



# CIFRI NEWSLETTER

Volume 8

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Number 1



Dr. Narinder Singh Randhawa has been appointed as the new Director General of ICAR and Secretary to the Department of Agricultural Research and Education, Government of India with effect from 1-2-85. Dr. Randhawa succeeds Dr. O. P. Gautam who retired from the services of the Council on attaining superannuation.

Born on 13 March, 1927 in the District of Amritsar, Dr. Randhawa has an illustrious career behind him. After his initial schooling at Lahore during pre-inde-

## Dr. N. S. Randhawa takes over as new Director General of ICAR.

pendent period, he obtained his postgraduate degree in agriculture from Punjab University, Solan (India) in the year 1956. Later, in 1964, he was awarded the degree of Doctor of Philosophy in soil science by the University of California, U. S. A.

In his 36 years of service, Dr. Randhawa held many important teaching, research and administrative posts with distinction in the field of agriculture. He was the Director of Agriculture, Punjab. He has served as the Professor, Dean, and Director of Research at Punjab Agricultural University, Ludhiana. Dr. Randhawa held the post of Deputy Director General (Soils, Agronomy and Engineering), ICAR since April 1979

till his appointment as Director General in Feb., 1985. Dr. Randhawa is a recipient of many coveted awards and fellowships for his outstanding contribution to agriculture. He has held important portfolios in various academic societies and is Fellow of a number of national science bodies. He was also a member of many delegations representing the country at international forums, both in India and abroad.

CIFRI fraternity extends warm welcome and whole-hearted cooperation in his efforts towards giving a new direction and dimension to ICAR system in agricultural research, education and extension. We wish him resounding success in his new office. □



**CIFRI'S PROGRESS IN CULTURE OF GIANT AFRICAN SNAIL *ACHATINA FULICA***

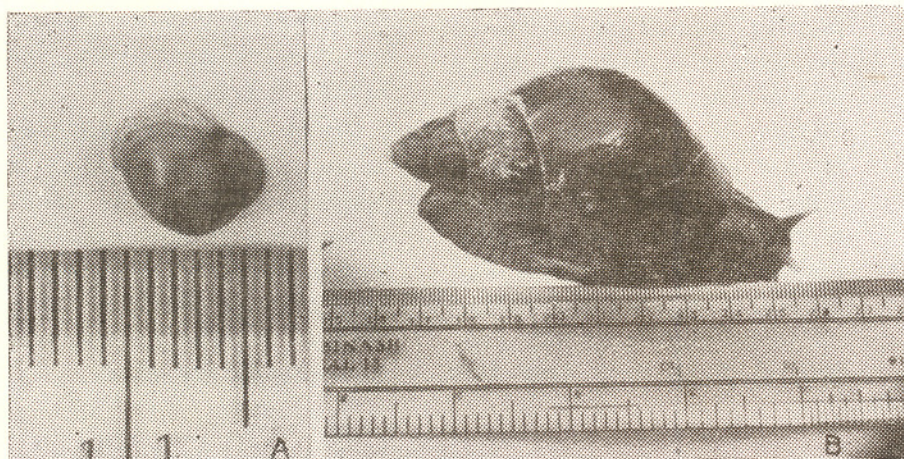
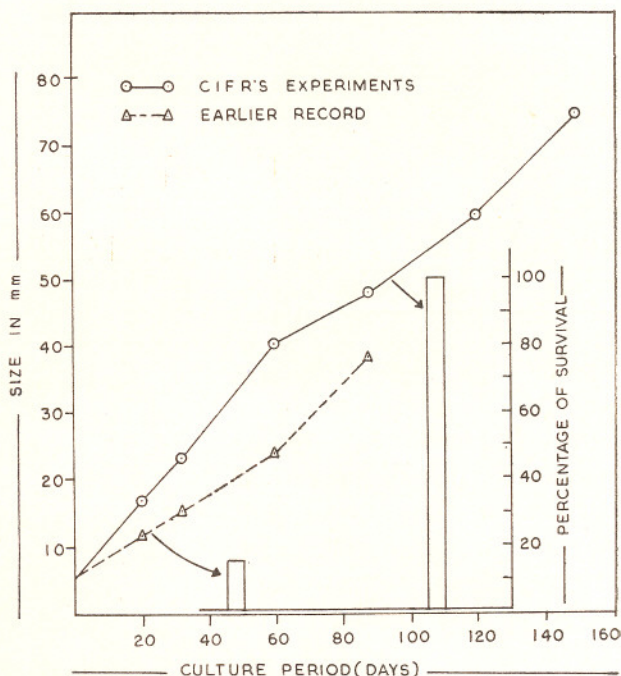
Giant African snail, *Achatina fulica* recorded an impressive growth when reared in improvised terraria at CIFRI, Barrackpore. The snails raised on kitchen refuse attained 74 mm and 61.6 g in 150 days with cent percent survival. Earlier recorded attempts to rear them resulted in heavy mortality and a much lower growth rate.

