वार्षिक प्रतिवेदन
ANNUAL REPORT
2005-2006






राष्ट्रीय शीतजल मात्स्यिकी अनुसंधान केन्द्र

National Research Centre on Coldwater Fisheries

(भारतीय कृषि अनुसंधान परिषद्)

(Indian Council of Agricultural Research)

भीमताल–263 136 जिला–नैनीताल, उत्तरांचल

Bhimtal,-263 136 Distt. Nainital, Uttaranchal

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NATIONAL RESEARCH CENTRE ON COLDWATER FISHERIES

(Indian Council of Agricultural Research)

BHIMTAL - 263136, District - Nainital (Uttaranchal)

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- The activities and achievements reflected in this report covers the period from April 2005 to March 2006.

- The material in this report contains the semi-processed and analyzed data of different projects, which will form the basis for the publications of the Centre. Therefore, material may not be used for any publication without written permission of the Centre.

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Preface

The uplands of the country are kaleidoscope of diverse topography, climate, race, language and culture which live together and share common problems. Keeping in view the squeezing land and burgeoning human ratio, mountain fish resource is of great relevance and development of such areas becomes matter of national concern, which need different technological approach and support services. Such regions have to be tapped for increased fish production for the national basket and rural development in hills. The hill area development is now being focused as priority in the country but up till now the economic upliftment of hill states, due to various climatic, geomorphologic and resource constraints have been very insignificant in comparison to states in the plains of India. Through adequate financial support, institutional upgradation and strengthening R&D support this imbalance can be removed.

During the past few decades with the creation of NRCCWF, the coldwater fisheries sector resulted in identifying the key areas for enhancement of fish stocks in wild waters and their culture in farms. The year 2005-2006 is a great milestone in the history of NRCCWF due to completion of the major infrastructural facilities in terms of office-cum-laboratory building, state-of-art auditorium, guest house etc. besides a large expansion and upgradation of Chirapani Fish Farm, Champawat is also underway. This has added to a long felt demand of research facilities already achieved by the Institute through its limited manpower.

Another important event of the year is the inauguration of its infrastructure facilities by Shri Sharad Pawar, Hon'ble Minister of Agriculture, Government of India.

One of the constraints like lack of residential accommodation for the scientific and other staff members has also got a lift by the declaration of the state government to transfer a piece of land for the purpose. It is hoped that this will fulfill the requirement in near future.

Another landmark of the year, particularly for the Kumaon region, is distribution of rainbow trout fish seed for the first time to the local farmers in the private sector from the Chirapani Fish Farm, Champawat. Sale of table size trout fish to the local people of the area has also got tremendous response from the public. In order to further strengthen the aquaculture activities in coldwater a joint management programme is also taken up with VPKAS, Almora.

Under NEH programme extensive aquaculture activities in high altitude regions in Arunachal Pradesh and high mountain lake survey in Sikkim was taken up.

Under linkage programme collaborative research has also taken place on various aspects of coldwater fisheries research and development activities with NBFGR; CIFA; College of Fisheries, GBPUAT, Pantnagar and Rajeev Gandhi University, Arunachal Pradesh.

The constant efforts of the scientists and staff made it possible to achieve the landmarks during the year. The generous support, guidance and encouragement received from Dr. Mangala Rai, Secretary DARE & DG, ICAR and Dr.S. Ayyappan, Dy. Director General (Fishereis) is recorded with sincere thanks and gratitude.

Thanks are also due to Dr.Yasmeen Basade, Senior Scientist for efficiently bringing out this Annual Report. Assistance rendered by Mrs. Susheela Tewari is recorded with appreciation.

September, 2006
Bhimtal

P.C. MAHANTA
Director

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Executive Summary

The National Research Centre on Coldwater Fisheries (NRCCWF) was established in September 1987 by Indian Council of Agricultural Research (ICAR) entrusting the responsibilities of conducting and promoting research on coldwater fisheries, aquaculture and aquatic resource management in the hill regions of the country. The Centre is located at Bhimtal, district Nainital in the State of Uttaranchal. The Centre at present has nine scientists, ten technicians, eight administrative and fifteen supporting personnel. The Institute had a total budget of about Rs. 360 lakhs for the year 2005-2006.

This year was the most remarkable one as the most cherished dream of NRCCWF blossomed into a reality. The New Complex of the Centre was inaugurated formally on February 5, 2006 by the Hon'ble Union Minister of Agriculture, Shri. Sharad Pawarji. The inauguration was marked with remembrance of the glorious past and the coming on of the promising future of the Centre.

The Institute veered its research priorities as per the guidelines of the high level Research Advisory Committee (RAC) comprising mostly of eminent professionals from the field of fisheries and keeping in view vision 2020 and recommendations of QRT. The Centre also has a Management Committee. A number of internal committees such as Staff Research Council, Institute Joint Staff Council, Official Language Committee, Consultancy Processing Cell, etc. are in place and contributed in Institute's management activities through periodic meetings and decisions taken.

Since its inception, NRCCWF, in spite of limited scientific and technical manpower and meager facilities has made significant contribution for proper appraisal of coldwater fishery resources and evolved suitable technologies to propagate important coldwater fish species in hills. Continuing its efforts, the Institute during the year focused its attention on overall performance which involved research, transfer of technology, human resource development, public awareness programmes, establishment of linkages and institutional building activities.

The research programmes are designed with major thrust on Openwater Fisheries, Aquaculture and Transfer of Technology. During the year the Institute worked on five research programmes apart from two adhoc schemes.

In openwater fisheries coldwater fishery resources of Uttaranchal were characterized using GIS. Based on satellite imageries the perimeter and area of reservoirs of Tarai region of Kumaon including Tumaria, Haripura, Baur, Baigul, Dhaura, Sarda, Nanak Sagar and Ramganga sagar were ascertained. In addition all the 22 rivers flowing through Kumaon region were also mapped to define there length and course of flow.

The limnology and fishery of high altitude lakes in NE regions was studied and it was observed that there are large

number of freshwater and saline lakes of various sizes situated at high altitudes in Himalayas, located between 3,500 – 5,000 m asl at different latitudes. To generate baseline data a survey was conducted on four lakes located in North of Sikkim, particularly to investigate summer limology and fishery of these lake in the phase manner, as round the year investigations are not possible due to their difficult accessibility and short ice-free period. Majority of the lakes offers excellent natural food for fish species feeding on zooplankton. In these lakes brown trout (*Salmo trutta fario* L.) has been stocked for sport purpose where in some lakes (Memencho lake) a self-sustaining population has got established. However, no indigenous fish fauna is recorded from these lakes, a remarkable feature of these systems.

Summer limnology of these sytems, indicated that majority of lakes offer excellent natural food, chiefly crustaceans for the introduced trout fish. These systems as the data reveal are unique and can be utilized to raise fish stocks in the area to promote angling cum tourist industry. Besides tourism, these lakes have the potential value for highland areas, where the diet is deficient in protein.

Under aquaculture, with the aim to develop cost-effective feeds for indigenous upland fishes, the nutritive value of indigenous ingredients was evaluated for feed formulation and to assess their suitability for fish feeds. Survey of the local area/market was conducted and indigenous feed ingredients available in the area were identified and the proximate composition, energy content and amino acid profile of the feed ingredients was analysed and the results concluded that some ingredients can be used as carbohydrate source and as protein source, while others can be used as both protein and lipid source. All the essential amino acids were found to be present in all the ingredients in various proportions. Feeding trials are being performed to determine the proper inclusion level of these ingredients and get information on the effects of fish meal replacement by them.

Under the ICAR Adhoc Scheme for developing the fish feed on pilot scale an aqua feed mill has been established along with extruder for preparing floating feed as rainbow trout is sight feeder. The feed formula was devised and feed was prepared by the established feed mill. The feed has been accepted by the fishes very well which have shown remarkable growth.

The scarcity of land area in the upland Himalayan region for construction of ponds and the porous nature of the soil and dearth of water for filling the ponds, has rendered the cage aquaculture in open water bodies as a most suitable alternative for rearing of fishes. The cages floated in the open waters can be used as rearing ponds to raise stocking material to obviate the necessity for constructing concrete nursery farm which are cost intensive and requires land area and source of water. Similarly, the rearing of fish in cages to marketable size enables easier stock manipulation and total harvesting. In a different view it is utilization of virgin resources which otherwise are

giving negligible production. The layout design of the cages has been developed taking into consideration the physiographic parameters of lake Bhimtal. Golden mahseer fingerlings are being procured from the river Kosi and are being conditioned for stocking in the cages at appropriate densities.

In order to understand the biochemical mechanism of cold tolerance in a coldwater fish, snow-trout a protocol has been standardized for purification of myosin protein from snow trout muscle tissue. Myosin protein is an elongated molecule made of two heavy chains and two copies of each of light chains. Each of heavy chain has globular head domain and its N terminus has ATPase activity. The two light chains bind close to the N-terminal head domain. Purified bands of myosin were visualized on SDS-PAGE gel electrophoresis. Two bands of approximately 200 kD and 50 kD were detected on the gel, respectively representing heavy and light chains of polypeptide of myosin. Protocol was also standardized for measuring ATPase activity in whole fish muscle extract and purified fish myosin. Optimum substrate concentration, $CaCl_2$ concentration, incubation temperature and pH were determined for ATPase in fish kept at cold temperature of 3-5 °C as compared to control group (21-23°C).

To build up a computerized database for coldwater fishes of India a module for identification of fish species is being developed. The user-friendly data management process facilitates the user to identify the fish species according to its characters. Another module for the list of institutions / person working on the species is being developed. This module will display the name of the person/organization, their address with email and the species on which they are working or worked previously. Data about seventy species belonging to different sub-families like Cyprininae, Cultrinae,Rasnorinae, Schizothoracinae, Garrinae, Balitorinae, Nemacheilinae, Botinae, Sisoridae, Salmonidae has been computerized in the form of database.

Under NEH activities the Centre is doing hard efforts to collect more and more information on coldwater fisheries, developing close liaison with the Universities, State Fisheries Department, agencies, authorities and the locals who have common interest and stake in cold water sector development with the aim to prepare a blueprint for coldwater fisheries development for the region. To achieve these objectives the Centre has initiated fisheries research and development activities in the region. A collaborative project between NRCCWF and Department of Fisheries, Government of Arunachal Pradesh was launched on 'Artificial Propagation and Seed Raising of Chocolate Mahseer, *Neolissocheilus hexagonolepis* in Arunachal Pradesh'. The project is located in the Dibang valley, Roying District of Arunachal Pradesh and supported by ICAR.

The staff members of the Institute both scientific and technical including administrative staff were deputed for various training programmes to enlighten them about the new developments in their respective fields. Scientists of the Institute also participated in the various seminars,

symposia, workshops and conferences and presented their scientific achievements. The Institute in turn imparted training to the fish farmers of the Uttaranchal state and NEH personnel on the different aspects of coldwater fisheries resources; coldwater fish culture, breeding, disease management, the crafts and gears used in coldwater fisheries, etc. In the mass awareness programme of the Institute the scientists appraised the local masses, visiting students, dignitaries, etc. about the different aspects of coldwater fish and fisheries.

The NRCCWF Scientist and staff members won prestigious awards. The 'Scientist of the Year-2004 Award' of National Environment Science Academy, New Delhi was conferred to Dr. Madan Mohan, Principal Scientist. The Institute also bagged prize at ICAR zonal sports meet.

The meetings of the various committees of the Institute viz., Research Advisory Committee, Staff Research Council, Management Committee, Official Language and Institute Joint Staff Council were held as per schedule. The respective committees discusses the various agenda items and provide guidelines for the proper management and smooth functioning of the Institute and the research activities.

The NRCCWF family is representative of the diverse cultures of the country and each member participated in celebration of various national days, events with genuine spirit of communal and cultural harmony.

