



CICFRI NEWSLETTER

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CIFRI RECHRISTENED AS CENTRAL INLAND CAPTURE FISHERIES RESEARCH INSTITUTE

The mandate of CIFRI has been modified giving added emphasis on the capture fisheries resources of the country and the Institute is rechristened as Central Inland Capture Fisheries Research Institute (CIFRI) with effect from 1.4.1987. This reorganization is

a part of the creation of four separate institutes in inland fisheries for specialised research. Two new Research Institutes and a National Research Centre have been carved out of CIFRI viz., Central Institute of Freshwater Aquaculture, Central Institute of

Brackishwater Aquaculture and National Research Centre for Coldwater Fisheries. Under the changed setup, the CIFRI is entrusted with the responsibility to conduct research for developing systems for monitoring and improving fisheries production in

THE VICE-PRESIDENT VISITS CIFRI PAVILION

The exhibition pavilion of CIFRI at Ramakrishna Ashram, Nimpith was visited by His Excellency, Shri R. Venkataraman, Vice-President of India on 22nd February, 1987. At the pavilion, the Vice-President was received by Dr. Arun G. Jhingran, Director of CIFRI and was briefed on the activities of the Institute in the areas fisheries research, extension and training. (News on page 6).



natural and man-made inland water resources through stocking, optimum exploitation and conservation.

Brief history of CIFRI

The Government of India in a Memorandum brought out in 1943, stressed the need for having a separate central research department for fisheries in the best interest of development of fishery resources of the country. A Fish Sub-Committee of the Central Governments' Policy Committee on Agriculture, Forestry and Fisheries endorsed the Memorandum and the Central Inland Fisheries Research Institute was established in Calcutta on March 17, 1947. The Institute was shifted to Barrackpore in 1949. The main objectives were to conduct investigations for a proper appraisal of inland fisheries resources of the country and to evolve suitable methods for their conservation and optimum utilization. While fulfilling the above objectives, the Institute directed its research efforts towards understanding the ecology and production functions of inland waterbodies available in the country like the river systems,

lakes, ponds, tanks, reservoirs and ox-bow lakes. These studies have unravelled the complex trophic structure and functions *vis-a-vis* the environmental variables in different aquatic ecosystems.

During the last four decades CIFRI has made significant contributions to the development of inland fisheries in the country. Inland fish culture which remained at a near subsistence level has been elevated to the status of a profitable vocation. Some of the CIFRI technologies like riverine carp seed production and composite fish culture have found ready acceptance among the fish farmers throughout the country. The Institute has also developed new technologies for paddy-cum-fish culture, sewage-fed fish culture and integrated fish and livestock farming. The breakthroughs achieved by the Institute in carp seed production, and hatchery management for freshwater and brackishwater prawns paved the way for rapid development of inland aquaculture in the country. The technological upgradation in aquaculture was one of the major factors that contributed to the phenomenal

increase in inland fish production from 0.2 m t in 1951 to 1.2 m t in 1984-85.

Fish culture in confined waters like ponds are practised under controlled conditions with a high degree of human intervention in monitoring the ecosystem. On the other hand, capture fisheries norms for open waters like rivers, man-made lakes, ox-bow lakes and tanks are based on conservation and exploitation of natural populations. As the production functions in open waters have a direct bearing on the environment, comprehensive studies on the habitat variables and their impact on the fauna and flora at different trophic levels are imperative to develop capture fisheries. Fish production from capture fisheries sector still contributes about 80% of the total inland production in the country. It is in recognition of the importance of conservation and optimum exploitation of our capture fisheries resources in our country that the CIFRI has been created with a view to enunciating scientific principles to be applied for the development of capture fisheries resources of the country.

