



1st Indian Fisheries Outlook 2022



Hon'ble CM of Manipur, Shri N. Biren Singh inaugurating the Pengba ranching programme at Loktak lake



ICAR-CIFRI Exhibition stall got the 1st Prize at Sundarban Mela 2021

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Director's Column



The world is slowly coming back to normal after the onslaught of COVID-19. People suffers lot due to this dreaded disease in the last two years. The institute tried its best to lessen the impact of this pandemic on the life and livelihood of fishers. The advisories for fisheries sector developed by the institute for securing sustainable small scale fisheries in inland open waters were lauded and recommended by UN Food and Agricultural Organization (FAO). Scientific knowledge was disseminated and inputs, trainings were provided to the impoverished fishers in many parts of the country.

About ICAR-CIFRI

Started as Central Inland Fisheries Research Station in March, 1947 at Barrackpore, West Bengal, ICAR-CIFRI has carved a niche in inland fisheries research. Induced fish breeding, composite fish culture and other scientific fish production practices developed during the sixties by the Institute helped in bringing the blue revolution in the country. Reservoirs and wetland fisheries management technologies

The institute co-organized and hosted the first Indian Fisheries Outlook 2022 titled "Priming Indian Fisheries in Attaining Sustainable Development Goals" during 22-24 March, 2022. This was a mega event in which more than 500 researchers, academicians, scientists, students, representatives of industries and 100 farmers of West Bengal participated. A number of quality research papers were presented and discussed.

We have been relentlessly trying to restore the biodiversity particularly IMC in the River Ganga through ranching and awareness for the last couple of years. In addition to our regular efforts, a national ranching programme was launched on 14 May for large-sale ranching in different stretches of the Holy river. For the first time in history, fertilized hila eggs were ranching in this river. A mega ranching programme was also organized at the Loktak lake of Manipur for releasing pengbaby the Hon'ble Chief Minister of the state, Shri N. Biren Singh which. In human resources development front, we have successfully organized training programmes for fishers (18 in numbers), students (3). Besides, 8 mass

developed and disseminated by the institute resulted in enhanced fish production from these resources. By the turn of the year 2000, the research and development agenda of the Institute concerning inland open waters shifted from fish as the only benefit to ecosystem health and ecological benefits with emphasis on sustainability, livelihood and nutritional security. In addition to the Headquarters at Barrackpore and two Research Stations at

awareness camps were conducted and exhibitions have been participated. One patent and two design registration were filed. A couple of MoUs have been signed for license agreement and academic and research exchanges.

The institute bagged 1st prize in an exhibition displaying the activities and achievements of NMCG project at the 25th SundarbanKrishti Mela O LokoSanskritiUtsab at Kultoli, Sundarban. During the period, 31 of our scientists got promoted, I congratulate all of them. I also congratulate the staff who got awards/recognitions and brought laurels to the institute. I inform with heavy heart that we have lost one of our in-service colleagues, Mr. Kishore Shaw, AAO who left us for the heavenly abode. The institute mourns for his tragic death and prays to God for providing enough strength to the bereaved family to bear the loss.

August, 2022

Dr. B. K. Das
Director

Kolkata and Kochi, CIFRI has four Regional Research Centres at Allahabad, Guwahati, Bengaluru and Vadodara, through which the issues of inland open water fisheries are being addressed.



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सिफरी समाचार CIFRINEWS

(January - June 2022)

1st Indian Fisheries Outlook 2022

“Priming Indian Fisheries in Attaining Sustainable Development Goals”

The institute, in collaboration with Inland Fisheries Society of India (IFSI) and Professional Fisheries Graduate Forum (PFGF), Mumbai organized this mega event during 22-24 March, 2022.



Hon'ble Minister delivering inaugural address



DDG (Fishery Science), ICAR giving his remarks

The inaugural function was graced by Shri Bankim Chandra Hazra, Hon'ble Minister of Sundarban Affairs and Development, Government of West Bengal. While Swami Suparnanada Maharaj, Honorary Secretary, Ramakrishna Mission Institute of Culture, Kolkata, Dr. Riji John, Vice Chancellor, Kerala University of Fisheries and Ocean Studies (KUFOS) were the Guests of Honour. The inaugural function was presided over by Dr. J. K. Jena, Deputy Director General (Fishery Science). Dr. B. B. Nayak, General Secretary PFGF, briefed about the conference. Dr. B. K. Das, Director, ICAR-CIFRI, highlighted the importance of the theme of the conference.

Dr. J. K. Jena, DDG (Fishery Science) ICAR, New Delhi and Chief Guest, in his address emphasized on the importance of fisheries sector in Indian agricultural and rural economy. He highlighted that for fisheries and aquaculture SDG goal 2 (zero hunger), goal 3 (good health & well being), goal 14 (life below water) and goal 15 (life on land) are more relevant. He stressed that with the target of 22 million tons fish production under Prime Minister Matsya Sampada Yojana, time has come for more investment in this sector and bringing more entrepreneurs.

Shri Bankim Chandra Hazra, Honourable Minister of Sundarban affairs, Government of West Bengal in his address highlighted the important role played by fisheries sector in the economic development of West Bengal and India. He hoped that the conference will discuss and brain storm on prospering sustainable fisheries and aquaculture in India.

Swami Suparnanada Maharaj, Honorary Secretary, Ramakrishna Mission Institute of Culture, Kolkata delivered the 4th P. C. Thomas lecture on Civilization, Culture, Science and Religion. On this occasion, Honorary Fellowship of Inland Fisheries Society of India (IFSI) was awarded to Prof. P. C. Thomas, Ex Director, College of Fisheries, OUAT and Dr. A. Eknath, Ex Director General, NACA. On this occasion conference souvenir, book of abstracts and several books were released by the dignitaries. More than 500 researchers, academicians, scientists, students, representatives of industries and 100 farmers of West Bengal participated in the conference.



Director, ICAR-CIFRI delivering his speech



Dignitaries at the ICAR-CIFRI exhibition stall



Technical session in progress

Research Highlights

Record of *Macrobrachium rosenbergii* (de Man, 1879) and *Danio rerio* (Hamilton, 1822) from the middle stretch of the river Ganga



Macrobrachium rosenbergii (de Man, 1879) recorded from the middle stretch of the river Ganga

Single specimen of *Macrobrachium rosenbergii* was recorded from the river Ganga at Prayagraj (Latitude: 25° 30'30"N, Longitude: 81° 49'56"E) on 24-03-2022. It was an accidental catch in the fisherman's gill net of mesh size 15 mm. It is known to migrate from freshwater zones of the river Ganga into the saline areas of the Hooghly-Matlah Estuary



Zebrafish (*Danio rerio*) recorded in River Ganga

for spawning during December-July with a peak during March-May. The distribution of this species in the river Ganga was affected due to the construction of the Farakka barrage in 1970s and has not been recorded upstream since then. The observation of *M. rosenbergii* upstream of the Farakka barrage in the river Ganga is the biological indicator of the improvement in the environmental conditions of the river.

A specimen of the fish species *Danio rerio* (Total length -32.31mm & weight -0.381gm) was recorded for the first time from the main channel of the river at Bijnor (Latitude: 29° 22' 48"N, Longitude: 78° 02' 01"E), Uttar Pradesh during a survey in the middle stretch of the river Ganga in April 2022. *D. rerio* is popularly known as *Zebra danio* belongs to the order - Cypriniformes and family-Danionidae. The IUCN status of the species has been placed under Least Concern (LC) category. Twelve species of *Danio* are reported from the Indian water bodies. This species typically occurs in slow-moving to stagnant water bodies. The new finding indicates the potentiality of the sampling areas regarding their availability in the wild and also as suitable habitats for small indigenous fishes.

Absar Alam, Sushil Kumar Verma, Sandeep Kumar Mishra, Jeetendra Kumar, Dharm Nath Jha, Venkatesh Rama Rao Thakur, Shravan Kumar Sharma and Basanta Kumar Das

Fish diversity and catch composition of the river Khandepar, a major tributary of the Mandovi River, Goa

The fish diversity of the Khandepar, a major tributary of Mandovi River, is least studied. The tidal water of Mandovi reaches up to the lower reaches of Khandepar River and the salinity of the river stretch range from 0.3 to 0.65 ppt during the pre-monsoon and post-monsoon seasons. The fishery of the lower reaches of the Khandepar River near the confluence was composed of commercially important fish species viz., *Sillago sibama*, *Lates calcarifer*, *Mugil cephalus*, *Planiliza parsia*, *Arius arius*, *Chanos chanos*, *Sphyaena jello* and crab species like *Scylla serrata* and *Uca* species. About 16 fish species were recorded from the sampling station near the confluence of Khandepar River. Catfishes viz., *A. arius*, *Mystus seenghala* and *Horabagrus brachysoma* forms a major catch (70%) during the sampling period followed by mullets (15%) and *Sillago sibama* (6%). Gill net with mesh size ranges from 30-35 mm was the major gear operated in the river stretch with a CPUE of 5-8 kg/gear/operation or day. Moreover, the molluscan fishery by diving, at the river reach forms a major livelihood for the local fishers along the river stretch with a CPUE estimated as 4-5 kg/individual.



Molluscan fishery by diving

Vaisakh G, Suhas P Kamble, Lohith Kumar, S. Samanta and Jayesh K Solanki



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सिफरी समाचार CIFRINEWS

(January - June 2022)

Tidal bores affect Two blotch pony fish, *Nuclequula blochii* (Valeciennes, 1835) in Hooghly estuary

A tidal bore is a sudden elevation of the water surface that travels upstream of the estuary with the incoming flood tide. A tidal bore may travel a long distance upstream, even up to the inland waters as observed in Hooghly estuary. A recent survey at Hooghly estuary found that such tidal bores reached beyond Tribeni fishing areas, and fishers encountered a very good catch after the tidal bores, with occurrences of marine species in catch composition though the area is totally freshwater in nature, located at 212.1 km from the sea mouth. Marine species encountered after the bores were recorded as *Alepes djedaba*, *Ilisha megaloptera*, *Nuclequula blochii*, *Platycephalus indicus*, *Rhabdosargus sarba*, *Scatophagus argus*, etc. with the dominance of Two blotch pony fish, *N. blochii*. Two blotch pony fish, a demersal marine/brackish water species was found in good numbers after the tidal bores, usually found on shallow waters near the bottom in lower estuary, and one of the most affected species, which move towards upper estuarine waters due to tidal bores.



Dibakar Bhakta, Ranjan K. Manna, Sangeetha M. Nair, Chayna Jana, Shubendu Mandal, Abhijita Sengupta, S. Samanta and Basanta K. Das

Gill net selectivity to increase the catch efficiency and overcome growth overfishing of small anchovy: on-field observation



Coilia ramcarati, single species overwhelmingly dominant in gill net catch (30-40 mm mesh size)

Gear selectivity is an important tool for the effective management of any fisheries. A typical example of gill net selectivity was observed during the survey in December 2021 at the lower stretch of Hooghly-Matlah (Pathar Pratima fishing areas) estuarine systems. Fish landing-based observation found that a gill net of 120-150 m in length, 4.5-5 m in height with 30-40 mm mesh size is highly selective for the species *Coilia ramcarati*, and *C. dussumieri*. This will not only increase the fishing efficiency of such nets but also highly effective to overcome the growth overfishing. A 3-4-hour fishing haul below the lower part of Pathar Pratima fishing areas could yield 550-600 kg of anchovy and all are in matured stages (>250 mm in size). Anchovies were mainly harvested in the Hooghly-Matlah estuarine systems using stationary, or migratory estuarine set bag nets, which were found as a destructive fishery. Gill net selectivity with suitable mesh sizes may

conserve the species in the estuarine, and coastal waters and might overcome growth over fishing.

Dibakar Bhakta, Ranjan K. Manna, Sangeetha M. Nair, Chayna Jana, Shubendu Mandal, S. Samanta and Basanta K. Das

The Asiatic hard clam in the Rushikulya estuary: A supplementary livelihood support to fishers



Fisherwomen collecting edible clams

The estuarine part of the Rushikulya river in Odisha is less than one km in width with very shallow depth of less than a meter at the upper reaches. The tidal effect in the river extends for about 4 to 5 km upstream forming a small estuarine complex (19°22'–19°24' N latitude and 85°02'– 85°05' E longitude). The Asiatic hard clam, *Meretrix meretrix* is one of the edible clams, and very commonly available in the upper reaches of this estuary. In general, a group of



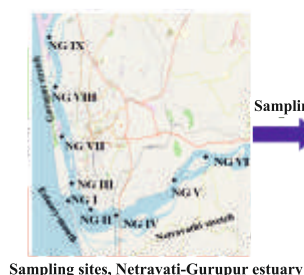
Collected edible clams from the estuary

fisher women consisting of 5–6 individuals are involved for the collection of those clams, and approx. 40–50 kg clams can be collected (3–4 hours) by an individual from the respective sites. Collection and sale of Asiatic hard clam in the estuary provides an income of Rs. 400–500 per individual and provides supplementary livelihood support to the fisher women of the nearby villages.

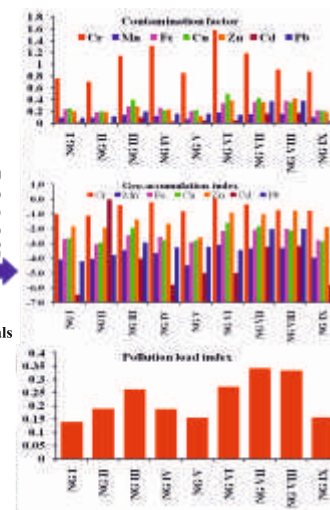
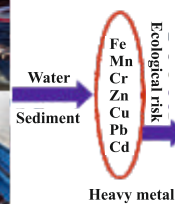
Pranab Gogoi, S. K. Das, S. Samanta and B. K. Das

Trace metals in water-sediment and associated pollution load indicators of Netravathi-Gurupur estuary: Implications on coastal pollution

The Nethravathi-Gurupur estuary, located in the Mangalore city of Karnataka on the West Coast of India, is formed by the confluence of Gurupur and Nethravathi Rivers. The Gurupur estuary receives the treated domestic sewage water ($4.8 \times 10^6 \text{ m}^3 \text{ y}^{-1}$) from Mangalore city. An industrial cluster of large-medium-small scale houses is also located near the Gurupur estuary. Using inductively coupled plasma mass spectrometry (ICP-MS), the study indicated that the metal content in water was in traces. The average concentrations of seven trace metals in the surface sediments of the estuary followed the order $\text{Fe} > \text{Mn} > \text{Cr} > \text{Zn} > \text{Cu} > \text{Pb} > \text{Cd}$.



Sampling sites, Netravathi-Gurupur estuary

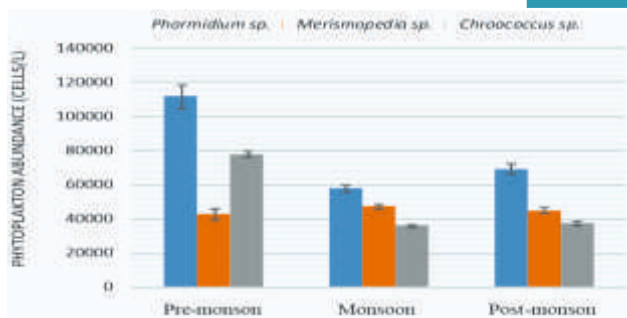


Higher concentration of metals were found at the Gurupur stretch. Based on pollution indicators, the pollution load index values of trace metals in sediment samples were less than one; the geo-accumulation index (I_{geo}) values of trace metals in sediment were less than zero; the contamination factors (CF) of all the heavy metals except chromium were less than one. Although all the studied metals were present at very low concentrations in water, the accumulated heavy metals in sediments could preferentially dissolve into the water by means of tidal churning and other forces. Although the present levels of trace metals in Netravathi-Gurupur estuarine system may not be a threat, their long-term accumulation may be potentially harmful to the aquatic biota and the human population dependent upon the system.

Ajoy Saha, D. J. Sarkar, B. K. Das, S. Samanta, M. E. Vijay Kumar and M. Feroz Khan

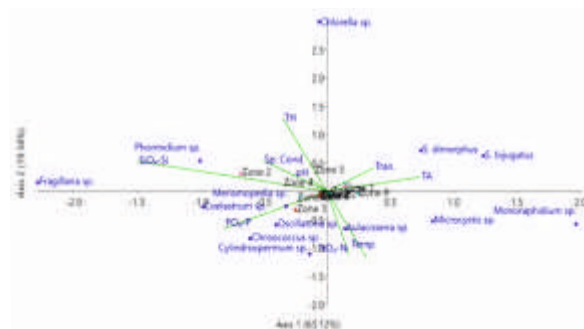
Seasonal variation and the key environmental parameters influencing the phytoplankton assemblage pattern in small tropical reservoir of India

The temporal variations of dominant phytoplankton community and their association with environmental factors, in a small tropical



Seasonal mean abundance pattern of the dominant species of phytoplankton in Derjang reservoir

reservoir Derjang, Odisha, India were assessed. During the study, 74 species of phytoplankton belonging to 54 genera were recorded in which Cyanophyta accounted 54% of the total phytoplankton population followed by Chlorophyta (31%) and Bacillariophyta (9.2%). The three major dominant species in the reservoir were *Phormidium* sp., *Merismopedia* sp. and *Chroococcus* sp., belonging to Cyanophyta. The leading species was *Phormidium*, throughout the seasons ($Y = 0.16, 0.12, 0.15$, in pre-monsoon, post-monsoon and monsoon, respectively) and it alone contributed 16.16% to the total phytoplankton population. The *Microcystis* sp. and *Chroococcus* sp. were dominated in summer season, while *Merismopedia* sp. in monsoon season. *Monoraphidium* sp. and *Cylindrospermum* sp. was dominated during post-monsoon season. Canonical correspondence analysis (CCA) indicated that the environmental parameters such as temperature, total alkalinity, total hardness and nutrients ($\text{NO}_3\text{-N}$, $\text{PO}_4\text{-P}$ and $\text{SiO}_4\text{-Si}$) were the effective variables for the abundance of the dominant species in the reservoir. The basic information on phytoplankton assemblage pattern would form a useful tool for further ecological assessment and sustainable fisheries management of the reservoir.