Inaugural function of NRCCWF New Building Complex

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Introduction

Establishment and growth

Indian Council of Agricultural Research (ICAR) established the National Research Centre on Coldwater Fisheries (NRCCWF) on September 24, 1987. The main objective of its establishment was to strengthen fishery research in coldwater sector, encompassing the Himalayan and Penninsular parts of the country. The Centre till September 2003 operated from three rented buildings in Bhimtal, located in the state of Uttaranchal. But shifted to its campus at Bhimtal Industrial area w.e.f. September 05, 2003. The Institute has a field centre located in Chirapani in the district Champawat of Uttaranchal state which is operating from January, 1992.

Mandate

- To assess the hill fishery resources in Indian upland regions for formulating ecological management plan to achieve sustainable fish production, including sport fishery.
- To develop and standardize aquaculture practices/technologies for major coldwater fish species with particular reference to trouts, mahseers, snow-trouts, and carps specific to different altitudinal zones.
- To create awareness, conduct frontline demonstration programmes and educational training in hill aquaculture and aquatic resource management in co-ordination with other organizations.

Location

The headquarters of NRCCWF is located at Bhimtal at an altitude of 1470 m asl in the district of Nainital of Uttaranchal State. It is about 25 km away from the famous tourist place of Nainital. The nearest railway station is Kathgodam, which is about 280 km from Delhi. The nearest airport is Indra Gandhi International Airport, New Delhi. The experimental field station of the Institute at Chirapani in Champawat district of Uttaranchal State is about 150 km from Bhimtal.

Faculty

The Institute has nine scientists. There are four Principal Scientists (two as per sanctioned cadre and two from career advancement scheme), one Senior Scientist, two Scientist (Senior Scale) and two Scientist. More than 50% of the sanctioned scientist's posts are vacant.

Management

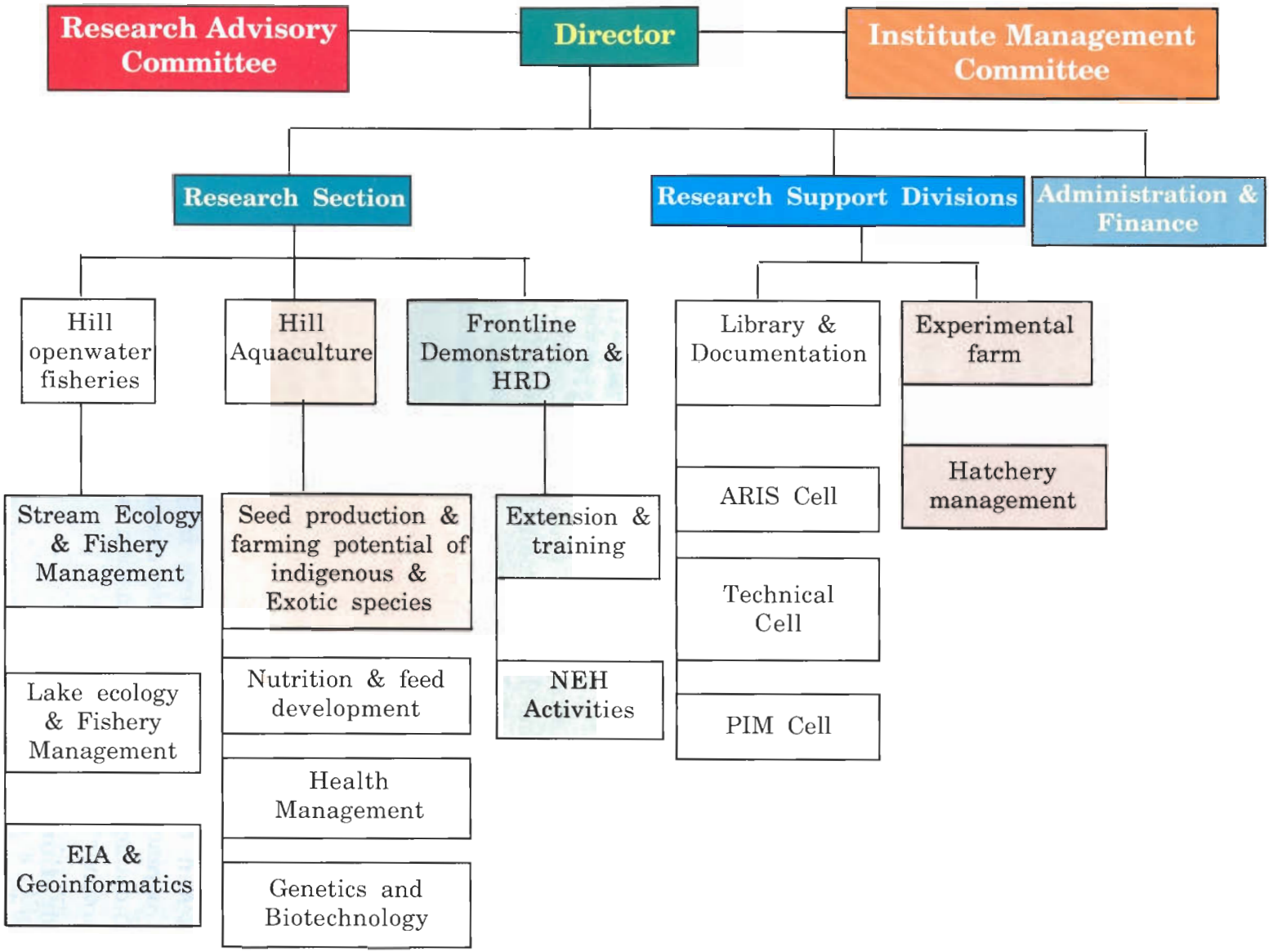
A high-powered Research Advisory Committee (RAC) guides the Centre on planning research thrust areas and new initiatives. The RAC also evaluates and monitors the progress of research activities.

The Management Committee (MC) constituted and mandated by the Indian Council of Agricultural Research under the chairmanship of the Director supervises the Centre. A number of internal committees, such as Staff Research Council, Official Language Committee, Institute Joint Staff Council are in place for decentralized management.

Organogram

The organogram of the Centre is given.

Organogram


Research Advisory Committee
Director
Institute Management Committee
Research Section
Research Support Divisions
Administration & Finance
Hill openwater fisheries
Hill Aquaculture
Frontline Demonstration & HRD
Library & Documentation
Experimental farm
Stream Ecology & Fishery Management
Seed production & farming potential of indigenous & Exotic species
Extension & training
ARIS Cell
Hatchery management
Lake ecology & Fishery Management
Nutrition & feed development
NEH Activities
Technical Cell
Health Management
PIM Cell
EIA & Geoinformatics
Genetics and Biotechnology

Research Support Facilities

Infrastructure

Building and Farm

The Institute is now functioning from its own new complex constructed at the Bhimtal Industrial Area. A pilot scale mahseer seed production unit is also operating at Bhimtal on the land belonging to the State Fisheries Department, which in addition to the mahseer hatchery houses a laboratory which provides backup facilities to seed production activities of the Centre. The Centre has an experimental fish farm facility at Chirapani in Champawat district of Uttaranchal State which has trout hatchery, cemented raceways for nursery and brood stock rearing, and few circular iron tanks for conducting yard trials on various culture aspects of the indigenous and exotic fish species.

Support Services

Project Implementation and Monitoring Cell

A separate cell called the Project Implementation and Monitoring Cell monitors the implementation and progress of research project programmes being conducted by the Centre. This cell annually organizes the meeting of Staff Research Council (SRC) to evaluate the progress made in each research project and accordingly approves the work programmes for the current year. The new proposals are also approved by the SRC after thorough evaluation of the objectives, practical utility, manpower support and financial involvement. The cell is also responsible for maintaining records of project reports through RPF system, besides compilation of annual report and newsletter of the Institute.

Technical Cell

The technical cell is given the responsibilities of dealing with all technical matters within and outside the ICAR system. This cell takes care of the training programmes, deputation, participation of scientists in seminars, symposia, workshops, meetings, etc., and organizing of conferences.

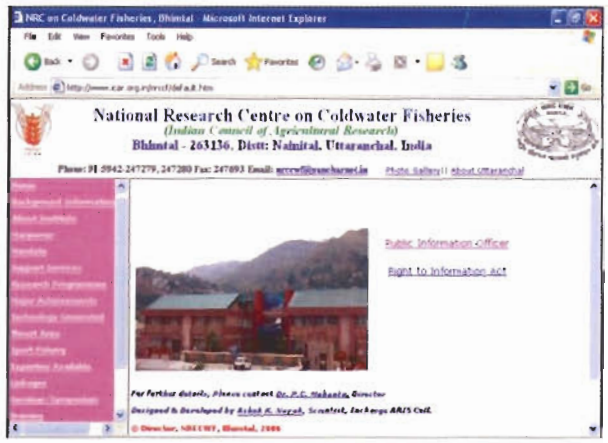
Library Section

The library of the Centre during the year subscribed 25 National and International journals. The current holding of the library includes 1512 books, 1581 foreign journals, 657 Indian journals and 3000 other publications. The library provides services to the scientists and other staff members of the Institute apart from scholars, researchers, students and other persons from local organizations interested in scientific literature on coldwater fisheries and allied subjects. The library section has now upgraded CD ROM facilities on aquaculture, fisheries and aquatic science by procuring CD ROM. The library section is further continuing its efforts in collection, processing and disseminating scientific/ technical information to the potential users. The library automation has also been started.

Documentation Section

This section is entrusted with the responsibility of publication of scientific

A view of ARIS Cell



NRCCWF Website

bulletins, brochures and pamphlets. During the current year this section published two booklets and two pamphlets.

ARIS Cell

The ARIS Cell of the institute is established in its new complex at Bhimtal. The Cell is now providing the VSAT Internet/email facilities, scanner, printers etc. for official use of scientist/ staff of this institute. The internet facilities were provided to all scientists, Library and Director Cell in their respective rooms for its efficient use. The LAN connectivity has also been installed in the new complex of the Institute. The institute is also well equipped with modern plasma display/LCD projection facilities required for the meetings.

Institute's Website

The website of this institute has been upgraded. It contains relevant information about the Institute, photographs of the Institute's new complex, experimental fish farm/ hatchery at Bhimtal and field station Champawat, the mandate of the institute with organizational structure and manpower. The website also contains the information about the institutional projects and externally aided projects and their achievements. The major achievements of the Centre, the technology generated, consultancy services and angling information is also being incorporated in the site. Further, the ongoing and forthcoming training programmes, seminar / symposia conducted by the institute has also been reflected in the website.

The NRCCWF's website finds a place in the Indian Council of Agricultural Research (ICAR) website with the address: http://www.icar.org.in/nrccf/default.html.

Extension Wing

The Extension wing carries out the various extension activities of the Institute such as transfer of technology programmes, organizing the exhibitions, training programmes and other activities related to farmers.

