

ANNUAL REPORT

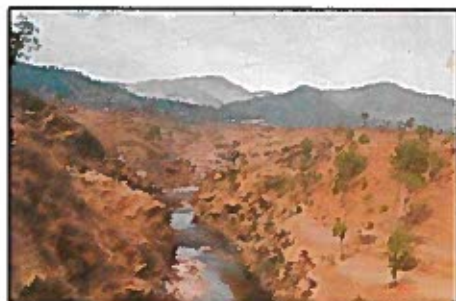
1993-94

वार्षिक रिपोर्ट



NATIONAL RESEARCH CENTRE
ON COLDWATER FISHERIES

राष्ट्रीय शीतजल मत्स्य पालन अनुसंधान केन्द्र



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समाहर प्रति



राष्ट्रीय शीत जल मत्स्य अनुसंधान केन्द्र (भा. कृ. अनु. प.)

शिल्वा हिल्स नर्सरी, रूपनगर, पोस्ट बाक्स सं० 28.

हल्द्वानी-263 139, जिला नैनीताल (उ.प्र.)

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INTRODUCTION

Brief History

The establishment of National Research Centre on Coldwater Fisheries was approved and sanctioned in 1986 as a new scheme in Seventh Five Year Plan under the reorganisation of Fisheries Research Institutes in the country by the Indian Council of Agricultural Research. The centre having its origin in Central Inland Fisheries Research Institute established at Srinagar (Kashmir) was later shifted and merged with NRC on Coldwater Fisheries, which started functioning with its location at Haldwani in April, 1988. The main objectives were to conduct investigations for a proper appraisal of coldwater fishery resources of the country to evolve suitable methods to propagate techno-economically viable coldwater fish species and to enhance fish production in coldwater zones of the Himalaya and Deccan Plateau. While fulfilling the above objectives, the Institute directed its research efforts towards understanding the trophic structure and functions *vis-a-vis* fishery potentials of both riverine and lacustrine systems in himalayan uplands. Moreover, for the research and development in the national perspective, due emphasis was given to standardize package of practices for mass scale seed

Himalayas. NRCCWF has two research stations, one at Champawat and the other at Bhimtal which provide further support in implementation of its mandate by carrying out research activities specific to their agro-climatic zones.

Mandate

The objectives of the NRC on Coldwater Fisheries are;

To explore and assess the coldwater fishery resources in upland areas and to develop strategies for their conservation and management;

To conduct research leading to development of techno economically viable and sustainable culture systems for indigenous and exotic fish species in upland areas; and

To undertake transfer of technology through training, education and extension programmes and to provide institutional consultancy services for the development of coldwater aquaculture in the country.

Organisational set-up

aspects, conservation of coldwater fishes in himalayan uplands alongwith environmental monitoring. The Bhimtal Research Centre strives to develop methodologies for mass scale production of healthy stocking material of golden mahseer under controlled conditions for replenishing depleted mahseer waters and to augment fish production of this native species in lacustrine and riverine systems. To enhance the existing rearing space for the juveniles of coldwater species, more nursery and rearing troughs have been installed in the farm complex. The said Centre has been equipped with adequate laboratory and library facilities. A nutritional lab has also been set-up at Bhimtal under ICAR Adhoc Scheme for monitoring nutritional requirements of coldwater fishes. The investigations being carried out at Haldwani aimed at to raise healthy stocking material and brood stock of golden mahseer under pond environment, which still is a major constraint in its farming. At Haldwani, a library having upto date literature, reference books, Foreign and Indian journals on coldwater fisheries has been established to cope up with the research needs of scientific and technical staff of the Institute. The Institute also has initiated investigations to raise brood stock of exotic trouts alongwith indigenous Schizothoracids at Chirapani

Staff Position

The overall staff position as on 31st March, 1994 is given below.

S No.	Category of posts	Posts sanctioned	Staff in position	posts vacant
1.	Research Management (Project Director)	01	-	01
2.	Scientific	15	07	08
3.	Technical	05	04	01
4.	Administrative	07	05	02
5.	Auxiliary	02	02	-
6.	Supporting	13	13	-
TOTAL:		43	31	12

Finance

The provision of allocation of funds and expenditure of NRC on Coldwater Fisheries during the year 1993-94 is as under:

Plan/ Non-Plan	(Rs. in lakhs)	
	Allocation RE/ 93-94	Actual expenditure 1993-94
Plan	51.70	37.67

Important achievements

Culture of golden mahseer

In a significant breakthrough achieved at the Bhimtal unit of NRC on Coldwater Fisheries, a technology was standardized for intensive raising of stocking material of golden mahseer (*Tor putitora*). The technology comprised facilities of flow-through system in each rearing unit and air-water lift aeration system. The hatchery unit for production of stocking material indicates that species is amenable for egg-taking from wild spawners and nursery rearing. A record survival of 92.0% from fertilized eggs to swim-up fry and 95.0% upto advance fry stages has been achieved. This has opened possibilities of raising mahseer seed on large scale to replenish depleted mahseer waters for the enhancement of fish stocks in himalayan regions.

Under management/ conservation programme, various streams, lakes in Kumaon region have been stocked with mahseer seed to repropagate this endangered fish. In addition, mahseer seed has been distributed to UP Fisheries Department, Fisheries Division, G.B. Pant University of Agriculture and Technology, Pantnagar (Nainital, UP) and private fish farmers in Nainital district.

For the first time, attempts have been made to culture this fish in pond environment with the objectives to raise healthy stocking material for the fish

encouraging results have so far been obtained. This methodology augments seed production and culture of this species in captivity and ensures effective utilization of coldwater ecosystems for increasing fish biomass per unit water area.

Trout culture

Efforts on scientific lines have been made to establish and raise brood stock of brown (*Salmo trutta fario*) and rainbow trout (*Onchorynchus mykiss*) at Chirapani fish farm in Pithoragarh district.

Coldwater fishery resources

Two freshwater lakes in Kumaon himalayan region have been bio-limnologically investigated to assess their nutrient status and fishery potentials. The study was mainly aimed to enhance fish production and to provide a model for developing similar mountain lakes in himalayan belt. Experimental fishing with standard gill nets was conducted periodically to assess the production of these ecosystems and under the programme envisaged for management, seed of golden mahseer produced at Bhimtal hatchery were stocked in these systems.

Transfer of technology

Technical assistance rendered to different states and other fishery agencies in India for site selection, layout plan and construction of coldwater fish hatcheries, farms etc.

GENERAL INFORMATION

Library and documentation

Exchange services

The Library maintained exchange relationship with various research organisations and Institutes of national and international levels. The annual report, special publications and technical manuals published on coldwater fish and fisheries were mailed to about 100 organisations, Institutions, fishery agencies etc. free of cost. Library services have also been extended to research scholars, students from different Universities/State departments etc. actively involved in the research on coldwater fisheries and individually through inter-library loan service.

Reprography services

The library maintained active reprography services by reproducing departmental publications as and when required and providing the required photocopies to the scientists of this Institute

on Coldwater Fisheries as well as to other organisations.

Technical reports

Approximately 30 technical reports and write-ups on the progress of research and other related activities of the Institute were mailed to ICAR, Ministry of Agricultural Research and Education and other concerned Fisheries Institutes. Several technical queries regarding activities of the centre from various regions of the country and abroad were attended to by this section. Biodata sheets in respect of the scientists of this Institute were mailed to various organisations for inclusion in different year books, directories etc.

Library facilities

During the year 42 books, 196 Indian and Foreign journals, 85 reports, FAO publications etc. have been added to the library of NRCCWF.

