Issue No. 9 July 2020 - December 2020

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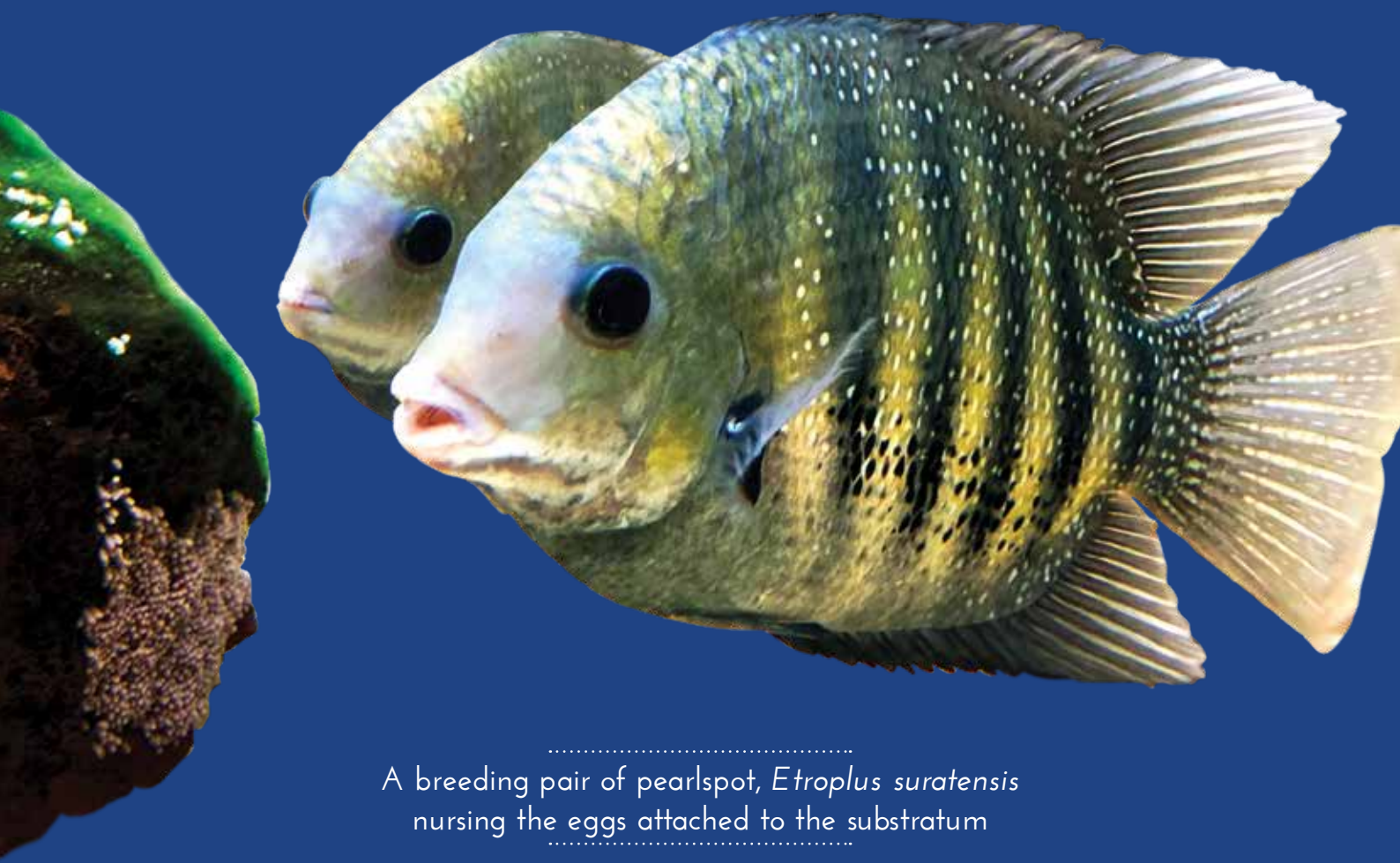
CIBANEWS

भाकृअनुप - केन्द्रीय खारा जलजीव पालन अनुसंधान संस्थान
ICAR- CENTRAL INSTITUTE OF BRACKISHWATER AQUACULTURE
ISO 9001 : 2015



A breeding pair of pearlspot, *Etroplus suratensis* nursing the eggs attached to the substratum

CIBANEWS

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ICAR-CIBA - a nodal R&D agency working in brackishwater aquaculture for the past three decades with a vision of environmentally sustainable, economically viable and socially acceptable seafood production. Technology backstopping and interventions by the institute are benefiting the sector to the tune of ₹ 10,000 crore annually.

CONTENTS

FROM THE DIRECTOR'S DESK

Dear all,

The emergence of the COVID-19 pandemic and the lockdown has brought an unprecedented and challenging situation in this century, which none of us has ever seen in the past and probably don't wish to see again. Our brackishwater sector, one of the important food production and the economically vibrant sector, is not an exception. Here, the entire aquaculture value chain, including seed and input supply, farming, labour availability, processing and trade, were hit. A cross-sectional assessment on the impact of COVID on the aquaculture value chain estimated an economic loss of 1.50 billion USD to the shrimp aquaculture sector during the current year. It is expected that shrimp production and its export performance may be declining by around 30% in the season. However, the pandemic witnessed the aquaculture's resilient nature, where the farming activity kept its momentum, though on a lower side. We predict a rapid revival of the sector in the post-pandemic time, as we can increase attention and enthusiasm in all the facets of aquaculture.

ICAR-CIBA has responded to the new normal, transformed ourselves to the changing situation, and started working on all the possible modes, beginning 4th May 2020 itself, adhering to the COVID protocols. We kept our communication channels active with the farmers and stakeholders through social media tools. We initiated meetings and training programmes through virtual platforms. The positive feedback & appreciation on the CIBA's first digital conference on 'Brackishwater Aquaculture Scenario in India, focusing on shrimp farming during COVID' reflected the program's relevance and success. CIBA developed and circulated advisories on sanitizing protocols and hygienic practices in the workplace in the different key sectors such as seed, feed, farming, processing and marketing. We were able to produce vital inputs such as seeds, feed, water quality kits, and disease diagnostics with the available infrastructure, staff, and other resources of CIBA to meet our farmer's requirements in all the possible ways to support and sustain them in farming. We encouraged our feed clientele to produce feeds and facilitated its supply to the farmers in coastal and inland regions. To some farmers, we helped them to source their inputs, and to some, we helped to sell their produce by facilitating logistics and access market under the challenging situations.

It is heartening to record here that our labs, hatcheries and feed mills at headquarters and both centres at Kakdwip and Navsari, were working and our scientists continued to show good progress in R&D activities by the second half of the year. The scientists' impressive scientific publication profile during the period is also a testimony of the work done during the pandemic period. ICAR-CIBA successfully conducted three national-level webinars with broader participation of stakeholders and policymakers on widespread farming and seafood production issues.

The quinquennial review team meeting of CIBA was conducted during this period to review and evaluate the R&D programmes and overall functioning of the institute through several rounds of virtual sitting. As a national recognition for CIBA, three of our stakeholders who adopted our technologies bagged national awards. Shri. T. Purushothaman, a progressive farmer from Kerala, won the 'Jagjivan Ram Innovative Farmer Award' of ICAR. A Chennai-based Nambikkai Fish Farmers Group and Andhra-based Sai Aqua Feeds, supported by CIBA's Agribusiness Incubation Centre won national awards, 'Best Fisheries Self Help Group' and 'Best Fisheries Enterprise Award'-2020 by the National Fisheries Development Board, Department of Fisheries, Govt. of India.

As a landmark in the institute infrastructure development, CIBA acquired 64 acres of brackishwater land from Salt Department, Govt. of India, near Muttukadu, for further expansion of Brackishwater Aquaculture R&D, and also aiming to establish a centre of excellence in brackishwater aquaculture for the region with a focus of SARC and Middle East countries.

It is inspiring to see the incredible support from the farmers, industry people, and government agencies for our efforts. I want to take this chance to thank all of them who have supported us in the past, and we expect it to continue our work for the sustainable growth of the brackishwater aquaculture sector, partnering with all the players from the private, govt and public sector. We are pleased to bring you the CIBANEWS with facts and figures on our activities, outcomes, technologies etc., in the second half of the year 2020. I am sure that this issue would be enriching and exciting to the readers.

Dr. K.K. Vijayan
Director

SPAWNING IN NET CAGES AND LARVAL REARING IN RECIRCULATORY AQUACULTURE SYSTEM: AN INNOVATIVE SEED PRODUCTION TECHNIQUE FOR PEARLSPOT, *ETROPLUS SURATENSIS*

Large scale seed production of pearlspot, *Etroplus suratensis* is still a major bottleneck in the expansion of pearlspot farming in the country. To address this issue, Navsari Gujarat Research Centre of CIBA has developed a cage based mass spawning model and subsequent hatching and larval rearing for pearlspot in a recirculatory aquaculture system at its research farm in Matwad, Navsari, Gujarat.

A total of 26 (13 pairs) pearlspot adults consisting of both male (TL: 20.5 ± 0.201 cm & BW: 222 ± 4.33 g) and female fish (TL: 18.57 ± 0.44 cm & BW: 179.15 ± 10.97 g) were stocked into a floating cage (4 × 4 ×1.5 m) at a sex ratio of 1:1. Earthen pots (1 no/pair) were suspended in the cage as substrates for spawning. After 5 days of stocking natural spawning was observed. A total of 27 spawnings with an average of 2 - 3 spawning/week were observed within 3 months. The number of eggs layed during each spawning ranged from 400 to 1250 nos with average fecundity of 800 nos/spawning. The substrate, along with the fertilized eggs, was transferred to the RAS system for subsequent hatching and larval rearing for 21 days. A total of 12,000 early fry were produced from 27 spawning within 3 months, with an average of 460 fry produced per spawning. The approximate capital cost for setting up a cage and portable RAS unit for incubation and

larval rearing is ₹ 50,000 that can yield a production of ₹ 50,000 to 60,000 fry/ annum.

Pearlspot seed produced from this model were supplied to scheduled caste sub plan beneficiaries at regular intervals for demonstration of nursery rearing of pearlspot as a source of livelihood generation. Pearlspot early fry (21 days old, TL: 0.9 - 1 cm) from the hatchery was further reared in hapas (2×1×1 m) at 500 nos/hapa in earthen ponds. Early fries were fed with artificial larval diet @ 15 % body weight. The fry attained fingerling size (4-4.5 cm), within 60 days of rearing with a mean survival of 80%. A total of 10,000 pearlspot fry and fingerlings were produced at NGRC – CIBA farm with the involvement of farmer groups. Around 8000 pearlspot fingerlings (4.5 - 8 cm) were sold to local farmers at ₹ 15/ fingerling to the farmers which generated a revenue of ₹ 1,20,000 to SCSP beneficiaries. This technology can be propagated to all coastal states of India for large scale seed production of pearlspot for the benefit of small scale aquafarmers and self-help groups as an income-generating livelihood activity.

