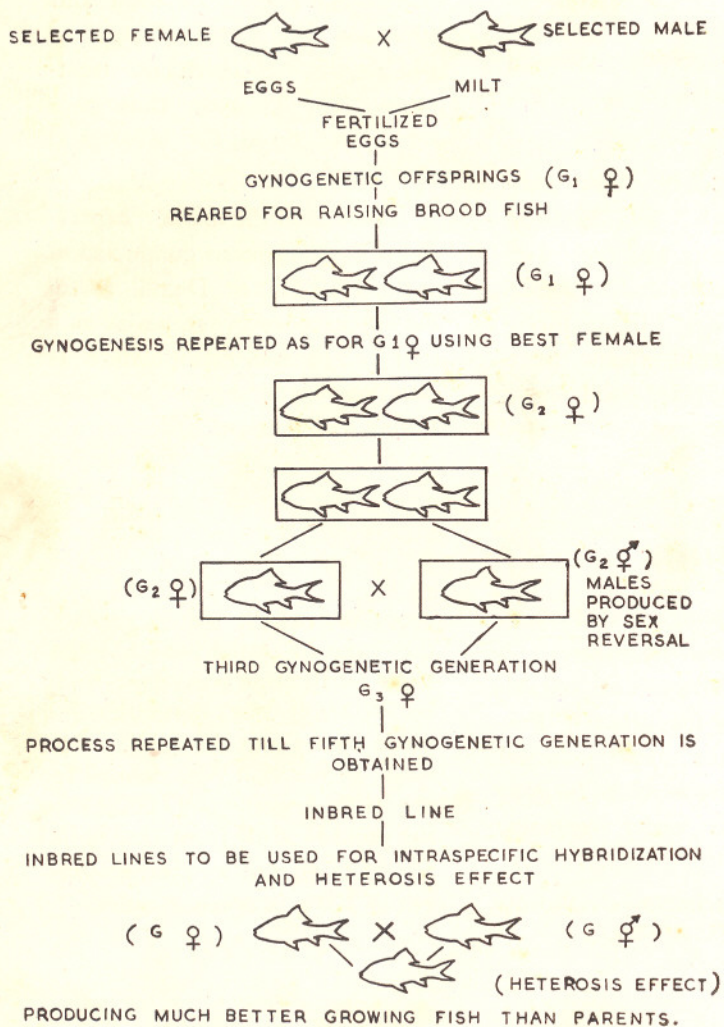


## GYNOGENESIS FOR IMPROVING FISH PRODUCTIVITY



- Genetically inactivated sperms by irradiation with ultraviolet rays.
- Diploidy restored by temperature shocks.
- First generation.

- Second generation.
- 50% of offsprings fed with methyl testosterone to produce males (sex reversal)

- Third generation.



# RESEARCH HIGHLIGHTS

## FISH GENETICS/Gynogenesis

### *Gynogenetic catla and silver carp produced*

*Artificial gynogenesis based on inactivation of sperm and diploidisation of maternal chromosomes is used for producing gynogenetic populations. This is an important tool in fish genetic research to produce inbred lines with a high degree of homozygosity of characters aimed at improving productivity of fish. Earlier, scientists at FARTC were successful in inducing gynogenesis in rohu and common carp.*

And now catla and silver carp too. For the first time gynogenetic catla have been produced. Catla eggs were fertilised with genetically inactivated milt of rohu. Fertilised eggs were subjected to cold/heat shocks to restore the diploid condition. The fry thus hatched out are being reared in the laboratory for future studies. A few fingerlings released in a 0.02 ha pond have shown good growth. All these young ones show typical catla (maternal) characters. Female homogamety would necessarily mean that gynogenetic offsprings are females.

**Recessive trait exposed :** The appearance of a few albino/colored

catla among gynogenetic offsprings showed the presence of this gene in heterozygous condition in certain catla populations. The gynogenesis has resulted in its homozygosity, thereby the expression of this trait. This further evidences the success of gynogenesis and its use in locating recessive or hidden traits in fish populations.

**Silver carp :** In silver carp the gynogenesis was attained through fertilising the eggs with genetically inactivated sperms using U. V. rays. In restoring homozygosity cold shock treatment at 12°C yielded good result. Two to five percent of treated

eggs hatched out. Rearing of fry is in progress.

**Polyploids :** Attempts were made to induce triploidy in rohu and rohu-catla hybrids fertilized with normal sperms of rohu and subjecting the fertilized eggs to cold shocks and colchicine treatments. The progeny thus produced are reared for cytological screenings.