Conferences/Symposia/Seminars/Meetings attended

S.No.	Subject	Organisers	Papers presented	Authors/participants from the Institute
1.	Workshop on Coldwater Fisheries, Kulu (HP)	Ministry of Agriculture Govt. of India Krishi Bhawan	Present Status of Coldwater Fisheries in India	Shri Madan Mohan

S.No.	Subject	Organisers	Papers presented	Authors/participants from the Institute
3.	Third Asian Fisheries Forum	Asian Fisheries Society & College of Fisheries, G.B. Pant University of Ag. & Tech., Pantnagar	Status of Common carp fishery in himalayan region	Shri Madan Mohan
			Culture of golden mahseer (<i>Tor putitora</i>) in Kumaon himalaya. 1. mass scale production of stocking material.	Dr. Shyam Sunder Sh. Madan Mohan Dr. H.S. Raina Sh. Baldev Singh Sh. R.S. Haldar
			Experiments on estimation of nutritional requirement for the juveniles of golden mahseer	Dr. H.S. Raina Dr. Shyam Sunder Ms. Uma Naulia
			Present status of riverine fishery resources of Haryana	Sh. B.C. Tyagi
4.	Regional consultation workshop on water and Natural Resources Management for	National Association of water Resources Development Agency, Govt. of India	Coldwater Fisheries in Pithoragarh District of Kumaon himalayas-Problems and prospects	Dr. C.B. Joshi

Distinguished visitors

The following is the list of distinguished visitors who have visited the Institute during 1993-94.

1. **Dr. P.V. Dehadrai** Deputy Director General (Fisheries). Indian Council of Agril. Research, Krishi Bhavan, New Delhi
2. **Dr. M.Y. Kamal** Asstt. Director General (Fisheries), Indian Council of Agril. Research, Krishi Bhavan, New Delhi
3. **Dr. K. Radhakrishna** Asstt. Director General (Fisheries), Indian Council of Agril. Research, Krishi Bhavan, New Delhi
4. **Dr. Kuldip Kumar** Director-cum-Chief Warden of Fisheries, Government of HP. Bilaspur, Himachal Pradesh
5. **Shri S.N. Ogale** Environmental Officer, Tata Electric Companies, Lonavla, Maharashtra
6. **Dr. M.C. Joshi** Director, Defence Agricultural Research Laboratory, Goraparao, Haldwani (Nainital) UP
7. **Dr. M.A. Khan** Principal Incharge, CIFE, Operation/ Training Centre, Chinhhat, Lucknow
8. **Shri Yashpal Arya** Member of Legislative Assembly, Uttar Pradesh Lucknow.



Assistance/training rendered

-The Institute provided technical assistance to Uttar Pradesh Fisheries Department for construction of Trout farm at Bairangana, District Chamoli, UP.

-Technical know-how rendered to Non-conventional Energy Development Agency (NEDA), Lucknow to develop coldwater fisheries in small dam/reservoir ecosystems while implementing small Hydro-Schemes in Lesser Himalayan belt in Kumaon and Garhwal (U.P.)

- Scientific assistance provided to Haryana State Fisheries Department for development of masheer hatchery at Tajewala- Yamuna Nagar.

- The Institute rendered scientific/technical assistance in construction of mahseer hatchery at H.N.B. Garhwal University, Srinagar, Garhwal, UP.

- Training imparted to the research scholars of Narain College, Shikohabad, Agra University, Agra on nutritional aspects of coldwater fishes at Bhimtal Research Centre of NRCCWF.

- Training on coldwater fisheries imparted to fisheries trainees of CIFE. Operation/ Training Centre, Chinhat, Lucknow at NRCCWF, Haldwani and Bhimtal mahseer hatchery, Bhimtal.

-Dr. Shyam Sunder Sr. Fishery Scientist of this Institute delivered special lecture on 'New concepts of fish farming in Kumaon region' to the trainees at District Industries Centre, Haldwani, Nainital, UP.

Training obtained

Dr. C.B. Joshi and Dr. Shyam Sunder, Sr. Fishery Scientists of this Institute undergone training in Agricultural Research Management at National Academy of Agricultural Research Management, Hyderabad from April 13-23, 1993.



Other activities

During the period, Scientist Research Council meeting was held to review the progress of research projects handled at the headquarters and research centres. New research projects were also discussed and analysed in the meeting.

The meetings of Hindi Implementation Committee (Hindi Karyanvayan Samiti)

reconstituted in 1993 were held quarterly under the Chairmanship of the Director and reports on the implementation of official language policy pertaining to the Institute were sent to the Council and Official Language Department for inclusion in the report of the Secretariate.

The election of Joint Staff Council of this Institute was conducted on 22.04.1994.

PROGRESS OF RESEARCH

During the period, there were three research projects on capture and culture aspects of coldwater fish species. One project on the fishery limnology of a Kumaon lake to increase fish yield has been completed. As a part of fulfilment of mandate of the Institute for management and conservation of fishery resources of coldwaters, projects on the propagation and culture of indigenous species by adopting new package of technologies, raising stocking material of exotic trouts and ecobased investigations of lesserhimalayan lakes to increase fish yield have been taken up.

The significant achievements made under various research projects are summarised below.

PROJECT NRCCWF/01

ECO-BASED INVESTIGATION OF A KUMAON LAKE FOR INCREASING FISH YIELD

Personnel : Madan Mohan, H.S. Raina, Shyam Sunder and A. Mukhopadhyay.

Location : NRCCWF, Haldwani

Research accomplishments

To develop a model for obtaining high fish yield in mountain lakes of Kumaon, based on the principles of ecological characteristics and culture cum capture fisheries, bio-limnological and fishery studies were conducted on Khurpatal lake. The lake having a total water spread area of 13.0 ha is situated at an elevation of 1600 m asl. It is a close type warm-monomictic ecosystem which remains stratified from March to November.

Bio-limnological features

The lake water at three littoral and one pelagic sampling stations was analysed for abiotic and biotic parameters during the period under report. The physico-chemical features ranged as; water temperature 13.0-26.0°C, secchi transparency 2.0-3.0 m; pH 8.1-8.3; free carbon dioxide nil-0.25 mg/l; dissolved oxygen 10.6-12.6 mg/l; total alkalinity 136.0-185.0 mg/l; chloride 14.2-16.2 mg/l; calcium 18.0-40.2 mg/l; magnesium 2.3-2.6 mg/l; dissolved organic matter 25.0-35.0 mg/l; total dissolved salts 148.0-192.8 mg/l; and specific conductivity 300-382 μ mhos.

The Khurpatal lake supports massive growth of phytoplankton population and it

palatinum, *Glenodinium quadridens* and *Ceratum hirudinella* were the predominant species in the lake.

The diversity of zooplankton assemblage in this lake is of a low grade. The zooplankton population at all the stations varied between 12.0-119.5 units/l. The population was mainly dominated by Rotifera (27.5-75.0%) followed by Copepoda (25.0-65.35%). The integrated zooplankton population at pelagic zone of the lake was averagely 132-350 units/l. The benthic fauna of the lake ranged between 756-1422 ind/m². (5.210-27.940 g/m² as wet biomass). Amongst the major benthic groups, Ephemeroptera (13.0-67.0%) was dominant, followed by Odonata (13.0-61.0%). The predominant forms recorded were *Gomphus*, *Coenagrion*, *Octogomphus* from Odonata and *Cænis* and *Heptagenia* from Ephemeroptera.

Phytoplankton production profiles have also been studied. At littoral site the maximum surface carbon fixation of 61.72 mgCm⁻³ hr⁻¹ dropped to 35.0 mgCm⁻³ hr⁻¹ at the 10 m depth zone when the secchi disc transparency was about 2.1 m. Similarly at pelagic site, profile studies showed that surface production of 72.5 mgCm⁻³ hr⁻¹ declined to 31.0 mgCm⁻³ hr⁻¹ at 13 m depth zone with transparency of about 3.0 m.

General fisheries

Fishery of Khurpatal was constituted by golden mahseer (*Tor putitora*) and exotic

baits is the only method for fishing by local anglers. Average catch per unit effort by this method was to a tune of 225-350 g/man/ day. Golden mahseer was the chief fish encountered in the catches.

PROJECT NRCCWF/04

ARTIFICIAL PROPAGATION OF IMPORTANT COLDWATER FISHES

Personnel : Madan Mohan, Shyam Sunder, H.S. Raina, R.S. Haldar and Baldev singh

Duration : July 1991-June 1997

Location : NRCCWF, Haldwani and Bhimtal

Objectives : To enhance the natural stocks of endangered coldwater fish species.