RAS system

21 days old fry

60 days old fingerlings

EXPERIMENTAL PRODUCTION OF POLYCHAETE WORM, *MARPHYSA GRAVELYI* IN CAPTIVITY AS FRESH HATCHERY FEED

Polychaetes are multi-segmented marine worms (Phylum: Annelida; Class: Polychaeta) that inhabit most mudflats, estuaries and sheltered sandy shores and plays a crucial role in the estuarine food web, supporting a wide range of predators such as crabs, shrimps, fishes and birds. Polychaete worms have been identified as a source of reproductively essential polyunsaturated fatty acids (PUFA) and hormones that enhance the vitellogenesis and reproductive performance of shrimp broodstock. Therefore, it has become an indispensable broodstock maturation feed in commercial penaeid shrimp and finfish hatcheries across the world, and it has led to small but vibrant niche aquaculture sector in many parts of the world including India. The common polychaetes used in shrimp hatcheries are *Perineries helleri*, *Palola* sp., *Neries virens*, *Perineries nuntia* and *Marphysa* sp. In this article, the salient findings of culture experiments on polychaete *Marphysa gravelyi*, carried out at Muttukadu experimental station of ICAR-CIBA is summarized.

Marphysa gravelyi

M. gravelyi inhabits the bottom of muddy shores at about one foot deep. They release transparent gelatinous egg masses with narrow stalk, which get attached to burrow hole containing varying number of eggs depending on the size of the adult worm. The length and volume of egg mass varies from 5 to 20 cm and 10 - 400 ml, respectively. Egg masses are filled with mucous substances, which protect them from desiccation. The egg mass gets detached from the burrow hole within a period of 15-30 min, and floated on the surface. The eggs are oval or spherical with an average size of 200 ± 4.6 µm. *M. gravelyi* produce 7,000 – 25,000 eggs in a jelly cocoon depending on the size and volume of the egg mass. The highest survival of larvae was found at a salinity of 25 ppt with a survival of 76 ± 2.7% followed by 15 and 35 ppt (56 ± 1.8 and 37 ± 2.6%). The conversion time of eggs into juveniles varies at different salinities and the fastest conversion occurs within 7 days at 25 ppt.

Larval rearing

Eggs with yolk sac are converted to prototrochophore larvae within 12 h, and subsequently metamorphosed to early metatrochophore larvae in 36 h (length of 310 ± 17 µm and width of 267 ± 15µm) at 25 ppt. At this stage, the larvae start to feed microalgae. Metatrochophore stage gets converted into late metatrochophore stage (length of 425 ± 32 µm) on 3rd day, and subsequently into small worms, nectochaeta (length 630 ± 42 µm) by the 4th day, and finally reach the juvenile stage by the 6th day with a size exceeding 1 cm. Among the microalgae, *Thalassiosira* sp. is found to be the best diet with highest survival (78 ± 3.6%) followed by *Chaetoceros* sp. (62 ± 2.9%).

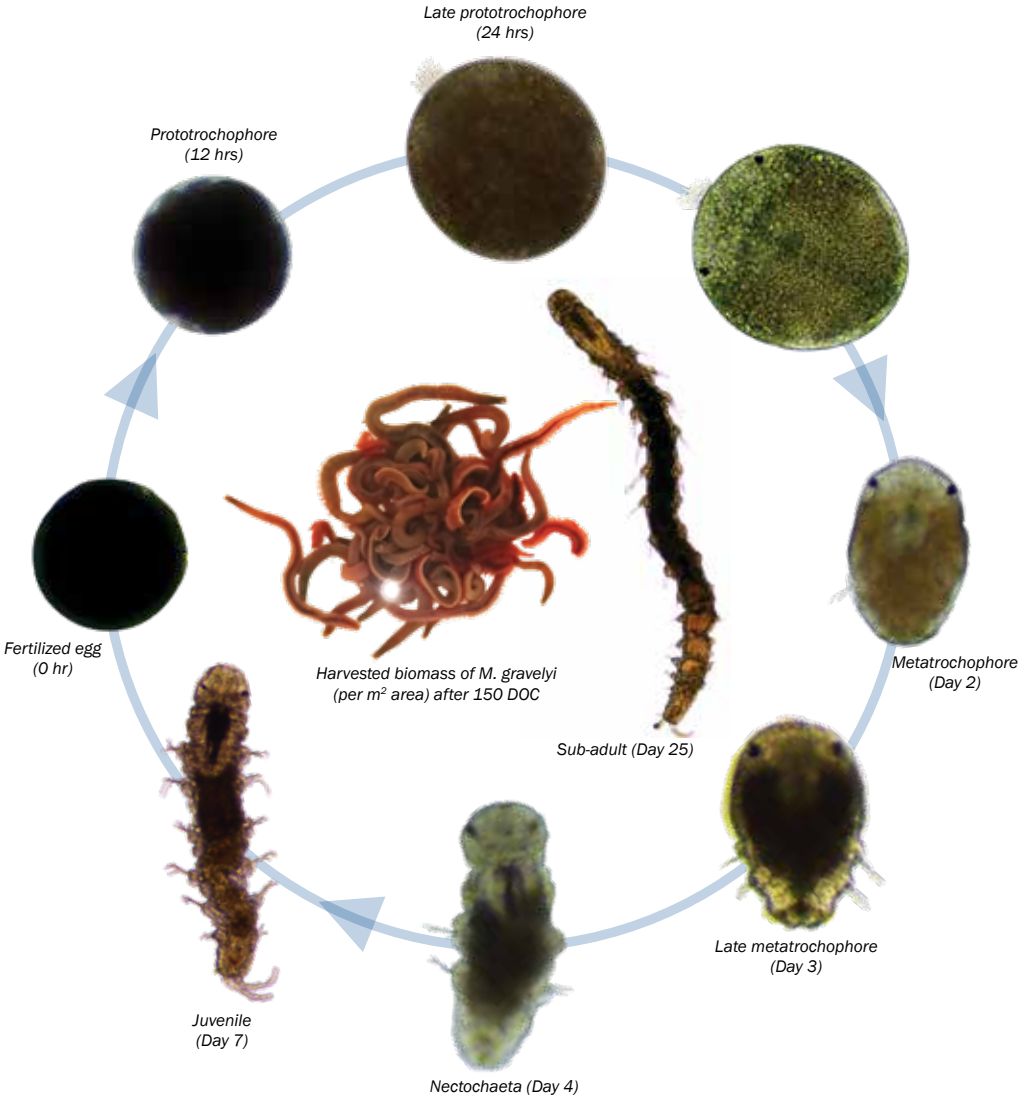
Biomass production

The highest biomass was obtained when sandy clay soil and organic manure was used as substrate during grow out production. An average of 260 ± 34 g/m^2 biomass was obtained during the five month grow-out culture period at MES with an average survival of 52% indicating the potential for upscaling to commercial systems.

Grow-out culture data of *M. gravelyi* (150 DOC)

Particulars	Initial stocking	After five months of grow-out period
Number of individuals/tank (1 feet tank)	100	62 ± 8
Range of individuals/tank (nos)	100	38 - 62
Range of individuals/m² (nos)	1000	408 - 667
Survival rate (%)	-	52
Range of survival rate (%)	-	38 - 62
Average individual body wet weight (mg)	-	490 ± 82
Range of individual body wet weight (mg)	-	370 - 690
Biomass (g/m²)	-	260 ± 34

LIFE CYCLE OF *MARPHYSA GRAVELYI*



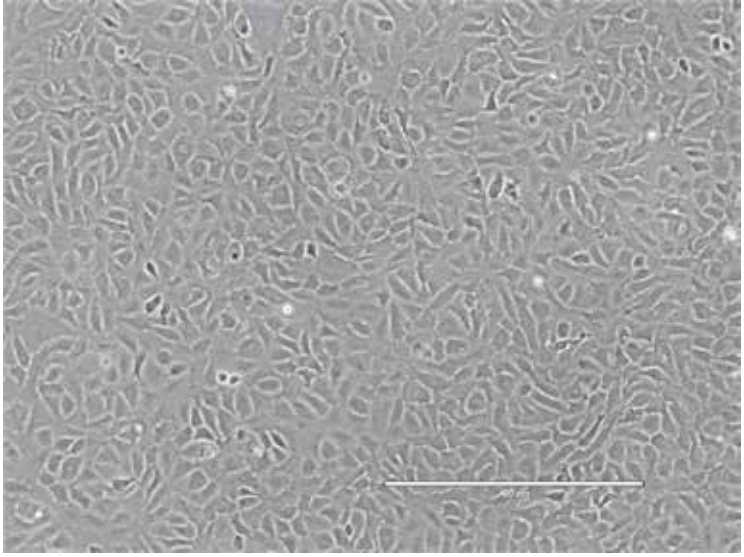
Paddy, sesamum and coconut trees irrigated with shrimp farm discharge water

INTEGRATING LOW SALINE/FRESHWATER SHRIMP AQUACULTURE WITH AGRICULTURE - A VIABLE FARMING SYSTEM WITH BETTER UTILIZATION OF RESOURCES

Farmers culturing exotic Pacific white shrimp Penaeus vannamei in low saline/freshwaters are being criticized for environmental and social issues, particularly in Andhra Pradesh and Tamil Nadu for the conversion of agricultural lands, salinisation of agricultural lands and drinking water resources nearer to aquaculture farms, and multi-user conflicts with other stakeholders. Integrating shrimp aquaculture with agriculture, a viable farming system, being practiced in Thanjavur, Villupuram, and Kanchipuram districts of Tamil Nadu, where shrimp farms discharge water is used as irrigation water for agriculture.

ICAR-CIBA investigated this farming system's sustainability for the past three years in the Orathanadu area of Thanjavur district, where about 200 acres of agriculture is benefitted from aqua-agri integration. *P. vannamei* @ 50 to 60 nos./m^2 cultured with Cauvery River, and bore well freshwater. The postlarvae acclimatized for low salinities in both hatcheries (up to 3 ppt) and farms (freshwater salinity). Salt was never added to the ponds to increase the water salinity. However, minerals ($MgCl_2$, KCl) were applied to mitigate the imbalance in minerals and to maintain ionic ratios. The shrimp survival ranged from 75 to 80% and the total production ranged from 3.5 to 5.5 t/acre in 80 to 85 days of culture.

