- Prusty, A.K., Kohli, M.P.S., Sahu, N.P., Pal, A.K., Saharan, N., Mohapatra, S., and Gupta S.K. (2011) Effect of short-term exposure of fenvalerate on biochemical and haematological responses in Labeo rohita (Hamilton) fingerlings Pesticide Biochemistry and Physiology, 100 (2011) 124–129.
- Ciji Alexander, Akhtar M. S., Das P. and Mandal S. C. (2011). Nutri-biotechnological interventions for growth maximization in carps of India. *World Aquaculture,* (accepted for publication in June, 2011 issue).

- Suman Sanwal, Debajit Sarma and N. Okendra Singh. 2010. Effect of stage and seasonal differences on length-weight relationship and condition factor of chocolate mahseer (*Neolissochilus hexagonolepis*). J. Ind. Fish. Soc. India, 42(2): 52-56.
- Debajit Sarma, D. Baruah and P.C. Mahanta. 2010. Performance of three pronged Chinese carp farming in mid Himalayas of West Kameng district, Arunachal Pradesh. Communicated to J. Ind. Fish. Soc. India, 42(2):48-51.
- N. Okendro Singh, Debajit Sarma and N. Gopimohon Singh. 2011. Length-weight relationship of *Tor putitora* (Hamilton) considering different stages of its lifespan. Indian Journal of Fisheries Vol. 58.
- Debajit Sarma, Trapti Tiwari, Puspita Das, Ghanshyam Nath Jha and Partha Das 2011. Proximate and Mineral Composition of Indigenous Hill Stream Fishes of Uttarakhand. Indian Journal of Animal Nutrition (In Press).

Article

- P. C. Mahanta and Debajit Sarma. 2010. Exploration of high altitudinal aquatic resources and sustainable utilization of ichthyofaunal diversity in India. In souvenir of 21st all India congress of zoology & national seminar. 21st-23rd December 2010. CIFRI, Barrackpore, Kolkata. pp. 44-53.
- P. C. Mahanta and Debajit Sarma. 2011. Scope of Hill Fish Farming in Nagaland. Interface Meeting for Development of Agriculture and Allied Sector in Nagaland During 4th February 2011.

Bulletin

- Debajit Sarma, M. S. Akhtar, N. N. Pandey, Neetu Shahi, B. P. Mohanty and P.C. Mahanta (2011). Nutrient Profile and Health Benefit of Coldwater Fishes. DCFR Bulletin No. 18.

Book

- W. Vishwanath, P. C.Mahanta, Debajit Sarma and N. Anganthoibi. Coldwater Fishes of India: An Atlas. DCFR, ICAR, Bhimtal. Pp.1-450.

Abstracts

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EVENTS

Celebration of International Women's Day

International Women's Day was celebrated by Women Cell of DCFR on 8th March 2011, at Bhimtal. The theme of women's day was "Equal access to education, Training and Science and Technology: Pathway to decent work for women". Dr P. C. Mahanta, Director, DCFR, chief guest Dr Abha Ahuja, HOD, Home Science Department, GB Pant University and several distinguished guests from different organization were present to grace the occasion. Equality of women and domestic violence was the main area of discussion.

Distinguished Guests and other participants on the occasion of International Women's Day (8th March, 2011)

Assam Matsya Mahotsava, 2011 Fishery minister of Assam & Manipur visited DCFR, Bhimtal exhibition

Celebration of Republic Day

Republic Day was celebrated on 26th January 2011 in the Directorate. Director In charge hoisted the National flag and addressed the staff of DCFR. He encouraged all the staff for development of the institute.

Republic Day celebration of DCFR Bhimtal

Republic Day was celebrated by the staffs of Champawat field center

Republic Day celebration at Champawat field center

Institute Management Committee (IMC)

The meeting of Institute Management Committee (IMC) was organized under chairmanship of the Directorate, DCFR on 27th April 2011. During the meeting, the proceedings of previous agendas of IMC were taken up along with new agenda items.

IMC meeting held on 27th April 2011

Meeting of Research Advisory Committee (RAC, 28th - 30th April, 2011)

The meeting of Research Advisory Committee (RAC) was held on 28th - 30th April , 2011 in the directorate under the chairmanship of Dr K. K. Vass, Ex Director, CIFRI, Barrackpore and NRCCCWF, Bhimtal. The chairman critically reviewed the progress of ongoing research works under various projects as well new research proposals and made necessary recommendation.

