



# MPEDA

Newsletter

VOL. VIII NO. 7 OCTOBER 2020

## Cover Story

Training programme  
on Tuna Long Line

Highlights of Marine  
Fish Landings

Exporter of the Month  
Sirimalla Venkatesh  
SMSEA Marines Private Ltd

Institute of the Month  
Centre for Marine Living  
Resources & Ecology  
CMLRE

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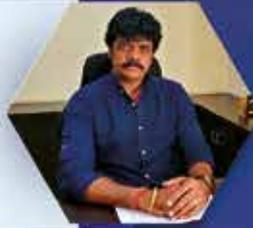
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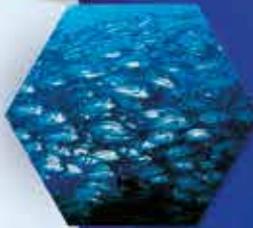


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## 25 Years of perfecting the science of aquaculture to help you dream bigger.

We are not just celebrating a milestone. We are celebrating India's rise as a powerhouse in shrimp production as we watch the Vannamei shrimp, that we fought to introduce, change the industry. We are celebrating countless seafood platters that our farmers brought to dinner tables all over the world. We are celebrating the success saga of our farmers, dealers, employees and partners. Join us, as we set our eyes on scaling newer heights.



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## On the Platter

**K. S. Srinivas IAS**  
Chairman

Dear friends,

The unlock process declared by the Government of India is slowly easing out the trade hurdles to a certain extent, though the markets are yet to warm up as expected. The year on year, the deficit in export trade has reduced to 18%, as we analyze the export figures during April to October 2020. Though markets like USA and China have shown improvement, EU and Japan still remain at low key with fresh outbreaks of Covid-19.

Meanwhile, it is reported that the Chinese Authorities are clearing the consignments only after checking for Covid-19 nucleic material in the outer packs, and that delays the cargo clearance at the Chinese ports. This has also reportedly affected the payments from China to our exporters. The shortage of containers adds to the worries of the exporters to ship out seafood cargo from India to different destinations anticipating New Year demand.

The General Administration and Customs China (GACC) has demanded a virtual inspection of two seafood processing units in India during the month and accordingly, two units were presented for virtual inspection by the end of the month to GACC on their preparedness on food safety, especially in tackling the Covid-19 contamination through seafood cargo. As the Chinese has strengthened their Covid-19 checks in cargo, I would like to request all the seafood processing units and other stakeholders of the sector to strictly follow the Covid-19 guidelines brought out by MPEDA so that adequate precautionary measures are put in place to prevent the contamination of Covid-19 virus in our food production systems. In view of the increased inspection by the GACC for Covid-19 nucleic material, MPEDA has intensified its surveillance of seafood processing units to guide them to properly implement Covid-19 related seafood protocols.

To support market promotion, MPEDA in association with Aquaculture Innovation Centre, Singapore has organized a Virtual workshop on live shrimp to Singapore. The workshop was attended by around 90 participants. Markets like Singapore, Hong Kong, South Korea, all hold high significance in live shrimp trade. With advanced technology, it is possible that India can export its live shrimps from farmed as well as wild sources to these markets.

Thank you.

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**EXPORTER OF THE MONTH**

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# Conquering the New World

“Quality is the main aspect of success in our business. We have a very strong quality team who are very meticulous in maintaining best quality and hygiene practices and the high quality of fish are exported to customers on promised time.”



**Sirimalla Venkatesh**

---

SMSEA Marines Private Limited



*Mr. Sirimalla Venkatesh*

**S**irimalla Venkatesh is a fighter. He dared to tread the less trodden path, right from an early age and chose to take risks from the moment he decided to become an entrepreneur. When he came up with the idea of launching a seafood exporting company in 2002, he was very young.

At his age, people would prefer to focus on preparing the ground for their career, whereas, Mr. Venkatesh took the plunge and launched SMSEA Corporation. In another ten years, he made his mark in the scene. “By 2012, we expanded our own manufacturing operation at our facility and it was named SMSEA Marines Private Limited.”