To standardize the package of practices for raising stocking material and brood stock of golden mahseer in pond environment.

Accomplishments

The golden mahseer (*Tor putitora*), one of the most thrilling sport fish of Indian sub-continent is loosing ground from its natural abodes on account of natural and man made ecological changes and hence needs immediate rehabilitation.

by this centre at Bhimtal during 1990 which is the first attempt in the country for the seed production of *Tor pultora* on mass scale. The efficiency of this units has already been tested by undertaking preliminary experiments on seed production in the earlier years.

Hatchery

Based on flow-through system, the seed rearing unit has a pumping device with a capacity to lift 300 litres of water/min. There are 3 overhead tanks each of 1000 litre capacity. The water supply is from a perennial spring-fed 'Jhingri' stream, the main inlet of Bhimtal lake. To combat the shortage of natural water supply from this stream, one artisan tubewell has been installed in the hatchery. The hatching unit consists of GI hatching troughs (220x60x30 cm) each having 5 wooden trays fitted with synthetic netting cloth. The nursery unit consists of high quality PVC nursery tanks (122x70x40 cm). The fingerling unit comprises 10 tanks of GI Sheet (2.sqm area). Each rearing unit is housed under a thatched shed to protect from the natural vagaries. At present, the unit has the capacity to incubate 0.25-0.3 m eggs and raise 0.15-0.2 m fry at a time. Constant efforts are being made to enhance the rearing space for the fish seed by providing more nursery and rearing troughs in the existing unit.

Seed production

During the breeding season, eleven golden mahseer brooders (Females T.L 385-560 mm; wt. 550-1390 g and Males T.L. 315-450 mm; wt. 325-665 g) were mated

and fertilized with milt from the male specimens by 'dry method'. The rate of fertilization ranged between 93.6-100.0 (\bar{x} :95.2%). In total about 36, 540 eggs were stripped and the number of fertilized eggs worked out as 34, 410.

The fertilized eggs were kept in hatching trays (50x30x10 cm) in the flow-through hatchery unit at Bhimtal having continuous water supply @ 1.5-2.0 l/min. The incubation period ranged between 90-110 hrs at a water temperature of 13.0-20.5 °C. Yolk absorption was completed in 10-12 days. The cumulative survival from fertilized eggs to swim-up fry stage recorded was 92.4% and their number left over was 32,481. The prophylaxis against the fungus, growing over non-viable eggs included flushing of hatching troughs/trays with malachite green in the ratio of 1:2,00,000 for 30 minute.

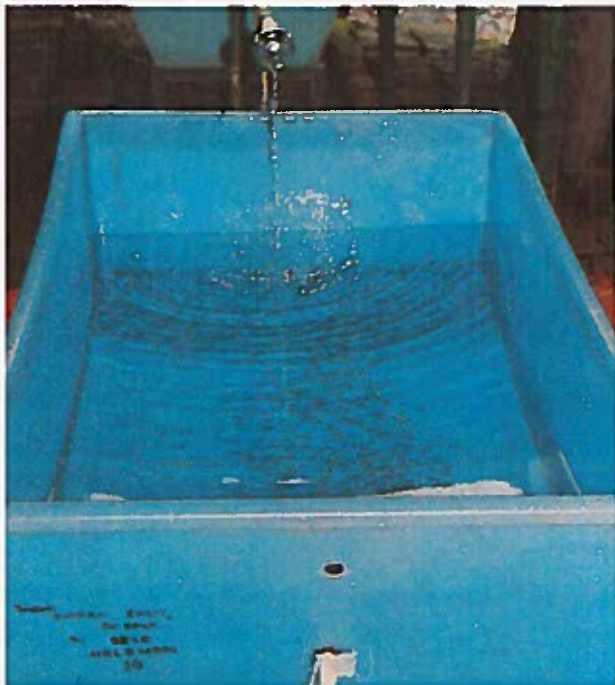
Nursery rearing of mahseer

The newly emerged swim-up fry were shifted in nursery tanks (120x70x40 cm). These were fed on emulsified hen's egg yolk every two hourly from sun-rise to sunset @ 8-10% body weight for about a fortnight. The water flow was maintained @ 2-3 l/min. The fry attained a length of 9-11 mm.

After the fry started accepting artificial feed, they were size graded and transferred in flow-through water troughs (2 sqm area) having flow rate of 3-4 l/min. The fry were



Hatching of golden mahseer.



4 months. The feeding was scheduled @ 6-10% body weight 6-8 times a day depending upon the size of fry and prevailing water temperature. The survival rate from swim-up fry to advanced fry stage was 93.7% having a size range of 30-35 mm. The cumulative survival from egg to advanced fry stage was about 91.0%. Out of 21,060 fry produced, about 18,500 fry were stocked in various kumaon lakes (Bhimtal-3300, Naukuchiatal- 12,000, Sattal-3200) in the first week of November in collaboration with U.P. State Fisheries Department under management and conservation programme of endangered species. In the fourth week of October, about 1500 mahseer fry were stocked in a private fish farm at Rudrapur, district Nainital; 1000 fry at FARTC, College of Fisheries, G.B. Pant University of Agriculture & Technology, Pantnagar (Nainital) UP.

The water quality parameters in the hatchery troughs during the period under report ranged as follows; water temperature 13.0-25.0°C; pH 6.9-9.3 dissolved oxygen 6.0-8.8 mg/l; free carbon dioxide 0.2-1.8 mg/l; alkalinity 62.0-78.0 mg/l; chloride 14.0-40.0 mg/l; DOM 12.0-20.0 mg/l; specific conductivity 113.6-170.2 μ mhos.

Culture of mahseer in pond environment

Sampling of golden mahseer (*Tor putitora*) fry stocked in a private fish farm at Rudrapur (Nainital) was conducted periodically. The sampling done in the third week of March, 1994 revealed an increase of 80-120 mm in length and 10-35 g in weight from an initial length of 30-35 mm and weight of 0.150-0.250 g. The rate of survival recorded was about 80%. The increase in fish biomass was approximately





Stocking of Golden mahseer fry in a pond in Tarai region of U.P.

0.3-0.4 g/ day. The pond was properly manured in a phased manner. In addition to abundant natural food available in the pond, the fish stock was fed daily @ 5-10 % body weight on supplementary diet comprising rice polish and mustard oil cake (1:1) fortified with vitamins and minerals pre-mix. The water quality parameters of the pond ranged as; water temperature 17.0-28.5°C; pH 8.2-8.8; dissolved oxygen 9.8-10.3 mg/l; DOM 49.4-56.8 mg/l; total dissolved salts 141.4-148.2 mg/l; and specific conductivity 316.5-339.4 μ mhos.

The results so far obtained from the present experiments appears to be very

PROJECT NRCCWF/05

RAISING OF BROOD STOCK OF BROWN AND RAINBOW TROUT AT CHIRAPANI- CHAMPAWAT, DISTRICT PITHORAGARH (UP)

Personnel : C.B. Joshi and Ravinder Kumar

Location : NRC-CWF, Champawat

Duration : April 1992-March 1994

Objectives : To raise brood stock of exotic trout species in himalayan uplands for development of sport and food fishery

transplantation of 5000 eyed eggs of brown and rainbow trout each from Barot trout hatchery, Himachal Pradesh in the month of February, 1993. In the month of May about 3822 fry of trout (14.0-28.0 mm in size) were produced. The respective survival from eyed-ova to early fry stage was 76.44% and 53.36% in brown and rainbow trouts respectively.