*Achatina fulica*, though normally regarded as an agricultural pest is edible and commands an attractive foreign market. According to MPEDA, there is a demand for 20,000 t of edible molluscs in France alone. CIFRI has taken up culture experiments on freshwater and land molluscs with a view to developing technologies of culture for export.

*Achatina fulica* is believed to have been introduced in India from Mauritius in the year 1847. It is viviparous in nature and the hatchlings measure 5 mm in size and weigh 67 mg. Newly hatched snails were collected from nature and stocked in improvised glass terraria of the size 46 × 23 × 25 cm. They were fed daily with kitchen refuse comprising spinach, ash gourd, ridge gourd, tomato, brinjal and an assortment of vegetables at the rate of 5% of body weight. Crushed egg shells were also given once a week to meet the calcium requirements of the snails.

**Export potential for snail's meat**

Processed meat of snails (*Achatina fulica*, *Helix aspersa*, etc.) is a prized delicacy in many European countries, especially in France. At present Eastern Europe and South East Asian countries are the major suppliers to France. Whereas *Achatina* is collected from wild, *Helix* is cultured.



Top—Growth performance of the snail during CIFRI'S experiment compared to earlier records.

Left—Hatchling of *Achatina fulica* just 5 mm in size.

Right—After rearing in terraria for 150 days they have grown to 74 mm.



The importance of these animals in meeting the shortage of meat in poor countries cannot be overlooked. Snails have been farmed for food in Europe since Roman times. Japanese troops raised them through out South East Asia to provide fresh meat in the jungle during World war II. Nigerian researchers also recently set up snail farms, but most of the output ends up in Paris because the French pay such high price for this delicacy. National Research Council, USA exploring the uncoventional areas of science that could help developing countries, has given utmost im-

portance in snail farming in their preliminary appraisals on mircolivestock farming.

India is endowed with a variety of species of snails. Snail farming in India has potential to capture world market in snail meat.

Apart from the ubiquitous *Achatina*, close relatives of *Helix aspersa*, viz., *Hemiplecta basileus* and *Ariophanta beddomei* are available in India meriting attention of culturists. CIFRI's successful rearing experiments of snails initiated at the instance of M. P. E. D. A. would now be followed by large-scale farming in designed field experiments. □

### REMATURATION AND BREEDING OF TIGER SHRIMP

Spent tiger shrimp *Penaeus monodon* collected from catamaran catches off Paradip coast (Orissa) were successfully rematured in the hatchery at Puri Centre and spawned to give viable eggs. Rematuration occurred after resorting to bilateral ablation of the eye-stalk.

Unilateral ablation of the eye-stalk resulted in the development of the gonad only up to early II stage of maturity even after 20 days. Once the bilateral ablation was done, 40% of the

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*Specimens of P. monodon induced to mature at Puri centre of CIFRI at various stages of maturity.*

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Stage II  
( 230 mm/125g)

Stage III  
(235 mm/131 g)

Stage IV  
(270 mm/180 g)



prawn reached the final stage of maturity within 6-8 days. The water temperature and salinity in the maturation tanks ranged from 22-30°C and 32-36 ppt respectively. The prawns were reared on chopped boiled molluscan meat

fed *ad libitum* two times a day. Mating occurred and viable eggs were released in two instances.

In addition, a batch of farm-reared prawns and an immature stock of Chilka prawns were also reared to full maturity in the

laboratory. These prawns too matured only up to stage II after unilateral eyestalk ablation. Final stage of maturity was attained after bilateral ablation.

The Centre was successful in 'rearing nauplii to P.L. 5 stage.

### SIXTH WORKSHOP ON BRACKISHWATER FISH FARMING

The Workshop was held at CIFRI Headquarters at Barrackpore on 25th January, 1985. In his welcome address Dr. A. V. Natarajan, Director, CIFRI recalled CIFRI's vital contribution to the multifarious aspects of the brackishwater aquaculture in the areas of site selection, farm layout, seed survey, nursery and development of production systems and

crop sequence for east and west coasts of India.