RAC meeting held in the Chairmanship of Dr K. K. Vass at the directorate

KVK Interface Meeting during 6-7 June, 2011

Coldwater fisheries have a great potential in generating rural income and providing food security to the rural population residing in Indian uplands. In hill regions of India, coldwater fisheries have got much importance gradually. To expand its activity, ICAR established NRC on Coldwater Fisheries during VII Five Year Plan. On account of population upsurge and

urbanization, upland aquatic resources once considered inexhaustible, are under threat. Hence, sustainable utilization and development of fisheries resources have assumed importance in coldwater regions of the country. In this context, the changing global biodiversity management scenario, equal attention has to be given towards conserving the rich fish diversity and natural resources by formulating partnership approach.

In this perspective, to achieve quality research in sustainable coldwater fisheries production, management and conservation, the NRCCWF has been transformed to 'Directorate of Coldwater Fisheries Research' during XI Five Year Plan. The priority area of the institute is to establish coldwater fisheries and aquaculture to be an important economic activity in upland region for livelihood security and eco-tourism. The DCFR and its experimental field center, Champawat is on its glorious path of virtually actualizing its vision by imparting boon of quality research in sustainable coldwater fisheries production, management and conservation.

The fundamental thought after transformation of NRCCWF to DCFR is to spread out the activities in the entire Himalayan region utilizing the recourses and manpower of various state fisheries departments and institutes located in the hilly region. In this direction, definite programs on partnership mode has been conceded in the XI five year plan with the different state fisheries departments, universities and institutes

in J&K, Himachal Pradesh, Sikkim, Arunachal Pradesh and Uttarakhand with immense success and encouragement. However, it is felt that, there are good numbers of KVK in the hill region are also functional in this direction. Therefore, to further strengthen the Technical Program through partnership approach in the XII five year plan to cater for the need of tribal population for the development of coldwater fisheries sector in the hill region, an interface meeting is proposed to hold with the involvement of KVKs and other stakeholders focusing on the following themes -

- Exploratory research on coldwater fish biodiversity.
- Expansion of Rainbow trout breeding and farming in potential coldwater areas.
- Expansion of new and economically viable fish farming system suitable for mid altitude areas.
- Development of broodbank and seed production of important coldwater fish species.
- Surveillance of disease in coldwater aquaculture
- Prospective areas in different states for developing Aqua-tourism.

In this background an interface meeting with the selected KVKs along with the different stakeholders was organised at this Directorate.

The Honorable Minister of State of Agriculture, Govt. of India Shri Harish Rawatji has graced the meeting as Chief Guest. More than 50 Nos. of KVKs, from all the hill states of India participated and deliberated in this important meeting. The officials and dignitaries from different hill states of India including the Deputy Director General (Fy) and Deputy Director General (Ex) graced the occasion and given their various suggestion for development of Hill fisheries on the above themes with the collaboration of KVKs working in this direction.

VISITORS

Visitors at Champawat Field Center

Prof. S. Moulick and Prof. C.K. Mukherjee from IIT Khargpur visited the Champawat farm on 14th March 2011. A meeting was held with the Scientist Dr. S.K Srivastava, Dr.N.N.Pandey, Sr. scientist and Dr. S.K.Gupta, Scientist of DCFR to discuss about the feasibility of various recircultory systems to cope up with the water crisis during the lean periods at the Champawat.

Hon'ble Minister of Parliament, Shri Pradeep Tamta Ji along with Ex MLA Shri Himesh Kharkwal visited field station of Champawat to see the ongoing aquaculture activities on 16th april 2011. Dr. Suresh Chandra, Sr. Scientist from DCFR field center Champawat explained them about the farming activities of trout as well different sps. of carps suitable as candidate sps for coldwater aquaculture. Shri Tamta Ji stressed upon the need to develop strong viable linkages with state fisheries and other organization for more effective demonstration, propagation, extension and promotion of hill aquaculture for upliftment of protien food security, livelihood and employment generation for the rural people of hill region.

Scientist at Champawat field center explaining the activities to honorable MP Shri Pradeep Tamta during his visit

Dr. N.S. Nagpure, PS & HOD Molecular Biology and Biotechnology division NBFGR, Lucknow visited the Chhirapani Champawta center on 20th May 2011. He was briefed about the research and farm activities of the center by Dr. S.K Srivastava, Sr. Scientist Dr. Suresh Chandra, Sr. Scientist and Dr. S.K.Gupta, Scientist.

Prof. Atul Borgohain AAU, Assam visited the farm on 10th June 2011 and commended the research findings and effort to transfer of technology for the farmers of hill region.