The shrimp farms' discharge water (SFDW) is being used by the neighbouring agriculture farmers for irrigating paddy during Kharif and black gram/ sesamum in Rabi for nine years. Even if the land is fallow also, farmers used to irrigate their land with SFDW to improve the fertility status of the soil. The SFDW increases nutrient availability for crop growth and enhances crop productivity. Paddy during Kharif and black gram during Rabi irrigated with nutrient-rich SFDW yielded 2.4 to 2.7 t and 4 to 9 quintals per acre compared to 1.56 to 2.4 t and 2 to 4 quintals per acre with conventional irrigation practice, respectively. Coconut trees within the farm, irrigated with SFDW yielded 240 coconuts/tree compared to 80/tree with the conventional practice of irrigation once in every 50 days. Farmers are getting an additional income of about ₹ 25,000 and ₹ 7,500 per acre for paddy and black gram, respectively due to an increase in production and by decreasing the fertilizer application compared to the recommended dose. Therefore the integration of agriculture with shrimp aquaculture save water, ensure environmental sustainability and provide more profit.

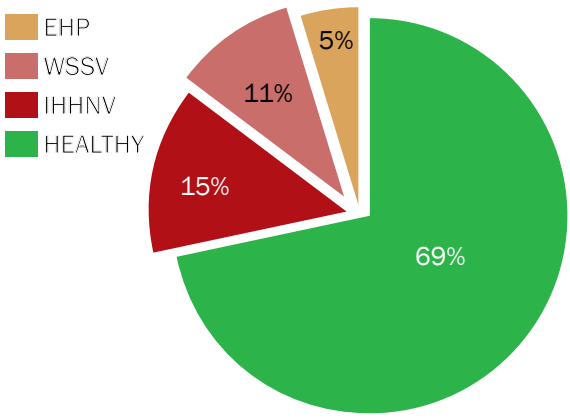


PRELIMINARY WORK ON THE DEVELOPMENT AND CHARACTERIZATION OF PRIMARY CELL CULTURE FROM BRAIN OF MILKFISH (*CHANOS CHANOS*)

A new adherent cell line designated as MFB-1 cells of epithelial nature has been established from the brain tissue of milkfish (*Chanos chanos*). The cell line MFB-1 reached 65 sub passages with uniform cell morphology, cell viability, and a split ratio of 1:2, reaching 100% confluency in 24 - 36 hrs with the population doubling time of 36 hrs. Juvenile milkfish weighing 15 g obtained from ICAR-CIBA hatchery, and the brain tissue was collected aseptically. The tissue fragments were washed with L-15 media supplemented with antibiotics (1000 IU mL^{-1} penicillin, 100 µg mL^{-1} streptomycin, 500 µg mL^{-1} gentamycin, and 10 µg mL^{-1} amphotericin B). The tissue fragments were suspended in L-15 medium with 20% fetal bovine serum in a TC-treated flask (Nunclon delta surface) with plug seal and incubated at 27°C to develop a primary cell monolayer. Cell monolayer with the population of mixed fibroblast and epithelial-like cells reached 100% confluency at 12 days of incubation. The cells were passaged using L-15 medium with 15% FBS of osmolality ranging from 250 to 270 mOSM kg^{-1} at 27°C. The confluent monolayer of MFB-1 cells could sustain for 20 days with L-15 medium supplemented with 2% FBS without any changes in cell morphology and peeling of the monolayer. The cell line's sterility was tested and found negative for bacterial, fungal, mycoplasmas, adventitious viruses, and endogenous retrovirus. MFB-1 cells were characterized by karyotyping (2n = 32). The cell line at 50th passage stage was confirmed by barcoding and sequence submitted in NCBI (GenBank sequence no. MN836380). Cryopreservation of cells was done at different passage levels and revived after six months with intended cell morphology and viability. This new cell line has varied applications, including studies on viral infections, toxicity testing, production of vaccines, drug screening, etc.

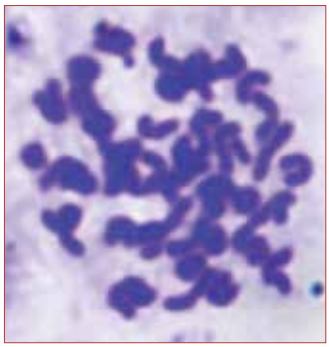
DISEASE TRENDS IN *PENAEUS VANNAMEI* POST-LARVAE

Stocking disease-free seeds in the pond is one of the foremost important biosecurity measures adopted by each farmer. Screening of seeds before stocking is a major step in scientific shrimp farming and it restrict the entry of the pathogen into the pond. Here, we present the disease trends in P. vannamei post-larvae (PL - 7 to PL - 34) screened at the National referral laboratory for brackish water shrimp and finfish diseases ICAR – CIBA. A total of 37 shrimp postlarvae were submitted to the laboratory from June 2020 to March 2021 by the farmers for screening shrimp diseases *viz.*, White spot disease (WSD), Infectious hypodermal haematopoietic necrosis disease (IHHND), and Hepatopancreatic microsporidiosis caused by *Enterocytozoon hepatopenaei* (EHP). Four samples were found to be positive for WSSV (11%), and five samples were positive for IHHNV (15%), and two samples were positive for EHP (5%) by PCR screening using OIE primers. This indicates that it is highly advisable to screen the seed for OIE-listed pathogens before stocking.



KARYOTYPE OF MANGROVE RED SNAPPER (*LUTJANUS ARGENTIMACULATUS*)

A karyotype is a collection of chromosomes of a living organism. By this, one can identify and evaluate the size, shape, and number of chromosomes in a body cell sample of a plant or animal. The karyotype is used to look for abnormal numbers or structures of chromosomes. Here karyotyping was carried out to analyze the chromosome complement at metaphase (numbers, size, type and morphological characteristics) in red snapper (*L. argentimaculatus*). Red snappers (6-8 g) were injected with 0.5% colchicine to arrest the cells at metaphase. The fish were euthanized one-hour post-injection and different organs (gills, spleen and kidney) were dissected out for analysis. The macerated tissues were incubated in hypotonic solution (0.56% KCl solution) for an hour, fixed with Carnoy's solution and stained with Giemsa stain. The chromosome spread was observed at 100 x magnification and chromosome numbers were determined. The chromosome number was found to be 48 (2n = 48).



INFESTATION OF DRAGONFLY NYMPH IN LOW SALINE SHRIMP PONDS CAUSES EARLY LOSSES IN SHRIMP POST-LARVAL SURVIVAL

Dragonflies are heavily bodied, strong flying insects that belong to the infra order Anisoptera under the order Odonata. The life cycle of dragonflies consists of three stages *viz.,* egg, nymph and adult, of which the nymph is the aquatic larval stage of dragonfly that are voracious aquatic predators feeding on aquatic invertebrates (aquatic insects, other insect larvae, small shrimp) and other organisms (tadpoles and small fish). Dragonflies generally do not lay their eggs in shrimp grow-out ponds due to the high salinity of the pond water, wherein the eggs and larvae cannot grow or survive. However, during the post-monsoon period, when the salinity of the source water is low (2 to 5 ppt) due to a large flux of freshwater from rivers, dragonflies have been observed to lay the eggs in low saline shrimp ponds. This phenomenon was observed during post-monsoon in most shrimp grow-out ponds in south Gujarat. During this period, large swarms of dragonflies,

Exuviae of dragonfly nymph

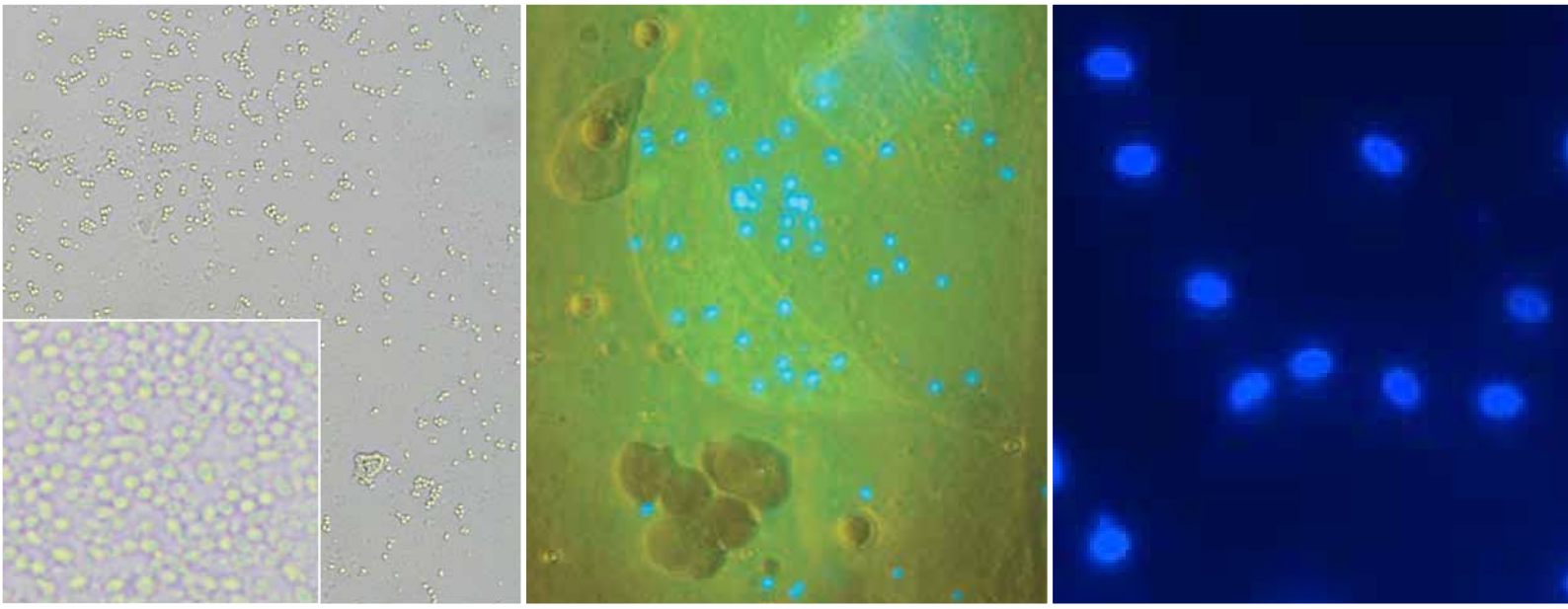
mostly belonging to the families Libellulidae and Aeshnidae, were observed to form mating pairs adjacent to ponds and lay their eggs in the low saline shrimp pond water. Laying of eggs by dragonfly adults were not observed in ponds that had bigger sized shrimp or those at higher salinities. Interestingly, adult dragonflies could identify low saline ponds that were filled and seeds weren't stocked, although laying of eggs continued at lower rates even in freshly stocked ponds until 10 to 25 DOC.

