ICAR-DCFR
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FROM DIRECTOR'S DESK

Welcome to the latest edition of our Newsletter, where we present an array of insightful updates and developments in coldwater fisheries and aquaculture. This edition showcases the continuous efforts and innovative approaches undertaken by the ICAR-Directorate of Coldwater Fisheries Research to enhance the sustainable management and development of aquatic resources, particularly in the unique and challenging environments of the Indian Himalayas.

The mapping of aquatic resources in Ladakh reveals a rich tapestry of river networks and lakes, emphasizing the potential for optimized aquaculture planning and sustainable resource management. In the realm of environmental health, our assessment of microplastics in the water bodies of Kashmir Valley uncovers alarming levels of contamination, highlighting an urgent call for action to mitigate plastic pollution's impact on both aquatic ecosystems and human health. The aquaculture section provides a comprehensive look at ongoing projects aimed at broodstock maintenance of indigenous hill stream ornamental fishes. We also explored the optimization of airlift pumps for small-scale Recirculating Aquaculture Systems, presenting a cost-effective solution for energy-efficient water circulation and oxygenation in intensive aquaculture.

We also developed an indicative feeding schedule for rainbow trout, derived from extensive trials on feeding rations, frequencies, and meal timings. Molecular genetics and biotechnology feature prominently with advancements in the artificial design of antimicrobial peptides (AMPs), offering a new frontier in combating bacterial pathogens. Further, our research on sex differentiation, sex ratios in golden mahseer under varying temperatures provides crucial insights into the environmental influences on fish populations, aiding conservation and breeding efforts. Fish health management includes promising findings on the anti-Saprolegnia activity of organic acids,

proposing new control measures for Saprolegniasis in coldwater aquaculture.

Our community outreach programs, under the Scheduled Caste and Tribal Sub-plans, emphasize the importance of inclusive development. From frontline demonstrations in integrated carp culture and rainbow trout culture to training programs on breeding and seed production, these initiatives aimed to empower marginalized communities through scientific fish farming practices. Finally, we highlight significant events, workshops, and training programs that underscore ICAR-DCFR's commitment to advancing coldwater fisheries and aquaculture.

I appreciate the overall efforts of all the scientists and staff of this directorate. Moreover, I sincerely urge the entire research team to aspire and achieve more in their future endeavours. At last, I extend my heartfelt gratitude to Dr. Himanshu Pathak, Secretary DARE and Director General, ICAR, and Dr. J.K Jena, Deputy Director General (Fisheries Sciences) for their encouragement and valuable guidance. The editorial team deserves commendation in compiling and presenting the scientific achievements of the directorate.

(Pramod Kumar Pandey)
Director

Fisheries Resource Management

Mapping of aquatic resources in Ladakh

The integration of remote sensing and GIS in mapping Ladakh's aquatic resources reveals a promising landscape. Linear Imaging Self Scanning Sensor (LISS-3) images and Shuttle Radar Topography Mission (SRTM) DEM data were used to analyze the distribution pattern of resources. Preliminary findings highlight extensive river networks (663 streams with a total length of 7923 km) and abundant lacustrine resources (approximately 90 lakes, covering an area of 98082.71 ha), emphasizing the need for further in-depth investigation to optimize aquaculture planning.

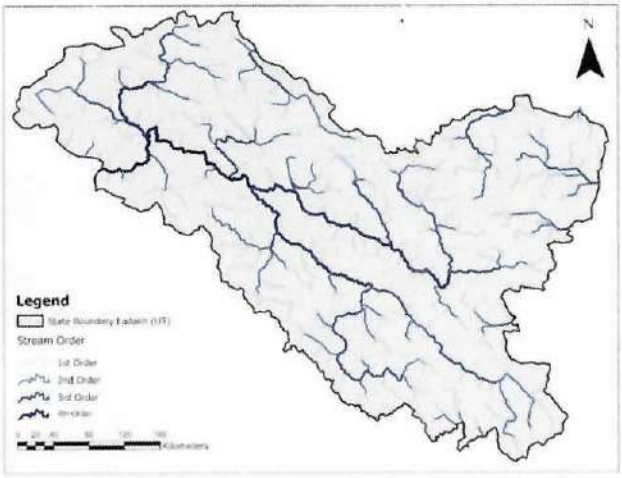


Fig. Riverine network of Ladakh

Assessment of microplastics in selected water bodies of Kashmir valley

The preliminary research findings underscore the alarming prevalence of microplastics in water bodies of Kahmir valley, posing significant risks to aquatic life and human health. Different sampling conducted in Jammu and Kashmir revealed the prevalence of microplastic fibers in the sampled fishes and water, necessitating urgent attention to mitigate potential health hazards associated with plastic pollution.