RESEARCH HIGHLIGHTS

MAJOR CARP FISHERY IMPROVES IN THE UPPER STRETCH OF RIVER BRAHMAPUTRA

A recent study of the catch structure of Brahmaputra fishery, based on the fish landings, indicates an improvement of major carp fishery in the upper stretches of the river. Seventy eight tonnes of fishes were estimated to have landed during July-December, 1986, at two centres, *viz.*, Uzanbazar and Fancybazar. Out of the total catches, major carps

contributed 12.8% at Uzanbazar and 37.8% at Fancybazar, while catfishes amounted to 15.2% and 7.2% respectively. Minor carps were only 6% and 1% at the two respective centres. *Labeo rohita* dominated among major carps, followed by *Catla catla* and *Cirrhinus mrigala*; while *Wallago attu* and *Mystus seenghala* dominated among catfishes. Among

minor carps, *Labeo gonius* and *L. bata* were the dominant species.

The investigations reveal that the fishery of Indian major carps shows an increasing trend in contrast to the observations made in earlier years (1975-80) when the fishery in these stretches mainly comprised catfishes and minor carps.

BHETKI AS A BIOCONTROLLING AGENT FOR TILAPIA

Some estuarine and freshwater wetlands situated in Calcutta spill area are faced with the problem of profuse breeding of *Oreochromis mossambicus*, popularly known as tilapia. High population density of the species has created enormous management problems related to overall fish production from the wetlands.

To evolve a suitable biological control mechanism, laboratory experiments were conducted along with field trials to assess the efficacy of bhetki, *Lates calcarifer* in controlling the recruitment of tilapia (*Oreochromis mossambicus*.)

In laboratory trials, it was observed that *Lates calcarifer* of 45-72 mm size actively predate upon tilapia of 11.0 to 18.5 mm size. Smaller *Lates* (40-50 mm), however, did not predate upon tilapia of 23 to 28 mm introduced along with smaller ones.

In a field trial, conducted in sewage-fed pond (0.17 ha) it was observed that *Lates* effectively controlled the recruitment of tilapia as was indicated by



the presence of only larger groups of tilapia (260 g, 110 g and 27.1 g) in the catch during partial harvesting. Absence of spawn/fry during harvesting, which was done employing dragnet (*Chat jal*), further confirmed the above findings, though breeding activities of the species were evident

from the presence of a large number of breeding pits at the marginal part of the pond. Stomach content analyses of *Lates* showed the presence of tilapia of different sizes. During the present course of culture, *Lates* stocked @ 185 no/ha, grew to 306 mm/426.5 g in 5½ months.

DR. JHINGRAN URGES THE SCIENTISTS TO BRING OUT THEIR BEST

Dr. Arun G. Jhingran, Director, CICFRI in a meeting with the scientists of the Institute held on 25 March, 1987 at Barrackpore called upon them to consummate the research assignments given to each of them with dedication and zeal. He was apprising the scientists of the new mandate given to the Institute under the banner *Central Inland Capture Fisheries Research Institute*. The scientists were duty bound to ensure that the research work carried out in the Institute was of high order, enough to bring forth watersheds in the capture fisheries management in the country. He urged the scientists to strive for excellence while pursuing their research assign-

ments. The target set for the projects for a particular year as outlined in the Activity Milestones were to be accomplished in the same year and the scientists were accountable for them, he reminded. The Director reiterated the importance of proper maintenance of the data log books by every scientist. Annual Assessment reports should properly reflect the accomplishments of the scientists and the data presented therein should be analytical and complete. Dr. Jhingran also called for realistic targets to be set under the mission projects and all the Scientists-in-Charge of mission projects had to strive hard to achieve the goals within the stipulated time. The

Director assured to correct the existing anomalies in staff distribution pattern at certain centres of the Institute. He asserted that the extension activities of the Institute would also cover the culture aspects so that the information and expertise accrued through decades and available at the Institute are properly made use of. A proper information management system would be developed at the Institute in order to keep the scientists abreast with the latest knowledge in their field and to maintain close liaison between the institute and the sister institutions in the country and the world over.

EXTENSION

Talks

The scientists of the Extension Section of the Institute delivered a number of lectures for the benefit of trainee fish farmers of 24-Parganas (North) at Howrah; SEDP trainees at Kakdwip; progressive fish farmers undergoing district level training programme (DFO's Office, Barasat), etc. The topics of these lectures were— Inland aquaculture; Induced breeding; Fish disease and its control; Carp and magur culture in low saline ponds; Brackish-water fish culture; Composite fish culture; and Fisheries extension.