The fry produced were stocked in cemented nursery ponds in the hatchery and then outside in the farm at different densities. The fishes were intensively fed on formulated artificial diet of high protein content, approximately @ 10-25% of the body weight. Results of rearing of these fishes for more than 200 days revealed that overall survival rate was very low averagely 0.5% in brown and 2.0% in rainbow trout. The brown trout fishes increased to a length of 52.150 mm (5-30 g in weight) from an initial length of 14.0-28.0 mm (0.100-0.150 g in weight). While the rainbow trout showed the length increase of 75-160 mm (5-50g in weight) from the initial sized 22.0-32.0 mm (0.100-0.150 g in weight.) Rise in water temperature, inadequate supply of water in stream source, heavy silt and debris flow in pre-monsoon and monsoon periods were some of the factors accounted for trout mortalities in this farm.

The physico-chemical features

PROJECT NRCCWF/06

FISHERY LIMNOLOGY OF A FRESHWATER KUMAON LAKE NAUKUCHIATAL

personnel : H.S. Raina, Madan Mohan, Shyam Sunder, R.S. Halder and Baldev Singh

Location : NRC-CWF, Haldwani and Bhimtal

Duration : June 1993 - may 1995

Objectives : To assess present nutrient status, bio-dynamics, food resources and production levels of the lake in order to exploit for increased fish productivity.

Accomplishments

Naukuchiatal lake is one of the largest sub-tropical freshwater lake system and an important source of fishery in Kumaon region. To assess the present nutrient status and fishery of this ecosystem, a detailed study has been taken up from July 1993. The lake having a total water spread area of 49 ha is a typical warm-monomictic ecosystem. It is a close type lake and source of water in the lake is from some underground seepages and from the catchments during monsoon season.

Bio-limnological features

The lake water at four selected sampling

dissolved oxygen 7.6-9.2 mg/l; total dissolved salts 65.5-84.5 mg/l; and specific conductance 130.5-170.0 μ mhos. The lake had moderate levels of nutrients during this period.

Among biotic parameters, the density of phytoplankton ranged between 0.5×10^6 to 1.76×10^6 units/l. Diatoms dominated and contributed more than 75% of the population. However, the total zooplankton population at pelagic zone was to the tune of 45-235 units/l at 0.0 m to 25.0 m depth of the lake. The macro-benthic population ranged between 105-157 ind/m² chiefly dominated by dipterons.

Experimental fishing

To ascertain the species composition and fish production of the lake, experimental fishing with standard gill nets was conducted in the lake which revealed that golden mahseer dominated (66.66-95.5%) the fish catches and common carp (0.5-35.33%) was the other species recorded in this system. The size frequencies of the dominant species (golden mahseer) ranged between 330-430 mm in total length (275-675 g in wt.). The size of common carp ranged between 320-600 mm in total length and 450-3500 g in weight. The catch per unit effort was estimated to the range of 1.870-2.285 kg/net in this lake.

Fish stocking

Other research activities

Under ICAR Adhoc Scheme on 'nutritional requirement of *Tor putitora*', a series of experiments were conducted on the juveniles of this species with experimental and purified test diets of different protein levels. The research work on formulation and evolving most efficient diets for nursery rearing of golden mahseer has also been investigated at Bhimtal Research Centre. A nutritive pelletized diet (casein based) having approx. 45.0% crude protein level, 13.0% crude fat (ether extract) and 15.20% carbohydrates (nitrogen free extract) supplemented by vitamins and minerals has been tried and screened for better growth and survival of mahseer juveniles. Present investigations open a vast scope to produce healthy and right size stocking material of this species on a mass scale for replenishing depleted mahseer waters like streams, lakes, reservoirs etc. in the himalayan region.

Survey studies

A survey on the bio-ecological status and fisheries of aquatic resources of Pithoragarh district was undertaken by a team of NRC-CWF, Champawat unit headed by Dr. C.B. Joshi, Sr. Fishery Scientist in order to identify potential zones to develop coldwater fishery (trout, snow-trout and mahseer) in these hilly remote areas of kumaon himalayas. Pithoragarh district in the Kumaon division of U.P. state spread over 8820 sqm constitutes a

demarcates its boundary with Nepal in the East.

The fisheries of Pithoragarh district in Kumaon region are poorly developed owing to difficult terrain and inaccessibility to the resources. Various streams, rivers and the village ponds are the aquatic systems in the area and most of them maintain fairly low temperature profile as a result the production of primary and secondary level organisms is scanty with low biological productivity. This district though bestowed with the valuable wealth of coldwater fish fauna but virtually remained untouched so far as fisheries activities are concerned. During the survey, R. Kali, Gori, Ramganga, Saryu, Ladhiya and their 25 tributaries were investigated. The main fish fauna of these systems comprised of about 25 species mainly dominated by species of *Tor* (*tor* and *putitora*) *Schizothorax* (*richardsonii*, *kumaonesis*), *Labeo* (*dero* and *dyocheilus*). The representation of loaches, brails, sisorids is also quite significant in these systems.

As per the study report, the aquatic resources of district Pithoragarh can be specified into two zones viz; snow- trout and trout zone and mahseer and carp zone. In Kali drainage sites above Jauljibi including snow-fed rivers Dhauli and Gori have potentials to develop trout and snow-

trout fishery owing to their low temperature profile and high oxygen concentration besides abundant supply of cold and clear water. Munsyari and Dharchula blocks in Gori basin of Kali river system (including Kuti, Dhauli and Gori and a few tributaries above Jauljibi) have potentials for trout culture and to promote trout for sport. Areas below Jhulaghat, the Kali system and its tributaries like Saryu, Ramganga and Ladhiya are known for mahseer fishery and can be exploited for mahseer culture for food and for sport purposes. The Zones at Thal-Muwani (Ramganga), Sheraghat-Rameshwar (Saryu) and Amori-Chalthi (Ladhiya) have also potentials for golden mahseer hatchery.

Snow-trout fishery is the major component of fish catches in hill streams and rivers of Pithoragarh District and thus proper attention to conserve and develop its fishery both from capture and culture view point have been suggested in the report. While, low laying areas in Pithoragarh like irrigation tanks, kuchha ponds in Nainisaini and Panda have potentials to develop common carp as a cheap source of protein for poor people inhabiting in hilly and remote areas. The report in the concluding lines have emphasised some conservation measures to improve coldwater fisheries in these ecosystems.

PUBLICATIONS

Mohan Madan 1993. Present status of coldwater fisheries in India. *Workshop on Coldwater Fisheries* Kulu, Min. of Ag. Govt. of India. May 1993.

The paper describes in detail the review, present status of coldwater fishery in Indian uplands besides its future scope for development. Some thrust areas of research which need immediate attention alongwith some broad recommendations are highlighted for conservation and improvement of existing fish stocks of highland fisheries.

Mohan Madan 1993. Status of common carp fishery in himalayan region. *3rd Asian Fish. Forum*, G.B. Pant Univ. of Ag. & Tech., Pantnagar. Abstract. p. 75.

Common carp was transplanted in India first time in the Nilgiris in 1936 from where it was introduced to almost every part of Himalaya including hills of Uttar Pradesh, Himachal Pradesh, Jammu & Kashmir and North Eastern hill states. It was introduced in 1954 in Nainital lake and other lakes of Kumaon hills. Since then, common carp is contributing a very good share in the fish catches of himalayan states. The present status of common carp fishery, prevailing culture practices and future prospects are presented in this paper.

Raina, H.S. and K.K. Vass 1993. Distribution and species composition of zooplankton in Himalayan ecosystems. *Int. Rev. ges. Hydrobiol.* 78: 295-307.

The zooplankton communities of lakes, sars, wetlands and ponds in himalayan uplands were investigated. The waters situated between 600-3800 m asl and in the ordinates 30°- 36° N reflected significant variations in the distributional pattern of rotifers and crustaceans. Some species having wide tolerance limits are more frequent while a few species due to their rigid environmental demands are restricted to few waterbodies. Such species serve as good indicators of these groups and their ecological implications have been discussed in the paper.

performance of this species. Digestibility and utilization of the feeds were also assessed. The diet containing about 45% protein gave the better results. Effects of different levels of metabolizable energy present as carbohydrates (dextrin) on the growth of the fish have also been highlighted and discussed in the paper. Bio-chemical composition of mahseer fry and fingerlings were analysed for various calorific values of the constituents.