Aquaculture

Broodstock maintenance of indigenous hill stream ornamental fishes

Attempts are being made to create a repository of indigenous hillstream fishes possessing vibrant body colours such as *Channa bipuli, Nemacheilus corica, Schistura obliquofascia, Garra spp., Botia dario,* and *Botia almorhae*. Broodstock of such fishes is being

maintained and domesticated to find their potential to contribute to the ornamental fish trade of the coldwater regions of India. These indigenous species can become potential candidates for the ornamental fish industry in the near future.

Optimization of airlift pumps for small-scale Recirculating Aquaculture System (RAS)

Water pumping accounts for a significant portion (70%) of energy consumption in the current small Recirculating Aquaculture System (RAS) design. Consequently, we optimized airlift pumps using a 63 mm pipe under various head conditions (15-45 cm) and at different airflow rates. The results suggest that airlifts could be a viable option to reduce operating costs. Airlifts, being devoid of any moving parts, handle both oxygenation and water movement from the filter to the fish tank. To assess their efficiency and usability under actual conditions (tanks with fish), short-term growth trials were conducted with *Pangasianodon hypophthalmus* and the results highlight the potential of airlift pumps for small-scale RAS.

Fish Nutrition and Feed Development

Developed an indicative feeding schedule for rainbow trout

A series of three feeding trials were conducted to study the effect of feeding ration, feeding frequency and meal timing on the feed efficiency and growth performance of juvenile rainbow trout. We observed that growth performance decreases corresponding to the reduction in feed intake. However, feed conversion and protein efficiency ratio showed an improvement at controlled feeding rates. With respect to meal timing, evening meals was found to be associated with slightly better growth and feed conversion, as compared to morning meals. Based on the results, an

indicative feeding schedule for best management of a nutritionally adequate feed in rainbow trout farms was developed.

Molecular Genetics & Biotechnology

Artificial designing: A tool to generate novel potent AMPs in the laboratory

In recent days, antimicrobial peptides (AMPs) are gaining importance as potential alternatives to address public health issues caused by antibiotics and chemicals. However, the practical implementation of AMPs, particularly naturally occurring ones, is often impeded by their low stability, toxicity, and notably, higher production costs resulting from their lengthy sequence. The artificial design of AMPs can help address these issues and enable their use as novel antimicrobials. Short amphipathic antimicrobial peptides can be designed using critical basic positively charged residues (Lysine and arginine) and hydrophobic residues (leucine, isoleucine, valine, alanine, tryptophan and phenylalanine) required for antimicrobial activity. Once the peptide is designed, it can be further evaluated and modified using various online web servers e.g.,CAMPR3, AI4AMP, sAMPpred-GATetc to get potent AMP. Using this technique, we designed a novel, short (12 mer), and compositionally simple AMP (contains only three types of amino acids; K, Y and W). The peptide was synthesized and tested against a range of bacterial pathogens, including *A. sobria, A. salmonicida, A. hydrophila, Edwardsiella tarda, Vibrio parahaemolyticus, Pseudomonas aeruginosa, Escherichia coli, Staphylococcus epidermidis*, and methicillin-resistant *S. aureus*. The peptide showed promising antibacterial activity. In addition, the peptide was found to be stable and less cytotoxic. The protocol for artificial generation of novel AMPs has been optimized in the laboratory.