Financial Statement

Abstract

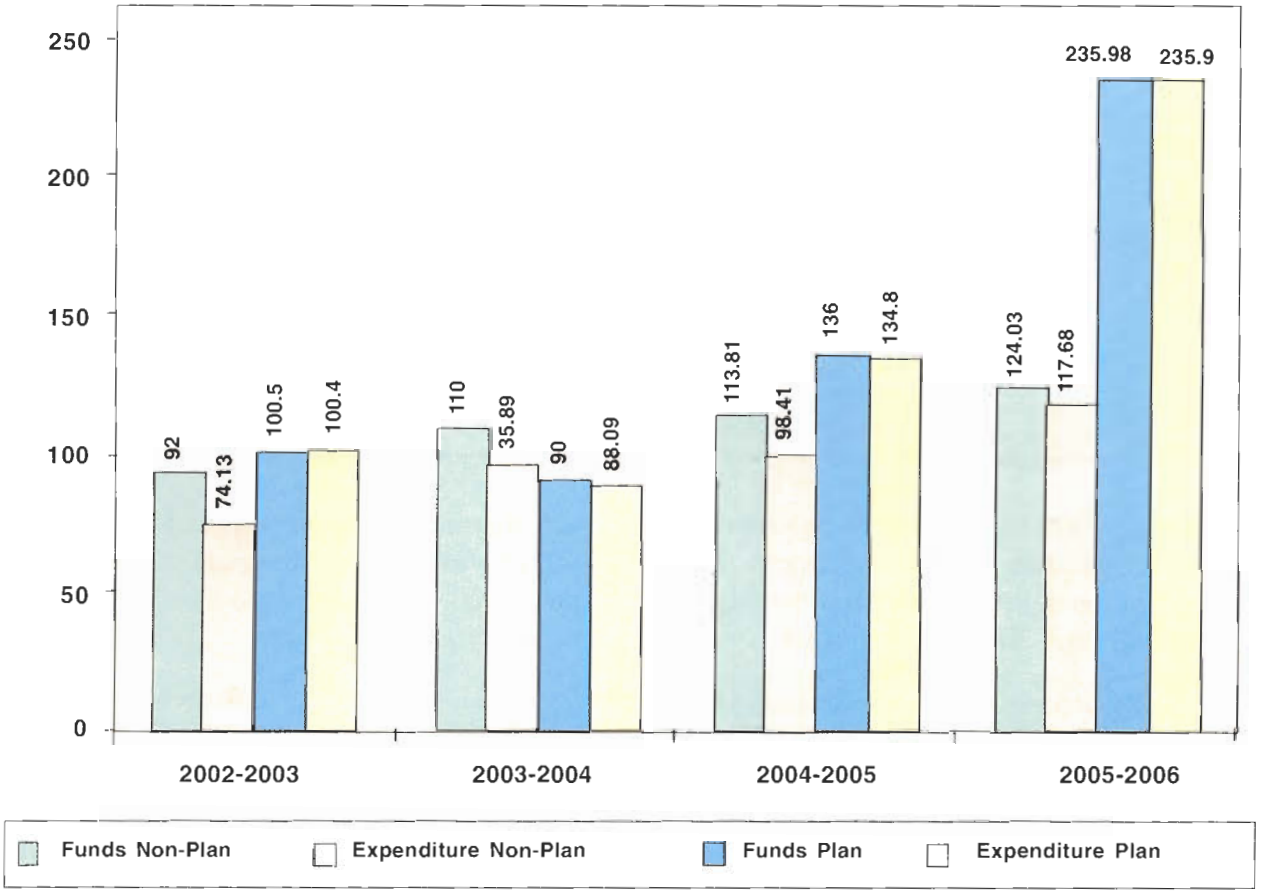
(Rupees in Lakhs)

Year	Funds Non-Plan	Expenditure Non-Plan	Funds Plan	Expenditure Plan
2002 - 2003	92.00	74.13	100.50	100.40
2003 - 2004	110.00	95.89	90.00	88.09
2004 - 2005	113.81	98.41	136.00	134.80
2005 - 2006	124.03	117.68	235.98	235.90

Budget Statement for the Year 2005 – 2006

(Rupees in Lakhs)

Code	Head of Account	Budget (R.E.)		Expenditure	
		Plan	Non-Plan	Plan	Non-Plan
02	Pay & Allowances	-	91.75	-	86.59
10	T. A.	5.75	1.50	5.74	1.43
15	Other Charges Including Equipment's	96.00	17.03	95.94	15.92
18	Information Technology	5.00	-	4.99	-
20	Works & Land	109.23	13.75	109.23	13.74
25	Other items Fellowship/ Scholarship/ Awards	15.00	-	15.00	-
28	NEH	5.00	-	5.00	-
Grand Total		235.98	124.03	235.90	117.68



Staff Position as on 31-03-2006

S. No.	Category	Post Sanctioned	In Position
1.	Director (RMP)	01	01
2.	Scientific	20	09
3.	Technical	14	10
4.	Administrative	14	08
5.	Supporting	18	15
	Total	**67**	**43**

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Research Achievements

Research achievements during the year under major programme areas of NRCCWF are given below.

OPEN WATER FISHERIES

Summer limnology of high altitude lakes in Himalayas

To generate baseline data on high altitude lakes of north-eastern region of the country, during June and October a rapid survey was conducted on important freshwater lakes locked in the north of Sikkim, particularly to investigate their summer limnology and fishery, as round the year investigations are not possible due to their difficult accessibility and short ice-free period. These natural lakes are still oligotrophic and normally remain ice bound for 3-4 months in a year. The main findings of the lakes are as under:

Table : Some morph metric features of Sikkim lakes.

Lake	Altitude (m asl)	Area (ha)	Depth (m)	Type
Tsomgo	3,993	3.5	25.0	Typical temperate with underground springs and outlet surrounded by high mountains
Memencho	3,425	6.0	50.0	Snow/precipitation source of water with outlet. Catchment high mountains.
Kupup	4,100	2.5	42.0	Underground springs. Located on a typical plateau.
Manju	3,200	1.0	2.0	Shallow pond type lake. Precipitation is the main source

Study areas

The freshwater lakes of Sikkim located in the east of the north-eastern Himalayas are situated at 28° 7' 28" -27° 04' 46" N Latitude 88° 0' 58" -88° 55' 25" E longitude. These lakes remains ice bound for 3-4 months in the year (November to February).

Physico-chemical characteristics

The data analyzed for various abiotic parameters from these lakes revealed that these systems are .clean, deep and still in oligotrophic nature. Overall water quality parameters are conducive to sustain significant biodiversity including fish species. Their physico-chemical features ranged between water temperature 11.0 -13.5° C; seechi reading 2.5 -3.7 m; pH 6.8-7.2; dissolved oxygen 7.6 -8.8 mg/l, total alkalinity 6.6-7.0 mg/1, chlorides 1.1 -1.7 mg/l, specific conductivity 16.2 -3.7 mhos at 25.0°C, calcium 3.0 -6.0 mg/1, magnesium 4.0 - 6.0 mg/1, nitrite 0.09 - 0.29 mg/l, nitrate 0.6-1.8 mg/l, phosphate nil -0.03 mg/1, iron 0.24 -0.37 mg/1, sulphide nil- 0.03 mg/1, nitrogen nil-2.6 mg/1.

Biotic communities

Freshwater lakes in Sikkim hold low population of phytoplankton (510-975 units/l) contributing marginally towards carbon fixing at various levels, while zooplankton have a sizeable population

in almost all the lakes. Bacillariophyceae is the main group, contributing 90% of the population. Main dominant forms recorded in the group are *Tabelarria fenestrata, Syndera ulna, Diatoma vulgaris, Fragilaria capucina,* etc. Unlike other high altitude lakes in Himalayas, majority of these lakes seem to be productive, as far as secondary zooplankton production level is concerned, though species diversity is quite low (7 Nos.). Zooplankton mainly contributed by crustaceans (Copepods 75% and Cladocerans 24%). *Alonella excise, Alonella globulosa, Chydorus sphaericus, Cyclops serrulatus, Cyclops vividis, Cyclops bicolor, Eucyclops agilis* are the dominant species in these lakes. In these systems copepods develop a characteristic red pigmentation, while cladocerans have dark brown colouration. The details of biological features of these lakes are depicted in table below.

Table: Biological characteristics of High Altitude lakes of Sikkim

Features	**Lakes**			
	Tsomgo	**Memencho**	**Rupup**	**Manju**
Phytoplankton (u/l)	715	975	510	110
Dominant groups	>85% diatoms	>90% diatoms	>85% diatoms	>94% diatoms
Dominant taxa	*Tabellaria fenestrate,*	*Syndera ulva,*	*Diatoma vulgaris,*	*Fragillaria capucina*
Zooplankton (u/l)	275	319	239	5
Dominant group	Copepoda (75.0%) Cladocera (25.0%)	Copepoda (78.0%) Cladocera (22.0%)	Copepoda (80.0%) Cladocera (20.0%)	Rotifera.
Dominant species				
Cladocera	*Alonella globulosa, Alonella excise, Chydrous sphaericus*			
Copepoda	*Cyclops serrulatus, Cyclops viridis, Cyclops bicolor, Eucyclops agilis, Mesocyclops leuckarti*			
Fish species	*Salmo trutta fario*	*Salmo trutta fario*	*Salmo trutta fario*	No fish
Indigenous fauna	Nil	Nil	Nil	Nil
Significant features	•Copepods (Cyclopodia) develop typical blood red pigmentation,			
	•Cladocerns develop dark brown colouration;			
	•Blooms of zoo-plankton (micro crustaceans) round the year;			
	•Low species diversity, but high standing crop;			
	•All the lakes (except Manju lake) support a massive secondary production.			

(Values are -average of three stations)

Profile studies

Profile study conducted from surface to 5 m depth zone in Tsomgo lake during June and October months did not revealed any remarkable variation in their biological features. However, the population of phytoplankton was recorded slightly higher between surface to 1 m zone (780 u/l in June and 850 u/l in October) as compared to the values recorded at 5 m zone (650 u/l at surface zones and 720 u/l at 5 m zone). Similar trend has also been observed in zooplankton populations. The population mainly contributed by crustaceans (216 -275 ind./l) at surface, while values at 5 m zones ranged between 110-125 ind./l in June and October, months respectively.

Feature	June		October	
	Surface	5 m depth	Surface	5 m depth
Phytoplankton (u/l)	780	650	850	720
Zooplankton (ind./l)	275	125	216	110
Biomass (wet plankton) (mg/l)	12.6	7.2	11.4	5.6

Biomass investigations

Total net biomass (wet biomass of phytoplankton and zooplankton together) in these lakes ranged between 6.8 -12.0 mg/l in the main three deep lakes; while in Manju lake, which is a shallow lake the values are very insignificant. The biomass standing crop production was significantly high at zones between surface to 1 m zones, ranging between 11.4 -12.6 mg/l, while at 5 m zone it ranged between 5.6 7.2 mg/l .The values of wet biomass at surface of these lakes are as under:

Lakes	Biomass (mg/l) (Range of three stations)
Tsomgo lake	8.0-12.0
Memencho lake	7.2-11.7
Kupup lake	6.8-10.0
Manju lake	0.05-0.2

Fish and fishery

These lakes have a population of brown trout *(Salmo trutta fario* L.) where in a self -sustaining population has got established. No indigenous fish fauna has been recorded in these lakes. Even after stocking with brown trout, no attempt was made to undertake fishing in these lakes to evaluate the stocks and their population structure.

Present status of Sikkim lakes

- Presently, though these systems are free from cultural eutrophication, except Tsomgo lake, which has an impact of tourist and other related activities. The overall water quality parameters are conductive to sustain significant biodiversity and majority of these lakes have brown trout. Lakes exhibits low species diversity but very high standing crop of

zooplankton particularly. The fresh wet biomass production ranged between 8.0 -12.0 mg/l, mainly contributed by the macro crustaceans which is very high compared to other lakes in Himalayan belt. These species are very eccentric which can withstand long periods of freezing and high degree of radiations. Population of macro -benthic organisms is of very low order.

- Population of the crustaceans is so high that most of the energy in this component is dissipated through decomposer chains, adding to the nutrient load of these systems.
- Summer limnology of these systems, indicated that majority of lakes offer excellent natural food, chiefly crustaceans for the introduced trout fish. These systems as the data reveal are unique and can be utilized to raise fish stocks in the area to promote angling cum tourist industry. Besides tourism, these lakes have the potential value for providing fish for highland areas, where the diet is deficient in protein.