Visitors briefed

On various occasions during the months of January to April 1987, the Institute arranged demonstrations, film shows, discussions, field visits, etc. for a total of 337 trainee fish farmers from the districts of 24-Parganas (North) and Hooghly in West Bengal, Kamrup district of Assam, Tamil Nadu, Bihar and Uttar Pradesh; 30 V.L.W. trainees from Hooghly district; and 90 students from Gurucharan College, Silchar, Guwahati University; Fisheries College, Mangalore; and Department of Zoology, Calcutta University.

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Dr. W. A. Tolley, Consultant Biologist from Rotterdam, Netherlands visited the Institute on 6 January 1987. He delivered a talk for the benefit of the scientists and technicians of the Institute on *Ornamental Fishes* in the auditorium of the Institute. Dr. Tolley also had a demonstration on the preparation and maintenance of the aquaria. Dr. Tolley was briefed by the Director of the Institute Dr. Arun G. Jhingran on the activities and achievements of the Institute.



Prof. S. K. Mukherjee (second from left), Ex-Vice-Chancellor, Calcutta University visited the Institute on 5.2.1987 along with Mr. A. B. Dasgupta (third from left), Vice-Chairman, State Planning Board, Govt. of West Bengal, and Shri P. C. Chakraborti, Jt. Director of Fisheries, West Bengal (extreme right). They are in discussion with Dr. Arun G. Jhingran (second from right) and Dr. B. N. Saigal (extreme left).

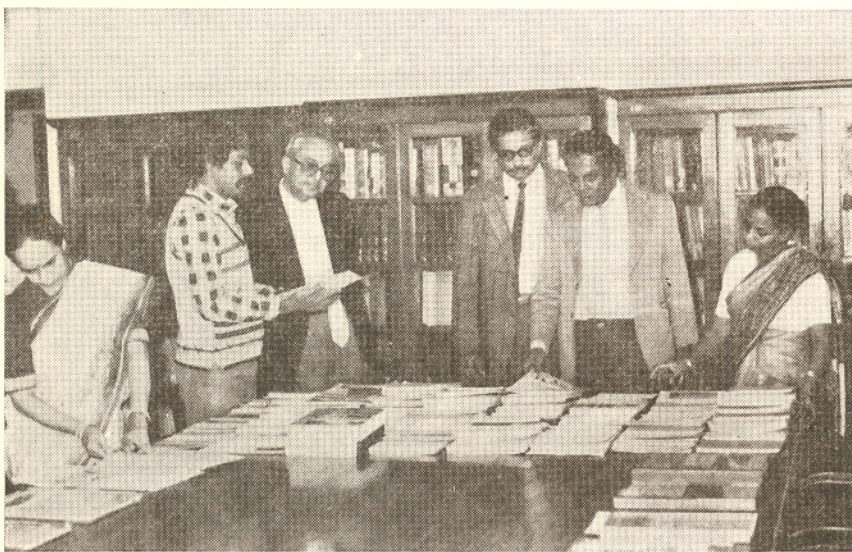
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Dr. Tolley addressing the scientists of CICFRI.





Shri B. G. Varghese, the eminent journalist, visited the CIFRI in February 1987 to apprise himself with the activities of the Institute. The picture shows: Dr. Arun G. Jhingran, Director, CIFRI handing over a set of CIFRI publications to Shri Varghese. Shri D. D. Halder (right) senior scientist is also seen.

Shri Varghese visits the Institute's library. Shri V. V. Sugunan, scientist briefs him on the Institute's activities.



Training

A course was conducted during 31 March to 15 April 1987 for Mr. Sunil Kumar Jaiswal, a Research Scholar from Osmania University, Hyderabad. Through the course, he was acquainted with aspects of *fish nutrition, fish breeding and aquatic pollution*.

A training course on *Carp Culture* was also conducted by the Extension Section during 6-16 April 1987 for 21 fish farmers from Agapur, New Barrackpore.