R.S.Negi, DIG, ITBP Force visited on 14th June 2011 the area of Champawat field center by sheer dint of curiosity and interest to know about fish culture.

RAC Chairmen Dr. K.K. Vaas, ADG (inland fishery) ICAR, Dr. S.D. Singh and RAC Member Prof. A. Dutta visited the Champawat farm on 28th

Dr. K.K. Vaas, RAC Chairman . Dr. S.D. Singh, ADG (Inland fishery) ICAR, and RAC Member Prof. A. Dutta at Experimental field center Champawat

Dr. K.K. Vaas, RAC Chairman . Dr. S.D. Singh, ADG (Inland fishery) ICAR and RAC Member Prof. A. Dutta observing hapa breeding of common carp Experimental field center Champawat

Dr. K.K. Vaas, RAC Chairman Dr. S.D. Singh , ADG (Inland fishery) ICAR, and RAC Member Prof. observing incubation of trout

April 2011 and appreciated the work of scientist. They expressed their contentment about the Research, Extension, development and ongoing infrastructures facilities setting up at the center. They advised to start brown trout culture as well as Silver carp breeding at this center.

A team of 10 progressive farmers, Fisheries development officer (Ramakant) and ADF of District Shahzahanpur visited the Champawat Farm on 24th May 2011. Dr. S.K. Gupta, Scientist Chhirapani Chamapwat explained to the farmers about the scientific method Fish Farmer as well as breeding and culture of trout and different sps. of carps. Dr. Gupta put in plain words about the importance of proper nutrition for different life stages of fish. He also gave emphasis on the role of good management practices (GMP) in fish farming to the farmers.

Scientist demonstrating the research activities

Joining

- Dr. R.S. Patiyal joined DCFR Chhirapani Experimental Field Centre, Champawat as Senior Scientist (Animal/Fish Genetics and Breeding) on 17th March, 2011
- Dr. Suresh Chandra joined DCFR Chhirapani Experimental Centre, Champawat as Senior Scienst (Fish Pathology) on 10th March, 2011.
- Mr. Y.S. Dhanik, AO, Joined DCFR Bhimtal on 11th April, 2011

In Loving Memory of

The DCFR, Bhimtal family remember the fond memory of Dr. Shyam Sunder, Former Principal Scientist, DCFR, Bhimtal for the commendable contribution in the coldwater fisheries sector. He was one of the first scientists to carry out work in the coldwater fisheries sector in India. We deeply pray to Almighty to rest his soul in peace.

Tribute to Dr. P.V. Dehadrai

Dr. P.V. Dehadrai was the first Deputy Director General (Fy.) and pioneer in shaping up the fisheries sector towards newer heights in India. Under his able guidance, the fisheries in India have reached to a stage of Blue Revolution. We deeply acknowledge his contribution and pray to God to rest his soul in peace.

अनुसंधान उपलब्धियाँ

मई. 2011 में निदेशालय की एक वैज्ञानिक टीम (डा. ठुकुरिया. वैज्ञानिक. श्री आर. एस. हलधर. तकनीकी अधिकारी एवं श्री रोहित कुमार. सी.टी.ए.) ने अंजी, जिला रिआसी की सरकारी मत्स्य हैचरी, कठुआ जिले का ट्राउट फार्म एवं बासोली मत्स्य का भ्रमण किया। मृत मछलियों का पोस्ट माटर्म करने के पश्चात उनकी किडनी और यकृत (लीवर) बड़े हुऐ पाए गये, मछलियों के टिशू सैम्पलों को प्रयोगशाला परीक्षण हेतु एकत्र किया गया।

मत्स्य पालन हेतु जी.यू.आई आधारित डी. एस एस. प्रणाली का निर्माण :

कुमायूं के पर्वतीय क्षेत्रों में मत्स्य पालन के विकास के लिए डिसिजन सपोर्ट सिस्टम (DSS) पर आधारित एक ग्रैफिकल यूजर इन्टरफेस (GUI) का निर्माण किया गया था। जब इस का मुख्य पृष्ठ खुलता है तो इसमे स्वतः ही स्वागत पृष्ठ पर वांछित विषय का शीषर्क है दो बटनों–'एण्टर' अथवा 'एक्जिट' के साथ परिलक्षित होता है।

जी. आई. एस. आधारित डिसिजन सपोर्ट सिस्टम (डी. एस.एस.) का स्वागत मेनू :