CCA plot showing the association of environmental parameters with dominant species of phytoplankton in Derjang reservoir

P. Majhi, U. K. Sarkar, Lianthuamluaia, C. Jana, B.K. Das, Y. Ali and B. Naskar

Indigenous cylindrical bamboo trap for catching small prawns in Dumbur reservoir, Tripura



Modified circular trap

A cylindrical trap, commonly used for catching small prawns in Dumbur reservoir of Tripura popularly known as "Ichar chai" has been documented. It is made up of woven bamboo strips in the form of mats with nylon twine, plastic tape and outer periphery wrapped with transparent polythene sheet instead of bamboo. The cylindrical trap is 36 cm long with one long bamboo stick with which four transverse bamboo sticks are tied (about 10 cm apart) in a circular fashion by nylon twine. From one side (tunnel end), two circular tunnels are made with bamboo sticks (about 2 mm diameter each) interwoven with nylon twine and fitted; from the other end (harvest end) the trap is closed with bamboo sticks (each about 5 mm wide) interwoven with nylon twine. Then the transparent polythene sheet is wrapped around and tied with nylon twine to complete the trap construction. From the harvest end, a nylon twine (35-40 cm long) is tied which is used to tie a thermocoal piece to act as a float for the trap. Fishers place some baits in the harvest end, prawns are attracted and directed towards the inner most chamber where they are trapped. The harvest end is opened and prawns are collected (about 50-120 g/ trap/ day). The cost of each trap varies from ₹ 70-80 and having a use-life of 1-2 years.



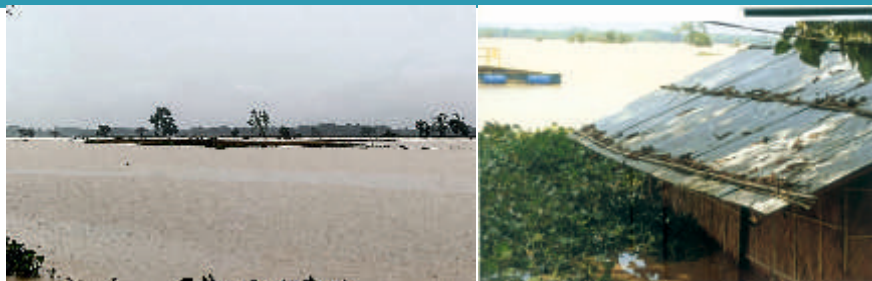
Circular tunnel of the modified trap

From one side (tunnel end), two circular tunnels are made with bamboo sticks (about 2 mm diameter each) interwoven with nylon twine and fitted; from the other end (harvest end) the trap is closed with bamboo sticks (each about 5 mm wide) interwoven with nylon twine. Then the transparent polythene sheet is wrapped around and tied with nylon twine to complete the trap construction. From the harvest end, a nylon twine (35-40 cm long) is tied which is used to tie a thermocoal piece to act as a float for the trap. Fishers place some baits in the harvest end, prawns are attracted and directed towards the inner most chamber where they are trapped. The harvest end is opened and prawns are collected (about 50-120 g/ trap/ day). The cost of each trap varies from ₹ 70-80 and having a use-life of 1-2 years.

S. C. S. Das, D. Debnath, B. K. Bhattacharjya, A. K. Yadav and B. K. Das

Impact of abnormally high pre-monsoon flood in the floodplain wetlands (beels) of Assam

Extreme climatic events such as flash floods have become more frequent in recent years affecting agriculture and allied sectors. Incessant rains during the 3rd week of May 2022 caused a major untimely pre-monsoon flood in the Central Brahmaputra Valley Zone (CBVZ) of Assam. Field observations revealed that in No. 47-Morakolong beel, Morigaon district the pre-monsoon flood inundated the exposed and



Pre-monsoon flood in 47-Morakolong beel of Morigaon district, Assam

parameters were: turbidity 291.70 NTU (high), dissolved oxygen 3.40 mg/L (low), free CO₂ 4.20 mg/L (high), alkalinity 54.70 mg/L, pH 6.9, conductivity 109.50 µS/cm, TDS 54.10 ppm, transparency 18.40 cm (low) and maximum depth 6.5 m. On the positive side, early floods leading to inundation of floodplain wetlands is likely to help in high spawning success of wetland fishes, which will be reflected in fish catches during the post-rainy months.

B. K. Bhattacharjya, D. Debnath, Sanjit Saikia and U. K. Sarkar

Record of *Craspedacusta sowerbii* and swimmer's itch (*Cercarial dermatitis*) from Parvati wetland in the conserved forest of Gonda, Uttar Pradesh

A bloom of freshwater jellyfish belonging to the phylum Cnidaria, class Hydrozoa, and family Olindiidae, *Craspedacusta sowerbii* Lankester, 1880 was recorded at Parvati Jheel (26°56'22.8"N 82°07'37.2"E; 26°54'37.3"N 82°08'16.3"E) in April 2022. This was the first record of freshwater Jellyfish in northern India's open water. More than 1,200 specimens were counted in the bloom; the recorded density was 52 individuals per cubic meter. The sporadic blooms of Jellyfish are part of the hydromedusa life cycle. *C. sowerbii* more often exist as microscopic podocytes (dormant "resting bodies"). Migrating Siberian birds and transport of aquarium plants are the possible reasons occurrence of the podocytes into the jheel. During the survey, it was also found that the water body was full of infestation of an invasive species *Eichhornia crassipes*. Further, the average phosphate (ppm) and total phosphorus (ppm) was reported as 0.147 and 0.405, respectively, which was high for human and cattle drinking purposes (PO₄⁻³ for lentic ecosystem prescribed by EPA, 1986). This may be because of dead and decomposed water hyacinth for many years. As a result, skin rashes were observed caused by an allergic reaction that may infect birds and mammals.



Craspedacusta sowerbii freshwater Jellyfish

Shravan K Sharma, AbsarAlam, Vijay Kumar, D. N. Jha and Basanta Kumar Das



Large size record of *Monopterus albus* at Kusheshwar Asthan Bird Sanctuary

Report of large sized freshwater mud eel, *Monopterus albus*, from natural population of Kusheshwar Asthan Bird Sanctuary, Bihar

A large sized *M. albus* of family Synbranchidae was recorded during an exploratory survey carried out in the wetlands of Kusheshwar Asthan Bird Sanctuary under Koshi-Gandak riverbasin, Darbhanga district, Bihar in the month of June 2022. The total length of the specimen was 71 cm weighing 347 g. Many reports on larger sized specimens of *M. albus* are available from Bangladesh as well as from north eastern states of India. The reported large specimen of *M. albus* from Kusheshwar Asthan Chaur area indicative of good state of the stock in the wetlands. Though *M. albus* is assessed and listed as Least Concern in the IUCN Red List of Threatened Species in 2022, the population trend of the species is unknown and needs updating and assessment.

Suman Kumari, Sajina A. M., Ali, Y. and U. K. Sarkar



Effect of stocking density on growth and production of *Cyprinus carpio* reared in cages in a floodplain wetland of Assam



Cyprinus carpio

Amur common carp, *Cyprinus carpio* was cultured in fifteen cages (cage dimension: 5 x 5 x 2 m³ each) installed in Samaguri beel, a seasonally open floodplain wetland of Assam, India. Fingerlings of *C. carpio* (av. length 8.44 cm; av. weight 9.23 g) were stocked at five different stocking densities i.e., 5 (S1), 10 (S2), 15 (S3), 20 (S4) and 25 fingerlings m⁻³ (S5). At the end of six months, the specific growth rate and weight gain percent of the reared fish recorded at different stocking densities were: S1 (1.94 and 3169.34), S2 (1.92, 3073.35), S3 (1.87, 2780.28), S4 (1.85, 2715.28) and S5 (1.77, 2338.79). There was no significant difference (P=0.171) in growth of the fish at different



Haul of Amur carp from cages

stocking densities although a decreasing trend in growth with increasing stocking density was observed. The gross yield of fish at different stocking densities were respectively, 1.18, 2.20, 2.87, 3.48 and 3.55 kg m⁻³. Thus, Amur carp can be stocked at a stocking density of 25 fingerlings m⁻³ or above for producing table-sized fish in ICAR-CIFRI GI-cages in the wetlands of Assam.

B. K. Das, S. Yengkokpam, D. Debnath, Pronob Das, B. K. Bhattacharjya, A. K. Yadav, Simanku Borah, Niti Sharma, S. C. S. Das, B. C. Ray and A. Kakati

Corica soborna Hamilton, 1822 fishery in Poondi reservoir, Tamil Nadu



Scoop net

The Poondi reservoir (13^o11'6" N, 79^o51'36" E), situated across the Kosathalaiyar River in Tamil Nadu. The *Corica soborna* Hamilton, 1822, (Ganges river sprat) fishery was observed in this reservoir from May - July 2022. It is a prominent fishery during the onset of South West monsoon with the inflow of Krishna river water through the canal situated north to the reservoir. The gear used for the fishery is a large scoop net made of muslin cloth. The fish is being caught when it swims against the current at the canal mouth. An average of 10-15 fishermen operate the scoop nets

from 6.30 to 8.30 am daily. The catch per unit effort (kg per scoop net per day) ranges from 10 to 20 kg. The average length and weight of the species are 4 cm and 5 gm respectively. The fish is characterised by moderately elongated body with a faint lateral band, 40-42 lateral line scales, keeled abdomen, 10-12 prepelvic and 7-8 post pelvic scutes. This fishery is being carried out solely by the migratory fishermen for their livelihood, sold at a rate of Rs. 100 per kg, locally.



Corica soborna

Jesna P. K., Ramya V. L., Vijaykumar M. E., Karthikeyan M., Sajina M., Sarkar U. K., Das B. K.

First report on molecular identification and characterization of *Vibrio cholerae* EMM1, pathogenic to *Labeo rohita*

A pathogenic strain of *V. cholerae* (EMM1) was isolated from diseased *L. rohita* cultured in wetland system at Purba Medinipur district, West Bengal, India. It was identified to be a non-choleraogenic, non-O1, non-O139 strain. The strain was identified through culture in specific media, Biochemical test, 16S rRNA gene sequencing and phylogenetic analysis. The pathogenicity of the strain EMM1 was confirmed through solid phase and liquid phase hemolysis assay, challenge experiment and histopathological study. Intraperitoneal injection of *L. rohita* with *V. cholerae* (EMM1) at a dose of 1.04 × 10⁷ CFU/ml leads to 100% mortality of *L. rohita* within 84 hrs. Challenge fish exhibited hemorrhages at the base of anal fin and pelvic fin. Changes in tissue section comprised of degenerated hepatocytes in liver,

shrunken glomeruli in kidney, necrosis of the intestinal villi epithelium and degeneration of muscle bundle. This is the first report on molecular identification of pathogenic *V. cholerae* from *L. rohita*. Overall, the study confirms that the identified strain could be a potent pathogen to fishes in inland open waters and other culture systems.

Manoharmayum Shaya Devi, Vikash Kumar, Tanushree Bera, Pranaya Parida, Praveen Maurye, Bijay Kumar Behera and Basanta Kumar Das

Sediment of natural floodplain wetlands host bacteria with potential for remediation of ammonia nitrogenous compound



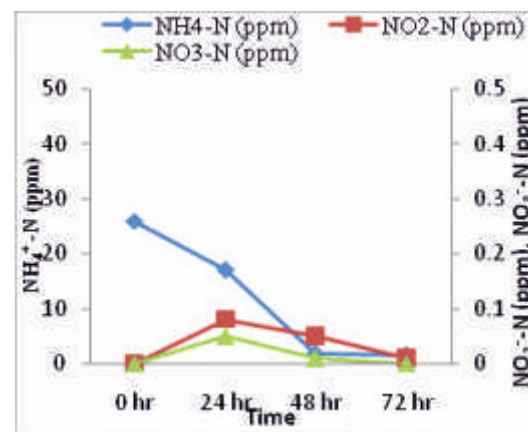
Bacillus subtilis



B. safensis

Potential role of non-pathogenic bacteria was studied in remediating the ammonia nitrogenous compound isolated from Sardar bherry, situated in East Kolkata floodplain wetland, India. Apart from ammonia oxidizing bacteria, the natural wetland has significant abundance of ammonia producing bacteria. In sediment, the sampling site inlet sewage canal (SC), wetland site and outlet canal (OC) have showed consistent distribution pattern of ammonia oxidizing bacteria, with significant abundance of

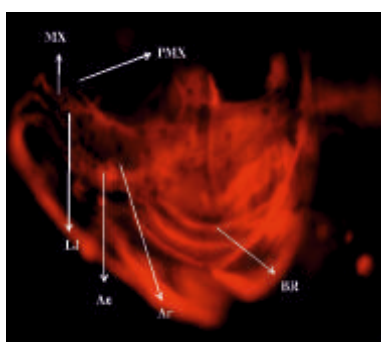
ammonia producing bacteria. In most cases, the NH_4^+ -N was reduced by > 90 % concentration to ~ 1 mg/L within 24 h of growth. The nitrification products, NO_2^- -N and NO_3^- -N were detected during the removal process within the 72 h of incubation. In contrast, few bacterial isolates were involved in ammonia production and laboratory analysis showed that ammonia concentration increased ~2 folds in bacteria supplemented group as compared to the control. Further, the bacterial isolates with significant role in ammonia oxidation were characterized as *Citrobacter freundii* A9, *Bacillus subtilis* C4, *B. safensis* OC1 and *B. subtilis* OC2. Overall, the results showed that bacterial isolates has a capacity to effectively reduce the ammonium concentration and it could further characterized for beneficial application in industrial or agricultural wastewater treatment system where ammonium concentration tend to be very high.



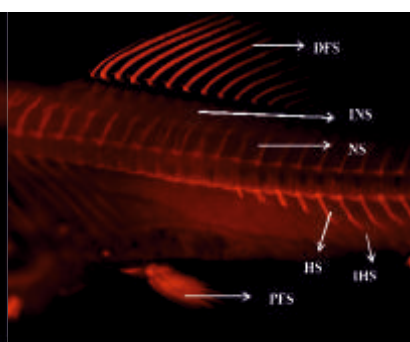
Ammonia removal assay by bacterial isolates of Sardar bherry natural wetland

Vikash Kumar, Tanushree Bera, Suvra Roy, A. K. Jana, B. K. Das and B. K. Behera

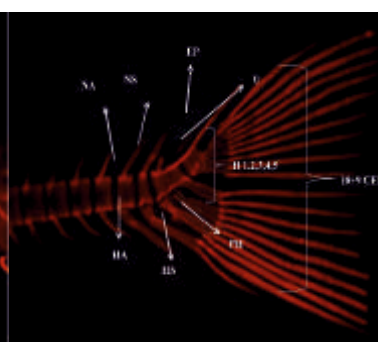
Ontogeny of skeletal development of *Labeo calbasu* using modified double skeletal staining technique



Head region



Mid region



Caudal region

An experimental study was conducted to understand the larval skeletal development in *Labeo calbasu* by using modified double skeletal staining technique with alizarin red and alcian blue. The larval samples from 2 dph (day post hatching) to 20 dph were preserved in 4% neutral phosphate buffered formalin solution. Alizarin red and alcian blue were used for staining the bony and cartilage parts of the skeleton, respectively. The stained specimens were studied



using Zeiss fluorescence microscope. The development of skeleton was observed at very early stages. A straight notochord throughout its length and origin of caudal fin rays were seen on 2 days after hatching. The ventral spines, unbranched caudal fin rays and hypurals at ventral side of notochord were clearly visible from 4 dph. The 4 dph is important as most of the head skeletal elements and vertebral column with vertebral centrum and neural spines started appearing by that time. The dorsal and caudal fins with branched rays and the opercular and jaw bones started ossifying between 10 and 20 dph.

H. S. Swain, Ambily M. N. and B. K. Das

Phenomic based population delineation of Carnatic carp, *Barbodes carnaticus* (Jerdon, 1849)

Population structure of *Barbodes carnaticus* species was studied using conventional and image based analysis method. The study was carried out with four stocks, namely Karnataka (KA), Tamil Nadu (TN), Kerala (KE) and farm reared stock (CI-CIFA, Bangalore). A total of 27 morphometric, 9 meristic and 30 truss measurements were used for stock discrimination. Fifteen landmarks were used to generate 30 truss distance measurements. For morphometric characters total five principal components (PC) explain 86.9% and for truss measurements total of four PC explain 96.01% of variation. Discriminant analysis using conventional method explained that 100% individuals of all the stocks were correctly classified except in TN stock where only 93.8 % were classified correctly. DFA employed with truss distance showed the prediction under CI stock individuals showed value of 100% followed by KA, KE, TN stock with value of 89.1, 8.6, 6.1. Factor analysis based on truss morphometry showed that factor one is related to body shape and factor two is related to head shape. Truss distances based cluster showed KE and CI stocks are similar compared to TN stock but in contrary morphometry based cluster showed KE and TN stocks are similar compared to CI stock. Most of the analysis showed that CI stock (farm reared stock) was different from all wild stocks. This study explained that combination of conventional and advanced image base analysis helped to discriminate the stock of *B. carnaticus*. Stock discrimination of this species was mainly due to geographic isolation and climatic factor. Within stock differentiation was minimum in this morphometric study, hence gene pool identification and markers study is very much needed for the better understanding of different stock.