MANPOWER DEVELOPMENT

Courses organised by the NAARM, Hyderabad in 'Agricultural Research Project Management' for the Heads of the Divisions and Senior Scientists of ICAR Institutes, were attended by *Dr. B. N. Saigal*, Scientist S-3 (From 16 to 30 January 1987), *Shri R.N.Pal*, Scientist S-3 and *Dr. S.P. Ayyar*, Scientist S-3 (From 2 to 13 March 1987). The course covered concepts of research projects and the application of the 'Management Approach' to the problems of Agricultural Research Units. The need of such training for Senior Scientists in Research Management was emphasised in the last Directors' Conference held at Delhi. The content of the course included Project Planning, Project Selection, Monitoring and Evaluation, Organisation Structure, Group Dynamics, Leadership, Conflicts, Mass Communication, etc.

Dr. T. Ramaprabhu and *Shri G. N. Saha* from this Institute took part in the training course on *Human Resources Management* held at NAARM, Hyderabad during 8-23 April, 1987. The course held for the Senior Scientist in the cadres of S-3 and S-4 of the Council, stressed on the improvement of the efficiency of Senior Scientists holding research management positions and

EXTENSION

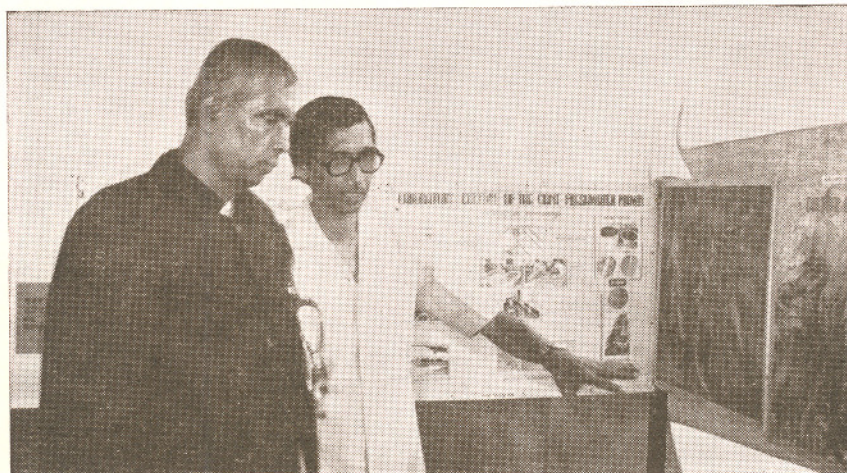
increasing the productivity of research. Topics like individual and the organisation, motivation of scientists, inter-personal relationships, transactional analysis, group dynamics, leadership, team work, research project management, etc. were also covered in the course.

Thirteen scientists from CICFRI joined the twenty-first Orientation Course on Agricultural Research Management held during 20 January to 19 February 1987 at NAARM, Hyderabad. The major objectives of the course were: to acquaint with the issues relating to agricultural research management process; to equip and acquaint with the techniques to the work better as a researcher; and to acquaint the philosophy of living, thinking and working together.

The course laid stress on the research project management and maintenance of Research Project File by each scientist in the ICAR system. Lectures on organisational behaviours, communication and technology transfer intercepted with individual and group exercises also formed part of the course. The participants were given practical exercises in preparing audio-visual material, scientific communications and use of mass media for dissemination of agro-information and field visits. The scientists from this Institute participated in the course were: (1) Shri P. K. Sukumaran, (2) Shri N. P. Srivastava, (3) Shri A. R. Choudhuri, (4) Shri V. K. Sharma, (5) Shri S. K. Sarkar, (6) Dr. V. Pathak, (7) Shri B. K. Banerjee, (8) Dr. M. J. Bhagat, (9) Shri S. K. Majumder, (10) Shri G. C. Laha, (11) Dr. Krishna Chandra, (12) Shri V. Kolekar, and (13) Shri R. K. Dwivedi.

Exhibitions

CICFRI participated in the



Shri Lahtan Singh, Minister for Agriculture, Govt. of Bihar at the CIFRI Pavilion in Vigyan gaon ki aor (science towards village), held at Munger. Shri Singh is briefed by Shri P. K. Pandit, extension scientist of the Institute.

following exhibitions aided by charts, posters, models, live fishes, etc.