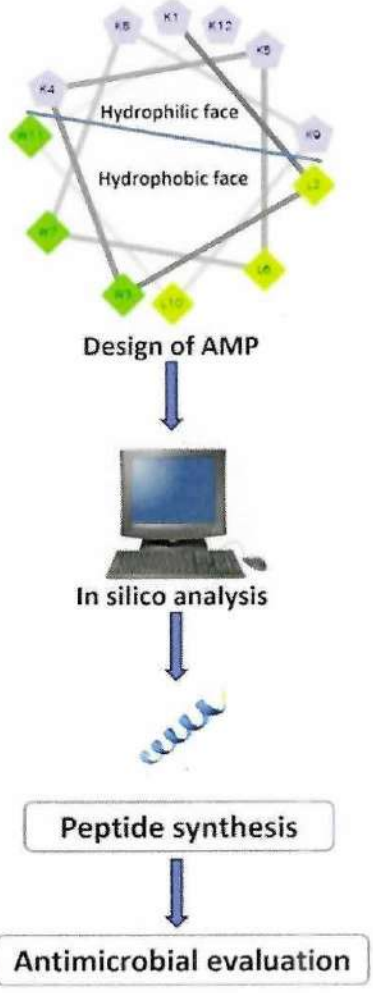


Fig. Artificial design of a prototypic, amphipathic, cationic antimicrobial peptide.

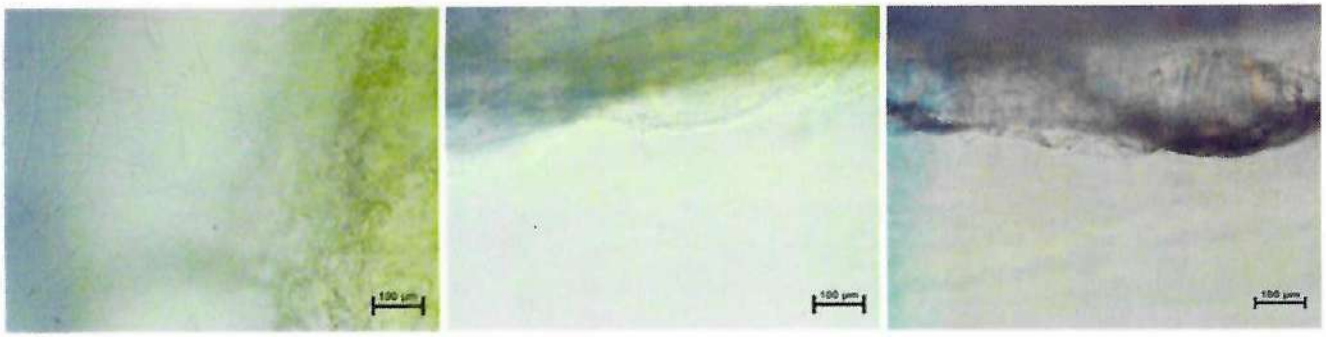
Evaluation of the effect of different temperatures on the sex differentiation and sex ratio in golden mahseer (*Tor putitora*)

Differential and skewed sex ratio has been observed and reported in golden mahseer natural population where males are mostly predominant than females. The skewed sex ratio in golden mahseer might be a response to the environmental stress, as temperature plays an important role in sex determination and also identified as an important factor in determining sex ratios in many other species of fishes, amphibians, and reptiles. Thus the study targeted to examine the role of temperature on the sex differentiation and sex determination in the golden mahseer. The larval sample 25 dph onwards were subject to different temperature treatment. A total of 19 genes were identified that plays important role in the sex differentiation process during the ontogenic development which were *in-silico* characterized and submitted to the NCBI. Real-time qPCR assays were used to determine the quantity of these genes at different ontogenic stages. The morphometric measurements were also taken during the different developmental stages.

Fish Health management

Anti-*saprolegnia* activity of organic acids

Two dicarboxylic organic acids, fumaric and maleic acid were evaluated for its anti-*Saprolegnia* activity. Fumaric acid is an intermediate in the citric acid cycle that occur inside the cells to produce ATP. While fumaric acid is a trans-isomer of butenedioic acid, maleic acid is the cis-isomer. A study was carried out to evaluate the activity of these compounds



A B C

Fig. Effect of fumaric and maleic acid on growth of Saprolegnia parasitica. A-Control (untreated) showing hyphal growth, B and C- treated with fumaric acid and malic acid with no hyphal growth

against important species of *Saprolegnia*. Among the tested species, fumaric acid was found to be most effective against *S. parasitica* and the effect on the other species was similar. On the other hand, maleic acid was found to be equally effective against all the tested species. When the two compounds were compared, maleic acid was found to produce higher inhibitory effect against *Saprolegnia*. In future, anti-*Saprolegnia* activity of these compounds may be tested *in vivo* to develop efficient control measures to prevent Saprolegniasis.