Landmarks used for truss analysis 1: Anterior tip of the snout on upper jaw, 2: Nape above insertion of opercle, 3: Origin of the dorsal fin, 4: End of dorsal fin base, 5: Dorsal origin of caudal fin, 6: Posterior end of vertebral column, 7: Ventral origin of caudal fin, 8: End of anal fin base, 9: Origin of anal fin, 10: Origin of pelvic fin, 11: Origin of pectoral fin, 12: Opercle end, 13: Anterior orbit of eye, 14: Posterior orbit of eye, 15: Ventral insertion of the opercle.

V. L. Ramya, B. K. Behera and B. K. Das

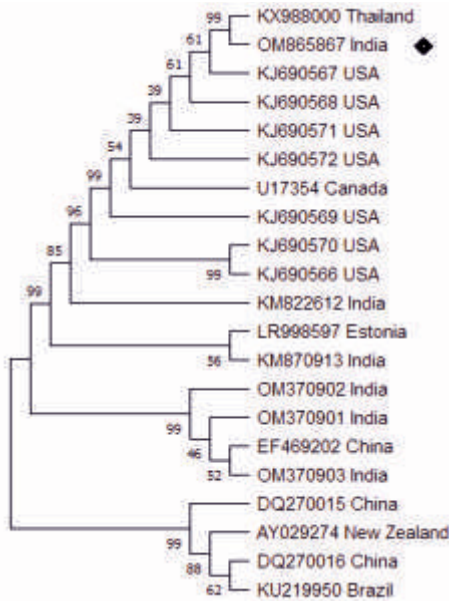
Role of turmeric oil to enhance immunity and induce resistance against *Ichthyophthirius multifiliis* and *Aeromonas hydrophila* co-infection in *Pangasianodon hypophthalmus*



The experimental *Pangasianodon hypophthalmus* used in the study. (A) Fish showing signs of the disease, including presence of white spot, hemorrhage, ulcer, discoloration, and redness in fins and all over the body surface. (B) The control fish appeared healthy and free from possible infection with no external symptoms.

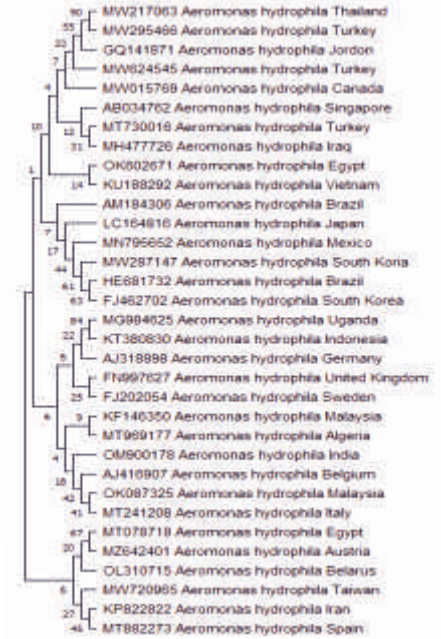
Ichthyophthirius multifiliis, a ciliated parasite causing ichthyophthiriasis (white spot disease) in freshwater fishes, results in significant economic loss to the aquaculture sector. One of the important

predisposing factor for ichthyophthiriasis is low water temperature (i.e. below 20 °C), which affects the fish health and make animals more



Parasite isolation and identification by 18S rRNA gene and phylogenetic analysis

susceptible to parasitic infections. Here, natural outbreak of *I. multifiliis* was reported (validated by 16S rRNA PCR and sequencing method) in *Pangasianodon hypophthalmus* from culture facility of ICAR-CIFRI, India. The fish showed clinical signs including hemorrhage, ulcer, discoloration, and redness in the body of fishes. Further microbiological analysis revealed that *Aeromonas hydrophila* was associated (validated by 16S rRNA PCR and sequencing method) with the infection and mortality of *P. hypophthalmus*, confirmed by haemolysin and survival assay. This created a scenario of co-infections, where both infectious agents are active together in *P. hypophthalmus*, causing ichthyophthiriasis and motile aeromonas septicaemia (MAS). The study showed that *P. hypophthalmus* fingerlings supplemented with turmeric (*Curcuma longa*) oil, at an optimum



Bacterial isolation and identification by 16S rRNA gene and phylogenetic analysis

concentration (10 ppm), exhibited significantly increased survival against co-infections with *I. multifiliis* and *A. hydrophila*. The study indicated that supplementation of turmeric oil increased the non-specific and specific immune response in *P. hypophthalmus* and significantly enhanced levels of HSP70, HSP90 and IgM level were observed in treated groups as compared to controls. Our findings suggest that turmeric oil modulates stress, antioxidant and immunological responses, probably contributing to enhanced protection in *P. hypophthalmus*.

Vikash Kumar, B.K. Das, H.S. Swain, H. Chowdhury, A.K. Bera and B.K. Behera

Post-larvae collection as an alternative means of livelihood during the fishing ban periods at Hooghly-Matlah estuary



Collection of post-larvae from Hooghly estuary

Along with the other east coast states, West Bengal follows a fishing ban for a period of 61 days, starting from 15th April to 14th June every year. During the 'fishing ban' period, large fishing boats are not allowed to venture into the sea, to allow fish to spawn. In the recent survey (during the fishing ban period) at lower stretches of Hooghly-Matlah estuary, it was observed that fishers were involved in the collection of post-larvae of prawns, mainly of *Macrobrachium rosenbergii* along with *Penaeus monodon*. A single fisher or a group of fishers (2-3 people in a group) could collect 450 to 1500 post-larvae of prawns in a single day (3-6 hours operation time) and earn Rs. 225 to 750 per day. Though the collection of such post-larvae was found destructive due to wanton killing of juveniles of other fishes, but it creates alternative livelihoods for the fishers during ban periods. To stop such natural seed collections, breeding of targeted species artificially, and providing alternative livelihoods to the natural seed collectors, might be some of the useful approaches.

Dibakar Bhakta, Ranjan K. Manna, Sangeetha M. Nair, Shubendu Mandal, Abhijita Sengupta, S. Samanta and Basanta K. Das



Activities Under NEH Plan

Mega ranching-cum-mass awareness programmes for the conservation of pengba in Loktak lake of Manipur

Osteobrama belangeri (locally called pengba) is a near threatened medium carp endemic to Manipur of North east India, Myanmar and Yunan provinces of China. A mega ranching programme was organized by the institute in collaboration with the Department of Fisheries (DoF), Manipur and the Loktak Development Authority (LDA) at the Loktak lake on 11th May, 2022 which was graced by the Hon'ble Chief Minister of Manipur Shri N. Biren Singh. The Hon'ble CM also distributed inputs, like 10 tonnes CIFRI CageGrow floating feeds, 10 numbers of Cage Nets and 10 numbers of CIFRI HDPE pens among the beneficiaries provided by ICAR-CIFRI. Shri H. Dingo Singh, Minister of Fisheries was also present on the occasion.



Feed distribution by the Hon'ble Chief Minister



Hon'ble Minister releasing the pengba

B. K. Das, B. K. Bhattacharjya, Sona Yengkokpam, T. Nirupada Chanu, S. C. S. Das, D. Debnath and N. S. Singh

Polyculture of Amur carp, Koi carp and Gonius in cages at mid-altitude region in Umiyam reservoir, Meghalaya

Umiyam is a small reservoir with total water spread area of 500 ha (approx.) located in Khasi hills of Meghalaya. ICAR-CIFRI, Regional Centre, Guwahati carried out cage culture trials in the reservoir in collaboration with ICAR Research Complex for NEHR, Umiyam, Meghalaya through community participation. A battery of six CIFRI-GI cages with an area of 100 m³ per cage (5 x 5 x 4 m³/cage) was installed. Advanced fingerlings of Gonius, Amur carp and Koi carp were stocked. Fishes were fed twice daily with CIFRI-CAGEGROW floating feed @ 3-5% of their body weight. Regular feeding was managed by the fishers. After six months of rearing, the maximum individual weight of Gonius, Amur carp and Koi carp were recorded as 195 g, 650 g and 700 g, respectively. The average growth of



Cages in Umiyam reservoir, Meghalaya



Final harvest from the cages

Gonius, Amur carp and Koi carp were recorded as 150 g, 480 g and 500 g, respectively. No disease incidence was reported and the highest survival (%) was found for Amur carp (80%) followed by Koi carp and lowest for Gonius. The final harvests of the cages directly benefitted 50 fisher families of the society.

Pronob Das, B. K. Bhattacharjya, S. Borah, S. Yengkokpam, D. K. Meena, A. K. Yadav, D. Debnath, N. Sharma, A. Kakati and B. K. Das of ICAR-CIFRI & S. K. Das, Alakesh Das, S. G. Singh, P. Devi, P. Mahanta, T. Tayung, S. Hazarika and V. K. Mishra of ICAR-RC for NEHR, Umiam, Meghalaya

Popularization of CIFRI-CAGEGROW floating feed in mid-altitude region of Meghalaya



Distribution of feed in Meghalaya

The Institute developed and commercialized CIFRI-CAGEGROW, a floating feed for benefit of fish farmers/ fishers undertaking cage and pen culture in open waters. In order to popularize the feed among the tribal fish farmers in mid-altitude region of Meghalaya, The Guwahati Regional Centre of the Institute organized an “awareness-cum-feed distribution programme” at Umsning, Ri-Bhoi district, Meghalaya on 05.03.2022 in collaboration with Department of Fisheries, Govt. of Meghalaya and Ri-Bhoi Farmers' Union. It was organized by Mr. A.K. Yadav, Dr. Pronob Das, Dr. S. Yengkokpam, Dr. D.K. Meena and Dr. S. Borah. Mr. F. Hasbar, Fishery Officer, Ri-Bhoi district and another fisheries official of Ri-Bhoi district attended the programme. On the occasion, a total of 2000 kg CIFRI-CAGEGROW floating feed was distributed to 30 tribal fisher families of the district.

Pronob Das, B. K. Bhattacharjya, A. K. Yadav, S. Borah, S. Yengkokpam, D. K. Meena and B. K. Das

Fish seed stocking-cum-input distribution at Mapithel reservoir of Manipur

Mapithel is a medium reservoir with a total water-spread area of 1182 ha located in Kamjong district of Manipur. Approximately 7,000 villagers live in 6 villages located around the reservoir. They were displaced ST community who have gradually transformed themselves from their main occupation of paddy farming to fishing as their source of livelihood after commissioning of the reservoir. ICAR-CIFRI had provided 10 net cages and 2 tonnes of CIFRI CageGrow feeds for cage culture purposes in the reservoir. A fish seed stocking programme was conducted on 12 May 2022. Dr. B. K. Das, Director assured that the Institute will provide training and technical support on enclosure culture. Approximately, 25,200 numbers of common carp (*Cyprinus carpio*) fingerlings having average weight 35.65 g and average length 12.43 cm were stocked in the cages for rearing them to marketable size. A total of 30 fishers from the village including women participated in the programme.



Director, ICAR-CIFRI addressing the gathering



Stocking programme at Mapithel reservoir of Manipur

B. K. Das, B. K. Bhattacharjya, Sona Yengkokpam, T. Nirupada Chanu and Dipesh Debnath



Technology Demonstration

Demonstration and popularization of CIFRI CAGEGROW feed among wetland fishers of north eastern India

In order to popularize the CIFRI CAGEGROW feed among fishers/ fish farmers demonstration and popularization drive was conducted at Umsning, Ri-Bhoi district, Meghalaya on 01 March 2022 in collaboration with Department of Fisheries, Govt. of Meghalaya and Ri-Bhoi Farmers' Union. The institute was represented by Dr. B. K. Bhattacharjya, Dr. Pronob Das, Mr. A. K. Yadav, Pronob Das, Dr. S. Yengkokpam, Dr. D.K. Meena and Dr. S. Borah. While Mr. F. Hasbar and others from state fishery department; Mr. D. Majaw, and Mr. K. Brightstar, and others from Ri-Bhoi Farmers' Union and 60 tribal fish farmers of locality and representatives from local media were also present in the interactive programme. On the occasion, a total of 2 metric tonnes CIFRI-CAGEGROW floating feed was distributed to 30 tribal fisher families of the district.



Feed distribution programme at Dhemajj, Assam

A similar programme was organized by the Guwahati regional centre where a total of 5.25 tonnes of the feed was distributed among 50 wetland fishers on 27th April, 2022 of Dhemajj district, Assam by official(s) of ICAR-CIFRI Regional Centre, Guwahat. The programme was co-ordinated by Dr. Simanku Borah, Scientist where B. K. Bhattacharjya, N. Sharma, P. Das and A. K. Yadav were present. Shri Pradan Baruah, Hon'ble Member of Parliament, Lakhimpur, and Dr. Ranoj Pegu, Hon'ble Minister of Education and WPTBC Department, Govt. of Assam also graced the occasion.

Penculture demonstration cum awareness programme in the reservoirs of Chhattisgarh

ICAR-CIFRI has taken initiatives to uplift the socio-economic status of the tribal populace of Chhattisgarh by joining the hands with Department of Fisheries, Chhattisgarh. The Institute has provided twenty numbers of pen, ten boats with engine, twenty coracles and twenty tonnes of CIFRI Cage Grow[®] feed in ten selected small reservoirs in Chhattisgarh viz. Taurenga, BaheraKhar, Sutia Path, Matiamoti dam, Koserteda, Rabo, Ghunghutta, Gej, Kesavanala. ICAR-CIFRI organized a Penculture demonstration programme in collaboration with DOF, Chhattisgarh at Taurenga Reservoir on 13th May 2022 with the objective to raise in situ fingerling in the pen for enhancing the production of the reservoir in a cost effective way. Dr. B.K Das, Director, CIFRI and Shri N. S. Nag, Director of Fisheries, Chhattisgarh released the fish seeds in the pen installed in the reservoir. A total of 56 tribal beneficiaries were present in that programme. A total of 50 kg pelleted feed has been handed over to the tribal fishers for trial.



Demonstration of climate resilient fisheries (CRF) at Panchpota and Media wetlands, West Bengal

Under the changing climate context, it is imperative to develop and demonstrate climate resilient adaptation strategies and sensitize the fishers for increasing their adaptive capacity in the context of changing climate. Pen culture is a type of enclosure culture and has the advantage of providing natural food base for the fish. The institute has undertaken Climate resilient pen systems in wetlands of West Bengal, Assam and Kerala for farming of fish and shellfish and conservation of SIFs. The climate resilient pen systems (CRPS) and cage system (CRCS) have high tensile strength HDPE net material, provision to withstand flood, wind action and is used for culturing resilient



indigenous species. Stocking of climate resilient indigenous fish species are encouraged in pen and cages to adapt to changing climate.

The institute organized a two-day awareness campaign “Climate resilient inland fisheries” and stocking programme in climate resilient systems as a part of Kisan Bhagidari & Azadi Ka Amrit Mahotsav on 29th and 30th April 2022 at Panchpota and Media wetlands, North 24 Parganas, West Bengal under the NICRA project. Dr. Uttam Kumar Sarkar, PI, project NICRA coordinated the campaign. Three CIFRI HDPE Pen (0.1 ha each) were installed at Panchpota wetland and six CIFRI GI Cages were installed at Media wetland. Around 90 kg *Labeo bata*, *Puntius sarana* and *Ompok bimaculatus* seeds were stocked in climate resilient pen system at Panchpota and climate resilient cage system (CRCS) at Media and 3 tonnes of CIFRI CageGrow feed was also distributed during the programme. A total number of 70 fishers have attended the programme.

Technology Management News

Design Registration Filed

- Design with application no. 359898-001 entitled “*Fiberglass-Reinforced Polymer Coracle*” have been filed with the Designs Office, Kolkata on 4 March 2022 in the name of Indian Council of Agricultural Research.
- Design with application no. 359899-001 entitled *Fiberglass-Reinforced Polymer Ornamental fish Breeding and Rearing Tank* have been filed with the Designs Office, Kolkata on 4 March 2022 in the name of Indian Council of Agricultural Research.

Patent Filed

- Patent Application no. 202231011331 entitled “*Fish anaesthetic/ sedative formulations of plant essential oils and method of preparation thereof*” has been filed on 2 March 2022 to Indian Patent office in the name of the Indian Council of Agricultural Research.

Memorandum of Understanding (MoU) Signed

- MoU was signed between ICAR-CIFRI, Barrackpore and North Eastern Electric Power Corporation Limited (NEEPCO), Shillong, Meghalaya on 27 December 2021 for assignment on “Planning and design of fish hatchery at Bichom dam site along with studies on Reproductive Biology on Snow Trout *Schizothorax richardsonni* for conservation and ratification propagation in River Bichom, Arunachal Pradesh”.
- MoU was signed with M. R. Aquatech, Bhubaneswar and ICAR-CIFRI on 8 March 2022 at ICAR-CIFRI, Barrackpore for the license agreement of “FRP Coracle” Technology
- MOU was signed with M. R. Aquatech, Bhubaneswar and ICAR-CIFRI on 8 March 2022 at ICAR-CIFRI, Barrackpore for the license agreement of “FRP Ornamental Tank” Technology
- MoU was signed between ICAR-CIFRI, Barrackpore and Kalyani University, West Bengal on 25th March 2022 for Academic and research collaboration between the two institution.