This and the earlier experiments in gynogenesis conducted at the FARTC at Dhauri reveal the success of gynogenesis as a tool for genetic manipulation in selection programme involving Indian major carps.

## LOW INPUT TECHNOLOGY/Pond culture

### *Common carp culture in Kashmir*

Common carp culture in a rural pond in Kashmir assures promises. In an experiment conducted by CIFRI Centre at Srinagar 180 kg of *Cyprinus carpio* was harvested from a pond of 0.06 ha after seven months.

This rate of production (3,000 kg/ha/7 months) has demonstrated

that the small ponds in this region which were hitherto considered as a waste by the villagers can suitably be used to raise fish crops. Further the results also indicates success of common carp farming in rural areas under temperate climate.

In this experiment no elaborate

procedure which would escalate the rate of input was adopted. Pond fertilisation was done only by diverting the domestic and cattle wastes into the pond. The food production was enough for the 420 fingerlings (7,000/ha) in the pond to grow from an initial weight of 40 g to an average weight of 500 g in seven months. □



## COMPOSITE FISH CULTURE/Northern region

**Production touches new heights**

Fish production to the tune of 8,208 kg/ha could be obtained in a period of 8 months at Karnal Centre, Haryana under the All India Coordinated Research Project on Composite Fish Culture and Fish Seed Production. This happens to be the highest production so far recorded under composite fish culture from northern region.

The pond having an area of 0.08 ha was stocked with 320 fingerlings (4,000/ha) in six species combination of catla 1.0 : rohu 1.0 : mrigal 1.0 : silver carp 2.5 : grass carp 2.0 : common carp 2.5. The management measures adopted involved application of both

organic fertilisers and feeding of grass carp with terrestrial (para grass) and aquatic (*Hydrilla* sp.) weeds. The fish harvested after eight months amounted to 656.8 kg.

**Commendable growth :** All the six species registered an average weight of over one kg. While the silver carp and grass carp attained 2.4 and 3.3 kg respectively, the respective average weight of catla, rohu, mrigal and common carp were 1.6, 1.1, 1.03 and 1.7 kg.

**Promising results :** This record production of 8,208 kg/ha/8 months was registered from one of the three ponds under experimental

trials during the 11th set of experiments conducted at Karnal centre. In the other two ponds too, the production rate was promising i.e., 4,534 kg/ha/7 months and 5,624 kg/ha/8 months. On several earlier occasions too, the production at this centre had exceeded 5,000 kg/ha in 8-11 months. These experiments have clearly demonstrated that a stocking density of 4,000-4,500 fingerlings/ha can result in as high as 5,000-7,500 kg/ha in northern region under polyculture of carps by adopting scientific fish husbandry techniques. This is further evidenced by a production of 6,130 kg/ha/11 months obtained in a farmer's pond under the Lab to Land Programme of this centre.

**ON THE ANVIL-9****FISH DISEASES AND THEIR CONTROL**

Disease is still one of the limiting factors in the expansion and intensification of aquaculture industry. As we advance in understanding the fish diseases and their control, we are faced with an increasing number of recognised infectious diseases. Everchanging environment in waterbodies coupled with intensification of fish culture magnifies the problems posed by diseases.

Records of fish diseases date back to 330 B.C. However, the disease control research in freshwater

aquaculture extends back only to a few decades. The last two decades have witnessed a change in emphasis towards prevention.

**CIFRI's approach :**

With the advent of aquaculture practice in India as an industry, CIFRI realised that aquaculture cannot afford to ignore the impact of disease in culture systems. CIFRI's approach in fish pathology investigations does not focus narrowly on a search for pathogens but carries



a wider perspective incorporating environmental, nutritional and physiological variations. This is why the Institute's attempt to control fish diseases envisages fish health monitoring and protection as well.

Freshwater Aquaculture Research and Training Centre of CIFRI at Dhauli mainly concentrates on carp diseases. Survey of pond fish populations to identify the parasites and microbial pathogens infesting carps is underway since quite some time. The survey has already resulted in certain revealings, like the detection of columnaris in rohu, *Labeo rohita* and the enzootical nature of renal myxosporidiasis in Indian major carps in the Districts Cuttack and Puri. The pathogens and parasites are isolated in the laboratory for a proper identification of the diseases. Histopathological changes in the intestine associated with individual disease entities are also looked into.