National surveillance programme for aquatic animal disease (NSPAAD)-II

Under the NSPAAD Phase II active surveillance was carried out in Uttarakhand to proactively identify and mitigate potential fish health threats in aquaculture. Covering districts like Nainital, Chamoli, Bageshwar, Udham Singh Nagar, Almora, Champawat, Rudrapryag, and Dehradun, the initiative involved visits to 203 farms, collecting baseline data and screening for infections. Notable pathogens were identified across several districts. One training program was organised to promote using the *"Report Fish Disease application"*, facilitating more effective disease reporting within the community.

Fig. Training programme for the use of report fish disease application

Activities under Scheduled Caste Sub-plan (SCSP)

Frontline demonstration on integrated carp culture and input distribution programmes

Frontline demonstrations on polytank based integrated polyculture of exotic carp with Good Management Practices (GMP) developed by ICAR-DCFR was conducted at Darim village with active participation of 25 fish farmers. Besides, 30 fish farmers were supported by providing inputs viz., fish seed, feed, water quality testing kits, fish nets, etc. Total 32 farmers of Matsya Utapadan Vipanan Sahkaari Samiti, Harinagar were benefitted by adopting scientific fish farming. In Mandi and Kullu districts of Himanchal Pradesh, selected 20 trout growers and provided proper feeding guidance. High energy trout feed was provided to the farmers with feeding chart.

Training programmes organized

During July to December 2023, ICAR-DCFR, Bhimtal, as well as its Experimental Fish Farm, Champawat, organized several training programmes for the farmers of the Scheduled Caste community. The various trainings conducted include five-day training programmes on "Breeding and seed

production of carps in mid-hills" and "Livelihood generation through value added fish and fishery products", three-day training programmes on "Breeding and seed production of indigenous coldwater fish species" and "Empowering SC fish farmers through skill development in carp and trout Farming". The participants were made aware of various aspects of carp and rainbow trout cultures such as site selection, pond/raceway construction, fish seed sources and stocking, water quality maintenance, feed management, disease identification and health management, preparation and storage of value-added products, etc. Additionally, practical know-how on the culture and breeding of indigenous cold water fish species and ornamental fishes was also provided. A total of 120 farmers of the SC community benefited through these training programmes.

Field days and farmer-scientist interactions

Farmer-Scientist interaction programmes were organised in Darim and Harinagar villages of Nainital district. The purpose of the visits was to understand the issues faced by the farmers belonging to the Scheduled Caste community and interventions required in the field of coldwater fisheries. To enable multipurpose use of Amrit Sarovar built in Harinagar village, carp seeds were introduced in it.

Activities under Tribal Sub-plan (TSP)

Ornamental fish rearing in aqua-garden at Leh

For integration with eco-tourism industry in Ladakh, ICAR-DCFR has introduced the concept and practice of aqua-gardening with ornamental fishes. A small aqua-garden with gold fish and koi carp has been set-up in Mr. Zabir Ahmad's farm at Chuchot village, Leh. Through this initiative, the potential of ornamental fish rearing and aqua-gardening to generate alternate livelihood in Ladakh is being evaluated.

Workshop on 'Boosting coldwater aquaculture and fisheries in Meghalaya'

ICAR-DCFR organised a focused workshop on 'Boosting coldwater aquaculture and fisheries in Meghalaya' on 18th August 2023, at Umiam, in collaboration with ICAR Research Complex for North East Hill Region and Directorate of Fisheries, Meghalaya. The Hon'ble Minister of Fisheries, Meghalaya, Shri Alexander L. Hek was the chief guest of this workshop. The workshop was attended by 100 farmers, entrepreneurs and interested stakeholders from various parts of Meghalaya.

Scientist-Farmer meeting at Mawphlang, East Khasi Hills

ICAR-DCFR and Iatreilang Foundation Multipurpose Cooperative Society Ltd. organised a scientist-farmer interaction meeting on 17th August 2023, at Mawphlang, East Khasi Hills, Meghalaya. The event was graced by Dr. Pramod Kumar Pandey, Director, ICAR-DCFR; Shri Tambor Lyngdoh, Founding Chairman, SYNJUK; and Shri Auspicious Lyngdoh, Headman of Nongrum, Mawphlang village. Scientists from ICAR-DCFR, farmers and young members of IFMCS attended the meeting.