डाटावेस में प्रवेश करने के पष्चात मत्स्य पालन विकास हेतु एक पृष्ठ म्दजमत बटन के साथ खुलता है। जिस पर नैनीताल जिले के गाँव का नाम दिया हुआ होगा, एक कौम्बों बौक्स गाँव का नाम क्लिक करने के लिए लगया गया है, जिस पर क्लिक करने पर नैनीताल जिले के हजारों गाँवों के नाम प्रदर्शित होंगे। चयनित गांव के नाम पर क्लिक करने से उस गाँव से सम्बन्धित समस्त सूचानाऐं जैसे– उसकी अक्षांसीय, देषान्तरी स्थिति, समुद्रतल से उँचाई, जनसंख्या घनत्व, उस गांव के निकटस्थ हैचरी, व बाजार आदि प्रदर्शित होगी।

भीमताल के चयनित क्षेत्रों में मत्स्य पालन हेतु जी. आई. एस. आधारित प्रणाली का विकास :

उत्तराखण्ड के कुमायूं क्षेत्रों में मत्स्य पालन हेतु जी. एस. आई आधरित सूचनाओं का अध्ययन किया गया। इस श्रम सम्बन्ध में उत्तराखण्ड के नैनीताल जिले जिसका क्षेत्रफल लगभग 40,1992 हैक्टेअर और स्थिति 28° 59′ उत्तर तथा 78° 52′ अक्षांस से 79° 58′ पूरब है को चयनित किया गया है।

यह डी. एस. एस. प्रणाली मिट्टी. व जल की भौतिक रासायनिक विषेशताओ के त्रिविमीय आंकडों पर आधारित है. पर्वतीय क्षेत्रों में मत्स्य पालन के लिए उपयुक्त क्षेत्रों का चयन अनन्वेषित क्षेत्रों में ही किया जा सकता है इस प्रणाली की आवष्यकता विभिन्न कारकों जैसे – भौतिक, रासायिनिक, पैमाने, मिट्टी की गुणवत्ता तथा पर्वतीय क्षेत्रों मे विद्यमान सुरक्षित स्थलों आदि के कारण महसूस की गयी। इसके आतिरिक्त यहाँ स्थित विभिन्न निर्माण कार्यो जैसे– यातायात सुविधा, तकनीकी जानकरीयाँ, जीवों की उपलब्धता आहार की उपलब्धता आदि प्रमुख कारकों के कारण भी इस प्रणाली की आवष्यकता अनुभव की गई, साथ ही यह भी महसूस किया गया कि यादि जी. आई.एस आधारित सौपटवेयर का निर्माण आम आदमी के लिऐ तैयार किया जाये तो वह पर्वतीय क्षेत्रों में मत्स्य पालन के विकास की संम्भावनाओं की वृद्धि में सहायक सिद्ध होगा।

सुनहरी महाशीर के पोषक तत्वों का निर्माणः

अरूणाचल प्रदेश की कामेंग नदी एवं उत्तराखण्ड की भीमताल झील (29° 20° 40 "उत्तरी, अक्षांस 79° 36′ 16" पूर्व एवं 1371 की समुद्रतल से ऊंचाई) एवं कोसी नदी (29° 25′ से 29° 39 उत्तरी अक्षांस 78° 44 से 79° 07′ पूरब एवं 1960 मी. समुद्र तल से ऊँचाई) से विभिन्न आकार की सुनहरी महाशीर पकड़ी गईं। निदेशालय के भीमताल स्थित महाशीर हैचरी एवं तालाबों से भी नमूने एकत्र किऐ गऐ। ये परिक्षण वर्ष 2008 तथा 2009 की अवधी में किऐ गऐ। वर्तमान अध्ययन के परिणामों से पता चला कि कोसी नदी से एकत्र किऐ गऐ नमूनों में प्रोटीन एवं कच्चे वसा की

मात्रा अधिक थी परिणामों से यह भी पता चला है कि सुनहरी महाशीर में कैल्शियम, पोटेशियम की मात्रा अधिक थी किन्तु सोडियम की बहुत कम थी। बाद में शरीर के भार की वृद्धि के साथ ही कैल्शियम एवं पोटेशियम की मात्रा कम होने लगी।

अतः यह निष्कर्ष निकाला जा सकता है कि हिमालयन महाशीर खनिजों का अच्छी स्रोत है। कामेंग नदी से एकत्रित मछलियों में सेलिनिसम (1.56 मिग्रा. / 100 ग्रा.) की मात्रा काफी अधिक थी, जबकि कोसी नदी की सुनहरी महाशीर में क्रमशः लोहा (1.28 मिग्रा. / 1.00 ग्रा.) मैग्नीज एवं जिंक (0.16 व 1.19 मिग्रा. / 100 ग्रा.) की प्रभावकारी वृद्धि देखी गयी।