Raina, H.S. 1994. Schizothoracids and their significance in upland coldwater fisheries in himalayas. *In Advances in Fisheries* (Ed. by S.A. Ahmed). Hindustan Publ. Corp. (Ind.), Delhi.

Snow- trouts (Schizothoracids) being the principal indigenous fishes of himalayan waters are entirely dependent on naturally reproducing population. Presently the majority of species in the group are in immediate danger of extinction, both in population and genetic variability due to variety of causes. Results of recent researches on aquaculture of snow-trout species in India have been reviewed. To ensure a high sustainable fish yield of this group in different ecosystems through recruitment and some other conservation measures are also recommended.

Sunder, S. 1994. Studies on macrobenthos with special reference to aquatic insects of various ecosystems from J & K State. *Pb. Fish. Bull* (In Press).

The communication embodies a detailed work on a) qualitative representation of aquatic insects from the important hill streams of Jammu & Kashmir; b) both qualitative and quantitative benthic data from 17 different ecosystems from Kashmir valley. In all 44 insect genera from Jammu province and 33 from Kashmir province have been recorded from various waterbodies.

Sunder, S., Mohan Madan, Raina, H.S., Haldar, R.S., Singh, B. 1993. Culture of golden mahseer (*Tor putitora*) in Kumaon himalayas. I. Mass scale production of stocking material. *3rd Asian Fish Forum*, G.B. Pant Univ. of Ag. & Tech., Pantnagar. Abstract. p.6.

To rehabilitate and conserve the vanishing fish species and building up stocks in the fish farms for food and replenishing the natural ecosystems, NRCCWF took a lead in establishing a flow-through hatchery for seed raising facilities of golden mahseer, *Tor Putitora* (Ham.) at Bhimtal. At present hatchery has the capacity to hold about 0.3 m fertilized eggs and 0.1-0.2 m fry/ fingerlings. During the period of past three years, more than 0.1 m advanced fry of this species have been raised at this hatchery

Tyagi, B.C. 1993. Present status of riverine fishery resources of Haryana. *3rd Asian Fish Forum*, G.B. Pant Univ. of Ag. & Tech., Pantnagar. Abstract. p. 69.

The paper reviews the present status of the riverine fisheries of the Haryana state (27° 39' to 30° 15' N Lat. 74° 27.8' to 77° 36' E Long). There are 14 rivers which measure 1320 km. With the time, the production efficiency of these resources is declining and commercially important fishes like mahseer, catla rohu and calbasu are depleting. For keeping these resources 'live', the adoption of conservational measures including restocking of fish seed in selected stretches of rivers are suggested.

PERSONNEL

Dr. H.S. Raina

Principal Scientist
(Act.Proj. Director)

Scientific

Shri Madan Mohan

Principal Scientist

Dr. C.B. Joshi

Sr. Fy. Scientist

Dr. Shyam Sunder

- do -

Dr. B.C. Tyagi

- do -

Dr. S.K. Singhal

Scientist

Shri R.K. Agnihotri

- do -

Shri Rahul Behl

- do -

Technical

Shri R.S. Haldar

T-4 (Farm Manager)

Shri Soumitra Roy

T-II-3

Shri Baldev Singh

T-I-3

Shri A. Mukhopadhyay

T-I

Shri Ravinder Kumar

T-II

Administrative

Shri Prakash Chandra

AAO/AF & AO

Smt. Susheela Tewari	Stenographer
Shri. Harish Ram	Senior Clerk
Shri Manni Lal	Junior Clerk
Km. Khilawati Sayana	- do -

Auxiliary

Shri Bakshi Ram	Driver
Shri Bhagwan Singh	- do -

Supporting

Shri Madan Lal	SS Gr IV
Shri Japhu Ram	SS Gr III
Shri Sant Ram	SS Gr II
Shri Hansa Dutt	SS Gr I
Shri J.C. Bhandari	- do -
Shri Gopal	- do -
Shri Ravinder Kumar	- do -
Shri Om Raj	- do -
Shri M.S. Rana	- do -
Shri R.K. Arya	- do -
Shri H.S. Chauhan	- do -
Shri P.C. Tewari	- do -

Transfer

Name	Date of transfer	From	To
Scientific			
Dr. S.K. Singhal	31.5.94	Research Unit of NRC-CWF, Champawat	IARI, New Delhi
Administrative			
Shri Prakash Chandra, AAO/ AF & AO	5.1.94	NRC-CWF, Haldwani	IVRI, Izatnagar
Technical			
Shri A. Mukhopadhyay T-I	30.8. 93	- do -	CRIJAF, Barrackpore (WB)
Supporting			
Shri Om Raj SS Gr I	30.9.93	- do -	Research unit of NRC-CWF Champawat
Shri R.K. Arya SS Gr I	24.11.93	Research unit of NRCCWF Champawat	NRC-CWF, Haldwani

Promotion

Name	Date	From	To
Scientific			
Dr. H. S. Raina	28.5.93	Sr. Fy. Scientist	Principal Scientist

Administrative

वार्षिक प्रतिवेदन (1993-1994)

पृष्ठभूमि:

देश के पर्वतीय क्षेत्रों के ठंडे पानी में पाई जाने वाली मछलियों के पालन पोषण व विकास हेतु अनुसंधान करने के लिए भारत सरकार की सातवीं पंचवर्षीय योजना की कृषि अनुसंधान व शिक्षा कार्यकारिणी की सिफारिशों के अनुरूप व भारतीय कृषि अनुसंधान परिषद की संस्तुति पर वर्ष 1986 में राष्ट्रीय शीत जल मत्स्य पालन अनुसंधान केन्द्र की स्थापना की गयी तथा कुमांऊ क्षेत्र के तराई खंड में स्थित हल्द्वानी नगर में इस संस्थान का मुख्यालय खोला गया। पर्वतीय क्षेत्रों के नदी, नालों, झीलों, तालाबों, व पोखरों में क्षमतानुसार मछली उत्पादन का लक्ष्य प्राप्त करने के उद्देश्य से संस्थान के दो प्रमुख उपकेन्द्र पिथौरागढ़ जिले के चम्पावत व नैनीताल जिले के भीमताल नामक स्थानों पर खोले गये ताकि संस्थान के अन्तर्गत की जाने वाली अनुसंधान योजनाओं को कार्यान्वयित किया जा सके।

शीत जल मत्स्य पालन अनुसंधान केन्द्र

कार्यों की भी देखरेख कर रहा है। पिथौरागढ़ जिले के चम्पावत कस्बे से करीब 7-8 कि०मी० की दूरी पर छीड़ापानी नामक स्थान पर स्थित इस निर्माणाधीन मत्स्य प्रक्षेत्र में अब तक 6 रेसवेज, 10 आयताकार नर्सरीज, 20 वृताकार नर्सरीज तथा 1 ओवाहाउस (जल प्रवाही मत्स्य बीज पोषण शाला) का निर्माण कार्य पूर्ण हो चुका है तथा साथ में बहने वाले नाले में संग्रहण टैंक बनाकर पाइपों के माध्यम से सभी तालाबों में पानी पहुंचाने की व्यवस्था भी पूर्ण हो चुकी है। वर्तमान में इस प्रक्षेत्र पर ट्राउट व स्नोट्राउट मछलियों के पालन पोषण के साथ-साथ कार्प जाति की मछलियों पर भी अनुसंधान कार्य किये जा रहे हैं।

संस्थान के भीमताल केन्द्र पर मुख्यतया माहसीर मछलियों के बीज उत्पादन का कार्य किया जा रहा है। इस केन्द्र में माहसीर मछलियों के प्रजनन व रख रखाव सम्बन्धी अनुसंधान कार्यों को करने के उद्देश्य से एक नियमित जल प्रवाही मत्स्य बीज पोषणशाला निर्मित की गयी है इस पोषणशाला में विकसित माहसीर मछलियों के बच्चों

पाली जाने वाली मछलियों के खान पान सम्बन्धी आवश्यकताओं पर सुचारू रूप से अनुसंधान कार्य कर रही है।