Success Story

Culture-based fisheries in Risia reservoir of Odisha: A boon for the tribal fishers

Risia, a small reservoir of 300 ha, is situated in Odisha. The tribal people of nearby Dandaghat, Betakata, Jamuna, Natapada, Badheipala, Risia and Kishore Chandrapur villages are dependent on this water body for their livelihood and nutritional security. The fishermen of the reservoir formed a Primary Fisherman's Cooperative Society (PFSC) named 'Maa Dukhilapat Fisheries Committee' in 2007 to regulate fishing activities in the reservoir. Fishes like Indian Major carps, catfishes, snake heads and other indigenous fishes are being caught by the fishermen. The institute made an intervention of culture based fisheries for increasing the production from this water body. Pen culture has been introduced in 2020.

Earlier the PFSCs used to stock IMCs fry (8 to 10 mm size) in the reservoir. However, the seed was very expensive and was also not of good quality.



Stocking in the reservoir by Shri Pratap Chandra Sarangi, Hon'ble Union Min. of State for AHD & Fisheries and MSME.



Distribution of fish feed among the women fishers

society got an additional yearly income of Rs. 16,000. This has motivated the tribal fishers and they have adopted the intervention and made the venture sustainable.

Consequently, the production of the reservoir was very low. The institute installed 3 *CIFRI Pens HDPE*® (each pen 0.1 ha) and demonstrated the culture technology in the reservoir for in-situ raising of advanced fingerling followed by stocking of the advanced fingerlings in the reservoir. 1.5 lakhs of fish fry have been stocked in these pens. Besides, 1 FRP boat, coracle, and about 5-ton fish feed were distributed to the members of the PFCS members. Along with the technical guidance and input support, an on-campus and two off-campus trainings programs were conducted on integrated reservoir development for building the capacity of the tribal fishers. After the intervention by ICAR-CIFRI, the fish production of IMC has increased from 4717 kg to 9180 kg in the year 2021 as compared to 2020, with the total production went upto 13 tons. On an average each member of the cooperative

Prajna R. Behera, Himanshu S. Swain, Mitesh Ramteke, Aparna Roy and P. K. Parida

River Ranching Programme

Ranching programme in the river Ganga on 76th Foundation Day of the institute

On the occasion of 76th Foundation day of the Institute 30,000 advance size fingerlings of IMC fishes were released into the Ganga river at Arailghat, Prayagraj. Dr. Sunanda Chaturvedi, Dr. Awadhesh Kumar Jha and students of HNB PG college, Naini, Prayagraj, Shri Rajesh Sharma, Convenor Ganga Vichar Manch, ICAR-CIFRI scientists, pilgrims, local fishermen, fish traders, and local people attended the programme.



Arailghat, Prayagraj



Sangam nose, Prayagraj



Another ten thousand of advance IMC fish fingerlings were ranched in the presence of Mahanath Shri Balvir Giri Ji Maharaj, Pithadhishwar Shri Math Baghambari Gaddi at Sangam Nose, Prayagraj by the Institute on 28 March 2022. Dr. D. N. Jha, the Center head of the institute, Shri Rajesh Sharma, Convenor Ganga Vichar Manch, and National Mission for Clean Ganga participated in the program.



Awareness among the school students at Araiighat, Prayagraj

National Ranching Programme

In addition to the regular ranching programme in the river Ganga for conservation and restoration of fishes, a 'National Ranching Programme' under the National Mission for Clean Ganga (NMCG) was executed. Under this series the first programme was conducted at Gandhi Ghat, Barrackpore, West Bengal on 14 May 2022 where two lakh wild fish germplasm of IMC (*Labeo rohita*, *Labeo atla* and *Cirrhinus mrigala*) were ranched in the river. Shri G. Ashok Kumar, IAS, Director General, NMCG, Ministry of Jal Shakti, Government of India

inaugurated the programme in the presence of Dr. B. K. Das, Director and Dr Sandeep Behera, Biodiversity Consultant, NMCG and officials of ICAR-CIFRI, NMCG. More than 100 Fishers along the river Ganga were sensitized and apprised about the importance of the River.



Ranching at Saryu River at Ayodhya, Uttar Pradesh





Ranching at Dakhineswar

organized at Dakhineswar where more than 2 lakh wild seeds of IMC were ranched. The event was graced by Senior Consultant, Mr. Brijesh Sikka and Dr. Sandeep Behera.

Mega ranching programme of pengba in Loktak lake, Manipur

Pengba (*Osteobrama belangeri*), the 'state fish' of Manipur, is a near threatened medium carp endemic to Manipur. Although the fish used to form a significant fishery in the Loktak, its population has significantly declined over the last few decades and was declared 'extinct in wild' as per IUCN Red list. With the objective of rejuvenating the depleted stock, ICAR-CIFRI initiated a mega ranching programme in the lake during 15 to 16th March 2022 where 30,000 pengba fingerlings was released. On 11th May another ranching programme was conducted in collaboration with the Department of Fisheries, Manipur and Loktak Development Authority (LDA). On this occasion, 1 lakh fingerlings of pengba was released in the lake in the august presence of Shri N. Biren Singh, Hon'ble CM of the state. Hon'ble CM also distributed 10 tonnes CIFRI CageGrow floating feeds to 4 Cooperative Societies, 10 numbers of cage nets and 10 numbers of CIFRI HDPE pens among 150 beneficiaries provided by ICAR-CIFRI. Dr. B.K. Das, Director; staff of the ICAR-CIFRI Guwahati Regional Centre, and staff of Department of Fisheries, Manipur; representatives from LDA, Manipur; ICAR, NEH RC Imphal Centre; KVK Imphal West; Fisheries students; Fisheries entrepreneurs; other stakeholders and around 150 fishers attended the programme.





Ranching of *Etroplus suratensis* in Vembanad lake, Kerala

Kochi Research Station of the Institute rached 2500 seeds of Pearl Spot, *Etroplus suratensis* in Vembanad lake at Mulavukadu Village, Ernakulam on 8th March 2022 under the NICRA project. Shri Ali Akbar, Mulavukadu Panchayat President, Ernakulam and the staff of the research station were present on the occasion.



Ranching of fertilized hilsa eggs in Ganga: First of its kind in India

Since 2020 more than 45,000 adult hilsa has been ranched in the Farakka stretch as an attempt towards hilsa fisheries restoration in the river Ganga. The institute in association with the NMCG, Ministry of Jal Shakti has initiated ranching of the adult hilsa in the middle stretch of the river. For the first time the Institute rached 1,80,000 fertilized hilsa eggs at the upstream of Farakka barrage in the river on 10 March 2022. During the process, adult hilsa male and females were bred on board through dry stripping method. The fertilized eggs were packed with oxygen support and transported to the ranching site.



Stripping of mature Hilsa



Fertilized eggs of Hilsa

Trainings Conducted

Details of trainings conducted during January- June 2022 are given in the following table.

Sl. No.	Date	Participants	Venue	Theme area
1.	9 February	50 Scheduled Caste fishers and farmers	Hiragota-Rowmari-Dighali beel, Kamrup, Assam by the ICAR-CIFRI, Guwahati	Orientation on PMMSY scheme for fisher stakeholders' sponsored by the MANAGE, Hyderabad
2.	14 February	100 participants	ICAR-CIFRI, Bangalore	Sustainable reservoir fisheries management under PMMSY (sponsored by NFDB)
3.	15 February	97 participants	ICAR-CIFRI Guwahati	Ecosystem based integrated wetland management
4.	15-17 February	50 participants	SF office, Gandacherra, Tripura	Cage culture technology for enhancing reservoir productivity
5.	15-21 February	30 fishers/fish farmers from Katihar	Institute HQs, Barrackpore	Inland fisheries management, sponsored by Bihar Govt.
6.	16-18 February	50 participants	Borkonabeel, Barpeta Assam	Inland fisheries management
7.	22 February	200 participants	Institute HQs, Barrackpore	Sustainable reservoir fisheries for employment generation under PMMSY (sponsored by NFDB)
8.	25 February-03 March	30 fishers/fish farmers from Bhagalpur	Institute HQs, Barrackpore	Inland fisheries management, sponsored by Bihar Govt.
9.	28-30 March	30 women fishers	Hatsingimari, South Salmara Mankachar, Assam	Backyard Ornamental fish farming for livelihood improvement and rural development
10.	08-14 March	30 fishers/fish farmers from Munger	Institute HQs, Barrackpore	Inland fisheries management, sponsored by Bihar Govt.
11.	31 March -06 April	30 fishers/fish farmers from Sheikhpura	Institute HQs, Barrackpore	Inland fisheries management, sponsored by Bihar Govt.
12.	19-25 April	19 fishers/fish farmers from Gopalgunj	Institute HQs, Barrackpore	Inland fisheries management, sponsored by Bihar Govt.
13.	07-13May	25 fishers/fish farmers from Jamui	Institute HQs, Barrackpore	Inland fisheries management, sponsored by Bihar Govt.
14.	17-23 May	25fishers/fish farmers from Rohtas	Institute HQs, Barrackpore	Inland fisheries management, sponsored by Bihar Govt.
15.	22-26 May	20 hill fishers of Mirik, Darjeeling, West Bengal	Institute HQs, Barrackpore	Capacity building programme under STC on hill fisheries development
16.	24-27 May	29 tribal fishers	Institute HQs, Barrackpore	Capacity building programme under STC on pen culture
17.	30 May-3 June	25 tribal women fishers	Institute HQs, Barrackpore	Capacity building programme under STC on ornamental fisheries
18.	30 May – 3 June	28 rural women of Jharkhand	Institute HQs, Barrackpore	Capacity building programme under STC on ornamental fisheries



सिफरी समाचार CIFRINEWS

(January - June 2022)

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Trainees on inland fisheries management



Training programme at Gandacherra, Tripura

Students training

A total of 3 trainings were conducted for the students on inland fisheries management at ICAR-CIFRI HQs, Barrackpore.

Sl. No.	Date	Participants
1	15-27 May	47 students from the Indian Institute of Environment Studies
2	01-02 June	35 students from the Indian Institute of Environment Studies
3	16-22 June	16 M.Sc. Zoology (Spl. Fish & Fisheries) students from Vinoba Bhave University, Hazaribag, Jharkhand



Students from Vinoba Bhave University, Hazaribag, Jharkhand

Mass Awareness Camps

Sl. No.	Name of the camps	Date	Participants	Venue
1.	Sustainable reservoir fisheries management towards income generation (NFDB sponsored)	14 February	100 participants from various states of India	RRC, Bangalore
2.	Scientific management of reservoir fisheries under STC	14 February	35 Fish farmers	RRC, Vadodara
3.	Sustainable production of climate resilient nutri-fish from wetlands under ICAR WorldFish collaborative project	15 February	97	RRC, Guwahati
4.	Scientific management of reservoir fisheries under STC	16 February	65 Fish farmers	RRC, Vadodara
5.	Impact of anthropogenic interferences in river ecosystem and fisheries	17 February	100	CIFRI HQ
6.	Livelihood enhancement options in beel fisheries	18 February	50	Borkona beel, Barpeta, Assam
7.	Wetland fisheries management towards livelihood improvement	25 February	112	CIFRI HQ
8.	Responsible fishing at Mapithel reservoir for sustainable fisheries	12 May	30	Chadong village, Kamjong, Manipur



Mass awareness at Manipur



Mass awareness at Borti beel, West Bengal

Exhibition Participated



CIFRI stall at NMCG pavilion in Magh Mela



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Awards / Recognitions to the Institute

ICAR-CIFRI Bagged 1st prize at Sundarban Mela, West Bengal

The institute has participated in 25th SundarbanKrishti Mela O Loko Sanskriti Utsab at Kultoli, Sundarban, West Bengal during 28 January to 6 February 2022 and bagged 1st prize displaying the activities and achievements of NMCG project. Dr. B. K. Das, Director also received the 'Life Time Achievement Award' on 4 February 2022.



Staff Corner

Awards / Recognitions to the staff

- Dr. Dharm Nath Jha, Sr. Scientist bagged the best poster award at the 1st Indian Fisheries Outlook 2022 held at ICAR-CIFRI, Barrackpore, from 22-24 March 2022 under the theme 'Fisheries extension, Governance, and Policies'.
- Dr. Preetha Panikkar received the best presentation award for the paper on 'Food web structure and trophic interactions in Stanley reservoir, Tamil Nadu' at the 1st Indian Fisheries Outlook 2022 at the ICAR- CIFRI, Barrackpore, West Bengal, held during 22-24 March 2022.
- Dr. Preetha Panikkar has been nominated by the Ministry of Science and Technology for the project evaluation submitted to Technology Development Board.
- Ms. Niti Sharma, Scientist received the best oral presentation for her paper 'Assessment of Ichthyofaunal diversity and habitat variables in Himalayan Brahmaputra River of Assam, North-eastern India' in the International Conference on "River corridor and river management 2022" in the theme 'River health and risk assessment' during 30 May to 1 June 2022 organized by IIT, Guwahati and IIT, Jammu.
- Shri Santhana Kumar V., Scientist got the Prof. A. P. Sharma Gold medal award at the 1st Indian Fisheries Outlook 2022 held at the ICAR-CIFRI, Barrackpore, from 22-24 March 2022 at ICAR-CIFRI, Barrackpore.



Mr. Santhana Kumar V. receiving the award from Prof. A.P. Sharma

Superannuations (Jan-June 2022)

Name & Designation	Last Place of Posting	Date of Superannuation
Dr. Kalpana Srivastava, CTO	Allahabad Regional Centre	31 January
Shri Gopal Chand, SSS	Allahabad Regional Centre	31 January
Shri R. Nagarajan, SSS	Bangalore Regional Centre	31 May
Shri M. Mari, Technician	Bangalore Regional Centre	31 May



Shri M. Mari



Shri N. Nagarajan

Promotions

Name & Designation	Promoted to the post of	With Effect from
Ms. Suvra Roy, Scientist	Scientist (Pay Level 11)	01.01.2019
Dr. Absar Alam, Scientist	Senior Scientist (Pay Level 12)	14.08.2019
Dr. Deepa Sudheesan, Scientist	Senior Scientist (Pay Level 12)	01.09.2019
Dr. Sajina A. M., Scientist	Senior Scientist (Pay Level 12)	01.09.2019
Dr. Soma Das Sarkar, Scientist	Senior Scientist (Pay Level 12)	01.09.2019
Shri A. K. Yadav, Scientist	Scientist (Pay Level 12)	09.11.2019
Shri Roshith C. M., Scientist	Scientist (Pay Level 12)	15.12.2019
Dr. D. K. Meena, Senior Scientist	Scientist (Pay Level 12) (Designated as Senior Scientist w.e.f 05.11.2021)	15.12.2019
Ms. Chayna Jana, Scientist	Scientist (Pay Level 12)	15.12.2019
Ms. Niti Sharma, Scientist	Scientist (Pay Level 11)	01.01.2020
Ms. Jesna P. K., Scientist	Scientist (Pay Level 11)	01.01.2020
Dr. Sona Yengkokpam, Sr. Scientist	Senior Scientist (Pay Level 13A)	07.01.2020
Dr. Sibina Mol S., Scientist	Scientist (Pay Level 11)	01.01.2020
Dr. Vaisakh G, Scientist	Scientist (Pay Level 11)	01.01.2020
Shri Jeetendra Kumar, Scientist	Scientist (Pay Level 11)	01.01.2020
Dr. Simanku Borah, Scientist	Scientist (Pay Level 11)	01.01.2020
Shri Wakambam A. Meetei, Scientist	Scientist (Pay Level 11)	01.01.2020
Ms. T. N. Chanu, Scientist	Scientist (Pay Level 11)	01.01.2020
Dr. Dipesh Debnath, Sr. Scientist	Senior Scientist (Pay Level 13A)	26.02.2020
Dr. Ajoy Saha, Scientist	Senior Scientist (Pay Level 12)	27.04.2020
Dr. Pronob Das, Scientist	Senior Scientist (Pay Level 12)	15.09.2020
Shri Vikas Kumar, Scientist	Scientist (Pay Level 11)	01.01.2021
Shri Mitesh H. Ramteke, Scientist	Scientist (Pay Level 11)	01.01.2021
Dr. H. S. Swain, Scientist	Scientist (Pay Level 11)	01.01.2021
Shri Tasso Tayung, Scientist	Scientist (Pay Level 11)	01.01.2021
Smt. P. R. Swain, Scientist	Scientist (Pay Level 11)	01.01.2021
Shri Pranab Gogoi, Scientist	Scientist (Pay Level 11)	01.01.2021
Dr. Dhruva Jyoti Sarkar, Scientist	Senior Scientist (Pay Level 12)	23.01.2021
Dr. Amiya Kumar Sahoo, Sr. Scientist	Senior Scientist (Pay Level 13A)	10.02.2021
Dr. Aparna Roy, Sr. Scientist	Senior Scientist (Pay Level 13)	23.06.2021
Dr. S. C. Sukla Das, Scientist	Senior Scientist (Pay Level 12)	15.09.2021

Transfer

Name & Designation	From	To
Inter-institutional transfer		
Shri Wakambam Anand Meetei, Scientist	ICAR-CIFRI, Barrackpore	ICAR-NEH RS, Imphal, Manipur
Shri Ningthoujam Samarendra Singh, Scientist	ICAR-CIFRI, Regional Centre, Guwahati	ICAR-CISH, Lucknow
Intra-institutional transfer		
Dr. Ajoy Saha, Scientist	ICAR-CIFRI, Regional Centre, Bangalore	ICAR-CIFRI, Barrackpore
Md. Quasim, CTO	ICAR-CIFRI, Barrackpore	ICAR-CIFRI, Regional Centre, Prayagraj
Shri Ravi Sonkar, SSS	ICAR-CIFRI, Barrackpore	ICAR-CIFRI, Regional Centre, Prayagraj
Ms. Anita Gawate, SSS	ICAR-CIFRI, Barrackpore	ICAR-CIFRI, Research Centre, Vadodara
Shri Divakar R., SSS	ICAR-CIFRI, Barrackpore	ICAR-CIFRI, Regional Centre, Bangalore
Shri Ganesh Bhanja, UDC	ICAR-CIFRI, RC Guwahati	ICAR-CIFRI, Barrackpore

Demise



Shri Kishore Shaw, Assistant Administrative Officer expired on 8 March 2022. The whole ICAR-CIFRI family mourn to the tragic demise and pray to the Almighty to rest the Great Soul in peace.