When it was started, the SMSEA Group focused on fish exports. It was a brave decision to focus on fish when the seafood export industry was almost entirely focused on shrimp. Since then, SMSEA has diversified its portfolio and added many components to its export list.

All the while, Mr. Venkatesh kept his focus sharp. “Quality is the main aspect of success in our business. The company procures only good quality of products from the suppliers and are processed with great deal of care and effort by following quality procedures. We are having a very strong quality team who are very meticulous in maintaining best quality and hygiene practices and the high quality of fish are exported to customers on promised time.”

The company maintains a healthy business chain, starting from the very first link in the chain – the suppliers – and to the last link – the customers. At the same time, the relation with employees are also kept in good spirits. “They are the major 3 stakeholders and balancing all of them is a challenge,” Mr. Venkatesh said. The success of SMSEA proves that this challenge has been fulfilled in his own style.

There are about 150 suppliers associated with the company. The team led by Mr. Venkatesh has ensured

that the company stayed committed to its suppliers and taking care of them during crises like cyclone, pandemic and other natural calamities. This is besides providing much-required financial support to develop their catching and fishing methods.

This helped the company, when it took the hit during the Covid pandemic, just like it happened across the board for the seafood industry. Business was at its lowest ebb. “Even in such a situation, the company did not stop production. This was done with the aim to support the suppliers, especially when they were faced with a crisis.” Mr. Venkatesh made sure of this support to suppliers even as he handled other issues that rocked the entire seafood industry. Trouble in relations with China, increase in freight rates, handling charges, food safety checks by importers, over catching, pollution and infrastructure facilities are putting extra pressure on the industry, which is already under tension.

This was critical as SMSEA was the brand leader in Chinese markets when the pandemic struck. Mr. Venkatesh’s intensely focused marketing strategy had been yielding results, since he made the deliberate move to focus on fish. He had chosen to swim against the tide of seafood market, where shrimp was trending. He chose fish because “of its high nutritional values and became focus for my business.” No wonder, he excelled and pioneered in export of fish varieties like ribbon fish, cuttlefish, croakers, Indian mackerel, tunas, sail fish and marlins, and other shell fish. Mr. Venkatesh started from Visakhapatnam and rose to the

level of major fish exporter from Andhra Pradesh. Soon, he realised that the raw material potential of entire East Coast and launched Sai Surya Exports from Odisha in 2007. Right now, he is tapping on the rich resource base for fish from not just Andhra Pradesh, but also from Odisha and West Bengal.

SMSEA Marines Private Limited was formed in 2012. By then the group has emerged as a company with a huge trade volume. The company owns a completely automated modern manufacturing unit in Anandapuram, Visakhapatnam district and a multi-storied cold storage with an ample capacity to reach the goals.

Mr. Venkatesh launched SMSEA Cold Storage in 2017, with a high throughput in Gambheeram, Visakhapatnam. Quite in tune with his business vision, this was done as Gambheeram was most suitable location for exporters from neighbouring places for storing and exporting frozen marine products.

Even as the company was spreading its wings, Mr. Venkatesh ensured that the company nurtured and supported its employees. “The company gives its employees timely rewards and maintains a good cordial relation with all of its employees. Most of the employees working here are associated with the company for more than 10 to 12 years.” This is a demonstration of the care taken by management towards the employees and how it is reciprocated. The third component in the industry chain – the main stakeholder customers – too are satisfied as Mr. Venkatesh has put in a system



*Your readiness, Our mission*



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to provide on time delivery of quality products. Most importantly, this is done while adhering to the existing rules and norms.

SMSEA also has expertise in providing its customers with value added products; some of them are Tuna, Sail fish / Marlins. Value addition is done as per buyer's specifications. Histamine free value added A grade Tuna is their specialization. SMSEA's value added products are mainly exported to Europe, USA, Middle East, Bangkok, Vietnam and China.

The pandemic crisis is slowly waning off and the industry is tenaciously making its way back to normalcy. Mr. Venkatesh realises that this is the right time to put in the effort to steady the ship and plan for future to meet the emerging international market requirements with better infrastructure.