प्रमुख अमीनो अम्ल एस्पर्टिक (7.606%), प्रोलाइन (6.684%) ग्लेसिन (7.456%) एवं लेसिन (9.411%) थे। विभिन्न अमीनों अम्लों का स्तर 0.482–9.631% के बीच था। इससे पता चलता है कि अमीनों अम्ल घाव भरनें की प्रक्रिया में एक महत्वपूर्ण अवयव है। अन्य अमीनों अम्लों जैसे– एलानाइन, प्रोलाइन, एग्रानाइन, सेटीन, आइसोल्यूसिन एवं फिनैलालाइन आदि के साथ ग्लेसाइन भी मानव त्वचा के लिए एक मुख्य अवयव है। सुनहरी महाशीर में इन तत्वों की प्रतिशतता बहुत पायी गई जो उसकी वृद्धि एवं ऊतको के टूट–फूट के निर्माण में सहायक हैं।

रेन्बो ट्राउट के पोषक तत्वों का निर्माण :

रेन्बो ट्राउट में नमी, कच्चा प्रोटीन कच्चा लिपिड. और राख के तत्व क्रमशः 74.00, 19.44, 5.18 व 1.37% थे। ये साल्मों गार्डनरी में पाऐ गए तत्वों के लगभग समान थे। इसमें सिर्फ कच्चे लिपिड की मात्रा थोड़ी अधिक (5.18%) थी।

नमी और वसा के आधार पर रेन्वो ट्राउट एक मध्यम वसा वाली मछली है, जिसमें वसा की मात्रा 5–10: तक होती है। यद्यपि गोंजालेज– फैडोंस इत्यादि ने बताया कि रेन्बो ट्राउट (आनकोरिकस माइकिस) में लिपिड की मात्रा अधिक (6.55%) तथा प्रोटीन तत्वों की मात्रा कम (16.04%) होती है। यह उनकी परिपक्वन स्तर, भौतिक स्थिति, ऋतुओं आदि के कारण होता है।

अमीनो–अम्ल निमार्ण :

रेन्बो ट्राउट के प्रोटीन मे अमीनो अम्ल का निर्माण संतुलित मात्रा में होता है, जिसमें प्रोफाइन (96.37 मि. ग्रा / ग्रा. कच्चा प्रोटीन), एस्पर्टिक एसिड (85–23 मि.ग्रा. / ग्रा. कच्चा प्रोटीन), टायरोसिन (83.84 मिग्रा कच्चा प्रोटीन), ग्लेसाइन (69.87 मिग्रा / ग्रा कच्चा प्रोटीन), सेराइन (66.63 मिग्रा. / ग्रा. कच्चा प्रोटीन), एग्रीनिन (65. 26 मिग्रा. / ग्रा. कच्चा प्रोटीन), आइसोल्युसाइन (64.56 मिग्रा / ग्रा. कच्चा प्रोटीन) एवं ट्रिप्टोफ्न (61.63 मिग्रा / ग्रा. कच्चा प्रोटीन) की मात्रा अधिक होती है। प्रमुख अमीनो अम्ल ग्लूटामिक, एस्पर्टिक एवं लेसिन हैं। विभिन्न अमीनो अम्लों का सी. स्ट्रेटस 0.9% से 21.7% सी. माइक्रोपेलेट्स में 0.1% से 19.4% तथा सी. लूसियस में 0.6% से 21.2% स्तर होता है।

वसीय अम्ल :

वसीय अम्ल (SFAS), मोनोअनसैचुरेटेड वसीय अम्ल (MVFAS) एवं पौलिअनसैचुरेटेड एसिड (PUFAS) आदि वसीय अम्लों के ग्रुप का विश्लेषण किया गया। वर्तमान अध्ययन के अनुसार, मोनोअनसैचुरेटेड वसीय अम्ल (MUFA) की मात्रा अधिक (35.88%) थी। इसके बाद संतृप्त वसीय अम्ल की 34.51c तथा पौलिअनसैचुरटिड वसीय अम्ल की मात्रा 31.39% थी। वर्तमान अध्ययन के अनुसार, हमने यह देखा कि रेन्बों ट्राउट की पेशियों में PUFAS का कुल DHA, AA एवं EPA प्रतिशत क्रमशः 20.52, 7.56 तथा 7.45 प्रतिशत था।

खनिज :

खनिजों के विश्लेषण में पाया गया कि पोटेशियम (K) की मात्रा अत्यधिक थी, तत्पश्चात Ca, Na, Zn, Se, व डद आदि की मात्रा अधिक थी। परिणामों से पता चाला कि विशेषकर K (208.0 मिग्रा. / 100ग्रा.) एवं Fe (5.17 मिग्रा.