The dragonfly females lay about 500-2000 eggs in one clutch that hatches into nymph in 5 to 7 days. The nymph would further undergo several moults ranging from 6 to 15 times (several nymphal stages) depending upon the species during their growth underwater. The nymph stage would extend for 35 to 65 days, depending on the species. When the nymph is fully grown and ready to metamorphose to adult dragonfly, they stop feeding for a few days and move to the edges of the ponds or catwalk or sluice gate where they put their heads outside water and adapts to breath from the air. The nymph subsequently climbs up the pond edges onto the soil or vegetation, sluice gates, catwalks during the night, and on finding the suitable substrate would moult for one last time to become adult dragonfly with wings and leave back the exuviae on these substrates. By the beginning of October, exuviae started appearing all around the ponds, catwalks, vegetation etc indicating that the pond has been greatly infested. The metamorphosis of nymph to adults continued through early November based on the presence of fresh exuviae. Dragonfly nymphs are aggressive predators and generally crawl on the pond bottom, although they can swim for short periods. The nymph has a retractable hinged labium that normally remains attached to the head and can be extended forward and retracted rapidly to capture prey such as other insects, shrimp post larvae and small fish. To study the possible impacts of dragonfly nymph on shrimp postlarvae, few medium-sized nymphs were collected and stocked along with *Penaeus vannamei* post larvae. The average survival rate of postlarvae at the end of 2 weeks ranged from 60 to 73.3% in the tanks containing the nymphs, whereas higher survival of 86.6 to 93.3% were observed in the control groups. In another trial employing fully grown nymphs stocked with shrimp, no mortality was observed after three days of rearing. The results obtained from the trial indicate that dragonfly nymph can easily prey on shrimp postlarvae. Farmers in Andhra Pradesh have often reported that survival rate of the post larval shrimp can drop as much 50% in ponds severely infested with dragonfly nymphs. Our experiences also suggest that, survival rates can reduce to 50 to 70% following two weeks of stocking depending on the infestation rates and nymphal stages of majority of the larvae.

Total eradication of dragonfly nymph in low saline ponds during the post-monsoon season is impossible. One of the best measure to prevent negative effects of dragonfly nymphs are to stock larger sized juveniles (0.25 to 1 g shrimp from a nursery), that cannot be preyed by the nymph. Alternatively, farmers can also resort to hapa based nursery rearing of shrimp in large hapas at densities of 1000 to 1500 PL/m^3 in 20 or 40-mesh hapas wherein the delicate postlarvae is protected from predatory nymphs. Dragonfly nymph infestations can cause severe economic losses to shrimp farmers carrying farming in naturally low saline regions, freshwater, and in other areas where creek salinities are low during the post-monsoon season. Farmers shall thus adopt necessary precautions to prevent the reduction in shrimp survival rates due to infestation of shrimp pond water by dragonfly nymphs.

Nursery rearing of shrimp post larvae in large hapas to prevent predation by dragonfly nymphs in infested ponds

RAPID DETECTION OF *ENTEROCYTOZOON HEPATOPENAEI* SPORES USING CHEMOFLOURESCENT STAINING



Microscopic detection of E. hepatopenaei spores in the hepatopancreas of P. vannamei post-larvae by Calcofluor white staining (400x)

PCR detection of *Enterocytozoon hepatopenaei* (EHP) using primers based on small subunit ribosomal RNA (SSU rRNA), spore wall protein (SWP), and β-tubulin genes are currently available and remains the most popular diagnostic method. Unfortunately, these assays often have not been validated against traditional techniques and not thoroughly tested for inclusivity or specificity. Besides, it is important to realize that the PCR detects DNA and not necessarily a viable pathogen. To confirm the presence of a viable pathogen, PCR should be used in conjunction with other methods that allow visualization of the pathogen in tissue, such as histology or in situ hybridization with DNA probes. The pathogen detection by light microscopy of hepatopancreas or faecal smears is based on the presence of characteristic spores that are very small (1.1 x 0.7 µm) and are sometimes difficult to observe due to interference of host tissues or debris. Recently, post-larvae of shrimp have been found positive for EHP in many hatcheries. We explored the use of chemoflourescent agents such as calcofluor white to quickly identify EHP spores in faeces and tissue localization in hepatopancreatic tissue by a simple and rapid technique.

Formulation per Litre

- Calcofluor White M2R 1.0 g
- Evans Blue 0.5 g

Recommended Procedure

- Prepare a wet mount of spore suspension, faeces, or HP tissues on a clean glass slide.
- Add one drop of Calcofluor White Stain (Sigma) and one drop of 10% Potassium Hydroxide.
- Place a coverslip over the specimen. Let the specimen stand and stain for 2-5 minutes.
- Cover the slide with a paper towel and gently press to remove any excess fluid.
- Examine the slide under UV light at x100 to x400 magnifications at a wavelength between 345 Abs peak and 455 Em peak of DPAI illumination light cube.

Interpretation of Results

The microsporidian spores appeared as bluish-white or turquoise oval halos when viewed through EVOS FL Auto Cell Imaging System at a wavelength between 345 Abs peak and 455 Em peak of DPAI illumination light cube. The calcofluor staining can be used as a non-invasive and non-lethal method for shrimp broodstock monitoring in hatcheries. The protocol is a sensitive method and fast requires ~15 min to perform but not an indicator of the spore's viability in suspensions.

ICAR-CIBA SENSITIZED THE COASTAL VILLAGERS ON COVID-19 PANDEMIC AND DISTRIBUTED SAFETY MATERIALS

As a social responsibility measure during COVID-19 pandemic, the ICAR-Central Institute of Brackishwater Aquaculture, Chennai has taken up a sensitization programme on COVID-19 among the tribal and scheduled caste families of Kannavanthurai, Senjiamman and Kulathumedu tribal villages of Tiruvallur District and Kundrakadu and Kovalam villages of Chengalpattu district of Tamil Nadu during 6th - 7th August 2020. As part of the programme, milkfish fingerlings and CIBA feed were distributed to fish farmers to sustain their livelihood activity. Moreover, to prevent the spread of COVID-19 face masks, sanitizers and hand gloves were distributed along with essential groceries to about 40 SC and ST aqua families. Dr. B. Shanthi, Principal Scientist, coordinated the event under CIBA-TSP and CIBA-CPCL CSR project.

KISAN DIWAS AND 'SWACHHTA PAKHWADA CELEBRATIONS AT KRC-KAKDWIP OF ICAR-CIBA

Kakdwip Research Centre (KRC) of ICAR-CIBA celebrated the Kisan Diwas on 23rd December 2020 with the tribal farmers at Mundapara village in Sundarbans, West Bengal. The programme highlighted the importance of precautionary measures like personal and community level sanitization to combat the COVID-19 pandemic. All the participants were provided with masks and hand sanitizers as a preventive measure to contain the COVID-19 virus spread. Sixty aqua farmers, youth, and tribal women participated in the programme and were sensitized on technologies for achieving higher fish productivity by effective resource utilization. The importance of integrated fish farming with livestock and horticulture was also discussed to generate additional income and protect their farms' micro-environment. Women SHG's shared their experiences with integrated fish farming and expressed their desire to scale up the technology with the technical support by KRC, ICAR-CIBA. KRC farm-reared juveniles of mullets, CIBA-Poly*Plus* feed, and plankton booster Plankton*Plus* were also distributed to the tribal farmers. Dr. Debasis De, OIC KRC Kakdwip and team coordinated the programme.

MANGROVE RED SNAPPER

(Lutjanus argentimaculatus)

The snapper family *Lutjanidae*, a gonochorist with separate sexes, contains many commercially important species representing the tropical and subtropical coastal fisheries. A very popular sports fish with a greenish-brown to reddish body, and a silvery-white belly. Individuals in deeper waters are reddish overall. Juveniles have a series of about 8 whitish bars on the sides and 1-2 blue lines across the cheek. The Mangrove red snapper has a slightly concave caudal fin, and the scale rows on the back are roughly parallel to the lateral line. Juveniles and young adults are found in mangrove estuaries and in the lower reaches of freshwater streams. Eventually, they migrate offshore to deeper reef areas, sometimes penetrating to depths more than 100 m. It is a good candidate for brackishwater aquaculture because of its high economic value, good growth rate and ability to adapt to various salinities and temperatures. It grows to more than 500g in 6 months and fetches a reasonable market price of ₹ 500/kg with no limit on body size. During the past decade, much of the interest in aquaculture of *L. argentimaculatus* focused on problems related to spawning and larvae rearing. Brackishwater aquaculture of *L. argentimaculatus* was done as "Capture based Aquaculture" in small cages deployed at the brackishwater lagoons and estuaries, which depends on the wild juvenile resource that is seasonal, variable, and probably unsustainable.

KINGDOM	:	**Animalia**
PHYLUM	:	**Chordata**
CLASS	:	**Actinopterygii**
ORDER	:	**Perciformes**
FAMILY	:	**Lutjanidae**
GENUS	:	***Lutjanus***
SPECIES	:	***L. argentimaculatus***

Like any potential aquaculture candidate, much of the success depends on a consistent supply of fingerlings. Undoubtedly, if this species needs to be commercially raised, a hatchery would be an integral part of the plan as there is a minimal supply of fingerling for this species that depends exclusively on wild collections. Since 2016, the Finfish Culture Division of ICAR-CIBA is building up captive broodstock of mangrove red snapper, and around 120 numbers tank and pond reared fishes achieved final maturation in captivity. In July 2019, a successful induced breeding trial was conducted on matured mangrove red snapper with HCG injection, and successful larval development was achieved. The technology will soon be disseminated to the farmers after refinement and scaling up.

TECHNOLOGY TRANSFERS, PRODUCT RELEASES AND KNOWLEDGE PARTNERSHIPS

Fisheries graduates from Karnataka joins hands with ICAR-CIBA for hatchery technology of Asian seabass under Start-up India initiative

Start-up India is an Indian government initiative to build a strong eco-system for nurturing innovations and transforming them into technologies useful for the society. Under this programme, ICAR-CIBA launched brackishwater aquaculture start-up initiatives during 2016. Subsequently, entrepreneurs were trained through the Agri-Business Incubation centre (ABI) of ICAR at CIBA. The objective was to use all innovations available in one place and facilitate the start-ups to get instant access to funding support and industry-academia partnership. Under this programme a MoU was signed with M/s Canares Aquaculture on 10th September 2020. Three young fisheries science graduates took up Asian seabass hatchery technology as first of its kind in the country.

Mr. V.S. Karthik Gowda, Mr. Kaushik A. and Mr. Sachin V. Savan, three young entrepreneurs, graduated from Mangalore Fisheries College, got interested in brackishwater hatchery and farming after visiting the CIBA hatchery complex at Muttukkadu. They started their venture using the seabass larvae from CIBA and succeeded in obtaining the desired growth parameters and survival up to 70% at the nursery stage. They sold seabass fingerlings to the farmers of Mangalore, Karnataka, with an impressive profit. Their plans to start a seabass hatchery of their own on the west coast with technology from CIBA have attracted generous funding support from angel investors, M/s Canares Engineering Company, Bangalore Mr. Gajanan H.S., and Mr. Ramji Pandey.