This cannot be done by the entrepreneurs alone and they need timely support from the governments too. For someone who has put in more than a decade's focused work into the industry, Mr. Venkatesh has got a clear vision about the requirements. "The possible solutions for these problems could be government developing more marine parks and no catch zones to allow the aqua animals to replenish themselves, banning of trawling and reducing by catch can solve the micro level issues," he said. With such measures in place, enterprising minds like Mr. Venkatesh can go forth and conquer new worlds.



*Quality is the pride of workmanship*





*VALUE ADDED PRODUCT*



**Product List of SMSEA Marines Private Limited**

Ribbon fish, Cuttlefish, Indian Mackerel, Skipjack, Yellowfin tuna, TT croaker, Leather Jacket, Octopus, Squid, Sail Fish, Marlin Fish etc.

The company also exports Vannamei shrimp but fish takes the major place in the export of the company.



**Major Export Destinations**

CHINA	USA	VIETNAM
SRI LANKA	THAILAND	FIJI LAND
TURKEY	TUNISIA	MALAYSIA
IRAN	DUBAI	JAPAN

The Company is EU Approved.



*Major Certifications*

**HACCP and FSSAI.**

# MPEDA opens new possibilities for Telangana fisheries sector

**M**r. Talasani Srinivas Yadav, Minister for Animal Husbandry, Fisheries, Dairy Development Corporation and Cinematography, Government of Telangana, inaugurated the new Sub Regional Division of MPEDA at Hyderabad on October 9, 2020. Mr. K S Srinivas IAS, Chairman MPEDA and Mrs. Anita Rajendra, IAS, Secretary, Animal Husbandry, Dairy Development and Fisheries, Government of Telangana, were present during the event.

Fisheries is a fast-growing sector in India, which remain an important source of food, nutrition, employment and income in India. The sector provides livelihood to about 16 million fishers and fish farmers at the primary level and almost twice the number along the value chain. Recognising the importance of the sector, an independent Department of Fisheries has been created by Union Government in 2019 to provide sustained and focused attention towards the development of Indian fisheries sector.

The sector has been showing a steady growth in the total GVA and accounts for 6.58 per cent of GDP from agriculture, forestry and fishing. The fish production in India has registered an average annual growth rate of more than 7 per cent in the recent years. The sector has been one of the major contributors of foreign exchange earnings with India being one of the leading seafood exporting nations in the world.

Fish and fishery products export emerged as the largest group in agricultural exports and in value terms accounted for Rs. 46,662 crore in 2019-'20. India is the second largest fish producer in the world with a total production of 13.7 million metric tons of which 65 per cent was from inland sector. Almost 50 per cent of inland fish production is from aquaculture, which constitutes 6.5 per cent of global fish production.

Telangana is ranked third with 6.14 lakh ha of water spread area accounting over 11.6 per cent of total

inland water resources of the country after Karnataka and Tamil Nadu. Telangana ranks eighth position in the country with 3.10 lakh tons of fish production during 2019-'20. But during 2019-'20 exports from Hyderabad International Airport reported with 1,424 tons of fish and fishery products worth Rs.38 Crore only.

The State is also known for its rich fish biodiversity harbouring over one hundred and sixty-five species of fishes in its diversified inland waters. Hence MPEDA with the help of the State Fisheries Department took the initiative to open a new office at Hyderabad to promote export production and processing from Telangana and to increase foreign exchange earnings for the country.

Telangana, the youngest State in the Union of India, needs all round development and socially inclusive growth. Fisheries is one of the most important traditional occupation and is providing livelihoods to around 5 lakh families in the State apart from being an important source of food nutrient. It is one of the fastest growing sectors generating income and employment in Telangana. The sector is contributing 0.6 per cent to the GSDP and plays an important role in the overall socio-economic development of fisher families in Telangana by providing nutrition and food security.

Telangana has immense inland water resource base in India for fisheries with 77 large, medium and minor reservoirs and about 24,112 department and panchayat tanks together with 5.72 lakh ha water spread area suitable for fisheries. Aquaculture is taking place in more than 1500 ha area. A rich human resource pool of 27.14 lakh population comprising of fishermen communities who are organized into about 4,000 fishermen societies with about 3 lakh members spread over the entire State.