Dr. Natarajan's disclosure on the breakthrough in the seed production of the tiger shrimp *Penaeus monodon* at the Ennore (Madras) hatchery installed by CIFRI received wide acclaim. Large-scale seed production of this estuarine shrimp now being a possibility, he desired for establishing a series

of hatcheries and seed banks to meet the growing seed requirement of estuarine shrimps.

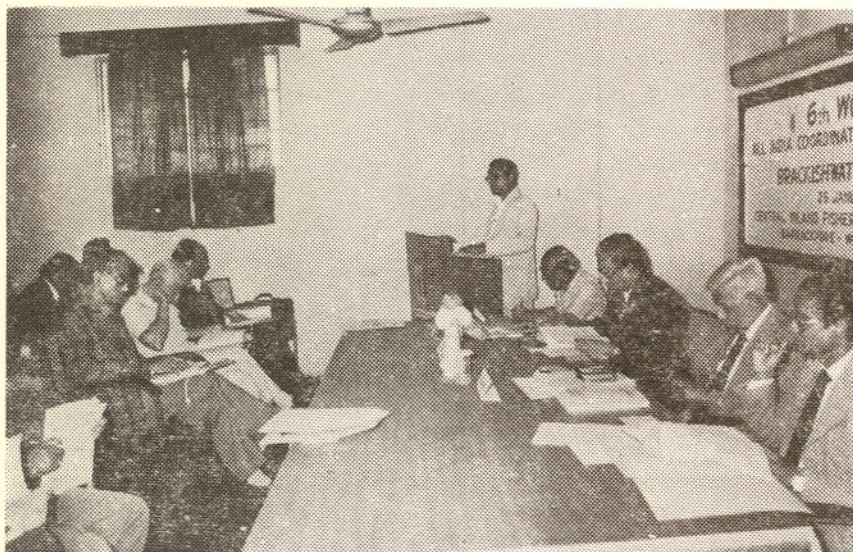
Pointing to the existing vital gaps in knowledge on brackishwater aquaculture on nutrition of the species and the ecology of brackishwater impoundments he pointed the Institute's current efforts in this direction. The Director hoped that the vast data on shrimp and brackishwater fish production generated by the Co-ordinated Project over the years would be availed fruitfully by states in planning their brackishwater aquaculture programmes.

Dr. V. G. Jhingran, Ex-Director of CIFRI looked retrospectively on circumstances leading to the sanctioning of the AICRP on Brackishwater Fish Farming and remarked that it had become necessary for the Project to start from basic studies. He said the formulae of seed, feed and breed should get



Shri K. H. Alikunhi addressing the participants at the inaugural session.





*Report from one of the centres being presented in the workshop.*

due attention in brackishwater aquaculture systems. Dr. Jhingran called for developing mullet and shrimp fishery in inland saltwater bodies in Rajasthan, Haryana and western U. P. He emphasized the need for infrastructure facilities at one or two places to carry out indepth basic and applied research to develop and refine the technologies. The norms thus derived could suitably be modified to suit varied agroclimatic and geomorphological conditions of our coast line.

Dr. K. H. Alikunhi, the Ex-Director of CIFE, chaired the inaugural session. While citing the successes under the project, he stressed the need for the transfer of technology. He felt equal attention needed to be given to brackishwater fish culture also,

though it might not be commercially as lucrative as the export-oriented shrimp culture. The fishes would meet needs of domestic consumption. He reposed his confidence in the committed young scientists and the experienced senior scientists in developing the brackishwater aquaculture into a viable economic proposition like other agricultural enterprises.

Shri G. N. Mitra, Ex-Joint Commissioner of Fisheries, Govt. of India felt that a lot of basic research work was yet to be done to give additional thrust to further improve the culture techniques. He cited the instance of fish and prawn nutrition. Survey of breeding ground of air-breathing fishes was another instance. He said facilities at FARTC could be utilised for basic investigations.

Based on a point raised by Shri Alikunhi that a high fecundity of *P. monodon* and its poor landings showed poor recruitment, Shri A. N. Ghosh stressed on development and conservation of the coastal environment. Mr. Ghosh also favoured a classification of the habitat to suit the type of brackishwater farming to be taken up.