संस्थान के उपरोक्त दो अनुसंधान केन्द्रों के अलावा पर्वतीय शीतजल स्रोतों में समुपयोजन एवं संरक्षण द्वारा मछली उत्पादन में वृद्धि के लिए विभिन्न परियोजनाओं पर भी कार्य किया जा रहा है जिसमें कुमौऊ की पहाड़ियों में स्थित नौकुचियाताल झील व कोसी नदी में परिस्थितिकीय अध्ययन किया जा रहा है ताकि इन प्राकृतिक जल स्रोतों में मत्स्य उत्पादन को बढ़ावा दिया जा सके।

उद्देश्य:

शीत जल मत्स्यकी को व्यवस्थित व विकसित करने के लिए पर्वतीय क्षेत्रों के ठंडे पानी के स्रोतों में मछलियों के पालन पोषण व संग्रहण के तौर तरीकों पर अनुसंधान कार्य करना इस संस्थान का मुख्य उद्देश्य है ताकि:-

1. ठंडे पानी के सभी स्रोतों में मत्स्य संदोहन व संरक्षण के लिए समुचित प्रबन्ध पद्धति विकसित की जा सके।

2. देशी व विदेशी किस्म की ठंडे पानी में पाई जाने वाली वाणिज्यिक दृष्टि से महत्वपूर्ण सभी मछलियों के पालन पोषण की लाभदायक तकनीक

3. मात्स्यकी क्षेत्र में विकसित प्रौद्योगिकी को प्रशिक्षण, शिक्षा तथा विस्तार माध्यमों द्वारा इच्छुक व्यक्तियों, विभागों व संस्थानों को हस्तांतरित किया जा सके।

संगठन:

संस्थान के मुख्यालय हल्द्वानी के अतिरिक्त शीतजल मात्स्यकी में अनुसंधान करने हेतु दो केन्द्र कार्यरत है। पिथौरागढ़ जिले में स्थित चम्पावत केन्द्र में इस समय ट्राउट, स्नोट्राउट व कार्प मछलियों के पालन पोषण का कार्य प्रगति पर है। जबकि भीमताल केन्द्र पर माहसीर मछलियों के प्रजनन व बीज उत्पादन के आलावा पौष्टिक आहार की परियोजनाओं में कार्य चल रहा है। इस केन्द्र में उत्पादित माहसीर मछलियों के फ्राई को तराई क्षेत्र के तालाबों में पालन पोषण हेतु रूद्रपुर के एक फार्म में संचित किया गया है। भीमताल में भी माहसीर मछलियों की बढ़ोत्तरी व प्रगति देखने हेतु विभिन्न तालाबों में इन मछलियों के फ्राइ संचित किये गये है।

मुख्य संस्थान से संबद्ध परियोजनाओं के अंतर्गत नौकुचियाताल झील व कोसी नदी में परिस्थितिकीय अध्ययन किये जा रहे है ताकि इन जल स्रोतों में ठंडे पानी की मछलियों के विकास के लिए तथा इनके समुचित संदोहन व संरक्षण के लिए

कर्मचारियों की स्थिति:

31 मार्च 1994 को संस्थान में कार्यरत कर्मचारियों की स्थिति निम्न प्रकार थी

क्र०सं०	वर्ग	स्वीकृत पद	कार्यरत	रिक्त स्थान
1.	अनुसंधान व्यवस्था (परियोजना निदेशक)	01	-	01
2.	वैज्ञानिक	15	07	08
3.	तकनीकी	05	04	01
4.	प्रशासनिक	07	05	02
5.	आक्सीलरी	02	02	-
6.	सहायक	13	13	-
	कुल	43	31	12

बजट:

संस्थान के लिए वर्ष 1993 - 1994 के अन्तर्गत स्वीकृत बजट में आयोजना (नॉन प्लान) मद का 18 लाख रुपया एवं योजना (प्लान) मद का 54.70 लाख रुपया था जिसमें से 16.69 लाख रुपया आयोजना एवं 27.67 लाख रुपया योजना मद में व्यय किया गया।

संस्थान हल्लदानी के पुस्तकालय में इस वर्ष 42 पुस्तकों, 196 भारतीय व विदेशी भाषाओं की वैज्ञानिक पत्रिकाओं तथा 85 प्रतिवेदनों का योगदान किया गया।

इस वर्ष प्रलेखन सेवा के अन्तर्गत कई तकनीकी प्रतिवेदनों के द्वारा विभागीय कार्य कलापों की जानकारी भारतीय कृषि अनुसंधान परिषद व अन्य संस्थानों को भेजी गयी। विभिन्न प्रकार की

संस्थानों, विश्वविद्यालयों, संगठनों व निजी संस्थाओं को अपने प्रकाशन निःशुल्क भेजे। संस्थान की मासिक, त्रैमासिक व वार्षिक तकनीकी प्रतिवेदनों, परियोजनाओं की सूची तथा अन्य वैज्ञानिक जानकारियों को संकलित करने में भी इसी अनुभाग का योगदान रहा। इसी अनुभाग ने संस्थान के वैज्ञानिकों द्वारा सेमिनार, संगोष्ठी, सम्मेलन इत्यादि में भाग लेने सम्बन्धी कार्यों का भी पर्यवेक्षण किया।

संस्थान की वैज्ञानिक अनुसंधान परिषद की बैठकें सम्पन्न कराने में भी इसी अनुभाग का योगदान रहा विभिन्न अनुसंधान-परियोजनाओं की समीक्षा व बैठक में लिए गये निर्णयों के कार्यान्वयन के लिए भी विभाग द्वारा सम्बन्धित वैज्ञानिकों को सूचित किया गया तथा इस आशय की टिप्पणी भी

भारतीय कृषि अनुसंधान परिषद को अग्रसारित की गयी।

संस्थान की प्रमुख समितियाँ:

सलाहकार समिति:

संस्थान की सलाहकार समिति की स्थापना वर्ष 1989 में की गयी और इस वर्ष भी समिति की संगोष्ठी में संस्थान के पुर्नस्थापन व विकास के लिए महत्वपूर्ण विषयों पर चर्चों की गयी, संस्थान में चल रही अनुसंधान परियोजनाओं, नयी परियोजनाओं तथा पूर्ण हो चुकी परियोजनाओं पर भी विचार विमर्श किया गया। संस्थान की सलाहकार समिति में निम्नलिखित पदाधिकारी सम्मिलित किये गये हैं।

- | | | |
|-----------------------|--|---------|
| 1. निदेशक | राष्ट्रीय शीतजल मत्स्यपालन अनुसंधान केन्द्र, हल्द्वानी | अध्यक्ष |
| 2. निदेशक | मत्स्य पालन विभाग उ०प्र०, लखनऊ | सदस्य |
| 3. श्री डी० बी० पाहवा | वरिष्ठ वैज्ञानिक | सदस्य |
| | भा० कृ० अनु० प० नई दिल्ली | |

- | | |
|---|------------|
| 6. डा० सी० बी० जोशी
वरिष्ठ वैज्ञानिक रा०शी०ज०म०पा० अनु० केन्द्र, हल्द्वानी | सदस्य |
| 7. सहायक प्रशासनिक अधिकारी
रा०शी०ज०म०पा० अनु० केन्द्र, हल्द्वानी | सदस्य सचिव |

राजभाषा कार्यान्वयन समिति:

राजभाषा नीति के सफल अनुपालन के लिए एवं हिन्दी कार्यक्रमों के सुचारू रूप से संचालन के लिए संस्थान में एक राजभाषा कार्यान्वयन समिति का गठन किया गया है जिसमें निम्नलिखित पदाधिकारियों की भागीदारी सुनिश्चित की गयी।