Training on composite fish culture and input distribution

ICAR-DCFR organised a one-day training program on 'Composite fish culture in the Himalayan foothills' at Bajpur, Udham Singh Nagar on 14th November 2023. This training was attended by 30 tribal farmers from district Udham Singh Nagar, Uttarakhand. The basics and prospects of composite fish culture and its potential socio-economic impact were briefed to the farmers. On this occasion, 10,000 carp seed and 19 fishing nets were distributed to 23 tribal farmers.

Events, Trainings and Meetings organized

Visit of Secretary (DARE) and Director General (ICAR)

Dr. Himanshu Pathak, Hon'ble Secretary, Department of Agricultural Research & Education, Government of India & Director General, Indian Council of Agricultural Research, New Delhi, visited ICAR-Directorate of Coldwater Fisheries Research, Bhimtal on July 5, 2023. He was welcomed by Dr. Pramod Kumar Pandey, Director and scientists & other staff of the institute. He visited the Recirculating Aquaculture system for rainbow trout, feed mill, different laboratories, library, museum and other facilities of the directorate. He also interacted with the scientists, staff as well as students and informed about the policies & future programmes of the Council, which required to be implemented in different ICAR institutes.

National Fish Farmers Day

ICAR-DCFR celebrated 23rd National Fish Farmers Day on 10th July, 2023. On the occasion, Dr. Pramod Kumar Pandey, Director, ICAR-DCFR, Bhimtal welcomed the chief guest, officials, scientists, farmers, entrepreneurs and professionals. He briefed about the recent achievements of the directorate such as development of RAS culture system for high valued rainbow trout fish & development of efficient trout feed. The Chief Guest, Dr. Shiv Prasad Kimothi, Member, ASRB emphasized importance of the strong linkage between scientists and fish farming community to achieve the target of national fish production to 22 million tons by 2025. Dr. Kimothi honoured three progressive fish farmers and also released one training manual. Dr. Gopal Krishna, Former Director & Vice Chancellor, ICAR-CIFE, Dr. Lakshmi Kant, Director, ICAR-VPKAS, Almora & Dr. A.K. Mohanty, Joint Director, ICAR-IVRI, Mukteswar were the Guest of Honour.

Independence Day Celebration

The 77th Independence Day was celebrated with flag hoisting ceremony attended by all scientists and staff of the Directorate at Bhimtal and Champawat. On the occasion, Dr. Pramod Kumar Pandey, Director unfurled the national flag at Bhimtal and saluted the patriots who fought for the freedom of nation. In his address, he conveyed his wishes to all and also recollected country's 76 years of efforts since independence to be self-reliant in all aspects including food production.

International Union for Conservation of Nature (IUCN) Workshop on "Discovering Diversity" – for the Conservation of Indian Himalayan Fish Species

International Union for Conservation of Nature (IUCN) workshop on the conservation of Indian

Himalayan Fish Species was organized by the ICAR-DCFR during 28-30 August, 2023. The workshop stood as a pivotal event in the relentless effort to protect the unique aquatic biodiversity of the Indian Himalayas. It brought together IUCN experts and Freshwater Fish Specialist Group (FFSG), scientists, conservationists, and stakeholders from across the region to assess and address the conservation status of these remarkable fish species.

Hindi Pakhwada

Hindi Pakhwada was organised during 1-15 September 2023 at ICAR-DCFR, Bhimtal. During the period, different programmes viz., hindi essay competition, hindi word knowledge, hindi translation, hindi skill, debate, hindi typing competitions were organised. All the staff and students participated in the activities.

Celebration of 36th Foundation Day of ICAR-DCFR

Directorate celebrated its 36th foundation day on 24th September 2023. On the occasion, the chief guest of the program, Professor Panjab Singh, Former Secretary, DARE and Director General, ICAR as well as the present Chancellor of Rani Laxmibai Central Agricultural University, Jhansi, inaugurated the function by lighting the lamp. Dr. J.K Jena, Deputy Director General (Fisheries), ICAR, Dr. Prabha Shankar Shukla, Vice Chancellor, North-Eastern Hill University, Shillong and Dr. Lakshmi Kant, Director, ICAR-VPKAS, Almora were present as guest of honour. The Chief Guest, Professor Panjab Singh congratulated the staff of the institute on its

foundation day. He highlighted the role of fisheries in the Indian economy and stressed the need to increase the productivity in fisheries as well as strengthen the marketing system. On the occasion, a policy paper "Road Map for Sustainable Development of Aquaculture and Fisheries in the Union Territory of Ladakh" was unveiled. Also, the new feed mill facility of the Directorate was inaugurated. Fish seeds were distributed to fish farmers under the Scheduled Caste Sub-Plan run by the institute. Along with the employees of the institute, officers of various institutes, fish farmers and members of Mahila Mandal Dal, Dhari participated in the program.