/100 ग्रा.) युक्त रेन्बो ट्राउट मछली मानवपोषण के लिए बहुत योग्य है।

एन. ए. आई. पी–3 के अन्तर्गत उत्तर–पश्चिमी हिमालयी क्षेत्र के मत्स्य प्रक्षेत्र एवं सतत् मत्स्य पालन के द्वारा खाद्य सुरक्षा (आजीविका) में वृद्धि :

चम्पावत जिला अपनी विशिष्ट जलवायु एवं उबड़–खाबड़ क्षेत्रों के कारण उत्तराखण्ड का एक पिछड़ा जिला है। यहाँ पर मत्स्य पालन के लिए बहुस्तरीय मौडल का निर्माण किया गया है जिसमे मत्स्य पालन के लिए टैंको में पौलिथीन का प्रयोग किया गया है। तालाबों में चाइनीज कार्प कामन कार्प को रखा गया और उन्हे उनके षरीर के भार के बराबर सरसों की खली व चावल की भूसी 2: की दर से दी गयी तथा मिट्टी के तालाबों के 0.12–0.36 किग्रा/मी^{2} की अपेक्षा 0.3 किग्रा–0.7 किग्रा/मी^{3} अधिक उत्पादन प्राप्त किया गया। अधिक उत्पादन में यह भिन्नता मिट्टी के तालाबों की अपेक्षा 2–60 से.ग्रे. अधिक तापक्रम के कारण थी। इसके जल का प्रयोग फसल के उत्पादन मे किया गया, जिसको चित्र के माध्ययम से दिखाया गया है। इस प्रकार तीन तालाबें का निर्माण चम्पावत जिले कें माकोट, मडयानी एवं धरौज क्षेत्रों में किया गया है।

जिनोमिक स्केल माइनिंग हेतु शाइजोथोरैक्स रिचार्डसोनी मत्स्य प्रजाति कें चयनित प्रजनन कार्यक्रम पर डी. एस. टी. परियोजना :

भिन्न–भिन्न आकार की भारतीय स्नोट्रउट, शाइजोथेरैक्स रिचार्डसोनी को विभिन्न क्षेत्रों– कोसी नदी, गोला नदी, तथा श्रिापानी धारा आदि से एकत्रित किया गया। पंखों के नमूनों को 75% इथेनौल कें रखकर विभिन्न वर्ग की मछलियों के जातीय सम्बन्धों का आध्ययन किया गया।

मत्स्य आनुवंशिक भण्डार पर आउटटीच परियोजनाः

मई, 2011 में 123 महाशीर मछलियों के पंख–ऊतकों के नमूनों को जम्मू एवं कश्मीर (अंजी, बासोली) एवं हिमाचल प्रदेश (बाडोन, शाकरा) के दो स्थालों से एकत्रित किया गया। पहले उनके पंखों के ऊतको को डी. एन. ए पृथक्कीकरण हेतु 70% एल्कोहल मे रखा गया। मौरफोमिट्रिक विश्लेषण के लिए महाशीर के क्षेत्रों को प्रांगुलित किया गया। सभी एकत्रित नमूनों से "फिनौल–क्लोरोफाम एक्सट्रैक्शन" विधि के द्वारा डी. एस. ए. को पृथक किया गया। 0.8% आगरोज जैल ईलैक्ट्रोफोरेसिस तथा 260 व 280 एन.एम. पर स्पैक्ट्रोफोटोमीटर के द्वारा डी. एन. ए नमूनों की गुणवत्ता एवं मात्रा का आंकलन किया गया। प्रत्येक नमूनों 20 पी. सी. आर. उत्पादन एक क्रम में थें। (भालुकपोंग जोगेन्दर नगर, भाकरा, रामनगर, लोनावाला, अंजी व बासोली) यह क्रम विश्लेषण 2011–12 की अवधी में किया गया।