In the following two sessions, technical reports of various centres were presented and discussed. The main points of discussion were seed availability from nature, survival of prawn seed in nurseries and farms, fish and prawn nutrition, growth rate, yield, etc. Besides, two papers, one on digestive physiology of brackishwater fishes by Dr. K. M. Das and the other on prawn feed formulation by Mr. A. Hajra were also presented in the workshop. The final session was devoted to the Project Coordinator's findings so far.

The following are some of the general observations of the workshop :—

- Subsidised shrimp seed banks may be established at centres of abundance ;
- The valuable data collected under the project may further be analysed and brought out in the form of a final report for circulation ; and
- Economic viability of the technologies may be assessed before the adoption. □



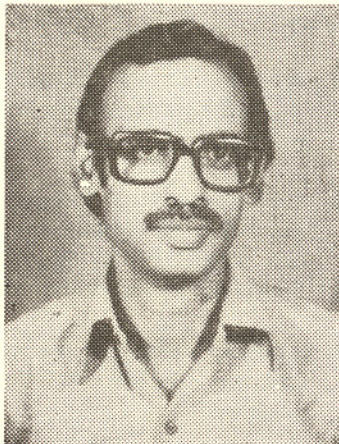
## STAFF NEWS

### HONORARY LIFE FELLOWSHIP FOR A. V. NATARAJAN

The Academy of Environmental Biology, India has bestowed on Dr. A. V. Natarajan, Director, CIFRI, its Honorary Life Fellowship at the General meeting held at Aurangabad on 22-12-1984. The Academy conferred the fellowship on Dr. Natarajan in view of his singular services and outstanding contribution to the field of fishery sciences and aquatic ecology.

### ICLARM PRIZE FOR CIFRI SCIENTIST

Dr. G. N. Chattopadhyay, Scientist at Rahara Centre of CIFRI won the \$ 500 prize of the Review of the year competition 1984, conducted by the International Centre For Living Aquatic Resources Management, Manila, Philippines. His entry which fetched the international prize was 'Chemistry of Brackishwater Fish Pond Soils With Special Reference to India'.



In the review Dr. G. N. Chattopadhyay has discussed the chemistry of bottom soils in brackish-water fish ponds in the context of its importance in determining the productivity of brackishwater fish ponds. An attempt has been made to elucidate the changes in water salinity levels of brackish-water ponds on some important soil properties, especially on the availability of some nutrient elements. Behaviour of various fertilizers applied to the pond soils and the scope of improving the efficacy of these fertilizers and manures in brackishwater environment has also been focussed in the review.

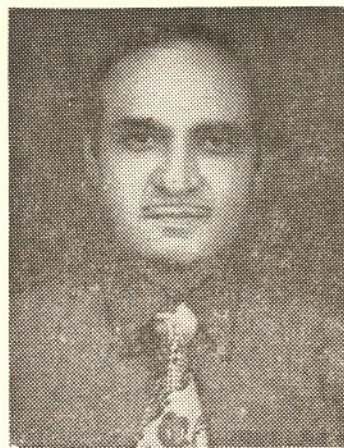
### S. N. MOHANTY AWARDED PH. D.



Sambalpur University, Burla, Orissa has conferred the degree of Doctor of Philosophy to Mr. Satyendra Nath Mohanty, Scientist at Freshwater Aquaculture Research and Training Centre of

CIFRI at Dhauli. Dr. Mohanty's contribution was on 'Autecology of *Rana tigrina* (Daud)'.

### B. K. SHARMA TAKES OVER AS CHIEF TRAINING ORGANISER, TTC



Upon his appointment as CTO, T.T.C. at Kausalyagang (Orissa), Mr. B. K. Sharma, S-3 has shifted from Operational Research Project, Kalyani to Kausalyagang.

### DR. M. R. SINHA NEW CHIEF OF OPERATIONAL RESEARCH PROJECT

Consequent to the appointment of Mr. B. K. Sharma as CTO, Dr. M. R. Sinha, scientist at Kalyani has been given full charge of the Operational Research Project on Integrated Livestock-fish Culture at Krishnagar.





## SEMINAR/SYMPOSIUM :

**Dr. V.R.P. Sinha**, Head, FARTC delivered a few lectures at the **First orientation-cum-training programme on 'prosperity through rice'**, held at IRRI, Los Banos, Manila from 23-30 January, 1985. During the course Dr. Sinha served as a visiting professor.