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Meetings & Events Organized

Interface meeting with fishery officials of Andhra Pradesh



Dr. Poonam Malakondaiah, IAS, Special Chief Secretary, Agriculture and Cooperation, AHDD & Fisheries, Govt of Andhra Pradesh along with Shri K. Kanna Babu, IAS, Commissioner of Fisheries, Govt of Andhra Pradesh visited ICAR-CIFRI on 8 January 2022. They held an interface meeting on 'Encouraging Fish Culture Technologies in Large Waterbodies with Special Emphasis on Enclosure Culture in Andhra Pradesh'. The Special Chief Secretary pointed out

the major areas of concern for fisheries in Andhra Pradesh. The Commissioner stressed on the partnership with ICAR-CIFRI for promoting cage culture in reservoirs of Andhra Pradesh. Dr. B. K. Das, in his presentation, focussed on the importance of cage culture and production enhancement programmes as well as their potential in Indian reservoirs.



Dr. Poonam Malakondaiah, IAS visiting the institute facility



National girl child day

ICAR-CIFRI has celebrated National Girl Child Day on 24 January. The day has been created by the Ministry of Women and Child Development to make awareness on gender-based discrimination in society and to bring about a change in behaviour towards girls in this male-preferred world. ICAR-CIFRI has prepared a beautiful collage of the photographs and has also felicitated six young achievers of extended ICAR-CIFRI family.

Republic day

The 73rd Republic Day was observed on 26 January at ICAR-CIFRI with great enthusiasm and joy. Dr. B. K. Das, Director hoisted the National Flag and addressed the staff. He emphasized that the Institute progressed in spite of difficulties and limited resources during that COVID period. He praised the staff members for their untiring and sincere efforts as well as encouraged all to work hard to keep the Institute's success on the higher note. Cultural programme was also organized on the occasion. On this special Day, the Institute awarded the best scientific, technical, administrative, skilled support staff and research scholars.



Director felicitating meritorious student of the staff



World wetland day



World wetland day being celebrated at Garjan-Bullutjan beel, Assam

World wetland day was fervently observed by the institute at Bortibeel, N 24 Parganas district of West Bengal under the theme 'Wetlands action for people and nature'. A total of 60 stakeholders took active part. Dr. B. K. Das, Director, ICAR-CIFRI urged all the stake holders for wise-use of wetland towards societal

benefits. Dr. U. K. Sarkar, Head, RWF Division, Dr. A. K. Das, In-charge, Training & Extension Unit addressed the gathering. The Guwahati Regional Centre of the Institute celebrated this day at Garjan-Bullutjan beel, Kamrup district, Assam in collaboration with the Assam Fisheries Development Corporation (AFDC) Ltd. Dr. B. K. Bhattacharjya, Head, discussed the importance of wetlands, their valuation, management, restoration and need for caring these precious water resources. Mr. Himanshu Bora, Manager, AFDC Ltd. was also present on the occasion.



Dr. A. K. Das addressing the fishers at Borti beel, W. Bengal

Interactive meeting with the fishery officials of Meghalaya

Mr. S.P. Ahammed, IAS, Principal Secretary to Govt. of Meghalaya (Fisheries) visited the cage culture site in Umiam reservoir on 3 February 2022 along with the Smt. A.L. Mawlong, MCS, Director (Fisheries); Mr. Paul Tariang, Superintendent of Fisheries, Ri-Bhoi district and other fisheries officials of Meghalaya. On this occasion, an interactive meeting on prospects of cage culture in Meghalaya' was organized at the cage culture site at UmniuhKhwan village. Scientists and technical personnel of the ICAR-CIFRI Guwahati regional centre and NE Centre of NFDB participated in the interactive programme. The programme was also attended by the local tribal fishers and farmers (including 18 women) under the Ri-Bhoi Farmers' Union.



Interacting meeting at Umiam reservoir

Workshop on “Inland Fisheries in India and the creation of capacity in the collection and analysis of Inland Fisheries Statistics”



This FAO & ICAR-CIFRI workshop was organized on 8 February 2022 for discussion on inland fisheries documentation strategies and to provide critical review and expert opinion on the first draft report on 'comprehensive document on inland fisheries resources of India'. Dr. V. V. Sugunan, Senior Expert, FAO-CIFRI project, Dr. B. K. Das, Director, Dr. JohnValbo-Jorgensen, Fisheries Resource officer (inland fisheries) of FAO, Dr. Ferge-Smith Simon, FAO representative, Dr. M. V. Gupta, World food Laurette, Representative of NFDB, Fisheries departments of Andhra Pradesh, Tripura, Assam, Chhattisgarh, Madhya Pradesh, Mizoram and CIFRI scientists were present in the meeting. The participants provided critical input and expert opinion on the draft report.

Webinar on “Impact of anthropogenic interferences in river ecosystem and fisheries”

The institute organized this webinar sponsored by National Fisheries Development Board (NFDB), Hyderabad on 17 February 2022. Dr. B.K. Das stressed on the present fish diversity in river Ganga and major activities undertaken by ICAR-CIFRI towards fish species



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conservation and restoration. Dr. S. Karketta, Advisor, MoEFCC, Dr. N.N Rai, Director, CWC, Dr. Sandeep Kumar Behera, Biodiversity consultant, NMCG, Dr. Hemant Bherwani, Scientist NEERI, Dr. S. Samanta, Head, REF Division of ICAR-CIFRI delivered lectures on the occasion. More than 100 persons, including officials from State Fisheries Department, researchers from various colleges and universities participated in the programme.

Fishers field school for ecosystem-based integrated wetland management



Farmer field school

The institute initiated 'Fisher field school' at Kholsi beel, Haringhata, Nadia West Bengal under a DBT scheme to promote ecosystem-based integrated wetland management on 18 February 2022. The Fisher Field School is based on the principle of Farmer Field School Approach of FAO, which is a group-based adult learning process. Forty women beneficiaries from fishermen community were selected for two interactive learning schools. Components like Pen culture, Culture Based Fisheries, Ornamental Fish Culture, Backyard poultry farming, Kitchen gardening and Mushroom cultivation have been introduced for economic empowerment of the fishermen community. A multidisciplinary team of scientists was constituted to establish Fisher Field School at the beel area. The team was led by Dr. Aparna Roy, which also includes researches from BCKV.

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Webinar on impact of anthropogenic interferences on ecosystem



Scientist-fisher-women interaction



Annual sports

The institute organized the annual sports 2022 during 16-17 February 2022 at Barrackpore Head Quarters. The event was inaugurated by Dr. B. K. Das, Director. He encouraged all the staff including contractual and research scholar to involve in sports events with true sportsman spirit and develop kinship among others. Various sports like tug of war, 100 m race, badminton, chess, TT and other outdoor sports events (athletics) were conducted for both the men's and women's participants including team events like cricket, volleyball, etc.



Interface meeting

Interface meeting with farmers- planners and researchers of West Bengal

The institute in collaboration with the Sundarban Dreams (NGO) hosted an interface meet for 24 Farmers Producers Organizations of 8 districts (Nadia, Malda, Murshidabad, Birbhum, Burdwan, North 24 Parganas, South 24 Parganas, Darjeeling) and 20 hill fishers from Darjeeling of West Bengal and 30 farmers from Bihar on 26 February, 2022 at institute HQs, Barrackpore. A total of 125 stakeholders participated in

this interface meeting. The key discussions were made for their livelihoods, governance pattern and net economic returns from the agricultural practices including fisheries. Dr. M. V. Rao, Additional Chief Secretary, Govt. of West Bengal addressed the gathering through online mode. The occasion was graced by Shri Santhosha Gubbi, IFS, Additional Secretary, Panchayat & Rural Development Department, Shri S Jones Justin, Deputy Field Director, Sundarban Tiger Reserve, Shri S. Niyogi, DGM, West Bengal State Corporative Bank Limited, Shri Radhakrishna Mondal, Asst. Director, Department of Consumer Affairs, Government of West Bengal and Dr. B. K. Das, Director, ICAR-CIFRI. On this occasion eleven farmers from various parts of the West Bengal were felicitated for their outstanding contribution in agriculture and allied sectors.



Interface meeting

International women's day



The institute organized a seminar on hybrid mode to celebrate the occasion of International Women's Day on 8 March 2022 on the theme of "Gender Equity for a Sustainable Tomorrow: Special Reference to Inland Fisheries". Dr. B. K. Das, Director highlighted the role of fisherwomen in the inland fisheries. He also mentioned about CIFRI's role in empowerment of women in the form of encouraging their involvement in canal fisheries or fisheries based in rain-fed pond and also through SHGs. Dr. Vijaya Lakshmi Saxena, President, Indian Science Congress Association, graced the programme and Chief Guest. Prof. Baskaram Manimaran, Former VC, TN Dr. Jaylalitha Fisheries University and Chairman RAC, Dr. S. K. Jain, Member RAC was also present. Dr. (Smt.) Leela Edwin Director (Acting) ICAR-Central Institute of Fisheries Technology and Prof. Suhrita Chakrabarty (Das), Professor and HOD, Bidhan Chandra Krishi

Viswavidyalaya delivered lectures. A total of 114 participants participated in online or offline mode.

Research Advisory Committee (RAC) Meeting

The Research Advisory Committee meeting of ICAR-CIFRI was held during 08-09 March 2022 through hybrid mode. The Chairman Prof. (Dr.) Baskaran Manimaran and Members of RAC, Dr. Sharad Kumar Jain and Dr. B. P. Mohanty attended the meeting physically while Dr. K.G. Padmakumar, and Dr. S. C. Pathak participated in the meeting through online mode. Dr. B. K. Das, Director appraised about the various research and developmental activities of the Institute highlighting new research initiatives, research achievements, outreach programmes, technologies and products developed, high impact publications and infrastructure development. Chairman, Prof Manimaran appreciated the achievements of the institute. He urged the scientists of the Institute to play pivotal role in providing technical guidance and management plans in the context of increasing focus on inland fisheries for production enhancement and to prioritise the research activities in the context of emerging challenges. Heads of Divisions, Heads/ In-charges of the Regional Centres presented achievements made under different institute projects and other activities at their respective Divisions/Centres. The Chairman and Members made remarks with critical reviews and suggestions towards research activities and made recommendations of RAC.



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Platinum jubilee lecture series #4 & 5



Platinum jubilee lecture series #4

Chancellor, BCKV delivered fifth lecture on 'Arsenic contamination of groundwater: Buildup in soil-crop-human continuum system and mitigation' on 17 March 2022.

The Institute organized the fourth and fifth Platinum Jubilee lecture series. Prof. Bhaskaran Manimaran, Former Vice Chancellor of Tamil Nadu Dr. J Jayalithaa Fisheries University, Nagapattinam delivered lecture on 'Productivity enhancement in open water fisheries development: Strategies for improved ecological and carbon foot prints' on 9 March, in a hybrid mode. Prof. Saroj Sanyal, former Vice



Platinum jubilee lecture series #5

National campaign on diversification in aquaculture

To commemorate India @75, ICAR-CMFRI jointly with other ICAR fishery institutes viz. CIFRI, CIFE, CIFT, CIFA, CIBA, NBFGR and DCFR organized a webinar as a part of National Campaign on Diversification in Aquaculture on 10 March, 2022. A series of three lectures was delivered by the eminent researchers across the globe. Dr. Krishna R. Salin, School of Environment, Resources and Development (SERD), Asian Institute of Technology (AIT), Thailand on "Aquaculture system diversification: Successful examples from Asia" was the first lecture. The second lecture was on "Towards Industrial Microalgae production for food and feed application" by Prof. (Dr.) Rene H. Wijffels, Wageningen University, The Netherlands and the third was by Dr. Jorge Dias, Co-founder &CEO and Production Manager, Sparos LDA, Portugal on "Unlocking the potential of Microalgae in aquafeeds". Scientists, technical officers of



CIFRI, HQ along with the centres attended the webinar.



76th Foundation day of the institute

The Institute celebrated its 76th Foundation day on 17 March 2022 at Institute headquarter, Barrackpore. Dr. B. K. Das, Director recalled that institute has played a pioneering role in ushering fisheries and aquaculture Revolution in India through its research and technology development that has enabled the country to increase the production of fish by 12 times, since 1950-51, thus making a visible impact on the national food and nutritional security. Swami Mahadevanand Maharaj Ji, Assistant Secretary, Bharat Sevashram Sangha, and Chief Guest of the foundation day stressed upon the importance of integrated fish farming technology and expects more collaborative work among all institutes to explore more opportunity. Shri Rajiv Kumar, GM,

Metal and Steel Factory, Ministry of Defence, Prof. A. P. Sharma, Former Director, ICAR-CIFRI, Prof. S. K. Sanyal, Former Vice Chancellor, Bidhan Chandra Krishi Viswavidyalaya, Kalyani, Dr. Gauranga Kar, Director, ICAR-CRIJAF, Barrackpore also graced the occasion. The medals to the winners of annual sports events were presented to awardees by Chief guests and guests of honors. Medical cards for staff members were distributed by the dignitaries.

Satellite symposium on “Hilsa Dialogue: A Bay of Bengal (BoB) Perspective”

ICAR-CIFRI, Barrackpore organized this satellite symposium as a part of 1st Indian Fisheries outlook 2022 and *Azadi ka Amrit Mahotsav* on 23 March 2022. The symposium was conceptualized to develop a regional policy and management plan towards Hilsa conservation and propagation through exchange of scientific intellectuals among hilsa experts representing India, Bangladesh, Myanmar and Norway. Dr. B. K. Das, Director, briefed the hilsa research activities carried out by the institute in recent years including tagging to understand the migratory path, cyro-preservation of hilsa spermatozoa. Prof. Abdul Wahab, Advisor, Worldfish (Bangladesh), presented the current status and policy of hilsa in Bangladesh while Dr. Michael Akester, Country Director (Worldfish), Myanmar highlighted the management policy towards hilsa fishing in Myanmar. Dr. Atle Mortensen, Norway shared the scientific knowledge and experiences on Salmon breeding and captive bloodstock development. Dr. P. Krishnan, Director Bay of Bengal Project, India, briefed the role Bay of Bengal Project in hilsa fishery management.



Swami Mahadevanand Maharaj Ji delivering lecture at Institute Foundation Day



Dr. B. P. Mohanty, Assistant Director General (Fishery Science), ICAR, Dr. Md. Jalilur Rahman, Scientist (Ecofish II) Worldfish, Bangladesh, Prof. Ashim Kumar Nath, Professor of Zoology, SidhoKanho University, Dr. Arnab Biswas, MD, Director, Alo Eye Hospital, Kolkata, were also present. Dr. K. K. Vass, former Director of ICAR-CIFRI, and chairman of the symposium brought out important suggestive measures and recommendations.

Dr. B. P. Mohanty, Assistant Director General (Fishery Science), ICAR, Dr. Md. Jalilur Rahman, Scientist (Ecofish II) Worldfish, Bangladesh, Prof. Ashim Kumar Nath, Professor of Zoology, SidhoKanho University, Dr. Arnab Biswas, MD, Director, Alo Eye Hospital, Kolkata, were also present. Dr. K. K. Vass, former Director of ICAR-CIFRI, and chairman of the symposium brought out important suggestive measures and recommendations.

IRC meeting

Institute Research Committee Meeting for the year 2021-22 was held during 21-23 April 2022 at the Institute headquarters in off-line mode. The meeting was started with a welcome address by Dr. Arun Pandit, Member Secretary IRC. He briefed the house regarding the areas of the projects being executed at the institute. The Director gave a brief overview of the recent developments in the research, developments, linkages, and other areas of the Institute. The Chairman motivated to build rapport with foreign researchers working in the same field and for exchanging ideas. He urged that a close contact may be maintained with the state department while sampling. Dr. A. K. Das, Member Secretary, RAC highlighted the recommendations of RAC meetings conducted in this year. The Chairman instructed that the recommendations should be included in the current projects. Head of Divisions and Heads of Centre also offered their comments. Following this Scientists presented their achievements and future work plan for discussion. New project proposals were also presented in the IRC.





Webinar on natural fish farming

The institute organized a national webinar on natural fish farming as a part of the campaign “Annadata Devo Bhava” under the aegis of *Azadi Ka Amrit Mahotsav* on 23 April 2022 in hybrid mode. The webinar was organized to recognize the role of the fish farmers and the importance of natural fish farming practices in the making of a sustainable society in terms of food and nutritional security. Dr. B. K. Das, Director, ICAR-CIFRI emphasized on incorporating our ancient traditional practices in current scientific fish culture activities. Dr. Das also elaborated the benefits of natural fish farming in preserving the aquatic environment. A total of 228 participants including 69 scientists, 32 students, 21 farmers, 17 technical officers participated in offline mode while 89 farmers, students, Deans of the College of Fisheries participated through online mode.



Webinar on natural fish farming



2nd advisory committee meeting

2nd advisory committee meeting of the Hilsa project

The second advisory committee meeting of the NASF funded research project on 'Captive breeding of hilsa, *Tenualosa ilisha*' was convened on 26-27 April 2022 at the institute headquarters, Barrackpore. Dr. K. K. Vass, former Director, ICAR-CIFRI chaired the meeting. Dr. J. K. Jena, DDG (F. Sc), ICAR also joined on-line. All the project partners and former ADG (I. Fisheries) Dr. S. Raizada also attended the meeting. The progress was discussed and mid course correction was suggested.