Science Exhibition organised by *Naba Prativa*, at Chandanpukur, 24-Parganas during 23-26 January 1987 for popularising the various technologies developed by the Institute. An estimated gathering of about 1200 farmers/interested persons visited the stall during this occasion.

Vigyan Gaon Ki Aor (Science towards village) Exhibition at Munger (Safiabad), Bihar from 13 to 20 February 1987. Visitors estimated to be about 1.5 lakh visited the stall. They were explained about the Institute's contributions to the research and development of inland aquaculture.

Exhibition held at Nimpith from February 22 to 26, 1987 organised

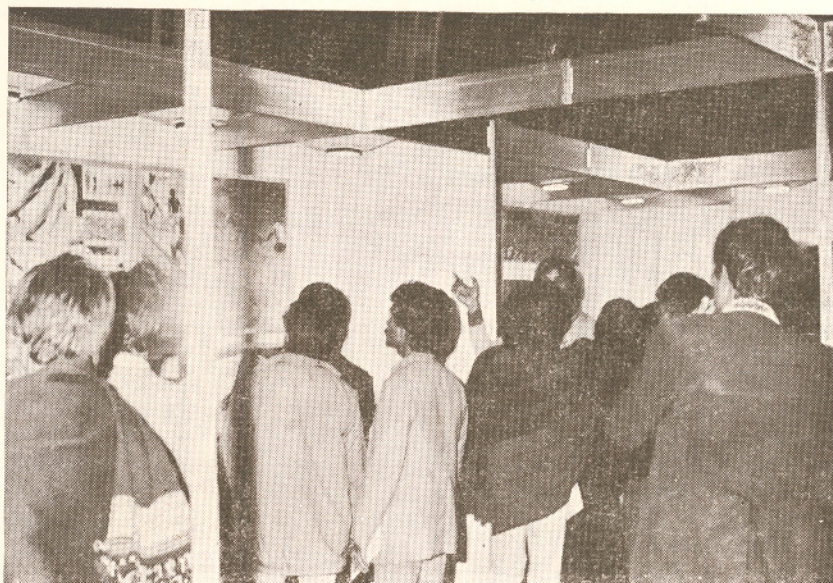
by Ramakrishna Ashram, Nimpith in connection with the Ashram's Silver Jubilee celebrations. Exhibits depicting the Institute's achievements and activities were displayed in the exhibition. His Excellency, Shri R. Venkataraman, Vice-President of India inaugurated the exhibition and His Excellency, Prof. Nurul Hasan, Governor of West Bengal also graced the occasion. The inaugural ceremony was attended by Dr. A. G. Jhingran, Director, CICFRI.

The Institute has active collaboration with the Ashram in their extension and training programme. The CICFRI pavilion at the exhibition attracted at least 10,000 visitors comprising farmers, entrepreneurs and students.

Exhibition "OUR INDIA" at Kohima from 7 to 15 March 1987. About one lakh fish farmers/interested persons visited the stall during the course of the exhibition,

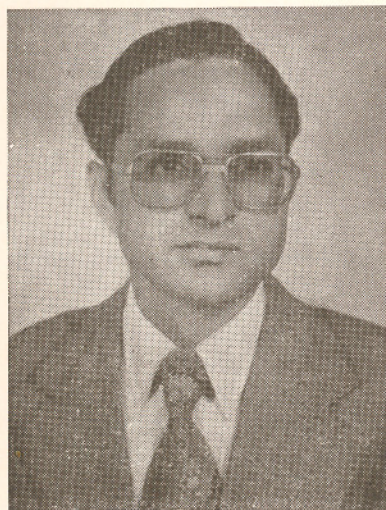
In commemoration of the Symposium on "Impact of current land use pattern and water resources development of riverine fisheries" the Institute organised an exhibition at its Headquarters from 25 to 29 April 1987. The exhibition was inaugurated by His Excellency Prof. Nurul Hasan, the Governor of West Bengal. The work and achievements of the Institute were appraised on to the distinguished dignitaries and interested persons during the exhibition. The exhibition was aided by models, live fishes, charts, etc. The pavilion had about 30,000 visitors.