कार्यशाला/संगोष्ठी/सम्मेलनो मे सहभागिता एवं प्रस्तुतिकरण :–

दि. 10–12 फरवरी, 2011 को डा. पी.सी. महंता, डा. ए बराट, डा. एन.एन. पाण्डे, डा. एस. के. श्रीवास्तव व डा. एस. अली ने एन.बी.एफ.जी.आर. लखनऊ में आयोजित 10वी कृषि विज्ञान कांग्रेस में भाग लिया।

बुलेटिन :

न्यूट्रीन्ट प्रोफाइल एण्ड हैल्थ बैनिफिट औफ कोल्डवाटर फिशेज, डी.सी.एफ.आर सं 18 एम.एस.अख्तर एन.एन पाण्डे, नीतू शाही, पी.सी. मोहंती तथा पी.सी. महंता।

पुस्तक :

कौल्डवाटर फिशेज औफ इण्डिया– विश्वनाथ, पी. सी. महंता, देबाजीत शर्मा एवं एन. अगन्थोइवी, एन एटलस, डी.सी.एफ.आर. भीमताल पृष्ठ 1–450।

घटनाऐं :

अन्तर्राष्ट्रीय महिला दिवस :

दि. 8 मार्च 2011 को महिला प्रकोष्ठ द्वारा अन्तर्राष्ट्रीय

महिला दिवस का आयोजन किया गया। महिला दिवस का मुख्य विषय " इक्वैल एक्सेस टू एजूकेशन, ट्रेंनिग सांइस एण्ड टैक्नोलोजी " पाथवे टू डिसेंट वर्क फौर वूमेंन था। इस अवसर डा. पी.सी. महंता निदेशक डी.सी.एफ. आर, मुख्य अतिथि डा. आभा आहूजा विभागाध्यक्ष गृह विज्ञान विभाग, गो.ब.पन्त. कृ. एवं प्रौ. विश्वविद्यालय, पतंनगर तथा अन्य लब्ध प्रतिष्ठित विदूान तथा कर्माचारी गण अपस्थित थे। इस अवसर पर महिलाओं को समान दर्जा एवं घरेलू अहिंसा पर विशेष चर्चा की गई।

गणतंत्र दिवस :

26 जनवरी. 2011 को निदेशालय मे गणतंत्र दिवस धूमधाम के साथ मनाया गया। इस अवसर निदेशालय में कार्यकारी निदेशक ने ध्वजारोहण कर संस्थान के विकास और आपसी सहयोग के साथ कार्य करने पर जोर दिया।

संस्थान प्रबन्धन समिति :

निदेशक महोदय की अध्यक्षता में दि. 27 अप्रैल 2011 को संस्थान की प्रबन्ध समिति की बैठक आयोजित की गई। बैठक में पूर्व के लिए गए निर्णयों पर चर्चा करने के साथ–साथ नवीन कार्यसूची पर भी चर्चा की गई।

अनुसंधान सलाहकार समिति :

दि. 28–30 अप्रैल 2011 को भूतपूर्व निदेशक डा. के. के. वास, सीफरी बैरकपुर की अध्यक्षता से अनुसंधान सलाहकार समिति की वैठक आयोजित की गई। वैठक में अध्यक्ष द्वारा वर्तमान मे चल रही परियोजनाओं के अन्तर्गत कार्यों का आलोचनात्मक मूल्यांकन किया तथा विभिन्न नवीन अनुसंधान प्रस्तावों को मंजूरी दी।

स्नेहपूर्ण यादें :

इस संस्थान से सेवानिवृत्त पूर्व प्रधान वैज्ञानिक डा. एस. श्यामसुन्दर का मई 2011 में देहावसान हुआ। उनकें द्वारा शीतजल मात्स्यिकी के क्षेत्र में किर गए कार्यो के लिए यह निदेशालय सदैव ऋणी रहेगा।

श्रृद्धा सुमन :

भा. कृ. अनु. परि. नई दिल्ली में मात्स्यिकी ईकाई के प्रथम उपमहानिदेशक डा. पी.वी. देहादराय का माह मई, 2011 में देहावसान हुआ। उनके द्वारा सुझाए गए परामर्श के कारण ही भारत नीलक्रान्ति के स्तर तक पहुँचा। उनकी आत्मा की शान्ति के लिए हम ईश्वर से प्रार्थना करते है।

कृषि विज्ञान केन्द्र इन्टरफेस मीटिंग :