During the MoU signing, Dr. K.K. Vijayan, Director, CIBA, appreciated the enthusiasm and courage of youth turning into entrepreneurs and also creating livelihood opportunities for the rural populations in the coastal region of Karnataka. Dr. M. Kailasam, SIC, Fish Culture Division assured support for the upcoming entrepreneurs. The event was organised by Business Planning and Development Unit of CIBA adhering to the COVID-19 guidelines by the MoHFW.

ICAR-CIBA transferred the technology on 'Phage Therapy' for the control of bacterial disease in shrimp hatchery rearing systems

ICAR-CIBA signed an MoU with M/s Salem Microbes Private Limited, Salem, Tamil Nadu, on 18th September 2020 to produce and market a phage-based product developed by the Aquatic Animal Health and Environment Division (AAHED) of CIBA, Chennai. The phage product is effective for the biocontrol of bacterial diseases in shrimp hatcheries. 'The "phage prophylaxis and therapy" was developed by CIBA using bacteriophages for the biocontrol of bacterial diseases, particularly vibriosis. Dr. S.V. Alavandi, SIC, AAHED, briefly explained the importance of this new-generation technology in shrimp hatcheries. He mentioned that the formulation comprised a broad spectrum of lytic bacteriophages from aquaculture systems and India's coastal ecosystems and has proven its efficacy in field evaluation trials. Mr. D. Ramesh Kumar, CEO, M/s Salem Microbes Pvt Ltd, an established firm and leader in aquaculture, animal husbandry and poultry with strong research and development and marketing of microbial products, showed interest in partnership with CIBA in scaling up phage technology to benefit the aquaculture sector. He said that phage therapy is a safe alternative to tackle the antimicrobial resistance (AMR) issue for sustainable shrimp hatchery operations.

Dr. K.K. Vijayan, Director CIBA, highlighted the novelty of phage technology and complimented Salem Microbes for recognizing CIBA's potential in R&D backstopping in brackishwater aquaculture and coming forward to take up the technology. Dr. P.K. Patil, OIC, Institute Technology Management Unit, facilitated the transfer of technology and patent filing.

National Fish Farmers Day celebrations at headquarters and Regional Centres at Kakdwip (West Bengal) and Navsari (Gujarat)

ICAR-CIBA organized a "Phone-in-Programme (PiP)" on National fish farmer's day for farmers to interact with subject matter specialists on various aspects of brackishwater fish and shrimp culture and farm management practices in their vernacular languages. Dr. K.K. Vijayan, Director, CIBA, highlighted the importance of induced breeding of fishes and shrimps for sustainable aquaculture development in the country. He enunciated the importance of connecting to farmers during the current scenario. ICT-aided tools like PiP facilitate the bi-directional communication of technical information to the farmers and field issues to scientists. Dr. D. Deboral Vimala, Principal Scientist, Social Sciences Division & Nodal Scientist PiP co-ordinated the event.

CIBA-Navsari Gujarat Research Centre also celebrated the National fish farmers' day at its Brackishwater Aquaculture Research and Development farm (NGRC-BARD farm) in Matwad village, Navsari, Gujarat. Shri. C.R. Patil, Honourable Member of Parliament, Navsari was the Chief Guest. He distributed milkfish fingerlings raised by the SHG members to ten aquafarmers. He was pleased to know about the revenue generated by Women Self-Help Group through technological interventions of NGRC CIBA during 2019-20. An exhibition was organized during the function to create awareness among farmers on brackishwater candidate fish species. The program was coordinated by Mr. Pankaj Patil, Officer-in-Charge, with Shri. Jose Antony and Shri. Tanveer Hussain, Scientists NGRC Navsari.

Similarly, Kakdwip Research Centre (KRC) of ICAR-CIBA celebrated the National Fish Farmers' Day with fish farmers and fishers from Sundarban, West Bengal. Scientists sensitized farmers to take up eco-friendly culture models such as Integrated Multi-Trophic Aquaculture (IMTA), scientific pond culture, Multiple Stocking and Multiple Harvesting (MSMH) system and integrated fish farming for generating extra revenue.

Farm-reared hilsa fingerlings & formulated feed for hilsa, Hilsa^{Plus} were distributed to farmers to promote hilsa farming in the Sundarban region and to demonstrate grow-out culture at their farms. Dr. Debasis De, Officer-in-Charge and other scientists of KRC-CIBA organized the programme at Kakdwip.

Fisheries Secretary, Dr. Rajeev Ranjan, inaugurated the ICAR-CIBA digital conference on 'New-age technologies for sustainable brackishwater aquaculture'

On ICAR foundation day, ICAR-CIBA conducted a CIBA Digital Conference (CDC-2) on 18th July 2020. National and international policymakers, scientists, and other professionals shared their experiences and vision forward at the conference, focusing on the role of 'emerging and novel technologies in the Brackishwater aquaculture front.' The conference focussed on the start-up ecosystem in the brackishwater sector and discussed the opportunities for a 'think globally and act locally' mode.

Dr. Rajeev Ranjan, IAS, Secretary of Fisheries, Ministry of Fisheries, Animal Husbandry and Dairying, Govt. of India, inaugurated the conference. He impressed upon the immense potential of the Indian aquaculture industry. He pointed out that aquaculture is a technology-driven sector, where technologies are adopted faster globally and the Indian aquaculture sector is at the forefront as a global leader through its significant contribution in terms of export income, nutritional security, employment generation, economic profitability, and new opportunities for innovative enterprises. The Indian government wanted to drive the sectoral growth through 'Pradhan Mantri Matsya Sampada Yojana (PMMSY)', with a broad reach to all sector components, where the start-ups and technology development ecosystem has a unique thrust. Secretary sought the participation of CIBA in providing the required technological backstopping, handholding the start-ups, to play an important role in taking forward the brackishwater aquaculture sector. He also pointed out the emphasis and continuity of the Blue Revolution through the recently launched PMMSY, which aims to enhance fish production to 220 lakhs metric tons with an investment of over ~20,050 crores in the next five years, promoting sustainable development of the fisheries sector in India. He stressed the need for species diversification and genetic improvement programme on the native Indian white shrimp to avoid over-dependence on vannamei. He also suggested CIBA to play a leadership role in technology dissemination for developing state-wise plans for brackishwater aquaculture and appreciated novel initiatives of CIBA, species diversification, promotion of desi formulated feed technologies, and aquatic animal health products etc.

Dr. K.K. Vijayan, Director, highlighted the research and development of CIBA and the impact of novel technologies developed by CIBA in species diversification, feed biotechnology, health management and genomics. He stressed the need for partnership between the governments, research institutions, private sector, and the farming communities on a Public-Private Partnership (PPP) model. He highlighted the need for credit and insurance support for the small and medium farmers.

Dr. Farshad Shishehchian, Group President & CEO, Blue Aqua Group, Singapore, presented new generation cutting edge technologies presently operated in Singapore's shrimp farming systems. He outlined the development of multi-species super intensive zero waste smart farms. He briefly explained the possibilities of adopting mesotrophic systems that effectively use the inputs in Indian farming conditions.

Dr. Krishnakumar Menon, Mariculture Expert at Dept. Presidential Affairs, UAE presented the challenges and opportunities in aquaculture in the Middle East, especially UAE. He briefly gave an overview of the aquaculture activities of Aquaculture and Marine Studies Centre (AMSC), Abu Dhabi, and their efforts to increase production through modern technologies to minimize the import of more than 90% of food items.

Dr. Ram Bangera, Senior Geneticist, Akvaforsk Genetics, Benchmark Genetics, Norway, briefed selective breeding in aquaculture and highlighted the requirement of a genetic improvement program. He highlighted the story of the growth trajectory in aquaculture achieved through selective-bred fishes such as salmon and farmed vannamei. This experience could be useful in the proposed plan for selective breeding of *P. indicus* for species diversification program.

Dr. P.K. Patil, Principal Scientist & ITMU, explained the technologies developed by CIBA and successful translation to the end-users. Dr. T. Ravisankar, Principal Scientist, Social Science Division, presented the economics of value chain, citing the commercialization of the CIBA technologies. Dr. Kumaraguru Vasagam moderated the discussions and thanked all the participants. The digital conference registered total participation by about 3,580 participants.

ICAR-CIBA conducted webinar on 'Pearlspot seed production and aquaculture: Present status and future prospects with respect to Kerala', on 7th August 2020

ICAR-CIBA conducted a webinar on "Pearlspot seed production and aquaculture- Present status and future prospects with respect to Kerala" on 7th Aug. 2020, focusing on the farmers on the west coast. In the opening remarks Dr. K.K. Vijayan, Director, CIBA, put forth the vision for pearlspot aquaculture, CIBA's scientific advancement and technologies developed in hatchery seed production, formulated feeds, and farming. He highlighted the developments such as the modular system of seed production, functional feeds for specific larval stages, and fish health to resolve the key issues faced by pearlspot farmers today. He further underlined that the next significant milestone to be achieved for pearlspot aquaculture would be possible only through a focused selective breeding program for faster-growing stocks. Dr. Kailasam, Principal Scientist & SIC, Finfish Culture Division and a team of scientist presented the key challenges of pearlspot farmers and CIBA's experiences with pearlspot farming, Modular System for seed production, life stage-specific functional feeds and presented the concept of the pearlspot selective breeding for faster growth.

Representatives from the pearlspot farming sector, Shri. Keertiram, from Alappuzha and Shri. Varghese Shiju from Ernakulam district of Kerala, presented their perspectives and experiences on pearlspot farming. The queries raised by farmers were discussed and answered at the end of the session. Eighty participants have attended the training and watched by 1050 people. The meeting concluded with the release of a short video on "Pearlspot seed production and aquaculture" by CIBA.

74th Independence Day Celebrations at ICAR-CIBA

ICAR-CIBA Celebrated its 74th Independence Day with pride and honour. Dr. K.K. Vijayan, Director, CIBA hoisted the tricolour national flag and delivered the independence day speech. He remembered the great sacrifices made by the great leaders and freedom fighters for getting Independence in his address and highlighted that every Indian citizen must protect the same and strive hard for the country's sustainable growth and prosperity. He also briefed the challenges and way forward with the ongoing COVID situations and role of each one to defeat the COVID pandemic and our contributions to build the brackishwater sector, institute, and nation. He shared the happiness of the recent national award won by a CIBA adopted farmer and acquiring 65 acres of land in the outskirts of Chennai. He stressed the importance of teamwork and holistic work culture to make new strides in the institute's research front. Director appreciated the outstanding employees in the housekeeping, gardening, driving and canteen sections, who performed their duties with sincere dedication despite hardships during the COVID-19 lock down to keep the office campus lively and clean. Likewise, the Officer in Charges of the regional research centres in Kakdwip, (West Bengal), Navsari (Gujarat) and Muttukadu Experimental Station also hoisted the national flag and addressed the gatherings. CIBA scientists & staff members participated in the celebrations, strictly adhering to the guidelines issued by the MoHFW to contain the spread of COVID19.