Studies on coldwater fisheries resources of India

These data were geo-rectified with help of toposheets of Survey of India (SOI) and were mosaic ked together in order to make one scene map. Area of Interest (AOI) was prepared at the 1: 1000000 scales and the different fishery resources were mapped with ERDAS IMAGINE 8.7 software, those are given hereunder.

Mapping of reservoirs

The important reservoirs of the Tarai region are Tumaria, Haripura, Baur, Baigul, Dhaura, Sarda and Nanak Sagar. Most of them are located in Bhabar and Tarai belts of the state. Apart from these Ramgangasagar is another important reservoir of the state. The perimeter and water spread area during 1997 and 2004 of these reservoirs are listed in the table.

Name of Reservoir	Date of Satellite Pass		Perimeter (km)		Water Spread Area (ha)	
	1997	2004	1997	2004	1997	2004
Nanak Sagar	19.10.1997	4.3.2004	47.8	39.3	2495	1760.3
Baigul	19.10.1997	4.3.2004	57.4	59.3	1442	1677.8
Dhaura	19.10.1997	4.3.2004	28.1	31.6	845	1350
Baur	7.11.1997 &6.12.1997	4.3.2004	29.5	21.7	978	1257.6
Haripura	6.12.1997	4.3.2004	15.8	16.4	672	883
Tumuria	7.11.1997	28.2.2004	42.0	57.2	1108	1604
Ramgangasagar	7.11.1997	28.2.2004	207.3	204.4	4971	4486.4
Sardasagar (Uttaranchal)	19.10.1997	4.3.2004	15.8	15.5	724	718.6

Mapping of rivers

The 22 rivers flowing through Uttaranchal were digitized from the satellite map. The mapped rivers and their length are given in the following table.

S.No.	River Name	River Length (km)
1	Alaknanda	720
2	Asan	116
3	Bhagirthi	561
4	Bhakra	429
5	Dhauliganga	179
6	Ganga	553
7	Gola	225
8	Goriganga	248
9	Kali	343
10	Koshi	247
11	Ladhia	101
12	Mandakini	142
13	Nandhaur	114
14	Pilakhar	133
15	Pinder	305
16	Ramganga-1	375
17	Ramganga-2	176
18	Solani	156
19	Song	146
20	Sarju	293
21	Tons	398
22	Yamuna	170

AQUACULTURE

Evaluation of indigenous ingredients and feed supplements for feed formulation of indigenous upland fishes of Kumaon region

Identification of the local feed ingredients

Survey of the local area/market was conducted and indigenous feed ingredients available in the area were identified and their local names, English name and scientific names were ascertained. The indigenous ingredients identified were- madira, mandua, konee, chena, ramdana, ugal, gahat, bhatt, and lai oil cake.

Proximate composition of the ingredients

Madira, mandua, konee, chena, ramdana and ugal had lower protein content, while gahat and lai oil cake had medium protein content and bhatt had higher protein content. Lipid content also exhibited similar pattern being higher in bhatt, medium in lai oil cake and lower in madira, mandua, konee, chena, ramdana and ugal. NFE content was higher in madira, mandua, konee, chena, ramdana and ugal medium in gahat and lower in bhatt. Consequently, energy content was lower in madira, mandua, konee, chena, ramdana and ugal medium in gahat and higher in bhatt. Based on the above results it can be concluded that madira, mandua, konee, chena, ramdana and ugal can be used as carbohydrate source gahat and lai oil cake can be used as protein source and

bhatt can be used as both protein and lipid source.

Amino acid profile of the ingredients

Amino acid profile of all the local feed ingredients and the formulated feed was analysed with the help of CMFRI, Cochin. All the essential amino acids namely, arginine, histidine, isoleucine, leucine, lysine, methionine, phenylalanine, threonine, tryptophan and valine were found to be present in all the ingredients in various proportions. Bhatt was found to be rich in all the essential amino acids followed by lai oil cake and gahat. While essential amino acids were present in the others also but in meagre quantities.

Cage culture of fishes in floating cages in subtropical Himalayan lake- Bhimtal

While reviewing the VISION-2020 document of N.R.C. on Coldwater Fisheries, High Power Committee with Dr. E. G. Silas Former Vice-Chancellor, Kerala Agriculture University as its Chairman suggested that National Research Centre on Coldwater Fisheries must include Cage culture of coldwater fishes in their programme under Coldwater Fish Aquaculture activities. A special interaction meeting with the Research Advisory Committee of this National Research Centre was convened and after their recommendations the cage culture of coldwater fishes was included in the research programme.

The unconventional production system, such as cage culture has not become very popular in India, although they have a definite role to play in enhancing fish production from open waters. It has now widely been accepted that cages floated in the open waters can be used as rearing ponds to raise stocking material to obviate the necessity for constructing concrete nursery farm which are cost intensive and requires land area and good source of water. Similarly, the rearing of fish in cages to marketable size enables stock manipulation and total harvesting.

Keeping in view the topography and other parameters of Bhimtal lake, several designs with different kind of materials were planned and discussed in detail. Finally, it was decided that the cages should be fabricated from High Density Poly Ethylene whose webbing must be knotless. The size decided was 3 m long, 3m wide and 3m deep.

With these specifications, the cage material has been procured by this Institute and installation process has been carried out. The fingerlings of golden mahseer have been collected from natural riverine ecosystem for stocking in cages.

Studies on induced maturation and seed production of Himalayan mahseer (*Tor putitora*) and snow-trout (*Schizothorax richardsonii*) in pond environment

The two indigenous fishes namely, snow-trout (*Schizothorax richardsonii*) and Himalayan mahseer (*Tor putitora*) are declining in number and size in natural waters and attempt to breed them in captivity is successful but the source of brood stock for spawning is

natural water. To raise the brood stock of these species in ponds is a maiden attempt. Himalayan mahseer stock of different age group (1+ and 2+ yr) collected from lakes is being reared in 2 fish ponds. The fish are being fed on a formulated diet having less fat and high protein and vitamin premix. The stock is healthy and growing @ 12-14g/month. The fungal infection during winter months caused some mortality (37%). As the stock is under aged hence maturity is not attained.

The brood stock of snow-trout is being reared in 2 ponds (15m^2) at Champawat (1620 masl) being 6fish/m^2 (69g each) and 10 fish/m^2 (24g each). In total there are 240 fishes.

BIOTECHNOLOGY

Studies on biochemical mechanism of cold tolerance of coldwater fish *Schizothorax richardsonii* (Gray)

Protocol standardization for isolation of myosin protein from fish muscles and its visualization on SDS-PAGE

A modified protocol of Martone et al (1986) was standardized for purification of myosin protein. 4.0-7 .0 mg of myosin was extracted per g of snow trout muscle tissue. Myosin protein is an elongated molecule made of two heavy chains and two copies of each of light chains. Each of heavy chain has globular head domain and its N terminus has ATPase activity. The two light chains bind close to the N-terminal head domain. Purified bands of myosin were visualized on 5% SDS-PAGE gel electrophoresis having 5M urea in sample buffer, using 10 mA current in stacking gel and 18mA constant current in running gel of 1mm thickness and l6cm length. Two bands of approximately 200 kD and 50 kD were detected on the gel respectively representing heavy and light chains of polypeptide of myosin. 4.0-7.0 mg of purified myosin /g of fish tissue was isolated and purity was checked with SDS-PAGE electrophoresis.

Standardization of protocol for ATPase measurement in myosin protein of snow-trout

Protocol for preparation of standard curve using Taussky-Shorr colour reagent was standardized for estimation of inorganic orthophosphorus. Protocol was also standardized using standard curve for orthophosphate for measuring ATPase activity in whole fish muscle extract and purified fish myosin. ATPase activities were measured using 0.5µm ATP in reaction mixture having 50mM Tris-HCl buffer pH7.5 by incubating at 27^0 C.

Characterization of isolated myosin ATPase activity from snow-trout due to cold adaptation of fish

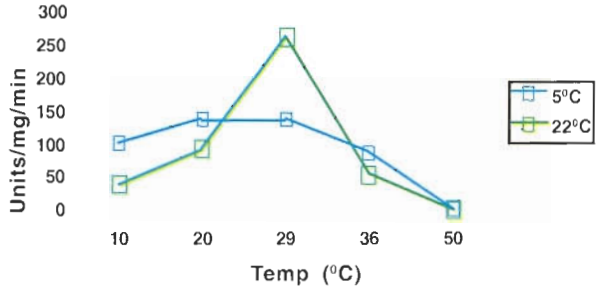
To determine variations in ATPase due to cold adaptation fish were kept for two weeks at 22°C (21-23^{0}C) as control while other set of fish were reared at temperature ranged from 3-5^{0}C. ATPase activity were measured in isolated myosin protein at different concentrations of substrate (ATP), $CaCl_2$, pH and incubation temperatures to see the difference in behaviour of enzyme isolated from fish kept at different temperatures.

- Activity of myosin ATPase was recorded higher in all fishes kept at cold temperature of 3-5 °C as compared to control group (21-23°C). This could be due to the reason that fish kept at cold temperature requires more energy to combat colder conditions for maintaining metabolic processes of body. This energy is produced by hydrolysis of high energy bond of ATP.

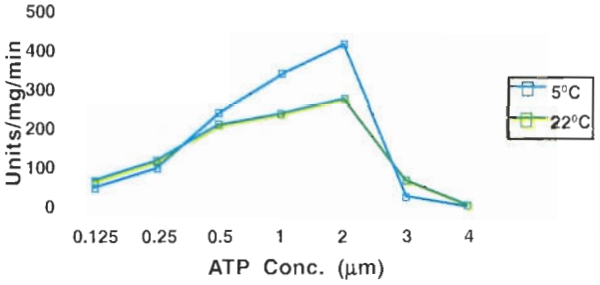
- The activity of ATPase increased in linear form up to 0.5 µm of substrate (ATP) concentration in experiment using 0.125-4.0 µm of substrate irrespective of the fish kept at cold temperature of (3-5°C) or warm temperature (21-23°C). However, 2 µm of substrate exhibited maximum activity in either case. Though 16.4 and 4.2 fold decrease in activity was recorded when 3 µm of ATP concentration was used in enzyme assay in fish kept at cold and warm temperatures respectively.

- Increase of $CaCl_2$ concentration from 5-50 µm exhibited maximum amount of ATPase activity. Though ATPase activity without $CaCl_2$ was recorded to be 2.99 and 8.5 folds less in fishes kept at cold and warm temperatures, respectively.

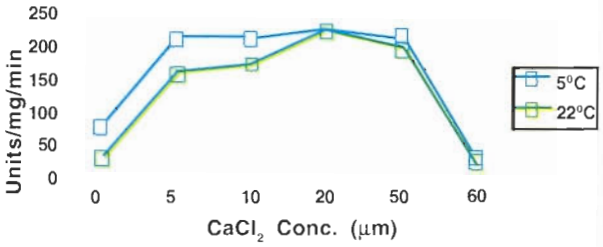
- 7.1 was recorded as optimum pH for ATPase activity. 1.28 and 4.03 fold less activity was recorded at pH 6.5 in fishes kept at cold and warm temperatures, respectively. Similarly at pH 9.0, 3.2 and 1.62 folds less activity were estimated at the two temperatures, respectively.