**Mr. K. K. Ghosh**, S-2 at FARTC Dhauli participated in a **meeting of senior statisticians** of ICAR Projects and Institutes at IASRI, New Delhi during 28-30 January, 1985. The meeting considered the possible new ideas in applied statistics relating to agricultural statistics. Shri Ghosh spoke as a key speaker for fisheries. The position regarding adoption of statistical designs in experiments at CIFRI and the achievements made in development of sample survey methodology was explained. Quite a number of recommendations made after the deliberations. Those having relevance to CIFRI have been taken note of by the Institute.

**Dr. K. Chandra** Scientist at Allahabad centre attended the **7th Annual Session of Indian Society of Agricultural Chemists** at University of Agricultural Science, Hebbal, Bangalore during Nov. 27-28, 1984. He also delivered an invited lecture entitled 'Some aspects of fisheries of inland waters of India in relation to pollution' in a Seminar on 'Chemical hazards in agricultural environment' conducted at the occasion.

**Dr. K. Chandra** also attended a **National Seminar on 'Assessment of environmental pollution caused due to industrialisation and urbanisation'** held at Marathwada University, Aurangabad during December 20-22, 1984. A paper on 'Possible pollution problems from wastes of power plants in India—A case study of Rihand reservoir, District Mirzapur, U.P.' was also presented by him at the seminar.

**Mr. V. V. Sugunan**, Scientist, **Mrs. Anjali De**, Librarian and **Mrs. Sukla Da.**, Senior Library Assistant participated in the **National Seminar on Agricultural Library and Information Service**, held at Bidhan Chandra Krishi Viswa Vidyalaya, Mohanpur (W. B.) during 4-7 February, 1985.

**Mr. Y. S. Yadava**, Scientist at Gauhati attended the **31st Annual Conference of Assam Science Society** held at Gauhati from 7-9 December 1984. At the conference Mr. Yadava presented a paper entitled 'Observation on the fishery of *Hilsa ilisha* of the river Brahmaputra at Gauhati'.

**Mr. K. R. Naskar**, scientist at Rahara Centre took part in the **International Symposium on Medicinal, Aromatic and Spice Plants** sponsored by the International Society of Horticultural Science, Netherlands. The Symposium was held at Darjeeling during 23-26 February 1985. Mr. Naskar presented a paper entitled 'Identity of some medicinal plants from the tidal mangrove forests of Sunderbans in West Bengal'.

## EXTENSION

### EXHIBITIONS :

The Extension Section with its well equipped audiovisual aids participated in four exhibitions. The scientists had fruitful discourse with the few thousand visitors beelined to the CIFRI stall. The exhibitions were :—

- **Gramin mela** organised by Garalgacha Science Club during 21-27 January, 1985 ;
- **Hooghly mela** held at Moshat (Hooghly Dist.) by Chanditala Sambad during 6-15 January, 1985 ;

- **Barranagar exhibition** from 26-1-85 to 28-1-85 ;
- **Gramin mela at Aniya** (Hooghly Dist.) from 26 to 31 January, 1985.

### FISH FARMERS DAYS

The Section participated in four Fish Farmers' Days in January. The Days were organised at Moshat, Kadamtala, Garalgacha and Nilgunj, all in West Bengal.



## EXTENSION

### ADVISORY SERVICE

Altogether 27 fish farmers received advices regarding various aspects of fish farming from the CIFRI extension scientists. The scientists visited several fish ponds to give on the spot advice to the farmers.

### TALKS/DISCUSSIONS

Shri U. Bhowmik, S-2, had delivered a talk on **Recent trends in aquaculture development** in the seminar 'Consolidation 84' organised by Rural Welfare Society, Diamond Harbour on 14-2-85.

On two occasions, Shri P. K. Pandit, S-1 met 46 fish farmers and talked to them on **Fish disease and its cure**.

### VISITORS BRIEFED

Over one hundred visitors (students, farmers, government officials, trainees, etc.) were briefed on recent aquaculture practices and the activities and achievements of CIFRI.

### FISH SEED PRODUCTION

As a result of fish breeding demonstrations at 6 centres of the Lab to Land programme, over 4 lakh seeds of common carp were produced in farmers' ponds.