Visitors to the CIFRI Pavilion at Kohima



STAFF NEWS

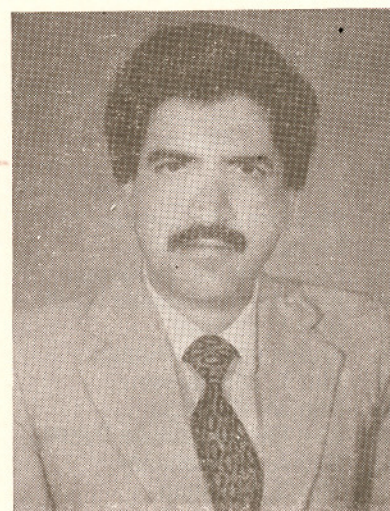
Ph.D. AWARDED



Shri Vijay Kumar Sharma, Scientist of this Institute at Bilaspur Centre has been awarded the Ph.D. degree by the Punjab University for his studies on "The biology and fishery of *Cyprinus carpio* Linn. from the Govindsagar Reservoir, Himachal Pradesh, India",

Shri D. K. Kaushal, Scientist at Bilaspur Centre of the Institute has been awarded the Degree of Doctor of Philosophy for his thesis "Studies on the aquatic fauna of Gobindsagar reservoir in relation to fish and fisheries" by the Meerut University, Uttar Pradesh. Dr. Kaushal studied the bottom fauna of Gobindsagar during July 1981 to 1983 in relation to the different environment factors and fish and fisheries of the reservoir. The density of benthos were clearly affected by the edaphic factors like inflow, outflow and water current. The reservoir level had an inverse relationship with the benthos population wherein the silty mud on clay favoured their growth. The fauna exhibited significant variation in different months at 1% level. A total of 19 genera of macrobenthos along with their spatial and bathymetric distribution are reported in the thesis. Gobindsagar, considering the benthic indices of trophicity is

characterised as a 'weak eutrophic reservoir' wherein benthic macroinvertebrates cause spatial distribution of *Cyprinus carpio*. Food habits of *C. carpio* and *Labeo calbasu* indicated their selectivity for dipterans under the prevailing conditions of the reservoir.



STAFF NEWS

Promotions/Appointments/Resignations

On the recommendation of the ASRB, the following scientists of the Institute are promoted to the next higher grade or granted advance increments as shown below:

Sl. No.	Name and designation	Promoted to/No. of advance increments	With effect from
1.	Shri D. K. De, S-1	S-2	1.1.84
2.	Shri S. Jena, S-1	S-2	1.7.84
3.	Dr. K. K. Vass, S-2	S-3	1.1.84
4.	Shri A. Mukherjee, S-1	S-2	1.7.82
5.	Shri S. N. Dutta, S-1	S-2	1.7.82
6.	Shri S. K. Wishard, S-1	S-2	1.7.84
7.	Dr. V. R. P. Sinha, S-3	S-3 (Personal Grade of	1.1.84
8.	Dr. P. V. Dehadrai, S-3	-do- S-5)	1.1.83
9.	Shri A. C. Nandy, S-1	S-2	1.7.80
10.	Shri D. Narayanaswamy, S-1	S-2	1.7.84
11.	Shri B. K. Banerjee, S-1	3 Advance increments	1.1.84
13.	Shri Balbir Singh, S-1	S-2	1.1.83
13.	Dr. K. J. Rao, S-1	S-2	1.1.83
14.	Shri M. K. Das, S-1	S-2	1.7.83
15.	Shri R. C. Das, S-1	S-2	1.7.83
16.	Shri J. B. Rao, S-1	S-2	1.1.83
17.	Shri P. K. Aravindakshan, S-1	S-2	1.7.82
18.	Shri V. R. Chitranshi, S-1	S-2	1.7.84
19.	Shri K. V. Ramakrishna, S-2	S-3	1.1.84
20.	Shri C. P. Rangaswamy, S-1	S-2	1.1.84
21.	Smt. G. K. Vinci, S-1	S-2	1.1.83
22.	Shri S. N. Mehrotra, S-1	S-2	1.7.82
23.	Shri D. V. Pahwa, S-2	S-3	1.1.84
24.	Shri G. K. Bhatnagar, S-2	S-3	1.1.84
25.	Dr. G. N. Mukherjee, S-2	S-3	1.1.84
26.	Shri Ch. Gopalakrishnaiah, S-2	S-3	1.1.84
27.	Shri S. D. Gupta, S-1	S-2	1.7.82
28.	Shri B. K. Mishra, S-1	S-2	1.1.83
29.	Shri G. N. Srivastava, S-1	S-2	1.1.83
30.	Dr. S. M. Pillai, S-1	S-2	1.7.83