Investigations aiming at standardisation of various parameters for fish cell culture, its maintenance and cryopreservation are at hand in the laboratory. The preparation of materials for the inoculation of cell culture is also attempted. Inoculation of the disease causing bacteria and viruses on experimental population is followed to derive at proper methodology to fight each disease. Sensitivity of the pathogens to various drugs are experimented to pinpoint effective drugs at right doses for a particular disease. Studies on haemosiderosis in catla will be conducted for detecting haemosiderin pigment and also to identify causative factors for haemosiderin formation in the fish.

The field observations include study and monitoring of environmental parameters favouring the disease and those helping its control. Stock density, stress factor, nutritional requirements, selection of resistant stock etc. are well considered.

Information on many commonly occurring communicable and non-communicable diseases of culturable species will be generated by these investigations. A package of prophylactic and control measures to ensure better survival, growth and health status of farm fishes is expected to be available by these investigations.

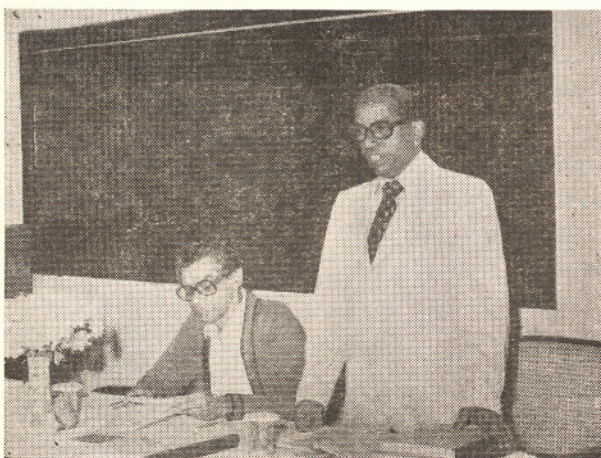
Barrackpore Centre concentrates on fish diseases met with in sewage ecosystem and the estuarine environment in and around Calcutta. Isolation and pure culture of disease causing bacteria and viruses from the sewage-fed ponds and bheries and Kulti Estuary is in progress. Experimental inoculation of these bacteria on healthy fishes is also to be done in order to ascertain the conditions under which the diseases are caused and transmitted. Preventive measures are also to be sorted out. This investigation is particularly relevant in the context of the large-scale fish culture practices adopted in the area and also due to the aesthetic objections including fears of contamination raised by certain sects of people.

Dilip Kumar, B. K. Mishra and R. K. Dey, S-1 scientists at Dhauli and R. N. Pal, S-2, P. B. Das, T-5 and S. P. Ghosh T-3 at Barrackpore are at work on these problems.





The Staff Research Council meeting started at 10.00 hrs. on 13 January, 1983 at Barrackpore. Dr. A. V. Natarajan, Director, Central Inland Fisheries Research Institute in his opening remarks expressed satisfaction on the overall progress achieved by CIFRI in 1982. He deeply appreciated the gains in brackishwater paddy-cum-fish culture, mahseer and large catfish breeding, sewage-fed fish culture, freshwater prawn farming, cage culture and beel fisheries. The Director underlined the diverse and complex inherent problems in riverine and lacustrine ecosystem which make it difficult to adopt a common management strategy for these water bodies. Commenting on the success in carp genetics, nutrition and health protection he expressed happiness over the excellent facilities being developed at FARTC, Dhauli. Dr. Natarajan also stressed on problems which needed immediate thrust in the research project programme of the Institute.



Representing ICAR, Dr. P.S.B.R. James, Assistant Director-General (Fisheries) participated in the meeting. With a call to all project leaders for a critical review of the ongoing projects, he pinpointed certain areas which invited CIFRI's indepth attention. The fisheries management in beels and Brahmaputra system, use of large water bodies for fish culture operations, saline and ground waters resource exploitation in N.W. states, management of bheries, utilising frog as predators of paddy pests, pen and cage culture in large reservoirs, culture and use of algae as fish food, fish farm designing etc. were certain areas on which he gave stress. He was happy over the wealth of information gathered by CIFRI which paved the way for many an advancements in inland fisheries front.



The meeting was attended by 85 scientists from various centres of the Institute. They reviewed the progress made under each project in 1982 and gave shape to research project programme of the Institute for 1983. Reorientation was given to the ongoing projects wherever found desirable. The project programme was also modified in the light of guidelines received from ICAR. The meeting ended at 5.45 p.m. on 15th January, 1983.