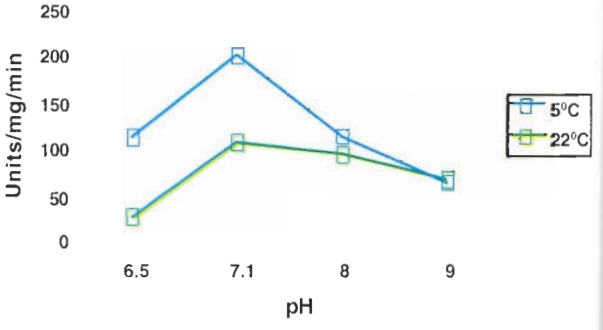
Effect of incubation temperature on ATPase activity of *S. richardsonii* reared at different tempeartures



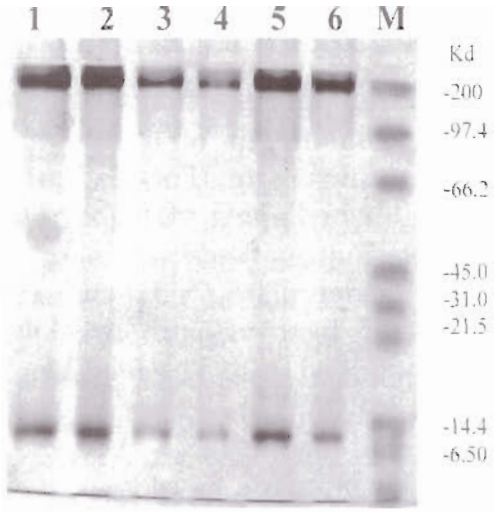
Effect of substrate conc. on ATPase activity of *S. richardsonii* reared at different tempeartures



Impact of $CaCl_2$ conc. on ATPase activity of *S. richardsonii* reared at different tempeartures



Impact of pH on ATPase activity of *S. richardsonii* reared at different tempeartures



Purified Myosin from Coldwater fish *Schizothorax richardsonii* (Gray)

- 29°C was observed as the temperature at which ATPase showed maximum activity while five fold decrease was observed in fish maintained at warmer temperature as compared to 1.57 fold decrease at colder temperature when reaction was carried at 36°C temperature.

INFORMATION TECHNOLOGY

Development of computerized database on coldwater fishes of India

The development of database is mainly aimed for the organization, storage and review of coldwater fishes of India. The data used for this database application were derived from scientific reports, scientific papers and studies, books and related scientific projects. The stored data is presented in user-friendly software with suitable menus, combo boxes, option buttons, etc. for easy and accurate access of information by the users.

The database contains different modules *viz.* identification, classification, morphological characters, habitat, distribution, biological features, breeding period, behaviour, present status, economic importance, etc. Brief morphometric and meristic characters of each fish have also been given in the modules. The database window shows the detailed characters of the fish species like group, class, division, order, family, sub family, genus, local names and common names. Another window shows the distinguishing characters of the species like fin formula, body, head, eye, color, scale, etc. In this database, an attempt has also been made to compile the wealth of fishes of upland Himalayas and make available to the readers, researchers, anglers, along with details of principal game fishes, role of sport fishery in development of tourism and principal fishing sites in different riverine ecosystems. The generation of database on the biological wealth of various ecosystems of this state would ultimately help in developing strategies for the proper management and conservation of upland fish germplasm. At present, the database is implemented with all the obtainable data; however, additional data sets can be loaded in case they are provided from any source.

Data about seventy species belonging to different sub-families like Cyprininae, Cultrinae,Rasnorinae, Schizothoracinae, Garrinae, Balitorinae, Nemacheilinae, Botinae, Sisoridae, Salmonidae has been computerized in the form of database.

Database systems are designed in such a way to manage large amount of

information. Microsoft Visual Basic 6.0 software has been used in developing the forms as front-end tool and Microsoft Access 2000 for tables as back–end tool. This database will be efficient in retrieving and storing information related to the coldwater fish species of India.

ICAR ADHOC SCHEME

Development of pilot scale feed for culture of rainbow trout (*Onchorhynchus mykiss*) in Kumaon region of Uttaranchal

About 15,000 eyed eggs which were 18 days old were received in the mid January 2005 at Champawat Fish Farm from Trout Fish Farming Project, Kokarnag in Kashmir. They were hatched and advanced fry were produced.

This stock is being raised to develop broodstock for large scale seed production of rainbow trout. The entire stock has to pass through critical stages of higher temperature and water scarcity at the farm. Though fish species is of quite cold temperature regimes (10-16^{0}C) and is being reared at higher temperature (maximum temp. in running water raceways at 22^{0}C and 18^{0}C for nearly eight months) by efficient water management practices. Some mortality in these conditions was unavoidable as they have to be frequently transferred from one nursery pond to another to overcome the shortage of water and dissolved oxygen contents. After about 15 months, majority of fish stock has shown not only good survival and growth while some of them grew up to about 500g which is remarkable growth in these conditions.

Establishment of feed mill at NRCCWF, Bhimtal

For developing the fish feed on pilot scale, establishment of a feed mill is primary requirement. The feed mill has been established along with Extruder for preparing floating feed as rainbow trout is sight feeder. The feed formula was devised and feed was prepared by the established feed mill. The feed has been accepted by the fishes very well which have shown remarkable growth. Noe efforts will be made to reduce the high cost of feed to make trout farming more economical.

Artifical propagation and seed raising of chocolate mahseer, *Neolissocheilus hexagonolepis* in Arunachal Pradesh

A collaborative project between NRCCWF and Department of Fisheries, Government of Arunachal Pradesh was launched in July 2003 on 'Artifical Prpagation and Seed Raising on Chocolate Mahseer, *Neolissocheilus hexagonolepis* in Arunachal Pradesh'. The project is located in the Dibang valley, Roying District of Arunachal Pradesh and supported by ICAR. Detail survey of different rivers/streams/lakes in this area were undertaken to assess the fish diversity, potential sites for collection of seed and brood stock of chocolate mahseer. Experiments on rearing of juveniles of chocolate mahseer to fingerlings were initiated at Iduli fish farm, Roying. Trials were conducted to evaluate the growth behaviour of chocolate mahseer under pond environment.

NEH ACTIVITIES

Fisheries development in NEH region

Based on preliminary survey in Arunchal Pradesh, 14 farmers having their ponds and some back ground of fish culture were selected, in 3 districts namely Ziro, West Siang and Itanagar of the State. The selected ponds were got prepared, stocked with seeds of grass carp, silver carp, common carp and rohu. The selected farmers were given a crash course on Composite Carp Farming Technology. In March 2006 the selected ponds were netted and harvested / partially harvested and based on survival, growth, average weight attained, the fish production was estimated. The rates of inputs particularly fish feed and the husbandry practices were found directly correlated to fish production. The fish production was recorded 0.37-0.68 kg/ m^2. The recurring expenditure on fish inputs ranged Rs. 14-21/ kg.

Rapid survey of fishery resources in Arunachal Pradesh

A Collaborative project of 6 month duration at the cost of Rs.4.58 lakh was initiated by NRCCWF and RG University, Itanagar to survey the fishery resources particularly coldwater in 13 districts of the State with the work components:

1. Survey of cold water resources of the state
2. Assessment of water qualities of different water bodies
3. Status of fish and fisheries and people's involvement
4. Technical details of fishing methods and fishing gears of the state

The information was collected from each of the thirteen districts of the Arunachal Pradesh both from primary and secondary sources as per the need of each of the proposed work components of the project and analyzed as per standard methods/procedure

Riverine resources: Major perennial rivers of Arunachal Pradesh are the Kameng, Subansiri, Dikrong, Kamla (Ranganadi), Siang, Siyom, Dibang, Lohit, Noadihing and Tirap having a length of over 1200 km.

Lacustrine resources: Arunachal Pradesh is also very rich in lacustrine resources, however, distributed only in few districts bordering China, Tibet and Bhutan. The lakes are found in Upper Siang, West Siang, Tawang, Papum Pare, Lower Subansiri district of Arunachal Pradesh. Most of these lakes present in Tawang and Upper Siang are either underexploited or hardly exploited till today probably due to inaccessibility and principally for their occurrence in the borderline of the country. The lake Mechuka (1090 m amsl) of West Siang, lake Shally and Mehao of Lower Dibang Valley and lake Geker Sinyi (Ganga lake) of Papum Pare are quiet accessible with more human interaction.

Reservoir resource: A reservoir covering an area of 10-15 ha approximately has been constructed as a dam over the river Kamla (Ranganadi)

of Lower Subansiri district of Arunachal Pradesh. Further, more than eight electricity producing dams are under construction / under survey in the state in different rivers of Arunachal Pradesh. The reservoir mentioned above has recently been handed over to the State Fisheries Department for initiating commercial fishery activities.

Ponds and tanks: There are many big tanks available in all the thirteen districts of Arunachal Pradesh. These tanks are basically reservoir tanks of mini-micro hydel project for generating electricity. The places are China Bridge, Keratang, Assam Hills, Lower Gompa of Tawang district, Rupa of West Kameng district, Tirbin of West Siang district and Mai and Tago of Lower Subansiri district. There are about 1287 numbers of ponds and tanks covering approximately 2200 ha of lands in Arunachal Pradesh. Among other aquatic resources rice wetlands are very important. However, except Apatani plateau the rice wetland are still unexploited in regard to fish production. Currently about 845 ha of such rice fields are found to be potential for contributing fish yield in general.

Status of fish and fisheries and peoples involvement

Status of fish in the drainage system indicates high diversity in number of

Fisheries activity in NEH region

available species due to diversified climate and topography of the habitat. A total of 137 species of both food and ornamental fish have been recorded in the state from the wild. The distribution of the fish in different rivers and water bodies along the altitude has also been surveyed. Besides, many introduced fish species (both EC+ IMC) are being farmed by the people inhabitating the lower and middle altitude zone of the state. Exotic trouts are available in the high altitude of East and West Kameng district of the state due to ranching programme of the state Fisheries Department from their Sergaon trout hatchery.

5

Technology Assessed & Transferred

FARM ACTIVITIES

Trout rearing

20000 eyed eggs were brought from Kashmir during Jan 2005 of which 12500 advance fries and 9140 fingerlings were achieved at the Chirapani fish farm, Champawat. They were fed palleted feed prepared at NRCCWF, Bhimtal @ 2 % of the body weight.

Trout sale

Due to paucity of water at the farm especially during summer months, it was decided to thin out 80% of the stock. Trout is on sale after opening ceremony on 10.3.2006. The opening ceremony of trout sale was conducted in presence of Chief Development Officer, Champawat, Director, NRCCWF, Bhimtal, Dr. Shyam Sunder, Principal Scientist, NRCCWF, Bhimtal, Shri. Prem Kumar, Scientist-in-Charge, NRCCWF, Champawat, Officers from different Departments, local public and fish farmer. Positive response of the buyers was observed inspite of higher cost.

Rainbow trout rearing at Chirapani fish farm, Champawat

Trout seed rearing and seed distribution to private entrepreneurs

The seeds were distributed to able and interested fish farmers of Kumaon region. They are as follows:

Mahseer seed production programme

- During the period 20 brooders of golden mahseer (T.L 390-520 mm and 500-1200 g in weight) were collected, through overnight hanging gill nets, from Sattal and Bhimtal lake.
- The ripe eggs (96,800 nos.) were stripped and fertilized with oozing milt from male specimen (T.L 320-460 mm and 300-800 g in weight) by "dry method". The rates of fertilization varied between 79.0-92.0% and in all about 85,940 eggs were fertilized.
- The fertilized eggs were kept in hatching trays having flow-through facilities (water flow of 2-3 l/min) for incubation. The incubation period ranged between 118-140 hours depending upon the water temperature fluctuating between 16.5-24.5°C and the yolk-sac absorption was completed within 10-12 days at the water temperature of 17.5-25.0°C.