Fish harvest mela at Duma wetland of West Bengal

Duma in North 24 Parganas of West Bengal is one of the largest horseshoe-shaped wetlands of Asia having an area of 257 ha with a water depth of 8 - 17 ft. The fisherfolk families of 9 villages surrounding the wetland are fully dependent on this waterbody. The institute has adopted this wetland for production enhancement demonstration and started pen culture demonstration in February 2021 with a target of increasing the fish production up to 1000 kg/ha/year within three years period. Six numbers of CIFRI Pen HDPE® of 0.1 ha were installed in the wetland and fingerlings of Indian major carp and grass carp were stocked in 5 pens. One pen has been stocked with fish seeds of small indigenous fish (SIF) *Systemus sarana*. ICAR-CIFRI is promoting the Sarana Model in the wetland fisheries to enhance the SIFs production and to provide additional nutritional security to the rural households. Besides technical support and guidance,



the institute is providing inputs like fish feed and fish seed to the society. On 18 April 2022, the 63rd day of harvesting, a Fish Harvest Mela has been organized in the presence of Dr. B. K. Das, Director. In spite of losses due to water flooding the fishermen harvested a total of 79 ton fishes as compared to 73 tonnes during the year 2020-21.



Institute Management Committee meeting

The Institute Management Committee meeting of the institute was held at Barrackpore on 30 May 2022. Dr. B. K. Das, Director, ICAR-CIFRI, Barrackpore chaired the meeting and Shri Rajeev Lal, Joint Director (Admn.) & Registrar served as the Member Secretary. Dr. K. K. Krishnani, Dr. Vindhya Mohindra, Dr. Akshaya Panigrahi, Dr. H.N. Dwivedi, Mr. Chanchal Guha were among the external members present on the occasion. The Chairman briefed the members about research and development activities being carried out in the Institute since last IMC meeting, overall Institute management and linkages established with other stakeholders. The Agenda items were discussed.



Garib Kalyan Sammelan

As part of the *Azadi ka Amrit Mahotsav*, Hon'ble Prime Minister Shri Narendra Modi interacted with beneficiaries of the central government schemes through video conferencing on 31 May 2022 at a national level event “*Garib Kalyan Sammelan*” held at Shimla. The state level programme of this event was organised by ICAR-CIFRI in collaboration with Eastern Railway at Railway Indoor stadium, Behala, Kolkata. Shri Ashwini Vaishnav, Hon'ble Minister of Railway, Communication and Electronics & IT was the chief guest and Shri Suvendu Adhikari, the Leader of Opposition, West Bengal Legislative Assembly was the guest of honour. On this occasion Honourable Prime Minister also released the 11th instalment of the *Kisan Samman Nidhi* to more than 10 crore farmers. At Kolkata the Hon'ble Minister and other Dignitaries interacted with the beneficiaries, farmers and other stakeholders. In addition to the beneficiaries, staff members of ICAR institutes located in and around Kolkata, staff members of Eastern, South Eastern and Metro Railway Kolkata, Officers of Department of Post were present on this occasion.





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Eminent Visitors



Brig. R Setlur and Col. Sajan Joshi on 1 February 2022



Dr. Pravin Putra (third from right) visited Bangalore Regional Centre on 28 February 2022



Dr. Indranil Samanta, external member, Animal Ethics Committee on 25 April 2022



Mr. Bjorn Karlos (first from right), Project Head, Redox, Norway on 26 April 2022



Dr. Udo Censkowsky (second from right), Team Leader, COFAD on 7 May 2022



Dr. Satyanarayana (second from right), Director, CSB-Central Tasar Research and Training Institute, Ranchi

Other Important Events



Celebration of Rabindra Jayanti on 9 May 2022



New Year celebration on 1 January 2022

Other Important Events



Field day at 47-Morakolong beel of Assam on 31 January 2022



Hilsa project review meeting on 1 February 2022



Poush sankranti celebration on 14 January 2022



Kishan bhagidari abhiyan during 25-30 April 2022



Director administering the pledge on the occasion of anti terrorism day on 21 May 2022



World Yoga day on 21 June, 2022



At Barrackpore



At Bengaluru

World environment day on 5 June, 2022



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सिफरी समाचार CIFRINEWS

(January - June 2022)



DG (ICAR) addressing all ICAR staff on the occasion of National Science Day

Activities under Scheduled Tribe Component (STC)

Ornamental fish culture

For empowering the tribal women of East Shingbhum and Bokaro districts of Jharkhand the institute in collaboration with the Department of Fisheries, Govt. of Jharkhand, initiated backyard ornamental fisheries. A total of 40 tribal women from rural villages were selected for this endeavour. They received the inputs for the ornamental unit including 400litrefibre tank, fish seed, fish feed, aerator, and accessories. A training programme was also organized on inland ornamental fisheries management during 30 May to 3 June at the institute headquarters.



Distribution of inputs at Devda vilage, Gujarat under STC

Reservoir production enhancement programme

As a part of production enhancement programme of reservoirs, the institute organized a virtual meeting to discuss the plan of action in a participatory mode involving Department of Fisheries, Chhattisgarh, Fishermen Cooperative societies of the state. The meeting was attended by Shri N. S. Nag, Director of Fisheries, Chhattisgarh; twelve State Fisheries Department Officers and ten Primary Fishermen Co-operative Societies (PFCS) of the state. In the meeting, Dr. B. K. Das, Director informed that twenty model pen will be demonstrated in 10 different reservoirs of the state for the first time. Subsequently, in addition to pens the Institute has provided ten boats with engine, twenty coracles and twenty tonnes of CIFRI Cage Grow feed in ten selected small reservoirs of the state. Apenculture demonstration programme was organized at Taurenga Reservoir on 13 May 2022 with the objective to raise in situ fingerling for enhancing the production of the reservoir. Dr. B. K. Das, Director, CIFRI and Shri N. S. Nag, Director of Fisheries, Chhattisgarh and 56 tribal beneficiaries were present in that programme. A training programme was organized during 24-27 May on production enhancement in small reservoirs through pen culture at the institute headquarters.



Stocking at Duma

Activities under Scheduled Caste Sub-Component (SCSP)

Reservoir and wetland fisheries development programme

Reservoir production enhancement programmes were carried out in seven reservoirs of Jharkhand namely Perkha, Bonda, Keredari, Ghaghra, Jarahiya, Kanke and Hatia during this period. Seven FRP boats with outboard motors were distributed to the cooperative societies of the reservoirs during 27-29 June 2022. Similarly, for the wetland development, 520 kgs of IMCs seeds were stocked in the 4 pens at Dumabeel, North 24 Parganas WB. The integrated wetland management programmes are being carried out in this beel under SCSP since 2020. Fish harvest mela was also organized at this beel on 18 April 2022.

Ornamental fish rearing cluster

Ornamental fish rearing cluster was developed in Jharkhand with an objective to empower rural women through this enterprise. 30 units of FRP ornamental tank (400 L), ornamental fish seed, fish feed, aerator, medicine and other accessories were provided to the selected beneficiaries. Literature on ornamental fish keeping along with ornamental fish feed were distributed to the rural women ornamental fishers.

Restoration of cyclone affected fisheries of Sunderbans

For, rejuvenating cyclone-affected fisheries of Sunderban, 3 lakh IMCs fish seeds, 35ton fish feed and 50 L of fish medicine were distributed to 500 fish farmers on 19 June 2022 at Kultoli, South 24 Parganas of West Bengal. Besides, one mass awareness program and demonstration programme on inland fish management practices were also arranged for them during 19-21 May 2022.

Human resource development

Training programmes on hill fisheries development and inland ornamental fisheries management were carried out during 22-26 February and 30 May-3 June, respectively. The former programme was participated by 20 hill fishers of Mirik, Darjeeling, West Bengal, while the later one was attended by 28 rural women of Jharkhand.



Feed distribution at Kultoli



Mass awareness programme at Kultoli



Swachhta Activities



Routine swachhta program in the Institute HQs during the month of April 2021



Awareness programme at ferry ghat, Barrackpore regarding cleanliness, conserving greenery and curbing plastic pollution on World Environment Day 2022



Leaflet distribution for awareness against single use plastics at Barrackpore Ferry Ghat



Routine Swachhta program at Guwahati centre

अनुसंधान उपलब्धियां

गंगा नदी के मध्य खंड से मैक्रोब्रायियम रोसेनबर्गि (डी मैन, 1879) और ज़ेब्राफिश डैनियो रेरियो (हैमिल्टन, 1822) की उपस्थिति

मैक्रोब्रायियम रोसेनबर्गि के एकल नमूना को प्रयागराज में गंगा नदी से दर्ज किया गया था। यह मछुआरे के गिल जाल (जाल छिद्र – 15 मिमी) से एक आकस्मिक पकड़ थी। यह देखा गया है कि गंगा नदी के अलवणीय जल क्षेत्रों दिसंबर-जुलाई के दौरान हुगली-मातला मुहाना के खारे क्षेत्रों में प्रवास करने मछलियाँ आती हैं (सबसे अधिक मार्च-मई के दौरान)। 1970 के दशक में फरक्का बैराज के निर्माण के कारण गंगा नदी में टेनुआलोसा इलिशा प्रजाति का वितरण प्रभावित हुआ था और तब से इसे ऊपरी क्षेत्र में दर्ज नहीं किया गया है। गंगा नदी में फरक्का बैराज के ऊपरी क्षेत्र में एम. रोसेनबर्गि का पाया जाना नदी की पर्यावरणीय स्थिति में सुधार का सूचक माना जाता है।

उत्तर प्रदेश में अप्रैल 2022 में गंगा नदी के मध्य खंड में एक सर्वेक्षण के दौरान मछली प्रजाति, डैनियो रेरियो (लंबाई : 32.31 मिमी और वजन : 0.381 ग्राम) को पहली बार बिजनौर में नदी के मुख्य चैनल में दर्ज किया गया था। ऑर्डर-साइप्रिनोफोर्मिस और परिवार-डेनियोनिडे से डी. रेरियोइस को जेबरा डैनियो के नाम से जाना जाता है, है। इन प्रजातियों को आईयूसीएन सूची में कम संकटग्रस्त श्रेणी में रखा गया है। भारतीय जल निकायों से डैनियो की बारह प्रजातियों की सूचना मिली है। यह प्रजाति आमतौर पर धीमा तथा स्थिर वेग वाली जल निकायों में पायी जाती है। इस नई प्रजाति की उपलब्धता वन्य क्षेत्र में छोटी देशी मछलियों के लिए उपयुक्त आवास को इंगित करती है।

अबसार आलम, श्रवण कुमार शर्मा, सुशील कुमार वर्मा, संदीप कुमार मिश्रा, जीतेंद्र कुमार, धर्मनाथ झा, वेंकटेश रामाराव ठाकुर, बसंत कुमार दास

गोवा की मांडोवी नदी की एक प्रमुख सहायक नदी, खांडेपार की मछली विविधता और पकड़ संरचना का अध्ययन

मांडोवी नदी की एक प्रमुख सहायक नदी खांडेपार की मछली विविधता का अब तक विस्तृत तौर पर अध्ययन नहीं किया गया है। मानसूर पूर्व महीनों में मांडोवी का ज्वारीय पानी खांडेपार नदी की निचले स्तर तक पहुंच जाता है और मानसून पश्चात अवधि के दौरान नदी की लवणता 0.3 से 0.65 पीपीटी तक होती है। खांडेपार नदी के संगम स्थल में व्यावसायिक रूप से महत्वपूर्ण मछली प्रजातियां। सिलागो सिहामा, लेट्स कैलकारिफर, मुगिल सेफालस, प्लानिलिजा पार्सिया, एरियस एरियस, चानोस चानोस, स्फाइरानेजेलो और केकड़ा प्रजातियां (स्काइला सेराटा) जैसे 16 प्रजातियां दर्ज की गईं। इन प्रजातियों में केटफिश, ए एरियस, मिस्टस सिंधाला और होराबायुसब्राचिसोमा 70 प्रतिशत थे जबकि मलेट 15 प्रतिशत और सिलागोसिहामा 6 प्रतिशत दर्ज किए गए। इस नदी खंड में 30-35 मिमी के जालछिद्र वाली गिलनेट का प्रति इकाई मत्स्यन 5-8 किलोग्राम प्रति गियर था। इसके अलावा, नदी में गोता लगाकर मोलस्क मछलियों को पकड़ना एक प्रमुख आजीविका का स्रोत है जिसका अनुमानित प्रति इकाई मत्स्यन 4-5 किलोग्राम प्रति व्यक्ति है।

वैशाख जी, सुहास पी कांबले, लोहित कुमार, एस सामंता और जयेश के सोलंकी

गंगा नदी के काकद्वीप मुहाना में समुद्री शैवाल, एग्रोफाइटन टेनुइस्टिपिटेटम का पाया जाना

लाल समुद्री शैवाल, एग्रोफाइटन टेनुइस्टिपिटेटम को हुगली-मातला मुहाना के काकद्वीप खंड में शीतकाल में दर्ज किया गया। समुद्री शैवाल को मुरीगंगा नदी में संचालित बैग नेट की एंकरिंग रस्सी लिप्त पाया गया। इस शैवाल की प्रमुख विशेषताएं हैं: इसका आकार थैलसनुमा और रंग गहरा लाल होता है। इसकी शाखाएँ पतली, नाजुक और लचीली होती हैं। एग्रोफाइटन टेनुइस्टिपिटेटम अपने अति प्रसार और अति लवणीय जलों में वास करने की क्षमता के कारण अन्य समुद्री शैवाल से यह बेहतर प्रजाति है। बहुत अधिक मैलापन (45.1-103.0 NTU) और कम पारदर्शिता (19-26 सेमी सेकी डिस्क गहराई) वाले जलों में भी इनका प्रसार देखा गया है। नमूनों के संग्रह के दौरान बुनियादी जल गुणवत्ता मानक जैसे जल प्रवाह वेग (0.53 ± 0.06 मीटर/सेकंड), जल का तापमान (20.3 ± 0.06 डिग्री सेल्सियस), पीएच (8.31 ± 0.05), घुलित ऑक्सीजन (6.8 ± 0.1 मिलीग्राम/ली), कुल क्षारीयता (112 ± 2 मिलीग्राम प्रति ली), विशिष्ट चालकता (6.9 ± 1.2 mS/cm) और लवणता (5.14 ± 0.94 पीपीटी) दर्ज की गईं।

संगीता एम. नायर, दिबाकर भक्त, रंजन के. मन्ना, शुभेंदु मंडल, अभिजिता सेनगुप्ता, श्रीकांत सामंता और बसंत के. दास

हुगली मुहाना में ज्वारीय बोर के कारण ब्लोचपो नीफिश, नुचेकुलाब्लोची (वैलेसीएन्स, 1835) सबसे अधिक प्रभावित प्रजाति है

एक ज्वारीय बोर पानी की सतह का अचानक से ऊंचाई तक उठना है जो बाढ़कृत ज्वार के साथ मुहाना के ऊपर तक जाती है। जैसा कि हुगली मुहाना में देखा गया है कि एक ज्वारीय बोर एक लंबी दूरी तक जा सकती है, यहां तक कि अन्तर्स्थलीय जल क्षेत्रों तक भी। हुगली मुहाना के एक हाल के सर्वेक्षण में पाया गया कि इस तरह के ज्वारीय बोर त्रिवेणी के मछली पकड़ क्षेत्रों से भी आगे तक पहुंच गए जिससे मछुआरों को मछली पकड़ बहुत अधिक हुई। हालांकि यह क्षेत्र अलवणीय क्षेत्र है जो समुद्री मुहाने से 212.1 किमी की दूरी पर पर स्थित है पर मत्स्य पकड़ में समुद्री प्रजातियों को भी पाया गया। इन समुद्री प्रजातियों में प्रमुख हैं: एलेपीस जेदाबा, इलिशा मेगालोटेरा, नुचेकुला ब्लोची, प्लेटाइसेफलस इंडिकस, रबडोसारगस सारबा, स्कैटोफैगस आर्गस जिसमें ट्वोब्लोचपोनीफिश, एन. ब्लोची प्रचुर हैं। यह एक समुद्री/खारा जल प्रजाति है जो आमतौर पर निचले मुहाना में उथले जल में पाई जाती है। यह प्रजाति सबसे अधिक ज्वारीय बोर के कारण मुहाना के ऊपरी स्थल में पाई जाती है।

दिबाकर भक्त, रंजन के. मन्ना, संगीता एम. नायर, चायना जाना, शुभेंदु मंडल, अभिजिता सेनगुप्ता, एस. सामंत और बसंत के. दास

गिल नेट की पकड़ क्षमता वृद्धि और छोटे एंकोवी के अत्यधिक दोहन को रोकने के लिए गिल नेट का चयन: एक ऑन-फील्ड अवलोकन

किसी भी मत्स्य पालन पद्धति के प्रभावी प्रबंधन के लिए गियर का चयन एक महत्वपूर्ण पहलू है। गिलनेट के चयन का एक विशिष्ट उदाहरण दिसंबर 2021 में हुगली-मातलह (पथार प्रतिमा के