## EXTENSION

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### HIGHLIGHTS

#### Exhibitions

CIFRI Extension Section participated in the following exhibitions :

- Grameen mela at Sekhala, Dist. Hooghly during 26-29 January, organised by the Rural Health Institute ;
- Annual agricultural exhibition from 6-13 February at KVK, Nimpith ;
- Ballydewangunj (Dighra), Dist. Hooghly from 15-19 February, 1983 organised by Pallimangal, Ramkrishna Mission Belur ; and
- Diwanpara Krira O Sanskriti Sangha, Belgharia during 17-20 February, 1983.

CIFRI extension scientists conveyed the intended message with the aid of posters, charts, blow-up photographs and models. An estimated number of over one lakh visitors including a good number of fish farmers took advantage of these fisheries stalls.

#### Fish Farmers' Days

A Fish Farmers' Day was organised at Aniya, Chanditala Block, Dist. Hooghly which was attended by about 250 fish farmers. Films on composite fish culture and induced breeding were also screened on this occasion.

The extension scientists also participated in discussions related to fish farming on the Fish Farmers' Day at KVK, Nimpith.

A 9 day training programme was arranged for Mr. N. E. Nnote and Mr. V. H. Amire, fisheries Officers from Nigeria who were at this Institute under FAO study tour programme. They were also taken around a few centres of CIFRI in West Bengal.

The extension scientists also briefed the trainers from IIT, Kharagpur and Netaji Subhas Cooperative College, Kharagpur. They also attended to over a hundred students who called on the Institute.

Shri P. Das, Scientist-in-charge of Extension Section delivered a talk on 'Fish Culture technologies suitable for small and marginal farmers of Sunderbans' at Nimpith, 24-Parganas.

## NEWS

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#### Picking fish from tea gardens

There are several established ways to integrate fish culture with agriculture. These do exist in Asian countries from olden times. However, Sri Lanka has sought a new avenue by producing fish around the tea bushes. With the help of the Inland Fisheries Division of the Ministry of Fisheries, fish are produced from 350 ponds in tea gardens at Uva Region for

more than ten thousand workers. Varieties involved in culture are carps and tilapia.

—Fish Farming International

#### Trout from skies

The barren lakes in British Columbia were sown with 6,00,000 rainbow trout seed from a low-flying aircraft. The air drop was necessitated by the inaccessibility to the lakes for the tank trucks.

#### Desert pond tilapia

A team of scientists under professor Lev Fischelson of Tel Aviv University has been developing a species of tilapia which can thrive well in brackishwater from desert wells. This tilapia population has been found to flourish on natural algae thereby replacing imported supplementary feeds.



## STAFF NEWS

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### Promotions :

Name	Designation		W. e. f.
	From	To	
Mr. D. K. Chatterjee	S-1	S-2	1 July, 1980
„ M. Rout	S-1	S-2	„
„ P. K. Saha	S	S-1	„
„ G. C. Laha	S	S-1	„
„ M. Chaudhury	S	S-1	„
„ K. O. Joseph	S	Three advance increments	„

### Retirement :

Mr. R. N. Singh, T-1-3 ( Driver ) retired from service on 1st January, 1983 on attaining superannuation.

### Relief :

Shri B. Venkatesh was relieved from the service of the Council and CIFRI on 28/2/83 to join National Bank for Agriculture and Rural Development, Bhubaneswar.

### Kaliyamurthy gets Ph. D. degree :

Mr. M. Kaliyamurthy, S-1 at Bhavanisagar Centre was awarded Ph. D. degree by Magadh University, Bodh Gaya, Bihar. His thesis entitled 'Studies on the percoid fishes of Pulicat Lake, South East Coast of India' was based on a study on biology, fishery, ecology and parasitology of some selected species of perches from Pulicat Lake.

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Holmes, R. L. and J. N. Ball

The pituitary gland : A comparative account (Biological structure and function 4)

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Swaminathan, M S.

Economic ecologists of India.

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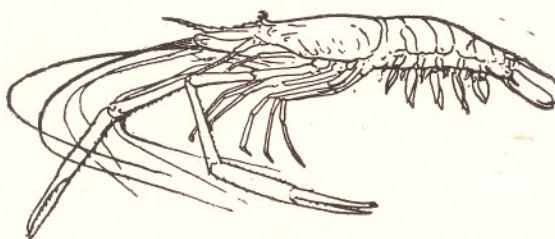
Statistical techniques in quantitative genetics.

Khan, Mohammad Abdul Quddus *ed.*

Pesticides in aquatic environments.

Rao, K. L.

India's water wealth : Its assessment, uses and projection.



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