## VISITORS



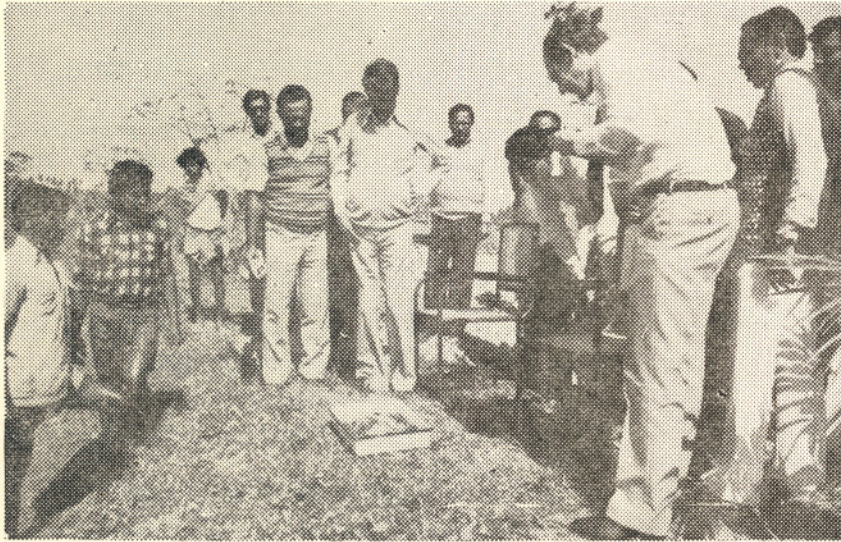
*A four member delegation from Bangladesh under the leadership of Md. Alibur Rahaman Dy. General Manager, Bangladesh Krishi Bank, Rajshahi visited CIFRI on 7. 2. 85. On the same day six fishery officials from Laos, Mrs. Manichand, Mr. Khamsing, Mr. Sethon, Mr. Bunthiang, Mr. Somai and Mr. Thomsathith visited the Institute. In the picture above, the members of Bangladesh and Laos delegation are seen in a meeting with the Director, Dr. A. V. Natarajan. Picture below shows the visitors from Laos at the Rahara Fish Farm of CIFRI.*





## VISITORS

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*Prof. E. Naylor, Head of the Dept. School of Animal Biology, University College of Wales, U. K. visited the Institute on 28.2.85. Dr. Naylor is seen visiting the Rahara Fish Farm.*



*Shri Alexander Luke, Commissioner of Fisheries, Gujarat (left) and Shri T. N. Satyanarayana, Asst. Director of fisheries who paid a visit to CIFRI on 14. 2. 85 are seen on discussion with Dr. A. V. Natarajan, Director, CIFRI.*

## LIBRARY

### Journals received

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AALDI Bulletin, **10**, 1982.

AID Research & Development Abstracts, **11** (3/4), 1984.

Aquaculture Abstracts, **5** (2) 1983.

Asian Aquaculture, **6** (8 & 9), 1984.

Aquatic Sciences and Fisheries Abstracts, **14** (9), 1984.

Aquaculture Magazine, **10** (4-6), 1984.

Australian Journal of Biological Sciences, **36** (5 & 6), 1983, **37** (4), 1984.