- | | |
|---|---------|
| 1. निदेशक
रा०शी०ज०म०पा० अनु० केन्द्र हल्द्वानी | अध्यक्ष |
| 2. श्री मदन मोहन, प्रधान वैज्ञानिक
रा०शी०ज०म०पा० अनु० केन्द्र, हल्द्वानी | सदस्य |
| 3. श्री आर० एल० रैना, सहायक
रा०शी०ज०म०पा० अनु० केन्द्र हल्द्वानी | सदस्य |
| 4. श्री बलदेव सिंह, तकनीकी वर्ग
रा०शी०ज०म०पा० अनु० केन्द्र, हल्द्वानी | सदस्य |
| 5. श्री. मन्नी लाल, कनिष्ठ लिपिक
रा०शी०ज०म०पा० अनु० केन्द्र, हल्द्वानी | सदस्य |
| 6. डा० श्याम सुन्दर, वरिष्ठ वैज्ञानिक | |

मुख्य उपलब्धियां

प्राकृतिक झीलों का परिस्थितिकीय अन्वेषण खुर्पाताल झील:-

पर्वतीय क्षेत्रों की प्राकृतिक झीलों में मछलियों की पैदावार बढ़ाने की दृष्टि से कुमाऊँ क्षेत्र की खुर्पाताल झील का परिस्थितिकीय अध्ययन किया गया ताकि झीलों के मत्स्यकी विकास के लिए इस झील को मॉडल के रूप में विकसित करके दिशा निर्देशन हेतु प्रयुक्त किया जा सके।

इस अध्ययन के तहत खुर्पाताल झील के भौतिक, रासायनिक व जैविक गुणों का विश्लेषण किया गया। वर्ष 1993-1994 के दौरान झील के पानी का तापक्रम $13^{\circ}\text{सेल्सियस} - 26^{\circ}\text{सेल्सियस}$, पानी में घुली हुई आक्सीजन की मात्रा $10.6-12.6$ मि० ग्रा०/ली०; कार्बन डाइआक्साइड $0.0-0.25$ मि० ग्रा०/ली०; हाइड्रोजन आयन कन्सन्ट्रेशन $8.1-8.5$; तथा कुल एलकैलिनिटी $136.0-185.0$ मि० ग्रा०/ली० थी। झील में (सूक्ष्म पौधों) फाइटो प्लैंक्टोन की संख्या प्रतिलीटर में 3.22×10 से 14.36×10 यूनिट थी। जबकि (सूक्ष्म जीव) जू प्लैंक्टोन की मात्रा $12-119.5$ यूनिट प्रतिलीटर थी। मछलियों की खुराक बनाने वाले जीव, जो कि झील की तलहटी में पाये जाते हैं की संख्या $56-1422$ प्रति वर्ग मीटर थी।

प्रत्यारोपण किया जाय तो निश्चय ही क्षमतानुसार मत्स्य उत्पादन किया जा सकता है।

नौकुचियाताल झील:

कुमाँऊ की पहाड़ियों में स्थित नौकुचियाताल झील में भी इस वर्ष परिस्थितिकीय अनुसंधान का कार्य शुरू किया गया है ताकि भविष्य में इस अध्ययन के परिणाम स्वरूप इस झील में भी मछलियों की पैदावार बढ़ाने के लिए उचित दिशा निर्देशन दिये जा सकें।

इस झील के पानी के भौतिक, रासायनिक एवं जैविक गुणों का विश्लेषण करने पर ज्ञात हुआ है कि अध्ययन के दौरान झील के पानी का तापक्रम $13-19^{\circ}\text{सेल्सियस}$; घुलनशील आक्सीजन की मात्रा $7.6-9.2$ मि० ग्रा०/ली०; पी० एच $7.2-7.8$; कुल घुले हुए साल्ट्स की मात्रा $65.5-84.5$ मि० ग्रा०/लीटर; व स्पेसिफिक कन्डक्टिविटी $130.5-170.0$ माइक्रोमोज थी, झील में फाइटोप्लैंक्टोन का घनत्व $0.5 \times 10 - 1.7 \times 10$ यूनिट/प्रतिलीटर था जिसमें 75 प्रतिशत से अधिक डाइएटम की मात्रा थी। झील की तलहटी में पाये जाने वाले जन्तुओं की संख्या $105-157$ प्रतिवर्ग मीटर थी।

झील में प्रयोग के तौर पर की गयी शिकार माही से ज्ञात हुआ कि झील से प्रतिजाल प्रतिदिन $1.870-2.285$ कि० ग्रा० मछली प्राप्त होती है। जिसमें माहसीर मछलियों का उत्पादन $(66.66-99.5$

अंगुलिकाओं की लम्बाई 30 से 50 मि०मी० तथा भार 150-260 ग्राम था।

शीतजल मत्स्य पालन

माहसीर मछलियों का पालन पोषण:

संस्थान के भीमताल केन्द्र के द्वारा इस वर्ष भी माहसीर मछलियों के प्रजनन, अंडों व जीरे का रखरखाव तथा फ्राइ उत्पादन के कार्य को सुचारू रूप से किया गया। निरन्तर जल प्रवाही हैचरी में निषेचित अंडों को हैचिंग तश्तरियों में व्यवस्थित करने तथा उचित मात्रा में जल प्रवाह (1.5-2.0 ली० प्रतिमिनट) करके उनकी हैचिंग की तकनीकी के विकास में भी केन्द्र ने उत्कृष्ट कार्य किया। कुल 24410 निषेचित अण्डों से पैदा होने वाले माहसीर बच्चों (जीरा) का प्रतिशत 92.4 तथा इन शिशु माहसीर से उत्पन्न एडवान्स फ्राइ का प्रतिशत 93.7 था।

माहसीर मछलियों के बच्चों को तराई क्षेत्र के तालाबों में पालने का प्रयोग भी पहली बार इस वर्ष इस संस्थान के वैज्ञानिकों द्वारा किया गया है। तराई क्षेत्र के तालाबों में माहसीर मछलियों के पालन पोषण की तकनीक से प्रजनकों की पैदावार यदि सफलता पूर्वक की जा सकी तो माहसीर मछलियों की बढ़ोत्तरी में आशातीत प्रगति की जा सकेगी। अभी तक इस परियोजना के अन्तर्गत संस्थान के वैज्ञानिकों द्वारा तराई क्षेत्र की जलवायु वाले तालाबों

प्रजनक तैयार करने का लक्ष्य है ताकि माहसीर मछलियों के पालन पोषण की नयी पद्धति विकसित की जा सके।

इस वर्ष 11 मादा प्रजनकों (जिनका भार 550-1390 ग्रा० तथा लम्बाई 385-560 मी०मी० थी) से कुल 26540 अण्डे प्राप्त किये गये। इन अण्डों को तकरीबन समान भार वाले (325-965 ग्रा०) नर मछलियों के उत्पाद द्वारा निषेचित किया गया। निषेचन की सफलता 95.2 प्रतिशत आंकी गयी स्फुटन के दौरान पानी का तापक्रम 13.0-20.5° सेल्सियस था और इन अण्डों के स्फुटन में कुल 90-100 घंटे का समय लगा।

वर्ष में कुल 21060 फ्राई का उत्पादन किया गया जिसमें 12000 नौकुचियाताल, 3300 भीमताल व 3200 सातताल झीलों में प्रत्यारोपित किये गये। 1000 फ्राइ को पंतनगर विश्वविद्यालय के तालाबों में संचित करने के बाद 500 अंगुलिकाओं को रूद्रपुर के एक फार्म में प्रयोग के तौर पर संचित किया गया।

ट्राउट मछलियों का पालन पोषण:

संस्थान के चम्पावत केन्द्र ने इस वर्ष भी छीड़ापानी मत्स्य प्रक्षेत्र पर विदेशी नस्ल की ट्राउट मछलियों के पालन पोषण की परियोजना के अन्तर्गत ट्राउट मछली की अंगुलिकाओं के रखरखाव का कार्य किया ताकि इन अंगुलिकाओं को

तकनीक विकसित करने में सफलता अर्जित कर लेता है तो उत्तर प्रदेश के पर्वतीय क्षेत्रों में तथा समान जलवायु वाले अन्य पर्वतीय इलाकों में ट्राउट मछलियों का सफलता पूर्वक प्रत्योरापण किया जा सकेगा।