Appointments

The following members of staff joined at CICFRI during the period:

Sl. No.	Name	Designation	Place of posting	Date of joining
1.	Shri Pintu Kr. Biswas	Enumerator (T-II-3)	Barrackpore	9.1.87
2.	Kumari Keya Saha	-do-	Barrackpore	14.1.87
3.	Shri Saket Kr. Srivastava	-do-	Patna	19.1.87
4.	Shri Haran Chandra Banik	-do-	Raipur	30.1.87
5.	Shri K. C. Pani	Farm Manager (T-II-3)	Dhauri	12.1.87
6.	Shri Dipak Kr. Biswas	-do-	Bhagalpur	14.1.87
7.	Shri T. Chatterjee	-do-	Barrackpore	15.1.87
8.	Shri M. P. Singh	-do-	Patna	15.1.87
9.	Shri Benoy Krishna Biswas	-do-	Guwahati	28.1.87
10.	Shri A. N. Mohanty	-do-	Dhauri	31.1.87
11.	Shri S. Krishnan	Enumerator (T-II-3)	Madras	24.2.87

Shri K. B. Rajani, Assistant Administrative Officer of this Institute is promoted to the post of Administrative Officer with effect from the forenoon of 28 March 1987 on ad-hoc basis for a period of 6 months.

Dr. C. Saha, S-2 was relieved of his post under this Institute in the afternoon of 7 February 1987 to take over his new assignment as Project Director, Orissa Shrimp Seed Production Supply and Research Centre of MPEDA on deputation for a period of 3 years.

Shri S. K. Bose, Assistant was relieved of his post under this Institute in the afternoon of 17 March 1987 to join as Accountant under the Zonal Coordinator (Zonal II), ICAR Lab. to Land Programme at Bidhan Chandra Krishi Vishavidyalaya.

Shri T. Bhattacharya, Junior Clerk has resigned from the service of the Institute from the afternoon of 7 February 1987.

CLUB CORNER

The Recreation Club of the Institute conducted its Annual Sports (outdoor) meet at Palta Water Works Ground, Monirampur, Barrackpore on 7 February 1987. Dr. Arun G. Jhingran, Director of the Institute as well as President of the Recreation Club inaugurated the sports meet. Results of the sports meet were as follows:

Shri Tridib Bhattacharjee winning his second prize in high jump.

Transfers

The following transfers were effected during January-April 1987.

Sl. No.	Name and designation	From	To
1.	Shri S. N. Mehrotra, S-2	Allahabad	Guwahati
2.	Dr. V. Pathak, S-1	Barrackpore	Patna
3.	Shri K. O. Joseph, S-1	CIFRI, Pollachi	CIBA, Pulicat Lake Centre

Joint Staff Council

The Joint Staff Council of CICFRI is reconstituted as under:

Dr. A. G. Jhingran, Director — *Chairman (ex-officio)*

Official Side

Shri Apurba Ghosh, S-3 — *Member*
 Dr. M. Sinha, S-2 — *Member*
 Shri V. V. Sugunan, S-2 — *Member*
 Shri L. M. Nandy, Sr. Adm. Officer — *Member (ex-officio)*
 Shri A. N. Mukherjee, Accounts Officer — *Member (ex-officio)*
 Shri M. L. Biswas, Asstt. Adm. Officer — *Member-Secretary*

Staff Side

Shri B. C. Bhattacharjee, Asstt. — *Member-Secretary*
 Shri Dipankar Chatterjee, Jr. Clerk — *Member*
 Shri A. R. Majumder, T-5 — *Member*
 Shri H. K. Sen, T-II-3 — *Member*
 Shri R. L. Balmiki, Driver — *Member*
 Shri Sukhlal Bairagi, S.S.G.-I — *Member*
 Shri B. B. Das, S.S.G.-II — *Member*
 Shri A. M. Patra, S.S.G.-III — *Member*

The tenure of office of the above reconstituted Joint Staff Council shall be for three years effective from 1st September 1986.