Rainbow trout seeds distributed to fish farmers

Rainbow trout fish sale start at Chirapani fish farm, Champawat

S.No.	Name of Farmer	Address	Quantity of seed given
1.	Sh. Chintamani	Vill- Kanda, Champawat	500 Nos.
2.	Sh. Khimanand	Vill- Maghera, Champawat	500 Nos.
3.	Sh. Ishwari Dutt Bhatt	Vill-Fungar, Champawat	500 Nos
4.	Sh. Laxman Singh	Vill- Kathad, Champawat	1000 Nos
5.	Sh. Mohan Singh	Vill- Simalkhet, Champawat	500 Nos
6.	Sh. Narayan Giri	Vill-Dudhpokhra, Champawat	500 Nos
7.	Sh. Inder Singh Bisht	Vill-Dadim, Nainital	2500 Nos

- The hatching rate was 84.0-95.0% and the cumulative survival from the fertilized eggs to swim-up fry recorded was 85.3% and about 73,300 nos. swim-up fry were produced.
- The newly emerged swim-up fry were stocked in flow-through nursery tanks (100 x 100 x 45 cm) having continuous water flow of 2-3 l/min and fed initially with goat liver for about a fortnight and finally shifted to laboratory prepared artificial palletized dry feed for subsequent months. The artificial feed consisted of soybean powder, rice bran, fish oil fortified with vitamin and minerals having 40% crude protein. The feeding schedule was maintained @ 10-15% of fish biomass for 5-6 times daily from sunrise to sunset.
- After a month or so, after size graded the young fry were transferred to bigger size rearing tanks (180 x 180 x 50 cm) with a continuous water flow of 3-5 l/min and the feeding schedule was restricted to 3-4 times a day @ 8-

Mahseer breeding and rearing at NRCCWF, Bhimtal

10% of body weight. They were reared for 2-3 months when they grew 50-75 mm in length and 2.0-2.7 g in weight. A total of 70,000 advanced fry were produced.

- In the 1st week of September, 2005 about 50,000 fry have been stocked in the lake Bhimtal. Two consignments of 5000 fry each during the month of June 2005 and October 2005 have been sent to Tehri Hydro Development Corporation Ltd. (THDC), Tehri Garhwal to stock in their Mahseer farm at Koteshwar and about 10000 fry were kept in the earthen pond at the NRC's mahseer hatchery complex for further rearing.

EVENTS

- The activities of NRCCWF were exhibited at the Swarojgar Mela organized by Jan Shikshan Sansthan, Bhimtal from 10-12 June, 2005. The swarojgar mela was inaugurated by Shri. Yashpal Aryaji, Hon'ble Speaker Uttaranchal Assemble. The occasion was graced by Dr. N.S. Jantwal, MLA, Nainital Constituency, Uttaranchal, Shri. K.K. Pandey, Director Birla Institute and other local authorities of Bhimtal Block.
- On the occasion of National Seminar on 'Uttaranchal mai matsayaki ki sambhawanaei' jointly organized by H.N.B. Garhwal University and CIFE at Srinagar Garhwal during October 28-29, 2005. Institute put up an exhibition stall at the venue of the seminar in which achievements of NRCCWF were highlighted through display of photographic posters and departmental publications.
- The NRCCWF set –up a stall at Seventh Indian Fisheries Forum organized at Banglore during November 8-12, 2005. The various research activities of the Institute were displayed including the various departmental publications.
- The Institute displayed its research and development activities during the International Workshop on Fisheries and Aquaculture in Indus River Region- Conservation, Management and Development of Indigenous Fauna' at Ludhiana, Punjab organized by Indian Society of Fisheries Professionals, Mumbai during December 20-22, 2005.

6

Education & Training

Trainings imparted

- Imparted training regarding the major activities of coldwater fisheries to a delegation of French students during June 28-29, 2005.
- Imparted training on 'Aquaculture development in Arunachal Pradesh' to research scholars from RG University, Itanagar during July 26-August 3, 2005.
- Delivered lecture regarding role of coldwater fisheries especially in north -east himalayan region to Post graduate students of Zoology from North Bengal Univ., Siliguri during January 9-10, 2006.
- Organized a crash programme to enhance fish production in hills through new techniques to a large group of farmers during February, 2006

Trainings attended

- Shri. Santosh Kumar, T-3 attended training programme on 'Advanced Techniques in Biochemical Analysis' organized by CIFE. (Deemed University), Mumbai during April 12-27, 2005.
- Dr. Yasmeen Basade Scientist (Senior Scale) successfully completed the summer school on 'Aquatic microbiology with reference to aquaculture' organized by CIFE (Deemed University), Mumbai during September 21 to October 11, 2005.
- Dr. Rajeev Kapila, Scientist (Senior Scale) participated in the training course on 'Molecular techniques for gene characterization and genome analysis' held at NBAGR, Karnal during November 17-26, 2005.

Foreign training

- Shri. Prem Kumar, Scientist (Senior Scale) and Shri. R.S. Haldar, T-5 participated in the study visit to NARC Nepal under the ICAR-NARC Work Plan for 2003-2004 in the field of 'Trout Farming' during December 12-16, 2005.

Shri. Prem kumar, Scientist (SS) and Shri. R.S. Haldar undergoing training at NARC, Nepal

7

Awards & Recognition

- Dr. Madan Mohan, Principal Scientist was conferred **'Scientist of the Year- 2004 Award'** by National Environmental Science Academy, New Delhi at its XVIIIth Annual Conference at J. B. Institute of Engineering and Technology, Hyderabad on October 25, 2005 for his contribution in the field of Fish and Fisheries.

- Shri. Pratap Singh Bisht, Junior Clerk won third position in discus throw competition at the ICAR Zonal Sports Meet 2006 organized by NDRI, Karnal during March 7-10, 2006.

Dr. Madan Mohan, Principal Scientist receiving 'Scientist of the Year-2004' award of NESA, New Delhi

8

Linkages & Collaboration

Linkage with North-East

A collaborative project between NRCCWF and Department of Fisheries, Government of Arunachal Pradesh on 'Artificial Propagation and Seed Production of Chocolate Mahseer, *Neolissochelius hexagonolepis* (McClelland)' has been initiated in July 2003. The project is located in Lower Dibang valley, Roying District of Arunachal Pradesh and is supported by ICAR. In view of the importance on northeastern Himalayan region and particularly for this fish species, the Institute realized to explore possibilities on artificial propagation of this species for producing its seed for planting in wild waters in upland regions of different states in NE region to rehabilitate/ restore their stocks and improve subsistence fishery to the local fishermen and offer sport to the anglers. This will be indirect help to the income of marginal and small-scale farmers, living along the vicinity of streams and rivers of NE region.

State Universities

The Institute has linkages with Kumaon University, Nainital, G.B. Pant University of Agriculture and Technology, Pantnagar (Uttaranchal), H.P. Krishi Vishwavidyalaya, Palampur (Himachal Pradesh) and S.K. University of Agricultural Sciences and Technology, Srinagar (Jammu and Kashmir) for various research and academic programmes.

Sister Institutes and Outside ICAR

- The Institute have linkages with other sister Institutes–CIFA, Bhubaneswar and CMFRI, Kochi.
- The Institute has developed linkages with the States Fisheries Department of Uttaranchal, Himachal Pradesh, Haryana, Gujrat, Kerala and Arunachal Pradesh for various research and development activities.
- The Institute have strong linkages with regards to transfer of technology programme for aquaculture in hills with - Sainik School, Ghorakhal; Birla Institute, Bhimtal; District Development Department, Champawat; Village Panchayats in Pati and Bhimtal Block and NGO's (Girideep, Bhimtal and HOPE, Pilkholi, Ranikhet).
- The Institute established linkages for the usage of watershed programmes in development of coldwater fisheries with CSWCR & TI, Dehradun.

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Publications

RESEARCH ARTICLES

- Madan Mohan 2005. Hydrobiological Status of a lesser Himalayan River. Journal of Indian Fisheries Association, Mumbai. 31: 1-12.
- Madan Mohan 2005. Spawning biology of snow trout *Schizothorax richardsonii* (gray) from River Gaula (Kumaon Himalaya). Indian Journal of Fisheries. 52, No. 2.
- Madan Mohan and Yasmeen Basade 2005. Effects of available diets with different protein to energy ratios on growth, nutrient utilization and body composition on juvenile Himalayan Golden Mahseer, *Tor* putitora (Ham.). Asian Fishery Science. 18: 277-285.
- Nayak, Ashok K. and Vass, K.K. 2005. Development of database on freshwater lakes of Uttaranchal in Central Himalayas. Journal of Inland Fisheries Society of India. 37(2): 80-82.
- Singh, N.O., Wahi, S.D. and Kumar, B. 2005. Study of different bootstrap strategies for estimating the precision of heritability in half-sib analysis. Indian Journal of Animal Production. 37(1-2): 36-39.

BOOKS

- Proceedings National Seminar on Aquatic Resource Management in Hills. 2005. Edited by K.K. Vass, S.A.H. Abidi and Late V.P. Agrawal. Published by National Research Centre on Coldwater Fisheries (ICAR), Bhimtal and Society of Biosciences, Muzaffarnagar.
- Coldwater Fisheries Research and Development in North East Region of India. 2005. Edited by B.C. Tyagi, Shyam Sunder and Madan Mohan. Published by National Research Centre on Coldwater Fisheries (ICAR), Bhimtal.

BOOKLETS

- NRCCWF-A Profile By Shyam Sunder & Yasmeen Basade. NRCCWF, Bhimtal.16 pp.
- Rashtriya sheetjal matsayaki ausandhan kendra- ek parichye. NRCCWF, Bhimtal.16 pp

PAMPHLETS

- Coldwater Fisheries: At a Glance, NRCCWF, Bhimtal
- Sheetjal Matsayaki: Ek Jhalak, NRCCWF, Bhimtal

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List of Ongoing Projects

Title of the Projects	Project Leaders & Associates	Year of Start	Likely year of termination
Institutional Projects			
1. Fishery limnology of high altitude lakes in Central Himalayan and NE regions.	**Dr. H.B. Singh** Dr. C.B. Joshi	2004	2006
2. Studies on coldwater fisheries resources of India.	**Sh. Prem Kumar** Sh. A.K. Nayak Sh. N.O. Singh	2004	2007
3. Studies on bio-chemical mechanism of cold tolerance in coldwater fish, *Schizothorax richardsonii*.	**Dr. R. Kapila**	2004	2007
4. Evaluation of indigenous ingredients and feed supplements for feed formulation of indigenous upland fishes of Kumaon region	**Dr. Y. Basade** Dr. M. Mohan	2005	2007
5. Studies on induced maturation and seed production of Himalayan mahseer, *Tor putitora* and *Schizothorax richardsonii* in pond environment.	**Dr. B.C. Tyagi** Dr. Shyam Sunder Sh. Prem Kumar Dr. R. Kapila	2005	2008
5. Cage culture of fishes in floating cages in a subtropical Himalayan lake-Bhimtal.	**Dr. M. Mohan** Dr. S. Sunder Dr. Y. Basade	2005	2008
Externally Funded Projects			
Cess Fund Project			
1. Artificial propagation and seed raising of chocolate mahseer, *Neolissocheilus hexagonolepis* in Arunachal Pradesh.	**Dr. H.S. Raina** Sh. B.M. Laskar Sh. Azen Pujen	2003	2006
2. Development of pilot scale feed for culture of rainbow trout (*Onchorhynchus mykiss*) in Kumaon region of Uttaranchal.	**Dr. M. Mohan** Sh. K.S. Negi Sh. A.U. Khan	2002	2005

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Consultancy

The Institute is rendering consultancy services as per the guidelines of the ICAR to various organizations.

- "Designing of hatchery of Himalayan mahseer *Tor putitora* (Ham.) for seed production" at Tehri, Garhwal Uttaranchal, a layout design of a mahseer hatchery, farm and other components/ facilities has been prepared and submitted to the authorities of Tehri Hydro-Development Corporation Ltd., Tehri for implementation.