शीतजल मत्स्य पालन पर्वतीय क्षेत्र की जनता के लिए खाद्य सुरक्षा एवं अतिरिक्त आय का एक प्रमुख साधन है। भारत के पर्वतीय क्षेत्रों में शीतजल मत्स्य पालन को धीरे–धीरे अधिक महत्व मिलने लगा है। भा. कृ. अनु. परि. ने अपनी गतिविधियों को विस्तार देने के लिए सातवीं पचंवर्षीय योजना के दौरान शीतजल मत्स्य पालन हेतु एक राष्ट्रीय अनुसंधान केन्द्र की स्थापना की जनसंख्या वृद्धि एवं नगरीकरण के कारण पर्वतीय क्षेत्रों के जल संसाधन खतरे में है। इसलिए देश के शीतजल क्षेत्रों में मात्स्यिकी संसाधनों के समुचित उपयोग एवं विकास को महत्व प्रदान किया गया है।

इस परिप्रेक्ष्य में, सतत् शीतजल मत्स्य उत्पादन में उपयोगी अनुसंधान प्रबन्धन एवं संरक्षण को प्राप्त करने के उद्देश्य से राष्ट्रीय शीतजल मात्स्यिकी अनुसंधान केन्द्र को ग्यारहवीं योजना की अवधी में शीतजल मात्स्यिकी अनुसंधान निदेशालय मे परिवर्तित कर दिया गया। संस्थान का प्राथमक उद्देश्य पर्वतीय क्षेत्रों में मत्स्य पालन एवं वहाँ की जनता के लिए खाद्य सुरक्षा व पारिस्थितिकी पर्यटन की स्थापना करना है।

राष्ट्रीय शीतजल मात्स्यिकी अनुसंधान केन्द्र के शीतजल मात्स्यिकी अनुसंधान निदेशालय में परिवर्तन के पश्चात मौलिक धारणा यह थी कि पर्वतीय क्षेत्रों में स्थित संस्थान राज्य मत्स्य विभाग के विभिन्न सदस्य इन संसाधनों का प्रयोग कर मत्स्य पालन सम्बन्धी गतिविधियों को पूरे हिमालय क्षेत्र में फैलाएंगे। इस दिशा

मे ग्यारहवीं पचंवर्षीय योजना मे विभिन्न राज्य मत्स्य विभागों, विश्वविद्यालयों के साथ मिलकर एक निधारित कार्यक्रम स्वीकार किया गया है। ऐसा महसूस किया गया है कि पर्वतीय क्षेत्रों में कृषि विज्ञान केन्द्रों (KVK) की संख्या बहुत है और वे इस दिशा में अच्छा कार्य कर रहे हैं। इसलिए पर्वतीय क्षेत्रों में जनजातीय समुदाय की आवश्यकता की पूर्ति के लिए शीतजल मात्स्यिकी क्षेत्रों के विकास, तकनीकी कार्यक्रमों की मजबूती एवं कृषि विज्ञान केन्द्रों तथा अन्य भागीदारों के कार्यों पर नियंत्रण रखने हेतु 12वीं योजना में एक इन्टरफेस मीटिंग प्रस्तवित है जिसके अन्तर्गत निम्न विषयों का समावेश है :–

- शीतजल मत्स्य जैवविविधता पर खोजपूर्ण अनुसंधान।
- सम्भावित शीतजल क्षेत्रों में रेन्बोट्राउट के प्रजनन एवं पालन का विस्तार।
- मध्य ऊँचाई वाले क्षेत्रों के लिए उपयुक्त नवीन एवं आर्थिक रूप से महत्वपूर्ण मत्स्य पालन प्रणाली का विस्तार।
- प्रमुख शीतजल मत्स्य प्रजातियों का बीज उत्पादन एवं प्रजनन बैंकों का विकास।
- शीतजल मत्स्य पालन में रोगो की निगरानी।
- राज्य के विभिन्न क्षेत्रों में एक्वा–पर्यटन का विकास।

Addl.Secy. & FA DARE/ICAR Sri Chaman Kumar, IAS interacted with the scientists and staffs of DCFR,Bhimtal

Students from J&K visited Laboratories and different establishment of DCFR, Bhimtal

IPR day celebrated at DCFR, Bhimtal on 26th April, 2011

Students and faculty members from Faziabad P.G.College visited the Directorate

Experts from IIT, Kharagpur visited the institutes

Farwell to Dr Ashok Nayak, Scientist 30 April, 2011

The Honourable Union Minister of Agriculture and Food Processing Industry Mr. Sarad Pawarji inaugurated the book on "Coldwater Fisheries Management" published by the Director, DCFR, Bhimtal at Delhi. The book is edited by Dr. P. C. Mahanta & Dr. Debajit Sarma of this Directorate.

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