CLUB CORNER



The 100 m race in progress.

<i>100 metre race</i>	: Shri Swapan Das Shri Tridib Bhattacharjee Shri Fatik Manna	— 1st — 2nd — 3rd	
<i>200 metre race</i>	: Shri Swapan Das Shri Tridib Bhattacharjee Shri Fatik Manna	— 1st — 2nd — 3rd	
<i>400 metre race</i>	: Shri Muktipada Das Shri R. R. Debnatn Shri U. Bhattacharjee	— 1st — 2nd — 3rd	
<i>100 metre race (above 40 years of age)</i>	: Shri Surja Bahadur Shri Santosh Das Shri S. Sarkar	— 1st — 2nd — 3rd	<i>Tug of war</i>
<i>100 metre race (above 50 years of age)</i>	: Shri M. L. Biswas Shri B. B. Ghosh Shri B. C. Dutta	— 1st — 2nd — 3rd	<i>Winners—</i>
<i>High jump</i>	: Shri Muktipada Das Shri Tridib Bhattacharjee Shri B. N. Saw	— 1st — 2nd — 3rd	Shri A. M. Patra—(Captain) Shri T. K. Majumdar Shri R. Ghosh Shri M. S. Burman Shri Surja Bahadur Shri S. K. Paramanik Shri M. M. Das Shri N. N. Majumdar
<i>Long jump</i>	: Shri Fatik Manna Shri Tridib Bhattacharjee Shri S. Das	— 1st — 2nd — 3rd	<i>Runners—</i>
<i>Shot put</i>	: Shri Muktipada Das Shri Swapan Das Shri Manab Dutta	— 1st — 2nd — 3rd	Shri Swapan Dev—(Captain) Shri S. K. Das Shri B. C. Dutta Shri J. C. Patra Shri N. P. Saha Shri C. R. Das Shri D. K. De Shri B. K. Das
<i>Musical chair (Ladies)</i>	: Miss Jayasree Das Dr. (Mrs.) Krishna Mitra Smt. Sikha Majumdar	— 1st — 2nd — 3rd	
<i>Hitting the wicket (Ladies)</i>	: Smt. B. Sakuntala Miss Jayasree Das Smt. Rupali Chatterjee	— 1st — 2nd — 3rd	

JOURNALS RECEIVED

- Aquaculture, Vol. **52** (3-4), Vol. **53** (1-4), Vol. **59** (1-4), 1986 and Vol. **60** (1-2), 1987.
- Agricultural Wastes, Vol. **15** (1-4), Vol. **17** (1-4), 1986.
- Aquatic Botany, Vol. **24** (1-4), Vol. **26** (1-4), 1986 and Vol. **27** (1-2), 1987.
- Aquatic Toxicology, Vol. **9** (1-5), 1986 and Vol. **9** (6), 1987.
- Aquacultural Engineering, Vol. **5** (1-4), 1986.
- Aquatic Sciences & Fisheries Abstracts, Vol. **16** (1-2), 1986, and Vol. **16** (12), 1986.
- Australian Journal of Biological Sciences, Vol. **39** (2-3), 1986.
- Advances in Biosciences, Vol. **5** (1), 1986.
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- Biological Abstracts, Vol. **82** (3-9), 1986.
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- The British Journal of Nutrition, Vol. **55** (1-3), and Vol. **56** (1-3), 1986.
- Bulletin of Marine Science, Vol. **38** (1-3) and Vol. **39** (1-2), 1986.
- Canadian Journal of Fisheries, Vol. **43** (10-12), 1986.
- Comparative Biochemistry & Physiology, Vol. **83 B** (3-4), Vol. **84 B** (1-4), Vol. **85 B** (1-4), Vol. **84 A** (1-4), Vol. **85 A** (1-4), 1986 Vol. **86 A** (1-2), 1987.
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