With the changing consumption pattern, emerging market forces and recent technological developments, the sector has assumed increased importance

## MARKETING NEWS

with farmers and others. Fish culture in tanks and own ponds, reservoir fisheries, fish harvesting, net fabrication, transportation and distribution, marketing and supply chain management are also emerging as important commercial activities.

Hence, the major focus of government is on facilitating development in line with the technological advancement to achieve inclusive socio-economic growth, meet community aspirations for their livelihood and economic progress, entrepreneur's expectations on the sector. Fisheries and aquaculture is now gaining importance as an attractive investment destination and a lucrative business activity in the State.

Aquaculture in Telangana State is mostly centred around Indian Major Carps. Hence MPEDA and State Government of Telangana signed Memorandum of Understanding (MoU) to promote production and processing of exportable freshwater species viz. Scampii, Tilapia, Sea Bass, Pearl Spot etc in Telangana so as to increase revenue as well as to promote exports from Telangana to earn foreign exchange for our country.

MPEDA and State Government of Telangana recognized the importance and agreed to continue engagement for the facilitation of development of export-oriented aquaculture production and processing in Telangana. MPEDA and State Government of Telangana proposed to take up the following key activities for the development of export oriented fish production and fish processing in Telangana:

### Multispecies Aquaculture Complex (MAC)

It is proposed that MPEDA will setup a Multispecies Aquaculture Complex (MAC) once land as well as fund support is extended by the Government of Telangana. The MAC will consist of hatcheries, nurseries and training centres for export oriented freshwater aquaculture species viz. Scampii, GIFT Tilapia, Sea Bass, Vannamei etc. MPEDA will extend technical consultancy through its society - Rajiv Gandhi Centre for Aquaculture (RGCA) basis for setting up of MAC. Telangana fisheries officials will be trained in RGCA project and will be under hand-holding of RGCA for two years from the date of functioning of the project.

This MAC will serve as a hands-on training cum demonstration centre for aqua farmers of the State to

demonstration seed production / nursery rearing of export oriented species viz. Scampii, Vannamei Shrimp, GIFT Tilapia and Sea Bass as aquaculture activities in Telangana state is mostly centric with traditional Indian Major Carps only. Hence by diversification of aquaculture from traditional Indian major carp into export-oriented species will increase revenue of the aqua farmers of the State.

### Demonstration farm

Aquaculture in Telangana is mostly focussed on Indian Major Carps. Hence MPEDA proposes to establish a demonstration farm to demonstrate aquaculture of exportable freshwater species like Scampii, GIFT Tilapia, Vannamei, Sea Bass etc to the farmers of the State so as to increase their revenue as well as to promote exports to earn foreign exchange for our country.

There are lot of scope to demonstrate integration of aquaculture with agriculture and animal husbandry for effective utilization of space and water resources to increase revenue to agri-farmers. MPEDA proposed to set up demonstration farm in association with Professor Jayashankar Telangana State Agricultural University, Rajendranagar, Hyderabad.

### Chilled Fish Handling Centre (CFHC) for export

There is a huge potential to promote export of chilled marine products, which is having the higher unit value realization than frozen marine products.

Establishment of required infrastructure will be quite helpful in boosting exports of chilled marine products, thereby enhancing the share of chilled marine products in the country's seafood export basket. Hyderabad International Airport is having very good connectivity to all major domestic and international destinations.

Hyderabad International Airport serves to 19 international destinations and 45 domestic destinations. Airport also handles 18 foreign cargo carriers and 9 domestic cargo carriers.

Every month on an average about 4,250 tons of cargos can be airlifted through Hyderabad whereas yearly maximum of 2,500 tons of chilled and live marine products only being exported through Hyderabad airport, which accounts around 5 per cent of the available cargo potential.

## MARKETING NEWS

MPEDA will provide technical support and financial assistance through MPEDA schemes for setting up of chilled fish handling centre near Hyderabad International Airport.