मत्स्य पकड़ क्षेत्र) मुहाना के निचले क्षेत्र में सर्वेक्षण के दौरान देखा गया था। मछली के लैंडिंग अध्ययन में यह पाया गया कि कोइलियाराम कारती, और सी. डसुमियरी प्रजातियों के लिए ऐसे गिल जाल अधिक उपयुक्त हैं जिनकी लंबाई 120–150 मीटर, ऊंचाई 4.5–5 मीटर और जाल आकार 30–40 मिमी है। इससे ऐसे जालों की मछली पकड़ने की क्षमता वृद्धि के साथ मछली के अत्यधिक दोहन पर भी रोक लगेगी। पथार प्रतिमा के मत्स्य पकड़ क्षेत्रों के निचले हिस्से में 3–4 घंटे की मत्स्ययन में 550–600 किलोग्राम केवल परिपक्व (> 250 मिमी आकार) मछलियां ही पकड़ी गईं। इसी प्रकार, हुगली- मातलह के मुहाने में सेट बैगजाल से एन्कोवी को पकड़ा गया था जिसमें बहुत सारी मछलिया नष्ट हो गई थी। अतः उपयुक्त जाल आकार और गिल नेट का चयन मुहाना और तटीय जल में प्रजातियों के संरक्षण के साथ इनके अत्यधिक दोहन को कम कर सकती है।

दिबाकर भक्त, रंजन के. मन्ना, संगीता एम. नायर, चायना जाना, शुभेंदु मंडल, एस. सामंत और बसंत के. दास

रुशिकुल्या मुहाना में एशियाई हार्ड सीपी मछली: मछुआरों के लिए एक वाकल्पिक आजीविका स्रोत

ओडिशा में रुशिकुल्या नदी का मुहाना की चौड़ाई एक किमी से भी कम है और इसके ऊपरी भाग की गहराई उथली है। नदी में ज्वार का प्रभाव लगभग 4 से 5 किमी तक फैला हुआ है, जो एक छोटा मुहाना क्षेत्र का निर्माण करता है। एशियाटिक हार्ड सीपी मछली, मेरेट्रिक्स मेरेट्रिक्स एक खाद्य मछली है और इस मुहाना के ऊपरी क्षेत्र में आमतौर पर पाई जाती है। सामान्यतः महिला मछुआरा समूह (5–6 महिलायें) इन सीपी मछलियों को संग्रह करती हैं। एक व्यक्ति 3–4 घंटों में लगभग 40–50 किग्रा सीपी को एकत्र कर सकता है। मुहाना क्षेत्र में एशियाई हार्ड सीपी मछलियों के संग्रहण और बिक्री से लगभग रुपये 400–500 प्रति व्यक्ति की आय हो सकती है। अतः इन सीपी मछलियों का संग्रहण और बिक्री एक वैकल्पिक आजीविका स्रोत प्रदान करता है।

प्रणब गोगोई, एस के दास, एस सामंता, बि के दास

नेत्रावती-गुरुपुर मुहाना के जल-तलछट और प्रदूषण संकेतकों में धातुओं का अवशेष: तटीय जलक्षेत्र प्रदूषण पर प्रभाव

भारत के पश्चिमी तट पर कर्नाटक के मैंगलोर शहर में स्थित नेत्रावती-गुरुपुर मुहाना, गुरुपुर और नेत्रावती नदियों के संगम पर बना है। गुरुपुर मुहाना में मैंगलोर शहर से उपचारित घरेलू अवशिष्ट जल प्रवाहित होता है। गुरुपुर मुहाना के पास बड़े-मध्यम-छोटे पैमाने के आवास का एक औद्योगिक समूह भी स्थित है। इंडवितवली कपल्ड प्लाज्मा मास स्पेक्ट्रोमेट्री (ICP&MS) आधारित अध्ययन में जल में धातु के अवशेष पाये गए। मुहाना के सतही तलछट में सात ट्रेस धातुओं की औसत सांद्रता क्रम इस प्रकार पाया गया- लोह तत्व > मैंगनीज > क्रोमियम > जिंक कॉपर > लेड > कैडमियम। गुरुपुर खंड में धातुओं की सांद्रता उच्च पाई गई। प्रदूषण संकेतकों के आधार पर, तलछट के नमूनों में ट्रेस धातुओं का प्रदूषण स्तर सूचकांक मान 1 से कम पाया गया; तलछट में ट्रेस धातुओं का भू-संचय सूचकांक (Igeo) मान शून्य से कम था; क्रोमियम को छोड़कर सभी भारी धातुओं के संदूषण कारक (CF) एक से कम थे। हालांकि सभी अध्ययन के अनुसार जल में धातुओं की सांद्रता बहुत कम पायी गई जिसका कारण तलछट में जमा भारी धातु ज्वारीय बाढ़ और अन्य कारकों से जल में घुलित होना हो सकता है। यद्यपि नेत्रावती-गुरुपुर मुहाना में ट्रेस धातुओं का वर्तमान स्तर हानिकारक नहीं है, पर उनका दीर्घकालिक संचय जलीय बायोटा और इस मुहाने पर निर्भर लोगों के लिए संभावित रूप से हानिकारक हो सकता है।

अजय साहा, डी.जे. सरकार, बि के दास, एस. सामंत, एम.ई. विजय कुमार और एम. फ़िरोज खान

भारत के छोटे उष्णकटिबंधीय जलाशय में मौसमी बदलाव और पादप प्लवक संयोजन स्वरूप को प्रभावित करने वाले प्रमुख पर्यावरणीय कारक

एक छोटे उष्णकटिबंधीय जलाशय, डेरजंग, ओडिशा में प्रमुख पादप प्लवक समुदाय की अस्थायी विविधता और पर्यावरणीय कारकों के साथ उनके संबंध का आकलन किया गया था। अध्ययन के दौरान, 54 जेनेरा की पादप प्लवक की 74 प्रजातियों को दर्ज किया गया था, जिसमें सायनोफाइटा कुल पादप प्लवक का 54 पाया गया। इसके बाद क्लोरोफाइटा (31 प्रतिशत) और बैसिलारियोफाइटा (9.2 प्रतिशत) दर्ज किए गए। जलाशय में तीन प्रमुख प्रमुख पादपप्लवक प्रजातियां पायी गईं - फोर्मीडियम एस पी, मेरिमोपिडिया एस पी और क्रोकोकस एस पी। इनमें पूरे वर्ष भर फोर्मीडियम एस पी प्रमुख प्रजाति थी जिसकी प्रचुरता 16.16 प्रतिशत पायी गयी जबकि ग्रीष्म ऋतु में माइक्रोसिस्टिस एस पी और क्रोकोकस एस पी, मानसून में मोनोरेफिडियम एस पी तथा मानसून के बाद सिलिड्रोस्पर्म एस पी का प्रबल प्रभुत्व देखा गया। कैनोनिकल कोरेस्पॉन्डेंस विश्लेषण (सीसीए) के अनुसार पर्यावरणीय मानक जैसे तापमान, कुल क्षारीयता, कुल कठोरता और पोषक तत्व प्रभावी कारक थे। पादप प्लवक संयोजन स्वरूप पर उपरोक्त मूल सूचनाएँ भावी पारिस्थितिक मूल्यांकन और जलाशय के स्थायी मत्स्य प्रबंधन के लिए एक उपयोगी मानक के रूप में कार्य करते हैं।

पी. मांझी, यू.के. सरकार, लियांथुआमलुआइया, सी. जाना, बि.के. दास, वाई. अली, बी. नस्कर

त्रिपुरा के डुबूर जलाशय में छोटे झींगे पकड़ने के लिए स्वदेशी बेलनाकार बांस का जाल का प्रयोग

त्रिपुरा के डुबूर जलाशय में आमतौर पर छोटे झींगे पकड़ने के लिए प्रयोग किया जाने वाले बेलनाकार जाल, जिसे स्थानीय रूप से "इचारचाई" के नाम से जाना जाता है, का दस्तावेजीकरण किया गया है। यह नायलॉन की सुतली और प्लास्टिक टेप के साथ बांस की पट्टियों से चटाई के रूप में बना होता है। इसकी बाहरी परिधि को बांस के बजाय पारदर्शी पॉलीथीन चादर से लपेटा जाता है। यह बेलनाकार जाल 36 सेमी लंबा होता है जिसमें एक लंबी बांस की छड़ी होती है जिसके साथ चार बांस की छड़ें (लगभग 10 सेमी के अंतर पर) लम्बवत तौर पर नायलॉन सुतली द्वारा गोलाकार तरीके से बांधी जाती हैं। एक तरफ (सुरंग के छोर) से दो गोलाकार बांस की छड़ियां (लगभग 2 मिमी व्यास वाली) नायलॉन की सुतली से अच्छे प्रकार से जुड़ी होती हैं। दूसरे छोर से जाल को बांस की छड़ियों (प्रत्येक लगभग 5 मिमी चौड़ा) के साथ नायलॉन सुतली के साथ बंद कर दिया जाता है। फिर पारदर्शी पॉलीथीन शीट को चारों ओर लपेटा जाता है और जाल को नायलॉन की सुतली से बांध दिया जाता है। मछली पकड़ने वाले छोर से एक नायलॉन सुतली (35–40 सेमी लंबी) बंधी होती है जिसका उपयोग जाल के लिए एक प्लोट के रूप में कार्य करने के लिए थर्मोकॉल के टुकड़े को बांधने के लिए किया जाता है। मछुआरे मछली पकड़ने वाले छोर में कुछ चारा डालते हैं जिससे झींगे इसकी तरफ आकर्षित होते हैं और भीतर की ओर चले जाते हैं जहां वे फंस जाते हैं। मत्स्ययन के अंत में जाल को खोल कर झींगे एकत्र किए जाते हैं (लगभग 50–120 ग्राम / जाल / दिन)। प्रत्येक ट्रेप की लागत रुपये 70–80 तक होती है जिसे 1–2 वर्ष तक ही उपयोग कर सकते हैं।

एस सी एस दास, डी देबनाथ, बी के भट्टाचार्य, ए के यादव और बि के दास

असम के मध्य ब्रह्मपुत्र घाटी क्षेत्र में बाढ़कृत मैदानी आर्द्रभूमि (बील) में मानसून पूर्व उच्च बाढ़ का प्रभाव

कृषि और संबद्ध क्षेत्रों को प्रभावित करने वाले हाल के वर्षों में अचानक बाढ़ जैसी चरम जलवायु घटनाएं अधिक देखी जा रही हैं। मई 2022 के तीसरे सप्ताह के दौरान लगातार बारिश के कारण असम के केंद्रीय ब्रह्मपुत्र घाटी क्षेत्र (सीबीवीजेड) में एक बड़ी असामयिक मानसून पूर्व बाढ़ आई। फील्ड अवलोकन पता चला कि मोराकोलॉग बील, मोरीगांव जिले में मानसून पूर्व बाढ़ के कारण 18 मई, 2022 को बील के साथ लोगों के घर भी जलमग्न हो गए थे। बाढ़कृत मैदान के अधिकांश आर्द्रभूमि (बील) मोरीगांव जिले के कोपिली नदी में जल स्तर में वृद्धि हुई थी। इस आकस्मिक बाढ़ के कारण शेड और पेन क्षेत्र का विनाश, बील के पास संग्रहीत मछली फीड की हानि और स्टॉक की गई मछलियों के पलायन के कारण बड़ी आर्थिक क्षति का सामना करना पड़ा। आर्द्रभूमि की पारिस्थितिकी भी बाढ़ से प्रभावित हुई थी। मुख्य जल गुणवत्ता प्राचलों के औसत मान थे: मैलापन 291.70 NTU (उच्च), घुलित ऑक्सीजन 3.40 mg/L (निम्न), मुक्त CO₂ 4.20 mg/L (उच्च), क्षारीयता 54.70 mg/L, pH 6.9, चालकता 109.50 µS/सेमी, टीडीएस 54.10 पीपीएम, पारदर्शिता 18.40 सेमी (कम) और अधिकतम गहराई 6.5 मीटर पर बाढ़कृत मैदानी आर्द्रभूमि में बाढ़ प्रारम्भिक अवधि में मछलियों की स्पॉनिंग अधिक हुई।

बी.के. भट्टाचार्य, डी. देबनाथ, संजीत सेकिया और यू.के. सरकार

गोंडा, उत्तर प्रदेश के संरक्षित वन में पार्वती आर्द्रभूमि से क्रैस्पेडाकुस्टा सोवरबी और खुजली संक्रमण (सेरकेरियल डर्मेटाइटिस)

पार्वती झील में फाइलम सिनिडारिया, वर्ग हाइड्रोज़ोआ, और परिवार ओलिंडियाडे, *क्रैस्पेडैकस्टा सोवरबी* लेंकेस्टर, 1880 जो मीठाजल जेलीफिश है, को अप्रैल 2022 में दर्ज किया गया था। उत्तर भारत के खुलाजल में मीठे पानी की इस जेलीफिश की उपलब्धता का यह पहला रिकॉर्ड था। इस मौसम में इस पौधे के 1,200 से अधिक नमूने दर्ज किए गए (घनत्व 52 पौधे प्रति घन मीटर)। जेलीफिश के छिटपुट फूल *हाइड्रोमेडुसा* जीवन चक्र का हिस्सा हैं। *सी. सॉवरबी* अक्सर सूक्ष्म पोडोसाइट्स के रूप में मौजूद होते हैं। साइबेरियन पक्षियों का प्रवास और एकवैरियम पौधों का परिवहन पोडोसाइट्स की झील में होने के संभावित कारण हैं। यह प्रजाति चीन की यांग्त्जी नदी की मूलतः पायी जाती थी और इसके बारे में और भी अध्ययन किया जा रहा है।

सर्वेक्षण के दौरान, यह पाया गया कि इस जल निकाय में परभक्षी प्रजाति, *आईकोर्निया क्रैसिप्स* की प्रचुरता है। इसके अलावा, इसका औसत फॉस्फेट और कुल फास्फोरस क्रमशः 0.147 पीपीएम और 0.405 पीपीएम पाया गया, जो मानव और पशु उपभोग के लिए हानिकारक था। इसका कारण है कि कई वर्षों से इसमें मृत और विघटित जलकुंभी भरे हुए हैं। इस कारण से पक्षियों और स्तनधारियों में त्वचा संक्रमण और एलर्जी हो सकती है।

श्रवण के शर्मा, अबसार आलम, विजय कुमार, डी.एन. झा, बसंत कुमार दास

कुशेश्वरस्थान पक्षी अभ्यारण्य, बिहार में बड़ी आकार के मीठाजल मड ईल, *मोनोतेरस कुचिया* की रिपोर्ट

जून, 2022 के महीने में कोशी-गंडक नदी बेसिन, दरभंगा जिला, बिहार के अंतर्गत कुशेश्वरस्थान पक्षी अभ्यारण्य के आर्द्रभूमि में किए गए एक सर्वेक्षण के दौरान एक बड़े आकार की *एम. कुचिया* (फैमिली: सिनब्रांचिडेवास) को दर्ज किया गया। इसकी कुल लंबाई 71 सेमी और वजन 347 ग्राम था। बांग्लादेश के साथ-साथ भारत के उत्तर पूर्वी राज्यों में *एम. कुचिया* के बड़े आकार के नमूनों पर कई रिपोर्ट उपलब्ध हैं। कुशेश्वरस्थान चौर क्षेत्र से *एम. कुचिया* के बड़े नमूने की रिपोर्ट आर्द्रभूमि में स्टॉक की अच्छी स्थिति का संकेत देती है। हालांकि 2010 में आईयूसीएन रेड लिस्ट के अनुसार *एम. कुचिया* का अस्तित्व सुरक्षित है पर इसकी जनसंख्या प्रवृत्ति के बारे में अधिक सूचनाएं उपलब्ध नहीं हैं इसलिए इसके मूल्यांकन की नितांत आवश्यकता है।

सुमन कुमारी, सजीना ए.एम., अली, वाई. और यू.के. सरकार

असम के बाढ़कृत मैदानी झीलों में स्थापित पिंजरों में पालित साइप्रिनस कार्पियों के विकास और उत्पादन पर स्टॉकिंग घनत्व का प्रभाव

अमूर कॉमन कार्प, *साइप्रिनस कार्पियो* को असम के मौसमी खुले बाढ़कृत मैदानी झील, समागुरी बील में पंद्रह पिंजरों (प्रत्येक पिंजरे का आयाम: 5 x 5 x 2 वर्ग घन मी) को स्थापित कर उसमें पाला गया। *सी. कार्पियो* की अंगुलिकाओं (औसत लंबाई 8.44 सेमी; औसत वजन 9.23 ग्राम) को पांच अलग-अलग संचयन घनत्वों अर्थात् 5 अंगुलिका प्रति घन मी. (S1), 10 अंगुलिका प्रति घन मी. (S2), 15 अंगुलिका प्रति घन मी. (S3), 20 अंगुलिका प्रति घन मी. (S4) और 25 अंगुलिका प्रति घन मी. की दर पर स्टॉक किया गया था। छह महीने के अंत में, विभिन्न स्टॉकिंग घनत्वों में दर्ज की गई मछली की विशिष्ट वृद्धि दर और वजन बढ़ने का प्रतिशत था: S1 (1.94 और 3169.34), S2 (1.92, 3073.35), S3 (1.87, 2780.28), S4 (1.85, 2715.28) और S5 (1.77, 2338.79)। विभिन्न स्टॉकिंग घनत्वों पर मछली की वृद्धि में कोई महत्वपूर्ण अंतर (पी = 0.171) नहीं पाया गया। हालांकि अधिक स्टॉकिंग घनत्व से मछली के विकास दर में तुलनात्मक कमी देखी गई। विभिन्न स्टॉकिंग घनत्वों पर मछली की सकल उपज क्रमशः 1.18, 2.20, 2.87, 3.48 और 3.55 किग्रा प्रति घन मी. थी। इस प्रकार, अमूर कार्प को 25 अंगुलिका प्रति घन मी. या उससे अधिक के स्टॉकिंग घनत्व पर टेबल-आकार के उत्पादन के लिए स्टॉक किया जा सकता है।