परिस्थितिकीय अध्ययन:

राष्ट्रीय शीत जल मत्स्य अनुसंधान केन्द्र के मुख्यालय हल्द्वानी से सम्पादित परियोजनाओं के अन्तर्गत इस वर्ष कुमाँऊ की दो मुख्य झीलों में परिस्थितिकीय व मत्स्यकी अध्ययन का कार्य किया गया। खुंपाताल झील में चल रही परियोजना में परिस्थितिकीय अध्ययन द्वारा मत्स्यकीय विकास व व्यवस्था का कार्य पूरा कर लिया गया है। तथा नौकुचियाताल झील के परिस्थितिकीय अध्ययन के लिए एक परियोजना इस वर्ष शुरू कर दी गयी है ताकि देश के पर्वतीय क्षेत्रों की अन्य झीलों में मत्स्यकी विकास के लिए यह परियोजना एक मॉडल के रूप में कार्य करे।

शीत जल स्रोतों का सर्वेक्षण:

पर्वतीय क्षेत्रों के ठंडे पानी के स्रोतों का मत्स्य विकास की दृष्टि से उपयोगिता आंकने के लिए कुमाँऊ क्षेत्र के सीमांत जिला पिथौरागढ़ के नदी नालों का सर्वेक्षण किया गया। यहां के मुख्य जल स्रोत हिमालय से निकलने वाली नदियां हैं जिनमें

अन्य गतिविधियाँ:

संस्थान की विविध गतिविधियों के अन्तर्गत इस वर्ष भी अनुसंधान परियोजनाओं के अलावा कई संस्थाओं को सलाह सेवायें उपलब्ध कराई गयी। राजभाषा नीति के अन्तर्गत हिन्दी समिति की कई बैठकें आयोजित करके संस्थान में हिन्दी के कार्य की प्रगति की समीक्षा की गयी। संस्थान के अहिन्दी भाषी तीन कर्मचारियों ने पत्राचार पाठ्यक्रम के द्वारा प्रवीण परीक्षा उत्तीर्ण की इस वर्ष भी हिन्दी प्रसार सेवा (मुख्यालय) तथा इसके केन्द्रों में हिन्दी भाषा में अधिकाधिक कार्य करने की प्रेरणा दी गयी।

तकनीकी सहायता एवं दिशा निर्देश:

संस्थान के द्वारा इस वर्ष भी देश के विभिन्न राज्य सरकारों के मत्स्य विभागों, विश्वविद्यालयों व अन्य संस्थाओं को दिशा निर्देश व तकनीकी सहायता प्रदान की गयी।

उत्तर प्रदेश सरकार के मत्स्य विभाग को चमोली जिले में निर्माणधीन ट्राउट फार्म में हैचरी, ओवा हाउस व अन्य तालाबों के निर्माण के लिए तकनीकी सहायता उपलब्ध करायी गयी।

हरियाणा सरकार के मत्स्य विभाग को यमुनानगर जिले में ताजेवाला नामक स्थान पर माहसीर हैचरी खोलने के लिए तकनीकी सहायता

माहसीर हैचरी के लिए तकनीकी सहायता दी गयी। सम्बन्धी विषयों में जानकारी दी गयी।

उत्तर प्रदेश लखनऊ में वैकल्पिक उर्जा विकास संस्थान को छोटे-छोटे जलाशयों, तालाबों व जलप्रपातों में ठंडे पानी की मछलियों के पालन पोषण की तकनीक उपलब्ध कराई गयी।

लखनऊ के चिनहट प्रशिक्षण संस्थान (सी०आइ०एफ०इ०) के प्रशिक्षणार्थियों को ठंडे पानी की मछलियों के पालन पोषण सम्बन्धी विषयों की जानकारी उपलब्ध करायी गयी।

नारायण कालेज शिकोहाबाद (आगरा विश्वविद्यालय से सम्बद्ध) के अनुसंधान कर्मियों को ठंडे पानी की मछलियों की खुराक व पालन पोषण

जिला उद्योग केन्द्र, हल्द्वानी के प्रशिक्षकों को मछलीपालन की जानकारी देने हेतु विशेष वैज्ञानिक वार्ताओं का आयोजन किया गया।

अतिथि:

वर्ष 1993-94 में संस्थान में निम्नलिखित विशिष्ट व्यक्तियों का आगमन हुआ।

1. डा०पी०वी० देहादराय उप महानिदेशक (मत्स्य)
भा० कृ०अनु०प० कृषि भवन, नई दिल्ली
2. डा०एम०वाइ० कमाल सहायक महानिदेशक (मत्स्य)
भा०कृ०अनु०प० कृषि भवन, नई दिल्ली
3. डा० के० राधाकृष्णन सहायक महानिदेशक (मत्स्य)
भा०कृ०अनु०प० कृषि भवन, नई दिल्ली
4. डा० कुलदीप कुमार निदेशक एवं मुख्य मत्स्य संरक्षक
हिमाचल प्रदेश सरकार बिलासपुर (हि०प्र०)

- | | | |
|----|----------------------------|---|
| 7. | डा० एच०ए० खान | प्रिंसिपल
सी०आइ० एफ०इ० ट्रेनिंग सेन्टर चिनहट, लखनऊ |
| 8. | डा० सी०एस० सिंह | प्रभारी
मत्स्य विज्ञान महाविद्यालय कृषि एवं प्रौद्योगिकी
विश्वविद्यालय पंतनगर, नैनीताल उ०प्र० |
| 9. | श्री यशपाल आर्य (एम०एल०ए०) | एम०एल०ए०
उत्तर प्रदेश लखनऊ |

संस्थान में कार्यरत कर्मचारियों की सूची

वैज्ञानिक वर्ग

डा. हरभजन सिंह रैना	प्रधान वैज्ञानिक (कार्यकारी परियोजना निदेशक)
श्री मदन मोहन	प्रधान वैज्ञानिक
डा. श्याम सुन्दर	वरिष्ठ वैज्ञानिक

तकनीकी वर्ग

श्री सौमित्र राय	टी -II-3
श्री बलदेव सिंह	टी-1-3
श्री असीम मखोपाध्याय	टी-1

प्रशासनिक वर्ग

श्री प्रकाश चन्द्र

सहायक प्रशासनिक अधिकारी/
सहायक वित्त एवं लेखा अधिकारी

श्री आर. एल. रैना

सहायक

श्रीमति सुशीला तिवारी

आशुलिपिक

श्री हरीश राम

वरिष्ठ लिपिक

श्री मन्नी लाल

कनिष्ठ लिपिक

कु. खिलावती सयाना

कनिष्ठ लिपिक

सहायक (आक्सीलरी वर्ग)

श्री बक्शी राम

चालक

श्री भगवान सिंह

चालक

सहायक

श्री रविन्दर कुमार

एस.एस.ग्रेड ।

श्री प्रकाश चन्द्र तिवारी

- तदैव -

श्री जगदीश चन्द्र भण्डारी

- तदैव -

श्री राजेन्द्र कुमार आर्या - तदैव -

श्री गोपाल - तदैव -

राष्ट्रीय शीत जल मत्स्य पालन अनुसंधान इकाई - भीमताल

श्री आर. के. अग्निहोत्री	वैज्ञानिक
श्री आर.एस. हालदार	टी - 4 (फार्म मैनेजर)
श्री जप्फू राम	एस.एस. ग्रेड III
श्री संत राम	एस.एस. ग्रेड II
श्री हंसा सिंह	एस.एस. ग्रेड I

राष्ट्रीय शीत जल मत्स्य पालन अनुसंधान इकाई-चम्पावत

डा. सी.बी. जोशी	वरिष्ठ वैज्ञानिक
डा. बी.सी. त्यागी	वरिष्ठ वैज्ञानिक
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श्री राहुल बहल	वैज्ञानिक
श्री रविन्दर कुमार	टी -I
श्री मदन लाल	एस.एस. ग्रेड IV