Independence Day Celebration at Kakdwip Research Centre of CIBA (KRC), Navsari Gujarat Research Centre of CIBA (NGRC) and Muttukadu Experimental Station (MES)

Dr. Joykrushna Jena, Deputy Director General (Fisheries), ICAR, digitally inaugurated the new entrance gates of ICAR-CIBA headquarter

On the occasion of the 74th Independence day celebrations, Dr. Joykrushna Jena, DDG (Fisheries), ICAR, officially inaugurated the new main gates of ICAR-CIBA, Chennai, through a digital platform in the presence of Dr. K.K. Vijayan, Director, CIBA, Chennai. Scientists, staff members, and students of CIBA participated in the function.

In his address, DDG highlighted the importance of an institution's main gate as it generates the first impression. He accentuated the importance of the brackishwater aquaculture sector in the Indian agricultural and rural economy and appreciated CIBA's achievements and viable technologies to benefit brackishwater aquaculture development. He stressed the need of species diversification and specifically mentioned the CIBA efforts in promoting the native Indian white shrimp across the shrimp farming states. He highlighted the successful partnership model between the CIBA and Mangrove foundation of Maharashtra Government, enabling the brackishwater cage farming of seabass, for creating employment and income generation for the coastal villagers. He congratulated the Director and staff members of CIBA for its valuable contributions in the sustainable development of brackishwater aquaculture and building the institute's infrastructure facilities. Dr. K.K. Vijayan, Director, CIBA, thanked DDG (Fisheries) for his valuable time for the inauguration and address. He acknowledged the hard work of TEAM CIBA for the achievements and also reminded the need of quality research work for the development of brackishwater aquaculture sector in the country.

ICAR-CIBA acquired 64 acres of brackishwater land near Muttukadu aiming to establish a centre of excellence in brackishwater aquaculture

About 64 acres of land near Muttukadu under Salt board, Ministry of Commerce and Industry, Government of India, has been handed over to ICAR-CIBA on August 20, 2020, to expand its research and development activities. The newly acquired land will be used for developing new facilities for brackishwater aquaculture research i.e. shellfish and finfish brood banks, nursery banks, and other allied activities. The establishment of a centre of excellence in brackishwater aquaculture for the South Asia region by consolidating the existing R&D facilities at the Muttukkadu experimental station (MES) of CIBA is also another long term plan of ICAR-CIBA. The land comprises ponds, canals, and inundated hyper-saline stretches, ideal for developing diversified farming systems for candidate brackishwater species. The site is 1 kilometre away from the MES and 35 km from the CIBA headquarters, which will be developed as the 3rd campus of ICAR-CIBA in Chennai.

ICAR-CIBA celebrated the 150th birth anniversary of Mahatma Gandhi

ICAR-CIBA organized a one-week programme from 25th Sep. to 1st Oct. 2020 to commemorate the 150th birth anniversary of the father of the nation Mahatma Gandhi. During this occasion, events like tree plantations, competitions for the children, and virtual meetings were organized, fulfilling Gandhian philosophy and building of Atmanirbhar Bharat. A series of tree plantation events were organized at headquarters, regional research centres in Kakdwip (West Bengal), Navsari (Gujarat), and field centres in Muttukadu and Kelambakkam, Tamil Nadu. About 300 seedlings of trees were planted and saplings were distributed to the participants to grow in their residential premises. During the occasion, the importance of forestry, agriculture, cleanliness, skill development, empowerment, grama swaraj, etc., were discussed by the speakers in remembrance of the Mahatma and reminded his vision of a clean and green planet. On 1st October 2020, a virtual meeting was organized

where farmers who adopted the CIBA's technologies shared their experiences with the technology and how they were benefitted. The meeting was broadcasted to the audience on the institute's YouTube channel. Shri. A. Perumal and Shri. A. Premkumar of Dr. A.P.J. Abdul Kalam fish producer self-help group of Vennangupattu, Chengalpattu district narrated their success story of adopting CIBA's cage aquaculture technology for their livelihood security that eventually resulted in doubling of income. Similarly, Shri. Kennith Raj and his wife Smt. Veilankanni shared their experience on successful adoption of CIBA's Plankton*Plus* technology under 'Waste-to-Wealth' concept and their transformation from self-help group to a company producing Plankton*Plus* and Horti*Plus* products from the fish trimming wastes.

Mahila Kisan Divas-2020

Mahila Kisan Divas, which coincides with the International Day of Rural Women to recognize the role of Women in Agriculture and Rural Development, was celebrated with coastal fisher families and tribal families by the ICAR-CIBA at Keelarkollai, Chengalpattu of Tamil Nadu on 15.10.2020. About 50 participants from coastal fisher families, mostly fisherwomen (85%) and scientists from ICAR-CIBA, Chennai participated in the programme. Tribal women members from Karathittu village & Keelarkollai village shared their experiences on adopting pearlspot fish larval rearing technology and CIBA's support on Asian Seabass and Milkfish farming in coastal brackish waters as a profitable livelihood option, fulfilling their dream of self-reliance. Dr. K.K. Vijayan, Director ICAR-CIBA, conveyed Mahila Kisan Divas message to the participating women and emphasized that CIBA worked with the coastal womenfolk and fine-tuned CIBA's technologies like nursery rearing of fishes, ornamental fish farming, mud crab fattening exclusively for the women farmers. During the occasion, success stories of CIBA's different livelihood technology interventions undertaken as part of the "Mera Gaon Mera Gaurav" programme and Tribal Sub Plan was also discussed. Dr. D. Deboral Vimala and Dr. P. Mahalakhsmi, Principal Scientists, Social Sciences Division coordinated the event.

ICAR-CIBA Muttukkadu Experimental Station (MES) bridged the mini-island area inside the lagoon for expanding its research infrastructure

The Field Experimental Station of ICAR-CIBA at Muttukkadu (MES), In the outskirts of Chennai spreads out in 121 acres, including 90.45 acres of water spread area. The institute's new research programmes targeting diversification of species and farming systems such as RAS, biofloc based shrimp farming, and associated feed testing facilities necessitated additional land area. Out of the total land area at the hatchery complex, about 2.0 acres of land was locked as a mini-island on the western side of CIBA finfish hatchery. A new eco-friendly wooden bridge has been constructed over the backwater lagoon without affecting the tidal movement and was inaugurated for the CIBA's R&D activities on 2nd November 2020 by Dr. K.K. Vijayan, Director CIBA. On this occasion, a biofloc based pearl spot nursery rearing unit was initiated with the release of fish fingerlings. The Director addressed the scientists on protecting our resources and optimally utilizing them for undertaking need-based research during this occasion. Dr. K. Ambasankar, Nodal Officer, who was instrumental in this timely action, coordinated the inaugural program. All the heads and in-charges, scientists, other staff, and research scholars of CIBA participated and graced the event.

National webinar on the biofloc farming technology (BFT) and release of CIBAFLOC+

ICAR-CIBA conducted a national webinar on “Biofloc based aquaculture: a way forward” to disseminate the science and technology to the thousands of farmers and young start-up entrepreneurs. Dr. Joykrushna Jena, DDG (Fisheries), ICAR inaugurated the event. In his address, he impressed upon the immense potential of the biofloc technology in the Indian aquaculture sector, both in brackishwater shrimp aquaculture sector and freshwater fish farming, enabling hundreds of fish farmers across India. Dr. C.P. Balasubramanian, SIC, Crustacean Culture Division highlighted the proactive involvement of the division in developing technologies to benefit the brackishwater aquaculture sector and advised the farmers and entrepreneurs to understand the technology before venturing into it. He promised technology support from CIBA for the same.

Dr. K.K. Vijayan, Director, CIBA, felicitated all participants for their interest in the biofloc technology and highlighted the need for scientific understanding and approach on this novel technology to suitably customize to the Indian techno-economic conditions. He said that it is the scientific community’s responsibility to expose the positive side and negative side of this highly sought technology with adequate scientific backup. As a part of the virtual event, ‘CIBAFLOC’, a ready-made inoculum developed by ICAR-CIBA for the development and maintenance of biofloc, was officially released. Dr. J. K. Jena, DDG (Fisheries) transferred the technology to the industry partner M/s Salem Microbes Pvt. Ltd. On a virtual mode and complimented the company for recognizing the potential of ‘CIBAFLOC’ developed by CIBA. M/s Salem Microbes Pvt. Ltd. Is a leader in microbial products and has their presence in the Indian market for the past two decades, and are presently diversifying into the aquaculture industry. Mr. D. Ramesh Kumar, CEO shared his happiness for partnering with CIBA for the scaling up of ‘CIBAFLOC’ and assured that the product would benefit the biofloc farmers.

In the technical session, world-renowned biofloc researcher from Israel, Prof. Yoram Avnimelech (Emeritus), who took the technology to many countries worldwide, enlightened the audience about the significance and recent developments of the technology. Dr. Akshaya Panigrahi, Principal Scientist who developed the consortium, briefed the BFT and relevance of CIBAFLOC in shrimp farming. Progressive entrepreneurs like Mr. Suryakumar, CEO, Hi-Tide Sea farm, Mr. M. A Khan, NNFC, Delhi, Mr. Anil Ghanekar, Eco Secure Systems, Chennai and Mr. Anjan Dandapat, Jagannath Aqua, Odisha shared practical experiences in relevance to the BFT. Dr. K.P. Kumaraguru vasagam, Principal Scientist and Dr. Sujeet Kumar, Senior Scientist briefed the nutritional and microbial aspects of the biofloc.

More than 2800 participants across the country registered for the event and several more joined through YouTube and other social media platforms. Dr. A. Panigrahi, and colleagues from the Crustacean Culture Division coordinated the event and responded to the participants’ queries. Dr. P.K. Patil, OIC, ITMU of the institute facilitated the transfer of technology by signing of MoU. The webinar concluded with a vote of thanks by Dr. Shyne Anand, Senior Scientist, CIBA.