बि के दास, एस येंगकोकपम, डी देबनाथ, प्रोनोब दास, बी के भट्टाचार्य, ए के यादव, सिमंकू बोरा, नीति शर्मा, एस सी एस दास, बी सी रे और ए काकाती

तमिलनाडु के पूंड़ी जलाशय में कोरिका सोबोर्ना (हेमिल्टन, 1822) पालन

तमिलनाडु का पूंड़ी जलाशय कोसाथलैयर नदी पर स्थित है। इस जलाशय में मई-जुलाई 2022 तक *कोरिका सोबोर्ना* हेमिल्टन, 1822, मत्स्य प्रजाति का पालन दर्ज किया गया। इस जलाशय के उत्तर में स्थित नहर द्वारा कृष्णा नदी के जल का प्रवाह होता है जिससे दक्षिण-पश्चिम मानसून की शुरुआत में यहाँ मत्स्य पालन एक प्रमुख आजीविक स्रोत है। मत्स्य पालन के लिए उपयोग किया जाने वाला गियर मलमल के कपड़े से बना एक बड़ा स्कूप नेट होता है। नहर के मुहाने पर धारा के विपरीत तैरने वाली मछलियों को पकड़ा जाता है। औसतन 10-15 मछुआरे रोजाना सुबह 6.30 से 8.30 बजे तक स्कूप नेट का संचालन करते हैं। प्रति इकाई मत्स्ययन प्रयास (किलोग्राम प्रति स्कूप नेट प्रतिदिन) 10 से 20 किग्रा तक होता है। प्रजातियों की औसत लंबाई और वजन



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सिफरी समाचार

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क्रमशः 4 सेमी और 5 ग्राम देखा गया है। इस मछली की लंबाई मध्यम होती है और इसकी त्वचा पर हल्की पार्श्व बैंड, 40-42 पार्श्व शल्क, उलटे पेट, 10-12 प्रीपेल्विक और 7-8 पोस्ट पेल्विक स्कूट होती है। इस मत्स्य पालन को मुख्यतः प्रवासी मछुआरे ने ही अपनी आजीविका के लिए अपनाया है जिससे वे स्थानीय तौर पर रुपये 100 प्रति किलो की दर से बेचते हैं।

जेस्ना पी.के., राम्या वी.एल., विजयकुमार एम.ई., कार्तिकेयन एम., सजीना एम., सरकार यू.के., बि. के. दास

लेबियो रोहिता के लिए रोगजनक विषाणु, विब्रियो कोलेराई ईएमएम1 की आणविक पहचान और लक्षण वर्णन पर पहली रिपोर्ट

वी. कोलेरा (EMM1) के एक रोगजनक स्ट्रेन को पूर्व मेदिनीपुर जिला, पश्चिम बंगाल, के आर्द्रभूमि में संवर्धित रोगग्रस्त एल. रोहिता से पृथक किया गया। इसकी पहचान नॉन-कोलेराजेनिक, नॉन-O1, नॉन-O139 स्ट्रेन के रूप में की गई। विशिष्ट मीडिया, जैव रासायनिक परीक्षण, 16S rRN। जीन अनुक्रमण और फाइलोजेनेटिक विश्लेषण में पालन के माध्यम से पहचान की गई थी। इसके लिए एल. रोहिता को वी. कोलेरा (ईएमएम1) के इंद्रोपेरिटोनियल इंजेक्शन (1.04×10⁷ सीएफयू/एमएल) देने से 84 घंटों के भीतर एल. रोहिता की मृत्यु हो जाती है। इससे मछली के गुदा फिन और पेल्विक फिन से रक्तस्राव होने लगता है। उसके यकृत में अपक्षय, गुर्दे में सिकुड़ा हुआ ग्लोमेरुली, आंतों के विली एपिथेलियम का परिगलन और मांसपेशियों का अधःपतन होने लगता है। एल. रोहिता से रोगजनक वी. कोलेरा की आणविक पहचान पर यह पहली रिपोर्ट है। यह अध्ययन इस बात की पुष्टि करता है कि अंतर्स्थलीय खुले जल और अन्य पालन उपरोक्त स्ट्रेन मछलियों के लिए एक शक्तिशाली रोगजनक कारक हो सकता है।

मनोहरमयुम शाय्या देवी, विकास कुमार, तनुश्री बेरा, प्रणय परिदा, प्रवीण मौर्य, विजय कुमार बेहरा और बसंत कुमार दास

प्राकृतिक बाढ़कृत मैदानी आर्द्रभूमि का तलछट में उपस्थित बैक्टीरिया द्वारा अमोनिया नाइट्रोजनस यौगिक का उपचार

प्राकृतिक आर्द्रभूमि के यूट्रोफिकेशन से अमोनिया नाइट्रोजनस यौगिक के निर्माण को तेज कर दिया है, जो विघटित ऑक्सीजन स्तर से जुड़ा हुआ है और जिससे जल निकाय में मछली और अन्य जलीय जानवरों में गंभीर पारिस्थितिक समस्याएं और विषाक्तता पैदा होती है। भारत के ईस्ट कोलकाता वेटलैंड में स्थित सरदार भेरी से पृथक अमोनिया नाइट्रोजनस यौगिक के उपचार में रोगजनक-निरोध बैक्टीरिया की संभावित भूमिका का अध्ययन किया गया था। अमोनिया ऑक्सीकरण करने वाले जीवाणुओं के अलावा, प्राकृतिक आर्द्रभूमि में अमोनिया पैदा करने वाले जीवाणुओं की प्रचुरता होती है। इसके तलछट में, सैप्लिंग साइट इनलेट सीवेज कैनल, वेटलैंड क्षेत्र और आउटलेट कैनल ने अमोनिया ऑक्सीडाइजिंग बैक्टीरिया के लगातार वितरण को दिखाया है, जिसमें अमोनिया उत्पादक बैक्टीरिया की प्रचुरता है। ज्यादातर मामलों में, NH₄⁺ -N वृद्धि के 24 घंटे के भीतर > 90 प्रतिशत एकाग्रता से तक कम (1mg/L) हो गया था। ऊष्मायन के 72 घंटे के भीतर नाइट्रिफिकेशन उत्पादों, NO₂⁻ -N और NO₃⁻ -N की पहचान की गई। इसके विपरीत, अमोनिया के उत्पादन में कुछ बैक्टीरिया आइसोलेट्स शामिल थे और प्रयोगशाला विश्लेषण में नियंत्रण की तुलना में बैक्टीरिया के पूरक समूह में अमोनिया की सांद्रता में 2 गुना वृद्धि देखी गई। इसके अलावा, अमोनिया ऑक्सीकरण में महत्वपूर्ण भूमिका वाले बैक्टीरियल आइसोलेट को सिट्रोबैक्टर फ्रीडी ए9, बैसिलस सबटिलिस सी4, बी सेफेंसिस ओसी1 और बी सबटिलिस ओसी2 के रूप में जाना जाता है। कुल परिणाम से पता चला है कि बैक्टीरियल आइसोलेट में अमोनियम सांद्रता को प्रभावी ढंग से कम करने की क्षमता होती है और यह औद्योगिक या कृषि अपशिष्ट जल उपचार प्रणाली में लाभकारी अनुप्रयोग के लिए विशेषता हो सकती है जहां अमोनियम सांद्रता बहुत अधिक होती है।

विकास कुमार, तनुश्री बेरा, शुभ्रा रॉय, ए.के. जाना, बि.के. दास और बी.के. बेहरा

संशोधित डबल स्केलेटल स्टेनिंग तकनीक का उपयोग करके लेबियो कलबासु का कंकाल विकास का अध्ययन

एलिज़रीन रेड और एलियन ब्लू के साथ संशोधित डबल स्केलेटल स्टेनिंग तकनीक का उपयोग करके लेबियो कलबासु में लार्वा कंकाल के विकास को समझने के लिए एक प्रायोगिक अध्ययन किया गया था। 2 dph (दिन के बाद हैचिंग) से 20 dph तक के लार्वा नमूनों को 4 प्रतिशत तटस्थ फॉस्फेट बफर फॉर्मलिन समाधान में संरक्षित किया गया था। कंकाल के हड्डी और उपास्थि भागों को धुंधला करने के लिए क्रमशः एलिज़रीन लाल और अलसीयन नीले रंग का उपयोग किया गया था। सना हुआ नमूनों का अध्ययन Zeiss प्रतिदीप्ति माइक्रोस्कोप का उपयोग करके किया गया था। कंकाल का विकास बहुत प्रारंभिक अवस्था में देखा गया था। इसकी पूरी लंबाई और पुच्छ की फिन रे की उत्पत्ति के दौरान एक सीधी नोचॉर्ड को अंडे से 2 दिन बाद देखा गया। उदर रीढ़, अशाखित रे की किरणें और नोचॉर्ड के उदर पक्ष पर हाइपोरल 4 dph से स्पष्ट रूप से दिखाई दे रहे थे। 4 dph महत्वपूर्ण है क्योंकि उस समय तक अधिकांश सिर कंकाल तत्व और कशेरुक केंद्र और तंत्रिका रीढ़ के साथ कशेरुक स्तंभ दिखाई देने लगा थे। शाखाओं वाली किरणों के साथ पृष्ठीय पंख और ऑपरेटिव और जबड़े की हड्डियों ने 10 और 20 dph के बीच सख्त बनाना शुरू कर दिया।

एच.एस.स्वैन, एंबिली एम.एन. और बि.के.दास

कर्नाटक कार्प, बारबोडेस्कनेटिकस (जेर्डन, 1849) का फीनोमिक आधारित जनसंख्या चित्रण

पारंपरिक और चित्र आधारित विश्लेषण पद्धति का उपयोग करके बारबोडेस्कनेटिकस प्रजातियों की जनसंख्या संरचना का अध्ययन किया गया था। अध्ययन में कर्नाटक, तमिलनाडु, केरल और सीआई-सीफा, बेंगलूर में बारबोडेस्कनेटिकस प्रजातियों को स्टॉक किया गया था। स्टॉक को पृथक करने के लिए कुल 27 मॉर्फोमेट्रिक, 9 मेरिस्टिक और 30 ट्रेस माप का उपयोग किया गया था। 30 ट्रेस दूरी माप उत्पन्न करने के लिए पंद्रह चिह्नों का उपयोग किया गया था। रूपमितीय वर्णों के लिए कुल पांच प्रमुख घटक 86.9 प्रतिशत व्याख्या करते हैं और ट्रेस माप के लिए कुल चार पीसी मिन्नता के 96.01 प्रतिशत की व्याख्या करते हैं। पारंपरिक पद्धति का उपयोग करते हुए विभेदक विश्लेषण ने बताया कि टीएन स्टॉक को छोड़कर सभी शेरों के 100 प्रतिशत व्यक्तियों को वर्गीकृत किया गया था, जहां केवल 93.8 प्रतिशत को सही ढंग से वर्गीकृत किया गया था। ट्रेस दूरी के साथ नियोजित डीएफए ने सीआई स्टॉक के तहत भविष्यवाणी को दिखाया, व्यक्तियों ने 100 प्रतिशत का मूल्य दिखाया, उसके बाद के, केई, टीएन स्टॉक 89.1, 8.6, 6.1 के मूल्य के साथ। ट्रेस मॉर्फोमेट्री पर आधारित कारक विश्लेषण से पता चला है कि कारक एक शरीर के आकार से संबंधित है

और कारक दो सिर के आकार से संबंधित है। ट्रेस डिस्टेंस आधारित क्लस्टर ने दिखाया कि केई और सीआई स्टॉक टीएन स्टॉक की तुलना में समान हैं, लेकिन इसके विपरीत मॉर्फोमेट्री आधारित क्लस्टर ने दिखाया कि केई और टीएन स्टॉक सीआई स्टॉक की तुलना में समान हैं। अधिकांश विश्लेषणों से पता चला कि सीआई स्टॉक (कृषि पालन स्टॉक) सभी जंगली स्टॉक से अलग था। इस अध्ययन ने स्पष्ट किया कि पारंपरिक और उन्नत छवि आधार विश्लेषण के संयोजन ने बी. कैरेंटिकस के स्टॉक में भेदभाव करने में मदद की। इस प्रजाति का स्टॉक भेदभाव मुख्य रूप से भौगोलिक अलगाव और जलवायु कारक के कारण था। इस मॉर्फोमेट्रिक अध्ययन में स्टॉक भेदभाव न्यूनतम था, इसलिए विभिन्न स्टॉक की बेहतर समझ के लिए जीन पूल पहचान और मार्कर अध्ययन की बहुत आवश्यकता है।

वी. एल. राम्या, बी.के. बेहरा और बि.के. दास

पंगसियानोडोन हाइपोथाल्मस में इविथियोथिरियस मल्टीफिलिस और एरोमोनस हाइड्रोफिला सह-संक्रमण के विरुद्ध प्रतिरक्षा बढ़ाने के लिए हल्दी के तेल की भूमिका

इविथियोथिरियस मल्टीफिलिस, एक परजीवी है जो मीठे पानी की मछलियों में इविथियो पिथरियासिस (सफेद धब्बे की बीमारी) संक्रमण करता है, जिसके परिणामस्वरूप जलीय कृषि क्षेत्र को महत्वपूर्ण आर्थिक नुकसान होता है। इविथियो पिथरियासिस के लिए एक महत्वपूर्ण पूर्व-निर्धारण कारक है, जल का तापमान कम (यानी 20 डिग्री सेल्सियस से नीचे) होना, जो मछली के स्वास्थ्य को प्रभावित करता है और इससे जानवरों को परजीवी संक्रमण बढ़ता है। सिफरी, बैरकपुर में पंगसियानोडोन हाइपोथाल्मस प्रजाति का पालन आरंभ हुआ आई. मल्टीफिलिस के प्राकृतिक प्रकोप (16^० तल्ल। च्क और अनुक्रमण विधि द्वारा मान्य) की सूचना दी गई थी। इस संक्रमण में मछली के शरीर में रक्तस्राव, अल्सर, मलिनकिरण और लाली सहित लक्षण देखे गए। सूक्ष्मजीवविज्ञानी विश्लेषण से पता चला कि एरोमोनस हाइड्रोफिला हेमोलिसिन और उत्तरजीविता परख द्वारा पुष्टि किया गया। पी. हाइपोथाल्मस संक्रमण से मछलियों में मृत्यु की संभावना भी देखी गयी। अध्ययन से पता चला है कि इष्टतम सांद्रता (10 पीपीएम) पर हल्दी का तेल (करकुमा लोंगा) पी. हाइपोथाल्मस अंगुलिकाओं में आई. मल्टीफिलिस और ए. हाइड्रोफिला के सह-संक्रमण को रोक सक सकता है। निष्कर्ष बताते हैं कि हल्दी का तेल मछलियों में होने वाले तनाव में एंटीऑक्सीडेंट और प्रतिरक्षाविज्ञानी प्रतिक्रियाओं को नियंत्रित करता है और संभवतः पी. हाइपोथाल्मस में सुरक्षा बढ़ाने में योगदान देता है।

विकाश कुमार, बि. के. दास, एच.एस. स्वैन, एच. चौधरी, ए.के. बेरा और बी.के. बेहरा

हुगली-मतला मुहाना में मत्स्ययन प्रतिबंध की अवधि के दौरान आजीविका के वैकल्पिक साधन के रूप में लार्वा संग्रह

पूर्वोक्त राज्यों और पश्चिम बंगाल में 61 दिनों की अवधि के लिए मछली पकड़ने पर प्रतिबंध लगाया जाता है, जो हर साल 15 अप्रैल से 14 जून तक होता है। इस 'मत्स्ययन प्रतिबंध' अवधि के दौरान, मछली पकड़ने वाली बड़ी नौकाओं को समुद्र में जाने की अनुमति नहीं है, ताकि मछलियों को अंडे देने में आसानी हो सके। हुगली-मतलह मुहाना के निचले भाग के सर्वेक्षण (मत्स्ययन प्रतिबंध' अवधि के दौरान) में यह देखा गया कि मछुआरे झींगे मुख्य रूप से मैक्रोब्राचियम रोसेनबर्गि के साथ-साथ पेनियस मोनोडोन के लार्वा को संग्रह करते हैं। एक मछुआरा या मछुआरों का एक समूह (एक समूह में 2-3 लोग) एक दिन (3-6 घंटे में) में झींगे के 450 से 1500 लार्वा एकत्र कर सकते हैं और आय 225 से 750 प्रति दिन प्राप्त कर सकते हैं। हालांकि इस तरह के लार्वा संग्रहण से अन्य मछलियों के अंगुलिकाएं नष्ट हो जाती हैं। इससे प्रतिबंध अवधि के दौरान मछुआरों के लिए वैकल्पिक आजीविका बनाता है। इसी प्रकार, प्राकृतिक बीज संग्रह को रोकना, लक्षित प्रजातियों का कृत्रिम रूप से प्रजनन करना और प्राकृतिक बीज संग्राहकों को वैकल्पिक आजीविका प्रदान करना, कुछ उपयोगी उपाय हो सकते हैं।

दिबाकर भक्त, रंजन के. मन्ना, संगीता एम. नायर, शुभेंदु मंडल, अभिजिता सेनगुप्ता, एस. सामंत और बसंत के. दास

World's first solar powered fishing vessel developed by India, secures global award

Srav, a solar offshore fishing vessel developed and designed by Kochi-based Electric Boats and NavAlt Solaris, is the first-ever sea-going solar fishing vessel in the world.

The invention has bagged the Gustave Trouve Award.

Source : New India Express

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