Brainstorming meeting between ICAR-DCFR and KUFOS, Kerala

ICAR-DCFR and Kerala University of Fisheries and Ocean Studies (KUFOS) jointly organised a

Brainstorming Meeting on the 'Development of Coldwater Fisheries and Aquaculture in Peninsular India' on 12th October 2023 at KUFOS, Kochi, Kerala. The meeting was attended by Dr. T. Pradeep Kumar, Vice Chancellor, KUFOS; Dr. Pramod Kumar Pandey, Director, ICAR-DCFR; Dr. K. Dinesh, Registrar and Dean, Faculty of Fisheries, KUFOS; Dr. Devika Pillai, Director of Research, KUFOS; Dr. M.K. Sajeevan, Professor and Head, FRM, KUFOS and other faculty and scientist from KUFOS and ICAR-DCFR. Dr. Pramod Kumar Pandey set the context for the deliberations by emphasizing on the significance of coldwater fisheries and aquaculture development in the Indian uplands and the need for expansion in the South Indian uplands.

Celebration of vigilance awareness week and campaign

Vigilance Awareness Week was observed at ICAR-DCFR, Bhimtal during the period of 30th October – 5th November 2023. Integrity pledge was taken by all staff members including contractual staff and students at ICAR-DCFR Bhimtal and Experimental Fish Farm, Champawat. e-pledge was also taken by staff members through web portal of Central Vigilance Commission. An awareness

programme was conducted for school children on importance of vigilance to fight corruption. Various activities were conducted for the students and contractual staff engaged in the research projects. As a part of this programme "Awareness Gram Sabhas" were conducted to create awareness among farmers and villagers about evils of corruption. A lecture on "Say no to corruption: commit to the Nation" was delivered by Mrs. Seema Bangwal, Sr. Treasury Officer, Govt. of Uttarakhand.

World Antibiotic Awareness Week

ICAR-DCFR organized an awareness campaign on "Preventing Antimicrobial Resistance Together" on the occasion of World Antibiotic Awareness Week from 18-24 November 2023. The focus of the programme was to raise awareness and promote understanding about the growing global concern of antimicrobial resistance. Under the theme "Preventing Antimicrobial Resistance Together," a talk was delivered by Dr. Suresh Chandra, Principal Scientist of ICAR-DCFR to educate participants about the urgent need for responsible antibiotic use. ICAR- DCFR orchestrated a pivotal discussion with State fisheries officials from Bhimtal, at the cage aquaculture unit, Bhimtal Lake, Uttarakhand.

Communal Harmony Week

Directorate celebrated Communal Harmony Week from 19-25 November 2023. It was started with pledge taking by all the staff of ICAR-DCFR at Bhimtal and EEF, Champawat and culminated with Flag Day on 25th November 2023.

Institute Research Committee (IRC) meeting

The 18th IRC meeting was held during 11-12 December 2023 at ICAR-DCFR, Bhimtal under the chairmanship of Dr. Pramod Kumar Pandey, Director, ICAR-DCFR. Progress of ongoing research projects were presented by scientists along with concept notes on new project proposals. Work done reports were

presented by PIs of different projects, Nodal officers of NEH, SCSP, TSP and Incharge EFF, Champawat.

Training on "Captive breeding and hatchery management of golden mahseer"

Five-day training programme on "Captive breeding and hatchery management of golden mahseer" was conducted at ICAR-Directorate of Coldwater Fisheries Research during 10-14 July 2023. The training was attended by 15 participants, including entrepreneurs and students from College of Fisheries Science, HAU, Hisar. During the training period, different aspects of golden mahseer and its resources, ecological significance, conservation challenges, mahseer based angling and ecotourism prospects and the crucial role of captive breeding and hatchery management for its conservation were deliberated and discussed. Training was coordinated by Dr. Ciji Alexander, Dr. M.S. Akhtar, Dr. Prakash Sharma, and Dr. Renu Jethi.