World Fisheries Day with 'fish farmers'

ICAR-CIBA celebrated World Fisheries Day-2020 at Muttukadu Experimental Station with fish farmers and farm women mentored by CIBA. Conservation of fisheries ecosystem to improve fisherfolk communities' livelihood status is the bottom-line of world fisheries day celebration. On this occasion, 30 fisher folks from the coastal villages of Chengalpattu district, Tamil Nadu, participated and shared their success stories on seabass (*Lates calcarifer*) nursery rearing, mudcrab (*Scylla serratta*), pearlspot (*Etroplus suratensis*), milkfish (*Chanos chanos*) and ornamental fish farming. The fish farmers acknowledged CIBA for the technical support for successfully continuing their activity, which has improved their income and livelihoods. In the technical session, Dr. K. Devaki, Subject Matter Specialist from Krishi Vigyan Kendra, Kancheepuram district, explained the backyard poultry rearing as an additional income generating avocation. Dr. K.K. Vijayan, Director, CIBA, complimented the fish farmers who successfully involved in aquaculture activities and generated revenue after CIBA's interventions. Dr. M. Kailasam, SIC, Finfish Culture Division, Shri. I.F. Biju, Scientist, Crustacean Culture Division explained the fine-tuned farming practices to the farmers. The participants visited the hatcheries, feed mill, and other facilities of CIBA. Dr. D. Deboral Vimala, Dr. P. Mahalakhsmi and Dr. C.V. Sairam, Principal Scientists of CIBA, coordinated the programme.

ICAR-CIBA created awareness on climate change issues in aquaculture and distributed soil and water health cards to aqua farmers at Gudur, Andhra Pradesh

ICAR-CIBA distributed soil and water health cards (SWHC) to 71 farmers of Chillakur Mandal, SPSR Nellore District, Andhra Pradesh, in presence of Smt. R.R. Anupama, Associate Professor & Head, Department of Aquatic Environment Management, Fisheries College, Muthukur, and Shri. S.K. Chand Basha, Assistant Director of Fisheries, Gudur Division, Andhra Pradesh, during 'Brackishwater Aquaculture Farmers Meet' conducted at Gudur on 18th December 2020 on the occasion of the celebration of World Soil Day under National Innovations in Climate Resilient Agriculture (NICRA) project. Dr. M. Muralidhar, Principal Investigator, NICRA Project, narrated the objectives and the importance of soil and water health in aquaculture productivity enhancement. Dr. S.V. Alavandi, SIC, Aquatic Animal Health & Environment Division, emphasized the importance of maintaining soil and water quality parameters and adopting better management practices in shrimp culture to reduce the outbreaks of diseases. Shri. S.K. Chand Basha explained the schemes of Pradhan Mantri Matsya Sampada Yojana (PMMSY) for the upliftment of socio-economic conditions of fisher folk of the country through increased fish production.

Transfer of marketing rights of CIBA-Plankton^{Plus} to a private entrepreneur

ICAR-CIBA signed an MoU with M/s SS Traders, Guntur, Andhra Pradesh, on 14th December 2020 to market CIBA-Plankton^{Plus} developed by the Nutrition unit. CIBA-Plankton^{Plus} is a value-added product developed from fish waste/trimmings using a unique technology. CIBA-Plankton^{Plus} is a micro and macronutrient rich hydrolysate that enhances healthy phytoplankton and zooplankton bloom during the culture period. ICAR-CIBA successfully tested and demonstrated the product in farmer's ponds in many coastal states of India, including West Bengal, Andhra Pradesh, Kerala, and Gujarat. Due to the promising results of the product in culture systems, M/s SS Traders, Guntur, Andhra Pradesh, took up CIBA-Plankton^{Plus} marketing.

Dr. Debasis De, Principal Scientist & team leader of this technology briefly explained the efficiency of this product in enhancing the aquaculture production of the country. M/s SS Traders is an established firm and involved in the marketing of many aquaculture inputs like feed, healthcare products, etc. for the last three decades and managing about 100 acres of shrimp farming at Guntur district. The company's partner, Mr. Subburaj said that the company was looking for consistent plankton bloom in nurseries and shrimp grow-out ponds.

Dr. K.K. Vijayan, Director, CIBA, highlighted the importance of this technology in converting waste to value-added products. He said that the product is suitable for various salinity regimes. He complimented SS Traders for recognizing CIBA's potential in R&D backstopping in brackishwater aquaculture and coming forward to sign the MoU. He also stressed the requirement of continued research in fine-tuning the products from fish waste.

Dr. S.V. Alavandi, SIC, AAHED, expressed that the technology can clean the fish markets across the country and provide the alternative livelihood of coastal people. Mr. Jaideep Kumar, Former Deputy Director, Rajiv Gandhi Centre for Aquaculture, Sirkali, Tamil Nadu, shared his experience on benefit of Plankton^{Plus} in previous years *Penaeus vannamei* culture in Andhra Pradesh. He added that they got benefits both in shrimp culture pond and shrimp hatchery. Mr. K.P. Sandeep, Scientist & member of the research team, explained its potential to boost the natural food organisms in aquaculture systems and research scope in this novel technology.

Quinquennial Review Team (QRT) Meeting of ICAR-CIBA

The Quinquennial Review Team (QRT) meeting of ICAR-CIBA for the period of 2014-19 was conducted to review and evaluate the R&D programmes and overall functioning of the institute. The ICAR appointed team include Dr. V.V. Sugunan (Former consultant, National Fisheries Development Board, NFDB) as Chairman, Dr. K.G. PadmaKumar (Former Principal Scientist, CMFRI), Dr. Y. Basavaraju (Former Dean, Fisheries), Prof. Rosamma Philip (Dean, Faculty of Marine Sciences, CUSAT), Dr. Rina Chakrabarti (Professor, University of Delhi) as Members, and Dr. K. Ambasankar (Principal Scientist, ICAR-CIBA) as Member Secretary. The Member Secretary compiled background information to the QRT team for familiarizing the various sections and activities of the institute followed by six on-line meetings held by the QRT between 2nd September 2019 and 17th December 2020, including virtual tours to the laboratories and research facilities at the Institute's headquarters, Research Centres and the Experimental Stations at Muttukkadu. All meetings were conducted on virtual mode due to COVID-19 pandemic and associated lockdowns. The meeting was attended by the QRT members along with the Council's representative Dr. Pravin Puthra, ADG (Marine Fisheries). Based on the exhaustive assessment a final report with their comments and recommendations of the review team was compiled and submitted to Director General, ICAR and Deputy Director General, Fisheries Subject Matter Division.

Patent

ICAR-CIBA obtained patent for the Development of a "*Modular system for getting repeated spawning and higher fry production in pearlspot fish*" Patent No. 344940 vide application No. 201641001060 under a ICAR funded project. The team includes Dr. K.K. Vijayan, Dr. K.P. Kumaraguruvasagam, Dr. K. Ambasankar, Dr. Krishna Sukumaran, Dr. J. Syamadayal, Dr. M. Kailasam and S. Balachandran.


GOVERNMENT OF INDIA
THE PATENT OFFICE
PATENT CERTIFICATE
Patent No. : 344940
Application No. : 201641001060
Date of Filing : 12/01/2016
Patentee : Indian Council of Agricultural Research (ICAR)
It is hereby certified that a patent has been granted to the patentee for an invention entitled MODULAR SYSTEM AND METHOD FOR GETTING REPEATED SPAWNING AND HIGHER FRY PRODUCTION IN PEARLSPOT FISH as disclosed in the above mentioned application for the term of 20 years from the 12th day of January 2016 in accordance with the provisions of the Patents Act,1970.

ICAR-CIBA adopted farmer wins national recognition

The ICAR-CIBA received national recognition with a farmer who adopted the institute's technologies won the prestigious Jagjivan Ram Innovative Farmer award of the Indian Council of Agricultural Research (ICAR). Union minister of agriculture Shri. Narendra Singh Tomer declared the award online during the 92nd foundation day of the ICAR. Shri. T. Purushothaman, a leading shrimp farmer from Kannur, Kerala, won the award as recognition of his outstanding contributions to developing diversified aquaculture practices. He adopted various innovative approaches and technologies developed by CIBA like zero-water exchange system for indigenous shrimp farming and multi-trophic species diversification. He followed integrated farming of brackishwater fish and shrimp with vegetables by utilizing brackishwater ponds and open water bodies. Mr. Purushothaman used indigenous shrimp species (Tiger shrimp and Indian white shrimp), Asian seabass, milkfish, pearlspot, and green mussel for farming in cages, pens, and rope culture methods, which in turn helped him to enhance his overall production and profit. During the last five years, this is the fourth time the CIBA is bagging ICAR's fish farmer award.

ICAR-CIBA-Agribusiness incubation centre promoted clienteles bags two national fisheries awards

Nambikkai Fish Farmers Group, Tamil Nadu and Sai Aqua Feeds, Andhra Pradesh, who adopted the technology of ICAR-CIBA supported by CIBA's-Agribusiness incubation centre (ABI), was awarded "Best Fisheries Self Help Group" and "Best Fisheries Enterprise Award" 2020" by NFDB, DoF, Ministry of Fisheries, Animal Husbandry and Dairying, Government of India. Shri. Pratap Chandra Sarangi, Hon'ble Minister of State for Fisheries, Animal Husbandry and Dairying, presented the awards to Shri. T. Kennit Raj, leader of Nambikkai Fish Farmers Group and Shri. Vijay, Sai Aqua Feeds in the presence of Dr. Rajeev Ranjan, IAS, Secretary (Fisheries), Ministry of Fisheries, Animal Husbandry and Dairying, Government of India and Dr. Suvarna C., Chief Executive, NFDB, Hyderabad. In recognition for the research initiatives of ICAR-CIBA, Nambikkai fish farmers group won the Best Fisheries Self Help Group award for adopting the technology of 'conversion of fish wastes into value-added products' developed by CIBA. A start-up company from Andhra Pradesh, Sai Aqua Feeds, who adopted CIBA technology in formulating desi shrimp feeds, won the Best Fisheries Enterprises award. Both the awards included a financial incentive of ₹ 2 lakh as cash prize and a shield.

Kakdwip Research Centre (KRC) of CIBA conducted an Online Training Programme on "Advances in Brackishwater Aquaculture" during 28th-30th July, 2020

Kakdwip Research Centre (KRC) of ICAR-CIBA, West Bengal conducted an online training programme on 'Advances in brackishwater aquaculture' during July 28th-30th, 2020. It was organized to create awareness among the brackishwater aquaculture farmers/entrepreneurs/students of West Bengal and Odisha states. Various aspects of brackishwater aquaculture *viz*. breeding & seed production of brackishwater candidate species, pond preparation, soil, and water quality management, feed formulation and management, disease diagnosis and management, brackishwater ornamental fish culture, and biofloc-based culture system were covered in the course. About 244 trainees, including farmers, students, and faculty members of the aquaculture field from West Bengal and Odisha, attended the training programme. The programme has got excellent feedback from trainees. Digital certificates were issued to all trainees who participated in the training programme. Dr. Debasis De, Officer-in-Charge, Kakdwip Research Centre, Dr. T.K. Ghoshal, Dr. Akshyay Panigrahi, Dr. Sanjoy Das, Dr. Gouranga Biswas, Dr. Prem Kumar, Ms. L. Christina and Ms. Babita Mandal were the faculties for the training programme.