- At Pookote lake, Wyanand, Kerala, under a consultancy proposal with State Fisheries Management Society (FIRMA), Kerala a mahseer hatchery and small farm has been established.

Mahseer hatchery/farm developed by NRCCWF at THDC, Tehri, Garhwal

Field work at Pookote lake (Kerala)

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RAC, MC, SRC, QRT Meetings

Staff Research Council (SRC)

Annual Staff Research Council meeting of the Institute was held on June 14, 2005 at Bhimtal under the Chairmanship of Dr. Madan Mohan, the Director. Dr. V.R. Chitranshi, ADG (Inland Fisheries), ICAR, New Delhi also attended the meeting. In the meeting the progress of each on-going research project during the year 2004-2005 was critically discussed and evaluated. The work programme for the year 2005-2006 was finalized.

Research Advisory Committee (RAC)

The meeting of the Institute's Research advisory Committee was convened during March 27, 2006 at Bhimtal. Members of the committee attended the meeting.

At the onset the Director welcomed the Chairman and all the Members of the RAC. After the introductory remarks by the committee members and

View of RAC meeting

Dr. Brij Gopal	Professor and Head School of Environmental Sciences, Jawharlal Nehru University, Delhi	Chairman
Dr. Sarvesh Kumar	Professor and Head Department of Zoology, Kumaon University, Nainital,	Member
Shri. N.A. Quareshi	Director Fisheries Government of Jammu & Kashmir, Srinagar	Member
Dr. D.N. Das	Senior Lecturer Aquaculture Unit, Department of Zoology, Arunachal Pradesh University, Itanagar	Member
Dr. V.R. Chitranshi	ADG (Inland Fisheries) ICAR, New Delhi	Member
Dr. P.C. Mahanta	Director NRCCWF, Bhimtal	Member
Dr. Yasmeen Basade	Scientist (Senior Scale) NRCCWF, Bhimtal	Member Secretary

presentation of the Action Taken Report by the Member Secretary, the progress made under each of the research projects for the year 2005-2006 and the new programmes to be taken up for the year 2006-2007 were discussed in detail. The Chairman and the Member of the committee gave recommendations for improvement of the research activities to be taken up. The meeting ended with vote of thanks proposed by the Member Secretary, Dr. Yasmeen Basade.

Management Committee (MC)

The 9th meeting of the Management Committee of the institute was held on March 28, 2006 at Bhimtal under the Chairmanship of the Director, NRCCWF, Bhimtal and the members of the committee attended the meeting. In addition to the Members of Management Committee the Special invitees from the Institute also attended the meeting.

Dr. P.C. Mahanta, Chairman at the outset extended warm welcome to all the members of the Institute's Management Committee for attending the meeting and described the activities of the Institute highlighting the development of infrastructure facilities like establishment of modern aquafeed mill, equipping the Champawat station for GIS studies, making wetlab functional, completion of Phase-I & II of building

Dr. P.C. Mahanta	Director NRCCWF, Bhimtal	Chairman
Dr. V.R. Chitranshi	ADG (Inland Fisheries) ICAR, New Delhi	Member
Shri. N.A. Quareshi	Director of Fisheries Government of J&K, Srinagar	Member
Dr. A.P. Sharma	Dean, College of Fisheries, G.B. Pant University of Agriculture & Technology, Pantnagar	Member
Dr. R.S. Pawar	Head, Riverine Division CIFRI Centre, Allahabad	Member
Dr. A.K. Laal	Principal Scientist CIFRI Centre, Allahabad	Member
Dr. S.P. Singh	Senior Scientist NBFGR, Lucknow	Member
Shri. R.L. Raina	AAO NRCCWF, Bhimtal	Member Secretary

Dr. Madan Mohan	Principal Scientist NRCCWF, Bhimtal
Dr. H.B. Singh	Principal Scientist NRCCWF, Bhimtal
Dr. Shyam Sunder	Principal Scientist NRCCWF, Bhimtal
Dr. B.C. Tyagi	Principal Scientist NRCCWF, Bhimtal
Dr. Rajeev Kapila	Senior Scientist NRCCWF, Bhimtal
Shri. N.O. Singh	Scientist NRCCWF, Bhimtal

Management committee meeting in progress

complex including furnishing of guest house and auditorium, allotment of land for residential quarters and for mahseer hatchery by Govt. of Uttaranchal. Dr. Madan Mohan, Principal Scientist briefed the committee about overall accomplishments of the Institute. The achievements made by the Institute in the research front were highlighted by Dr. Shyam Sunder, Principal Scientist. Dr. H.S. Raina, Principal Scientist appraised about the achievements made under farm activities as well as consultancy services rendered by the Institute. During the meeting various agenda items were discussed critically. The Chairman at the end of the meeting expressed his appreciation on the interest and support provided by the members for the overall development of the Institute and hoped to get continued support from the members.

Rajbhasha Committee

The regular quarterly meetings of the Hindi cell of the Institute were convened under the Chairmanship of the Director. In these meetings proposals were discussed and approved to improve the use of Hindi language in day-to-day activities of the Institute by the scientific, technical and the administrative members of staff. The Committee members include the following:

Dr.Madan Mohan	Director	Chairman
Dr. B.C. Tyagi	Principal Scientist	Member Secretary
Shri. A.K. Nayak	Scientist	Member
Smt. Susheela Tewari	Stenographer	Member
Shri. Harish Ram	Assistant	Member
Shri. Amit Kumar Joshi	Hindi Translator	Member
Shri. Ravinder Kumar	T-3	Member

Joint Staff Council (IJSC)

The Institute's Joint Staff Council's meeting was held regularly at quarterly intervals under the Chairmanship of the Director and was attended by all the members from official and staff side. In the meetings action taken on previous agenda items were reviewed and various new agenda items regarding welfare of the staff were discussed. IJSC comprised of the following members:

Official side	Staff side
Dr.Madan Mohan, Director & Chairman	Shri. T.M. Sharma, T-2 & Secretary
Dr. Rajeev Kapila, Senior Scientist	Shri.Santosh Kumar, T-3 & Member
Dr. Yasmeen Basade, Scientist (SS)	Shri. Pratap Singh, LDC & Member CJSC
Sh. Prem Kumar, Scientist (SS)	Shri. J.C. Bhandari, LDC & Member
Sh. A.K. Nayak, Scientist	Shri. Ravinder Kumar, SSG-III & Member
Shri. R.L. Raina, AAO & Member Secretary	Shri. Prakash Akela, SSG-I & Member

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Participation in Conferences, Seminars, Meetings and Workshops

Conferences/ Meetings/ Symposiums/ Seminars/ Workshops	**Participants**
Workshop on Enhancement of Fish Production in Pong Wetland at Pong Reservoir organised by H.P. Fisheries Department, H.P. on February 19, 2005.	Dr. Shyam Sunder
9th Meeting of National Committee on Exotics at Krishi Bhavan, New Delhi during Feburary 2005.	Dr. Madan Mohan
Workshop on Implementation of Personnel Management Information System Network in ICAR (PERMISnet) organized at Indian Agricultural Statistics Research Institute, New Delhi on March 9, 2005.	Shri. A.K. Nayak
Regional Committee-1 Meeting at VPKAS, Almora during April 5- 6, 2005.	Dr. Madan Mohan
Meetings of Nodal officers for North East Region at CAU, Agartala on April 20, 2005.	Dr. B.C. Tyagi
Brainstorming Session on Development of Processing and Value Addition in Freshwater Fishes organized by College of Fisheries, G.B. Pant University of Agriculture and Technology, Pantnagar on April 25, 2005.	Dr. Madan Mohan Dr. Shyam Sunder Dr. B.C. Tyagi Dr. Yasmeen Basade Shri. Prem Kumar
National Symposium on 'Re-assessment of Fish Genetic Resources in India and Need to Evolve Sustainable Methodology for conservation' organized by NBFGR, Lucknow during April 26-27, 2005.	Dr. C.B. Joshi Dr. Shyam Sunder Dr. B.C. Tyagi
Visit to Shere Kashmir University of Agriculture and Technology, Srinagar during April 29-30, 2005.	Dr. Madan Mohan
National Symposium on Recent Advances in Science: A Prospective organized by Dolphin Institute of Biomedical and Natural Sciences, Dehradun during June 3-5, 2005.	Dr. Rajeev Kapila
Farmers training and interaction programme on Integrated Agriculture Management in Hills organized by VPKAS, (ICAR), Almora on June 4, 2005.	Dr. Shyam Sunder Dr. Yasmeen Basade
IX All India Hindi Conference held at Udaipur during June 13-15, 2005.	Shri. A. K. Joshi Shri. P.C. Tiwari

Conferences/ Meetings/ Symposiums/ Seminars/ Workshops	Participants
Inauguration of the Short Course on Recent Advances in Coldwater Aquaculture organized by Dept. of Fisheries, College of Vetrinary and Animal Sciences, CSK Himachal Pradesh Krishi Vishvavidyalaya Palampur during September 25-27, 2005.	Dr. Madan Mohan
Participated in Brainstorming Session on Disaster Management in Fisheries and Aquaculture held at NIDM, New Delhi during October 6- 7, 2005	Dr. Madan Mohan Dr. Shyam Sunder
XVIIIth Annual Conference of the National Environmental Science Academy organized at J.B. Institute of Engineering and Technology, Hyderabad during October 25-27, 2005.	Dr. Madan Mohan
National Seminar on 'Uttaranchal mai matsayaki ki sambhawanaei' jointly organized by H.N.B. Garhwal University and CIFE at Srinagar Garhwal during October 28-29, 2005.	Dr. Madan Mohan
10th Meeting of National Committee on Exotics at Krishi Bhavan, New Delhi.	Dr. Madan Mohan
Seventh Indian Fisheries Forum Organized at Banglore during November 8-12, 2005.	Dr. Madan Mohan Dr. C.B. Joshi Dr. Shyam Sunder Shri. T.M. Sharma Shri. Hayat Singh Chauhan
Meeting of Directors of ICAR, Fisheries Research Institutes at PDBC, Banglore during November 12-12, 2005.	Dr. Madan Mohan
Meeting convened by Department of Fisheries, Government of Haryana for preparing Action Plan for development of fisheries in the State during November 29-30, 2005.	Dr. Madan Mohan
Visit to CIFT, Kochi and mahseer hatchery at Pookute lake during December 9-10, 2005.	Dr. Madan Mohan
All India Official Language Seminar held at Pondicherry during December 27-29, 2005.	Shri. A.K. Joshi
Special Workshop on Network Project on 'Fish Germplasm Exploration, Cataloging and Conservation' organized by NBFGR, Lucknow on January 27, 2006.	Dr. H.S. Raina Shri. A.K. Nayak

Conferences/ Meetings/ Symposiums/ Seminars/ Workshops	Participants
Workshop on Intellectual Property Rights: Himalayan Context organized by G.B. Pant Institute of Himalayan Environment and Development, Kosi, Almora during February 26-27, 2006.	Dr. Rajeev Kapila
National Workshop on Patenting: What, Why and How' on patent awareness organized by Department of Biotechnology, Kumaun University, Nainital on March 10, 2006.	Dr. Yasmeen Basade
Meetings of Nodal officers for North East Region at CAU, Imphal on March 20, 2006.	Dr. B.C. Tyagi
Workshop on Coldwater Fisheries organized by the Department of Fisheries of West Bengal at Siliguri, Darjeeling during March 21-22, 2006	Dr. P.C. Mahanta Dr. Shyam Sunder
National Convention on Knowledge- Driven Agricultural Development: Management of Change organized by ARSS Forum and sponsored by ICAR at IARI, Pusa Campus, New Delhi on March 24, 2006.	Dr. Shyam Sunder

Nodal Officers (ICAR) for NE Region and officials of Fisheries Department meeting at CAU, Imphal

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Workshops, Seminars & Farmer's Events Organized

Independence Day Celebrations

Independence Day was celebrated by unfurling of the National Flag by the Director Dr. Madan Mohan. The Director addressed the gathering of the staff member and asked the staff members to work in unity towards the achievement of the goals of the Institute. The function was marked by plantation in the premises of the new complex of the Institute by the Director and staff members of the Institute.