In-plant Training on "Broodstock rearing, breeding and hatchery operation of golden mahseer"

Twelve-day in-plant training on "Broodstock rearing, breeding and hatchery operation of golden mahseer" was conducted during 24 September to 05 October, 2023 for the personnel from UJVN Ltd. Dehradun at ICAR-DCFR, Bhimtal. The training was coordinated by Dr. M. S. Akhtar, Dr. Ciji Alexander and Dr. Renu Jethi. The main objective of the training

was to impart learning by doing different activities related to golden mahseer maturation & breeding, broodstock management, feeding management, water quality monitoring, data storing, fish handling, nursery rearing, netting operation etc. so that the trainees would operate and manage the newly constructed mahseer hatchery at Juddo, UJVN HEP site, Dehradun.

Training on "Basic technique in solid peptide synthesis (SPSS)"

Seven-day training programme on "Basic technique in solid peptide synthesis (SPSS)" was conducted at ICAR-Directorate of Coldwater Fisheries Research during 10-16 October 2023. The training was attended by 18 participants, including students, researchers, and scientists from different universities viz., ICAR-NDRI, Karnal, Rajasthan University of Veterinary and Animal Science, Bikaner, ICAR-IVRI, Bareilly, Kumaon University, Nainital and SSJ University, Almora. During the training period, different theory and practical classes on basics of protein, applications of synthetic peptides, chemical synthesis of peptides, antimicrobial peptides, cell penetrating peptides, evaluation of antimicrobial activity, anticancer peptides, epitope mapping, cleavage of peptide from resin, application of peptide nucleic acid, purification of peptides and recombinant proteins were conducted. Training was coordinated by Dr. Dimpal Thakuria, Dr. Kh. Victoria Chanu, Dr. Amit Pande, and Dr. Renu Jethi.

Training on "Nutrition and feed management in coldwater aquaculture"

Five-day training programme on "Nutrition and feed management in coldwater aquaculture" was conducted at ICAR-Directorate of Coldwater Fisheries Research during 13-17 November 2023. The training was attended by 16 participants including farmers from Nepal, students, researchers and scientists from different universities viz., Punjab University; Central Agricultural University, Imphal; SKUAST, Kashmir; Delhi University and personnel from feed industries. Training was coordinated by Dr. Biju Sam Kamalam, Dr. Rajesh M, Dr. Ciji Alexander, and Dr. Renu Jethi. During the training, different theory and practical classes on nutrition and feeding of coldwater fishes, nutritional physiology of fish, demonstration of fish sampling and biometric measures, demonstration of nutritional biochemistry assays, feed formulation, aquaculture nutrition research and feed/ingredient evaluation, ornamental fish nutrition and feeding, demonstration of feed mill operation, applications of nanotechnology in aquaculture nutrition were conducted.

Training on "Classical and molecular taxonomy of fish"

Five-day hands-on training program on "Classical and molecular taxonomy of fish" was organized at ICAR-DCFR, Bhimtal from 18-22 December 2023. Training was attended by total 16 participants, among which 15 were from various states of India including Uttarakhand, Himachal Pradesh, Kerala, Uttar Pradesh, Andhra Pradesh, Meghalaya and Kashmir and one participant from the Directorate of Livestock and Fisheries Development, Nepal. As part of the training sessions, Dr. Rameshori Yumnam (Assistant Professor), Manipur University, Imphal, delivered a comprehensive lecture on classical taxonomy focusing on freshwater fishes, particularly Labeonines and Siluroids. Various lectures and practicals were conducted on fundamentals of classical taxonomy and the nomenclature associated with hill freshwater fishes, principles of molecular fish taxonomy and bioinformatic analysis of nucleotide sequences. Training program was coordinated Dr. Neetu Shahi, Dr. S. Ali and Mrs. Garima.

Training on "Fish Feed Milling and Formulation" in Ranchi, Jharkhand

On the invitation of the Directorate of Fisheries, Jharkhand, ICAR-DCFR scientists Dr. Biju Sam Kamalam and Dr. Rajesh, M conducted a three days hands-on training and demonstration programme on "Fish feed milling, formulation and quality control" for the PMMSY feed mill beneficiaries, entrepreneurs, officials and fish farmers who are presently operating or planning to start fish mill operations in Jharkhand during 27-29 December 2023 at the Fish Farmers Training Centre, Ranchi. The training was attended by nearly 40 PMMSY scheme beneficiaries.