Personnel

Promotion			
Sl. No.	Name	Designation	Date
1	Smt. V. Usharani	Administrative Officer	22.07.2020
2	Shri. A. Manoharan	Asst. Administrative Officer	07.09.2020
Transfer			
1	Shri. R. Kandamani	Asst. Administrative Officer on promotion as Administrative Officer to ICAR–National Research Centre for Banana, Trichy (T.N.)	06.08.2020


Smt. V. Usharani


Shri. A. Manoharan


Shri. R. Kandamani

Superannuation			
1	Shri. M. Shenbagakumar	Chief Technical Officer	31.07.2020
2	Shri. K.P. Naskar	Skilled Support Staff (KRC of CIBA)	31.08.2020
3	Smt. S. Premavathy	Skilled Support Staff	31.10.2020
4	Shri. N. Ramesh	Technical Officer	30.11.2020


Shri. M. Shenbagakumar


Shri. K.P. Naskar


Smt. S. Premavathy


Shri. N. Ramesh

CIBA IN NEWS MEDIA

Award for Kannur shrimp farmer

T. Purushothaman

STAFF REPORTER

KANNUR

T. Purushothaman, a shrimp farmer from Payyannur, has bagged the Jagjivan Ram Innovative Farmer Award instituted by the Indian Council of Agricultural Research (ICAR).

Union Minister of Agriculture Narendra Singh Tomar has declared the award online during the 92nd foundation day of the ICAR.

Mr. Purushothaman has been selected for the award for his outstanding contributions to the development of diversified aquaculture practices utilising technological advancements.

The award comprises a cash award of ₹50,000 and a citation.

An experienced aqua-farmer, Mr. Purushothaman with support from the Central Institute of Brackish Water Aquaculture (CIBA), Chennai, focussed on farming indigenous species following scientific principles and adopting various technologies, which helped him develop innovative practices such as zero water exchange system in indigenous shrimp farming and multi-trophic species diversification.

Printed from THE TIMES OF INDIA

Mangaluru: ICAR-CIBA help fisheries graduates set up seabass hatchery

TNN | Sep 13, 2020, 08.22 PM IST

MANGALURU: In a major development, three graduates from Fisheries College, Mangaluru have launched a start-up initiative in seed production of Asian seabass in Kumta.

The initiative was launched with the technical support of the ICAR-Central Institute of Brackishwater Aquaculture (CIBA), Chennai. This is probably the first of its kind initiative in the private sector on a start-up mode. An MoU was signed between the CIBA and Canares Aquaculture to ensure the transfer of CIBA's technology on seabass seed production to the latter.

Entrepreneurs Karthik Gowda VS, Kaushik Alike and Sachin V Savan, as students, had visited CIBA's seabass hatchery at Muttukadu experimental station. When they expressed their start-up plan with the CIBA authorities, the institute provided them technical guidance and field training in seabass nursery rearing. The CIBA followed up the start-up with hand-holding which enabled them to get funding support to start the firm.

Dr K K Vijayan, director, CIBA called the initiative a milestone in brackish water aquaculture. "It is a path-breaking development in the country's aquaculture sector with youngsters coming to this field with start-up ventures which will pave way for a resurgence and growth in the brackish water aquaculture, especially Asian seabass farming in the country", he said.

Emphasising the need for boosting the production of quality seeds of Asian seabass, Dr Vijayan said that it is equally important

Printed from THE TIMES OF INDIA

Hatchery to be set up to boost brackish water fish production

TNN | Nov 9, 2020, 04.04 AM IST

Indigenous remedy to fight disease in shrimp

Aiming commercial production, the CIBA has signed an MoU with Salem Microbes Private Limited, Salem, to transfer the technology to the latter.

Published: 22nd September 2020 04:21 AM | Last Updated: 22nd September 2020 04:21 AM

CIBA develops bacteriophage for shrimp farms

B. KOLAPPAN

CHENNAI

Bacterial diseases remain a major threat to the shrimp industry, often causing a huge economic loss to the hatchery owners. Now, the Chennai-based Central Institute of Brackishwater Aquaculture (CIBA) has developed a bacteriophage-based product that will target and kill only disease-causing bacteria without harming the other micro-organisms.

"This product is effective in bio-control of the bacterial diseases in shrimp hatchery settings, which would help produce quality shrimp seeds, free from antibiotics," said S. V. Alavandi, principal scientist and head of the Aquatic Animal Health and Environment Division of the CIBA, which developed the new-generation technology. The 'phage prophylaxis and therapy', developed by the institute, is based on bacteriophages, which are viruses that kill only specific disease-causing bacteria and act as therapeutic agents in controlling bacterial infections.

CIBA Director K.K. Vijayan said the product comprised a "cocktail of phages", which could neutralise a wide range of pathogenic bacteria-causing diseases.

The CIBA signed a MoU with Ramesh Kumar Dhanakoti, CEO, Salem Microbes Pvt. Ltd., Salem, to transfer the technology. P.K. Patil, principal scientist, Technology Management Unit of the CIBA, facilitated technology transfer of technology and filing of patents.

CIBA develops technology to produce quality shrimp seeds

T. SUDHEESH I DC

CHENNAI, SEPT. 21

Giving a boost to shrimp farming, the ICAR-Central Institute of Brackishwater Aquaculture (CIBA) has developed a bacteriophage-based product that is effective in bio-controlling of bacterial diseases in shrimp hatcheries. The new technology will help the farmers produce quality antibiotic-free shrimp seeds.

...increase the export of the product. The decade-long study was initiated as part of new policy/insurance to antibiotic resistance policy in aquaculture hatcheries, bacterial diseases like vibriosis often cause considerable economic loss to hatchery operators across the globe. CIBA's new product will be of great use in preventing such diseases in aquaculture, especially in shrimp hatcheries. The new product...

...Microbes Private Limited to popularise the technology through large-scale commercial production. The industrial partnership is crucial in promoting the technology among shrimp farmers. We have filed for the patent of the same as well", said Dr Vijayan.

Dr. S. V. Alavandi, Principal Scientist and Head of Aquatic Animal Health and Environment Division of CIBA which ...developed the technology...

...in controlling bacterial infections.

Unlike antibiotics, bacteriophage therapy has no residual issues and has the advantage of being specific to their host bacteria without harming other micro-organisms. "A broad spectrum of lytic bacteriophages from aquaculture system and coastal ecosystem in the country has been used for the development of the product. Bacteriophages and their lytic enzymes...

First private seabass hatchery to be set up

CIBA inks MoU with young entrepreneurs from Kumta in Karnataka

B. KOLAPPAN

CHENNAI

Even though 23 years have passed since the Chennai-based Central Institute of Brackishwater Aquaculture (CIBA) succeeded in the captive-breeding of Asian seabass (*Kodava*), a fish with high commercial value, hatcheries have remained only with government research institutions. The private sector has been more interested in shrimp farming.

Now, for the first time in the country, CIBA has signed a memorandum of understanding (MoU) to set up a seabass hatchery in the private sector, on start-up mode, in Karnataka.

The MoU was signed with Canares Aquaculture, owned by young entrepreneurs Karthik Gowda V.S., Kaushik Alike and Sachin V. Savan, from Kumta in Karnataka, to ensure the transfer of CIBA's technology.

Fish eye: The institute provided the youngsters technical guidance to set up a hatchery.

They were students at the Mangalore Fisheries College, and during a visit to CIBA's seabass hatchery at the Muttukadu Experimental Station, their interest was kindled, and the idea of setting up their own aquaculture start up was born.

When they approached CIBA authorities to set up a hatchery, the institute provided them technical guidance and field training in seabass nursery rearing.

The institute also followed up, enabling the start-up to obtain funding support to start the firm.

"It is a significant development in the country's aquaculture sector, as youngsters coming to the field with start-up ventures will pave way for resurgence and growth in brackishwater aquaculture, especially Asian seabass farming in the country," said K.K. Vijayan, director, CIBA.

Reluctance of pvt. sector

He explained that the private sector was largely reluctant to enter marine fish seed production because of the relatively longer production cycle and the need for a unique skill set to rear marine fish larvae.

M. Kailasam, principal scientist of CIBA, said eggs would be collected by inserting a small tube in the genital opening of the fish. "We will then analyse the eggs to ascertain their maturity. If they have reached the perfect stage, we will give the fish hormone injections to facilitate the release of eggs," he said. Hatchlings will be supplied to farmers after 25 days, he added.

A MIDAS TOUCH TO WASTE

CIBA training has helped K Velamurani turn fish waste into wealth & create a company with an annual turnover of ₹13 lakhs

Hatchery to be set up to boost brackish water fish production

Central Institute of Brackishwater Aquaculture will support govt for developing captive breeding and seed production of commercially important brackish water fishes

...Setting the stage for increasing the brackish water fish production in Kerala, the Chennai-based Central Institute of Brackishwater Aquaculture (CIBA) has partnered with the state fisheries department to set up a nodal agency for hatchery under the aegis of the government.

...As MoU was signed between CIBA and Agency for Development of Aquaculture Kerala (ADAK) for the establishment of a hatchery at Ottayeri in Thiruvananthapuram, following the initiatives taken by fisheries minister J Mercykutty Amma.

...According to the MoU, CIBA will provide scientific and technical support to the government for developing captive breeding and seed production of commercially important brackish water fishes – Asian seabass, milkfish and Kerala's state fish pearl spot.

The hatchery will target seed production of these species throughout the season.

"Ghar's linkage as a knowledge partner will be a game changer in the state's brackish water aquaculture sector as it would become an ideal model for transfer of technologies in a farmer-focused manner," said K K Vijayan, director-CIBA.

...The establishment of the much needed brackish water multi-species hatchery is timely and would provide stimulus for augmenting brackish water finfish production in the state along with bolstering the livelihood generation during every step of the fish production process, he said.

"Kerala is endowed with rich brackish water resources to the tune of 1.36 lakh ha. So...timely availability of fish seeds in sufficient quantity is still a major constraint, the brackish water aquaculture is yet to explore its potential...

...Timely availability of seeds in a farmer friendly way will help develop the sector," he said.

"The proposed hatchery will help boost the sustainable brackish water fish production in the state as it addresses the critical issue being faced by the fish farmers – inadequate seed availability of brackish water fishes," said Tanu Roy, fisheries secretary and chairperson, ADAK.

According to M Kailasam, principal scientist & head in charge of fish culture division of CIBA, fish species such as asian seabass, milkfish and pearl spot are ideal for Kerala, considering the resilient nature of the species in changing salinities and their market demand in the state.

"Brackishwater aquaculture for food employment and prosperity"

ICAR-Central Institute of Brackishwater Aquaculture

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