### Aquaculture Quarantine Facility (AQF)

MPEDA will provide technical assistance through its societies like RGCA for setting up of Aquaculture Quarantine Facility (AQF) at Hyderabad Airport. AQF is very much essential for maintaining imported aquatic animals in isolation with no direct (or) indirect contact with other aquatic animals, to undergo observation for a specified length of time and, if appropriate, testing and treatment.

New AQF at Hyderabad International Airport will facilitate to quarantine imported brooders and fingerlings and very well mobilized to various destinations across the country as Hyderabad International Airport having very good connectivity between all the major domestic and international destinations.

### Leasing policy for cage aquaculture

Cage Aquaculture - fish farming in floating cages is one of the latest emerging technologies for intensive production of fish. It is viewed as a major option for increasing fish production and has been expanding rapidly in many parts of the world. In India, cage aquaculture is still in its early development stage, while it is in its infancy in Telangana.

There are no cage aquaculture facilities installed in the State besides a pilot project initiated by the Department of Fisheries. There is a need felt to consider cage aquaculture as a commercial activity so as to augment the fish production in a sustainable manner.

However, Telangana has no water leasing policy for this new technology and as such it becomes necessary to formulate a policy for leasing the water bodies to meet the requirement of the sector. MPEDA will assist Government of Telangana in formulating a leasing policy for cage aquaculture for promoting export oriented aquaculture in the water bodies of the State.

### Sustainable aquaculture societies

Till recently, each farmer's production system was independent and unsynchronized with that of

neighbouring farmers. They mostly adopted traditional methods for operating their farms and did not have access to technological innovations and scientific applications.

National Centre for Sustainable Aquaculture (NaCSA), a society under MPEDA started grouping these farmers into societies and educated them on better management practices (BMP) for safe and sustainable shrimp farming. NaCSA also trained these farmer societies to follow cluster approach in shrimp farming.

Cluster refers to interdependent aquaculture ponds often situated in a specified geographical locality and in close proximity to each other with sharing resources or infrastructure (like water sources or effluent discharge system); having the same production system and involving the same candidate species for mass production into domestic and export market. MPEDA will assist to organize the aquaculture farms into clusters under NaCSA.

The State government will provide assistance to these societies. The Government of Telangana will seek timely feedback and co-operate mutually to promote export oriented aquaculture by consolidating the unorganized sector into farming clusters / channelizing them with the cold chain etc.

### Setting up of Signature Stall

MPEDA will also technically assist the establishment of a Signature Stall to provide an exclusive space for the sales and display of value-added marine products manufactured by different marine product exporters.

The objective is to build awareness among customers about various species of fin fish and shell fish harvested in India, and to promote and popularize novel ideas in value addition and packing of seafood products. This will also serve as a reference point for dignitaries, both national and international buyers to know about the variety of products offered by our export community. The stall also offers domestic sales of selected items.

Apart from the sales, the idea here is to create an awareness of the marine value-added product processing sector, encouraging more consumers and entrepreneurs.



# WTO: Objectives, Principles and Functions

**T**he World Trade Organisation (WTO) is the only body making global trade rules with binding effects on its members. More than an institution, the WTO is a set of agreements. The WTO regime is known as the rules-based multilateral trading system.

The history of the Organisation dates back to 1947, when the General Agreement on Tariffs and Trade (GATT), was set up to reduce tariffs, remove trade barriers and facilitate trade in goods.

Over the years, GATT evolved through eight rounds of multilateral trade negotiations, the last and most extensive being the Uruguay Round (1986-1994). The WTO came into being in Marrakesh on January 01, 1995, following the conclusion of the Uruguay Round. GATT then ceased to exist, and its legal texts were incorporated into the WTO as GATT 1994.

### Objectives of the WTO

The agreement establishing WTO reiterated the objectives of the GATT. More specifically, the WTO outlined its objectives to include the following under its scope:

- i. Raise standard of living and incomes by ensuring (a) Full employment, (b) expanding production and trade, and (c) optimal use of world's resources;
- ii. Adopt the idea of sustainable development in relation to the optimal use of world's resources, which is to reinforce the need to protect and preserve the environment in a manner consistent with the various levels of national economic development;
- iii. Recognise the need for positive efforts to ensure that developing countries secure a better share of growth in international trade; and
- iv. To demolish all hurdles to an open world trading system and usher in international economic renaissance



because the world trade is an effective instrument to foster economic growth.