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- Australian Journal of Zoology, Supplementary Series No. 99, 1984.
- Bamidgeh, **36** (3), 1984.
- Bay of Bengal News, No. 16, 1984.
- Bulletin of Marine Science, **34** (2 & 3), 1984.
- Bulletin of National Research Institute of Aquaculture, No. 6, 1984.
- Canadian Journal of Fisheries and Aquatic Sciences, **41** (8 & 9), 1984.
- Canadian Technical Report of Fisheries & Aquatic Sciences, Nos. 1265, 1270, 1277, 1984.
- Copeia, No. 3, 1984.
- Crustaceana, **46** (1-3), 1984 & **47** (1), 1984.
- Current Science, **53** (23 & 24), 1984 & **54** (1), 1985.
- Ecological Modelling, **25** (1/3), 1984.
- Environmental Biology of Fishes, **11** (4), 1984.
- Environmental Conservation, **11** (3), 1984.
- Environmental Sanitation Abstracts, **6** (2 & 3), 1984.
- Environment and Ecology, **2** (4), 1984.
- Environmental International, **9** (6), 1983 & **10** (2 & 3), 1984.
- Everyman's Science, **10** (5), 1984.
- Fertiliser News, **29** (11 & 12), 1984.
- Fisheries : A Bulletin of the American Fisheries, **9** (1-4), 1984.
- Fishing Chimes, **4** (9), 1984.
- Fishing News International, **23** (9), 1984.
- Fish Farming International **11** (9), 1984.
- Freshwater and Aquaculture Contents Tables, **7** (10), 1984.
- Genetical Research, **43** (1-3), 1984 & **44** (1), 1984.
- Geobios, **12** (1), 1985.
- Genetic Technology News, **5** (1), 1985.
- Haryana Kheti, **16** (12), 1984 and **17** (1 & 2), 1985.
- Heredity, **52** (3), & **53** (1), 1985.
- Heredity, **52** (3), & **53** (1), 1984.
- Hydrobiological Journal, **20** (4), 1984.
- Hydrobiologia, **118** (3), 1984 & **119** (1-3), 1984.
- ICLARM Conference Proceedings, No. 11, 1984.
- ICLARM Newsletter, **7** (3), 1984.
- ICLARM Technical Reports, No. 15, 1984.
- Indian Farming, **34** (8), 1984.
- Indian Science Abstracts, **20** (6), 1984.
- Indian Journal of Agricultural Economics, **39** (3), 1984.
- Indian Journal of Animal Sciences, **54** (12), 1984.
- Indian Journal of Environmental Health, **26** (2), 1984.
- Indian Journal of Experimental Biology, **22** (10-12), 1984.
- Indian Journal of Marine Sciences, **13** (3), 1984.
- Irrigation and Power : Journal of Central Board of Irrigation and Power, **41** (3), 1984.
- Journal of Animal Ecology, **53** (1-3), 1984.
- Journal of the Bombay Natural History Society, **81** (2), 1984.
- Journal of Ecology, **72** (1 & 2), 1984.
- Journal Du Conseil, **41** (1 & 2), 1984.
- Journal of Experimental Marine Biology & Ecology, **83** (1-3), 1984.
- Journal of Environmental Biology **6** (1), 1985.
- Journal of Experimental Biology **108-111**, 1984.
- Journal of Fish Biology, **24** (3-6), 1984 & **25** (1-5), 1984.
- Journal of Fish Diseases, **7** (1-5), 1984.
- Journal of the Indian Society of Soil Science, **32** (3), 1984.
- Journal of Marine Biological Association of U. K., **64** (1-3), 1984.
- Journal of Nutrition, **114** (1-9), 1984.
- Journal of the World Mariculture Society, **14** 1983.
- Journal of Zoology, **202** (3-4), **203** (1-4) & **204** (1-3), 1984.
- Limnology & Oceanography, **29** (3-5), 1984.
- Newsletter, Network of Aquaculture Centres in Asia (NACA), **3** (1), 1984.
- Parasitology, **88** (1-3), 1984 and **89** (1), 1984.
- Paryavaran : Environmental News India, **1** (2), 1984.
- Pesticides Information, **10** (2), 1984.
- Prace Vurh Vodnany, **13**, 1984.
- Proceedings of the California Academy of Sciences, **43** (12-24), 1984.
- Proceedings of the Indian National Science Academy, **50** (5), 1984.



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Proceedings of the Indian Academy of Sciences (Animal Sciences), **93** (6-7), 1984.

Progressive Fish Culturist, **46** (1-3), 1984.

PTI Science Service, **4** (2), 1985.

Report, Annual Aquaculture Department, SEAFDEC, 1983.

Report, Annual Central Institute of Fisheries Nautical & Engineering Training, 1983-84.

Report, Annual Fresh Water Biological Association of U. K., **52rd.** for the year ended 31-3-84.

Sankhya : The Indian Journal of Statistics, **46 B** (3), 1984.

Scientific American, **251** (1-5), 1984.

SEAFDEC Newsletter, **7** (2), 1984.

Ukrainian Biochemical Journal, **56** (5), 1984.

Unesco Reports in Marine Science, No. 21, 1984 & No. 28, 1985.

U. S. Fish and Wildlife Service, Report, No. 17, 1982.

Water Research, **19** (1), 1985.

Weed Abstracts, **33** (11), 1984.

World Water, Feb, May, June, July & Oct. 1984.

Zeitschrift fur die Binnenfischerai der DDR, **31** (8-10), 1984.

## Books received

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Mather, Kenneth John L. Jinks.

**Biometrical genetics—The study of continuous variation.**

Jhingran, A. G.

**The fish genetic resources of India.**

Chopra, V. L., B. C. Joshi, R. P. Sharma & H. C. Bansal, ed.