Hindi Pakhwada

In order to promote Hindi as an Official language Hindi pakhwada was celebrate by the Institute from September 14-20, 2005. During this week long celebrations Hindi essay competition, Hindi typing competition, etc. were organized and the winners were rewarded during the closing ceremony of the week long celebrations. Dr. Yadav, Senior Scientist, Regional Tusar Research Station, Bhimtal graced the occasion as Chief Guest. Dr. Madan Mohan, Director addressed the gathering and was of the view that a Hindi magazine can be published by the

Hindi week celebrations

Institute relating to the requirements of the fish farmers of the hill region of the country. The celebrations were concluded by vote of thanks by Shri. Amit Kumar Joshi, Hindi Translator.

NRCCWF Foundation Day

The Institute's eighteenth Foundation Day was celebrated on September 27, 2005. Dr. Madan Mohan, Director welcomed all the staff members to participate in the function and urged staff members to join hands and work together for development of the centre. The occasion was graced by Smt. Nidhi Mani Tripathi, CDO as Chief Guest. Smt. Chitra Thapa, Chairperson, Nagar Panchyat, Bhimtal and other officials from private and government institutions and farmers of the area were also present to celebrate the event.

National Science Day

National Science Day was celebrated on 28th February 2006 at the new complex of NRCCWF, Bhimtal. The programme was celebrated in association with Birla Institute of Applied Sciences, Bhimtal. Dr. P.C. Mahanta, Director welcomed the guest of honor, distinguished Space Scientist, Padma Bhushan, Dr. George Joseph, Former Director Space Application Centre, Ahmadabad; all the distinguished guests from Birla Institute of Applied Sciences, Bhimtal and the staff members of the Institute. On this occasion Dr. George Joseph, Padma Bhushan, delivered a lecture on 'The Indian Mission to Moon Chandrayaan - 1' as a part of series of

talks organized by Uttaranchal State Council for Science and Technology in collaboration with Birla Institute of Applied Sciences, Bhimtal from February 28- March 2, 2006. He elucidated that scientific objective of Indian Mission to Moon was to study Moon's composition to test the hypothesis of origin and early history of evolution of solar system through simultaneous photo geological and chemical mapping of Moon. The programme ended with vote of thanks.

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Distinguished Visitors

Following distinguished dignitaries visited the Institute during the year 2005 – 2006.

Hon'ble Shri. Sharad Pawarji, Union Minister of Agriculture, Govt. of India and President of Indian Council of Agricultural Research

Hon'ble Shri Kantilal Bhuria Ji, Minister of State for Agriculture, Consumer Affairs, Food and Public Distribution, Govt. of India

Hon'ble Shri. N.D.Tewariji, Chief Minister of Uttaranchal State

Dr. Mangala Rai, Secretary (DARE) and Director General, ICAR

Shri Yashpal Arya, Speaker Legislative Assembly, Govt. of Uttarranchal,

Shri. M.S. Mahra, Honorable Minister of Agriculture, Govt. of Uttaranchal

Shri K.C. Singh Baba, Member Parliament

Shri N. Ramachandran, Chief Secretary, Govt. of Uttaranchal,

Shri Rakesh Sharma, Commissioner Kumaon Division

Dr. P.L. Gautam, Vice-Chancellor, G.B. Pant University of Agriculture and Technology, Pantnagar

Prof. R. C. Pant, Vice Chancellor, Kumaon University, Nainital

Dr. A. Alam, Vice-Chancellor, Shere-Kashmir University of Agriculture and Technology, Srinagar

Dr. S. Ayyappan, Deputy Director-General (Fisheries), ICAR, New Delhi

Dr. Kalloo, Deputy Director-General (Horticulture), ICAR, New Delhi

Dr. J.S. Samra, Deputy Director-General (Natural Resource Management), ICRA, New Delhi

Dr. Katyal, Deputy Director-General (Education), ICAR, New Delhi

Dr. P. Das, Deputy Director-General (Agriculture Extension), ICAR, New Delhi

Dr. Brij Gopal, Professor and Head, School of Environmental Sciences, Jawharlal Nehru University, Delhi

Dr. Sarvesh Kumar, Professor and Head, Department of Zoology, Kumaon University, Nainital

Dr. V.R. Chitranshi, ADG (Inland Fisheries), ICAR, New Delhi.

Dr. Anil Agarwal, Principal Scientist, ICAR, New Delhi

Dr. S.D. Singh, Principal Scientist, CIFE, Mumbai

Dr. M.P. Singh Kohli, Principal Scientist, CIFE, Mumbai.

Dr. D. Kumar, Principal Scientist, NBFGR, Lucknow

Dr. A.P. Sharma, Dean Fisheries College and Director Fisheries, Government of Uttaranchal

Shri. N.A. Quareshi, Director Fisheries, Government of J&K, Srinagar

Dr. D.N. Das, Senior Lecturer, Aquaculture Unit, Department of Zoology, Arunachal Pradesh University, Itanagar

Dr. R.S. Pawar, Head, Riverine Division, CIFRI Centre, Allahabad

Dr. A.K. Laal, Principal Scientist, CIFRI Centre, Allahabad

Dr. S.P. Singh, Senior Scientist, NBFGR, Lucknow

Smt. Nidhi Mani Tripathi, CDO, Bhimtal, Nainital

Smt. Chitra Thapa, Chairperson, Nagar Panchyat, Bhimtal

Shri Kantilal Bhuriaji visits institute's library

Dr. Mangala Rai visits nutrition laboratory of NRCCWF, Bhimtal

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Personnel

List of staff (As on March 31, 2006)

(This is not a seniority list)

RESEARCH MANAGEMENT

Dr. P.C. Mahanta, Director (Joined NRCCWF on 07-02-2006)

SCIENTIFIC

1. Dr. Madan Mohan, Principal Scientist (Acting Director w.e.f. 28-01-2005 to 06-02-2006)
2. Dr. H.S. Raina, Principal Scientist
3. Dr. C.B. Joshi, Principal Scientist (Retired on superannuation on 31-01-2006)
4. Dr. Shyam Sunder, Principal Scientist
5. Dr. B.C. Tyagi, Principal Scientist
6. Dr. Rajeev Kapila, Senior Scientist
7. Dr. Yasmeen Basade, Scientist (Senior Scale)
8. Shri. Prem Kumar, Scientist (Senior Scale)
9. Shri. A.K. Nayak, Scientist
10. Shri. N.O. Singh, Scientist

TECHNICAL

1. Shri. R.S. Haldar, T-5
2. Shri. Amit Kumar Joshi, T-4 (Hindi Translator)
3. Shri. Baldev Singh, T-3
4. Shri. Santosh Kumar, T-3
5. Shri. Ravinder Kumar, T-2
6. Shri. Gopal, T-2
7. Shri. R.K. Arya, T-2
8. Shri. Hansa Dutt, T-2
9. Shri. T.M. Sharma, T-2
10. Shri. Bakshi Ram, Driver, T-2 (Retired on superannuation on 30-09-2005)
11. Shri.Bhagwan Singh, Driver, T-2

ADMINISTRATIVE

1. Shri. R.L. Raina, AAO
2. Smt. Susheela Tewari, Stenographer
3. Shri. Harish Ram, Assistant.
4. Shri. Manni Lal, Asstt. (Transferred to CIPHET, Ludhiana as Junior Accounts Officer)
5. Smt. Khilawati Rawat, Assistant
6. Shri. P.C. Tewari, Senior Clerk
7. Shri. Pratap Singh, Junior Clerk
8. Shri. J.C. Bhandari, Junior Clerk
9. Smt. Munni Bhakt, Junior Clerk

SUPPORTING

1. Shri. Sant Ram, SSGr IV
2. Shri.Ravinder Kumar, SSGr IV
3. Shri. Om Raj, SSGr III
4. Shri. H.S. Chauhan, SSGr III
5. Shri. H.S. Bhandri, SSGr III
6. Shri. Dharam Singh, SSGr II
7. Shri.Sunder Lal, SSGr II
8. Shri. Manoj Kumar, SSGr II
9. Shri. Pooran Chandra, SSGr II
10. Shri. Kuldeep Kumar, SSGr II
11. Shri. Prakash Akela, SSGr II
12. Shri. Bhola Dutt, SSGr I
13. Shri. Chandra Shekhar, SSGr I
14. Smt. Basanti Devi, SSGr I
15. Shri. Mangala Prasad, SSGr I (Joined on 13-01-2006)

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Special Infrastructural Development

Inauguration of New Complex of NRCCWF

Newly constructed Administrative Complex and Guesthouse of the National Research Centre on Coldwater Fisheries (NRCCWF), Bhimtal (Uttaranchal) has been inaugurated on February 5, 2006 by Shri. Sharad Pawar, Honorable Union Minister of Agriculture, Govt. of India and President of Indian Council of Agricultural Research .On the occasion Shri. N.D.Tewariji, Chief Minister of Uttaranchal State; Shri Yashpal Arya, Speaker Legislative Assembly, Govt. of Uttaranchal; Shri. M.S. Mahra, Honorable Minister of Agriculture, Govt. of Uttaranchal; Shri K.C. Singh Baba, Member Parliament; Dr. Mangala Rai, Secretary DARE and Director General, Indian Council of Agricultural Research and Dr. S. Ayyappan, Deputy Director General (Fisheries), ICAR were the chief guests. Prof. P.L.Gautam, Vice Chancellor, G.B. Pant University of Agriculture and Technology, Pantnagar; Prof. R.C.Pant, Vice Chancellor, Kumaon University, Nainital; Shri N. Ramachandran, Chief Secretary, Govt. of Uttaranchal and Shri Rakesh Sharma Commissioner Kumaon Division were the guest of honour on this occasion.

On this auspicious occasion, several dignitaries from ICAR Institutes, sister organizations of ICAR Institutes, State Agriculture University and Regional Academic Universities located in this region were also present.

Dr. S.Ayyappan, Deputy Director General (Fisheries), welcomed the chief guests Shri. Sharad Pawarji, Shri N.D.Tewariji and all invited dignitaries and briefed about the Institute, its mandate, research so far accomplished and developmental programmes at this Centre.

In his inaugural speech, Dr. Mangala Rai, welcome the chief guests and briefed the importance of coldwater fishery and requested farmers to include fish farming with their agriculture farming for the overall production of coldwater fishery in the country. He further requested Scientists of this institute, planners, policy makers, farmers and entrepreneurs in the Uttaranchal State for sustainable natural resource development and production enhancement of the coldwater fishery.

Shri N.D. Tewariji, Chief Minister of Uttaranchal State in his address suggested that the Institute should have close linkages and active coordination both with Fisheries Department of the State and University of Agriculture and Technology, Pantnagar, particularly to develop research packages to achieve maximum fish biomass production in the state and that this Institute should give due attention to promote sport fishery on the lines of *angling -cum-tourism,* as being done in other Himalayan states.

In his inaugural address, the Honorable Union Minister of Agriculture Shri Sharad Pawarji expressed happiness and mentioned that in inland fisheries sector, hill fishery can pay an important role for the overall fish production. He also urged that the basic

and strategic research should be given top priority utilizing the best available infrastructure facilities with the Institute for the scientific cause set for welfare of the farmers of hill region.

On this occasion, the Union Agriculture Minister, Government of India also felicitated the best fish farmers of this region and released publications of the Institute.

Glimpses of inaugural function of NRCCWF New Building Complex at Bhimtal