Swachhta Abhiyan

ICAR-DCFR celebrated 154th birthday of Mahatma Gandhi on the occasion of Gandhi Jayanti at Bhimtal and Champawat Campus. Swachhta Pakhwada for the period 02.10.2023 to 31.10.2023 initiated at Institute with a pledge on swachhata taken by all the members of staffs. Various activities were carried out during the Special Cleanliness Drive at Bhimtal and Champawat centres.

Swachhta Pakhwara 16-31 December 2023

Swachhta Pakhwada for the period of 16.12.2023 to 31.12.2023 initiated at institute with the pledge on swachhata taken by all the members of staff on 16.12.2023 followed by message on swachtta by the Director, Dr. Pramod Kumar Pandey. Various cleanliness activities were untaken during the period with active participation of staff, farmers and students.

Participation in exhibition

Name of the programme	Organizer	Duration	Place/venue
Goral Mahotsav	Zila Panchayat and Municipal Corporation , Champawat	22 June – 2 July 2023	Champawat
3rd PMMSY launch celebration	Department of Fisheries, Ministry of Fisheries, Animal Husbandry & Dairying	15 September 2023	Brilliant Convention Centre, Indore, Madhya Pradesh
One Day Exhibition	Distt Legel Services Authority	08 October 2023	District Court Campus, Champawat
Kisan Mela	ICAR-Vivekananda Parvatiya Krishi Anusandhan Sansthan, Almora, Uttarakhand	19 October 2023	ICAR-VPKAS Experimental Farm, Hawalbagh, Uttarakhand
Two days exhibition	Uttarakhand State council for Science and Technology	18-19 October 2023	Champawat, Uttarakhand
Global Fisheries Conference 2023 (GFC2023)	Department of Fisheries, Ministry of Fisheries, Animal Husbandry & Dairying	21-22 November 2023	Ahmedabad, Gujrat
3rd International Conference on Aquatic Animal Epidemiology (AquaEpi III)	ICAR-National Bureau of Fish Genetic Resources, Lucknow, U.P.	29 November – 01 December 2023	ICAR-National Bureau of Fish Genetic Resources, Lucknow, U.P.


Fig. ICAR-DCFR Stall

Important Visitors

▪ Officer trainees from ICAR-IISWC, Dehradun visited ICAR-DCFR, Bhimtal.	5th July 2023
▪ M.Sc students from Department of Zoology, University of Kalyani, West Bengal visited ICAR-DCFR, Bhimtal.	4th August 2023
▪ B.FSc students from College of Fishery Science, Muthukur, Andhra Pradesh visited ICAR-DCFR, Bhimtal.	18th September 2023
▪ Officials of Uttarakhand State Council for Science and Technology visited ICAR-DCFR.	21st September 2023
▪ Mr. D.N. Bhombe, DIG, S.S.B Almora, Uttarakhand visited at Experimental Fish Farm, Champawat	5th October 2023
▪ School children from G.D Goenka International School, Nainital visited ICAR-DCFR, Bhimtal.	6th October 2023
▪ A group of paramilitary personnel of 5th Bn. SSB, Champawat and APF No 07 Brigade, Nepal visited at Experimental Fish Farm, Champawat	17th October 2023
▪ Dr. D.P Uniyal, Joint-Director, UCOST, Dehradun visited at Experimental Fish Farm, Champawat.	19th October 2023
▪ School children from Saraswati Public School, Bhimtal visited ICAR-DCFR, Bhimtal.	21st November 2023
▪ Dr. Sanchi Bhimrajka, Associate Editor, Springer Nature India Pvt. Ltd visited ICAR-DCFR, Bhimtal.	14th December 2023



Fig. Glimpse of visitors at ICAR-DCFR

Publications

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- Bhat, R.A.H., Khangembam, V.C., Pant, V., Tandel, R.S., Pandey, P.K., Thakuria, D., 2023. Antibacterial potential of a de-novo designed peptide against bacterial fish pathogens. International Journal of Peptide Research and Therapeutics, 29: 85.
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