**Genetics : New frontiers**, Proceedings of the XV International Congress of Genetics, New Delhi, 1983.

**Vol. I** : Genetic Organisation, Function & Regulation.

**Vol II** : Recombinant DNA Technology.

**Vol. III** : Genetics and Health.

**Vol. IV** : Applied Genetics.

**Abstracts of contributed papers : XV International Congress of Genetics**, New Delhi, December 12-21, 1983.

**Part I** : Sessions : C-1A to C-IVC. (Abstracts 1-772).

**Part II** : Sessions : C-IVD to C-VID (Abstracts 773-1522).

**Part III** : Plenary symposia and symposia sessions : Summaries of contributions.

Sharma, Uma & S. P. Grover.

**An introduction to Indian fisheries.**

Turner, William Barwell.

**The freshwater algae (Principally Desmidiaceae) of East India.**

Goode, George Brown & Tarleton H. Bean.

**Oceanic ichthyology—A treatise on the deep sea and pelagic fishes of the world.** (Part I Text & with an atlas containing 417 figures).

Chaudhuri, H. & S. B. Singh.

**Induced breeding of carps.**

Shankarnarayan, K. A. & V. Shankar.

**Grasses and legumes for forage and soil conservation.**

Gaur, A. C. & others.

**Organic manures.**

Srivastava, U. K. & others.

**Inland fish marketing in India :**

**Vol 1** : Overview : Summary and conclusions.

**Vol. 2** : Fish seed production and marketing.



## LIBRARY

- Vol. 3** : Freshwater culture fisheries.  
**Vol. 4A** : Reservoir fisheries.  
**Vol. 4B** : Case studies and profiles of selected major reservoirs.  
**Vol. 5** : Riverine fish system.  
**Vol. 6** : Brackishwater culture, estuaries, lakes and swamps.  
**Vol. 7** : Markets, co-operatives and corporations.  
**Vol. 8** : Data base for planning and control.

Kempner, Thomas ed.

**A handbook of management, 3rd ed.**

### NEW CIFRI PUBLICATIONS

#### PACKAGE OF PRACTICES

- 1. Package of practices of increasing carp seed production** (Aquaculture Extension Manual, New Series No. 1, Feb. 1985)  
P. Das and M. Sinha.
- 2. Package of practices for increasing production in carp culture ponds** (Aquaculture Extension Manual, New Series No. 2, Feb. 1985).  
V. R. P. Sinha, R. D. Chakraborty, S. D. Tripathi, P. Das & M. Sinha, G. N. Saha, D. P. Chakraborty, R. N. Pal, M. Ranadhir, S. Paul, P. Mitra and H. C. Karmakar.
- 3. Package of practices for increasing production of air-breathing fishes**  
(Aquaculture Extension Manual, New Series No. 3, Feb., 1985).  
P. V. Dahadrai, M. Yusuf Kamal and R. K. Das.

- 4. Package of practices for increasing production in rice-cum-fish farming system**  
(Aquaculture Extension Manual, New Series No. 4, Feb., 1985)  
Apurba Ghosh, S. K. Saha, R. K. Banerjee and A. B. Mukherjee.
- 5. Package of practices for increasing production in fish-cum-livestock farming system**  
(Aquaculture Extension Manual, New Series No. 5, Feb., 1985).  
B. K. Sharma, M. K. Das and D. P. Chakraborty.

#### TECHNICAL REPORTS

- 1. Report of the Quinquennial Review Team (1976-81) on the Achievements of the Central Inland Fisheries Research Institute.**
- 2. Sixth Workshop of All India Co-ordinated Research Project on Brackishwater Fish Farming, Barrackpore January 25, 1985.**
- 3. Sixth Meeting ICAR Regional Committee No. II, March 10-11, 1984. Agenda Notes.**
- 4. Report on the pilot sample survey for estimation the catch of inland fish in a region of West Bengal**  
1. Estimation inland fishery resources—  
K. K. Ghosh & P. M. Mitra-CIFRI, Barrackpore ;  
O. P. Kathuria, S. K. Raheja & Pranesh Kumar-IASRI, New Delhi.

#### BULLETIN

- Bulletin No. 37 : **Scope for scientific and commercial fish farming in West Bengal.**  
A. V. Natarajan.

*Edited by :*

V. V. Sugunan, V. K. Unnithan, (Mrs.) G. K. Vinci and S. Paul.

*Published by :*

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