### Principles of the WTO

In its broad perspective, the WTO was to strive at creating a liberal and open trading environment by which enterprises could trade under conditions of fair and undistorted competition. With the aim to achieve these, four principles were laid down to guide the trading rules of its members.

- i. Most Favoured Nation (MFN) Treatment: The principle of MFN treatment laid that tariffs and regulations must be applied to imports or exports without discrimination among members. In other words, no member country was to be accorded a treatment of 'a favoured nation';
- ii. National Treatment: It prevents discrimination between imported products and equivalent domestically produced goods, especially in levying internal taxes and domestic regulations;
- iii. Protection through Tariffs: While advocating liberal trade, the WTO recognises that some members may need to protect their domestic production against foreign competitors. The underlying principle was, however, that such protections through tariffs must be kept at low levels in what was called as 'bound tariff framework'; and

## MARKETING NEWS

iv. Bound Tariffs: The principle of 'bound tariff' advises the member countries to reduce and gradually eliminate protection to domestic production. The reduction and ultimate phase-outs of tariffs was meant to provide the cushion time required for gaining competitive strength and the tariffs were to be phased out firmly in a committed time frame.

### Functions of the WTO

The WTO is meant to perform the following functions.

i. Administer, through various councils and committees, the 29 agreements contained in the final Act of the Uruguay round of world trade talks, plus a number of plurilateral agreements, including those on government procurement;

ii. Oversee the implementation of the significant tariff cuts (average 40 per cent) and reduction of non-tariff measures agreed to in the trade negotiations;

iii. Act as a watchdog of international trade by regularly examining the trade regimes of individual members;

iv. Ensure that members notify in detail various trade measures and statistics, which are to be maintained by the WTO in a large database;

v. Provide several conciliatory mechanisms for arriving at an amicable solution to trade conflicts among members;

vi. Resolve trade disputes that cannot be solved through bilateral talks by adjudication in the WTO dispute settlement court;

vii. Act as a management consultant for world trade by having its economists keep a close watch-on the pulse of the global economy and provide inputs to WTO by studies conducted on the main issues of the day; and

viii. Assist developing countries through its secretariat to implement the Uruguay Round agreements through a newly-established development division and a technical co-operation and training division.

The WTO is, thus, a forum where countries continuously negotiate the exchange of trade concessions and trade restrictions all over the world.

The WTO has a substantial agenda for further negotiations in many areas, notably certain services sectors.



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## FOCUS AREA

INSTITUTE OF THE MONTH: CMLRE



# CMLRE exploring to augment the Marine Living resources

**Dr. GVM Gupta**  
Director, CMLRE





*ATAL BHAVAN- CMLRE CAMPUS at Puthuvype, Kochi, Kerala*

**T**he marine sector cannot move much forward without learning in detail about the mechanism and dynamics of ecosystem in deep sea. This is where an academic institution of the calibre of Centre for Marine Living Resources & Ecology (CMLRE) comes into the picture.

For one, the CMLRE does extensive studies on spawning regions in the ocean. “We have the only Fisheries Oceanographic Research Vessel (FORV) in India to explore living resources beyond 1000 metre depth. FORV Sagar Sampada is the key in fulfilling the major mandate of CMLRE, which is to explore the deep-sea living resources,” said Dr. GVM Gupta, Director of CMLRE in an exclusive interaction with MNL.

CMLRE has its genesis in the Sagar Sampada Cell (SSC), which was established by the Government of India as a Subordinate Office of the erstwhile Department of Ocean Development (DOD). This was done for managing the affairs of the Fisheries and Oceanographic Research Vessel (FORV) Sagar Sampada. It was declared as an Attached Office of



DOD on December 26, 1995. Subsequently on January 12, 2001, it was renamed as CMLRE.

“We cannot go into fisheries without knowing which all areas are suitable for the spawning of fishes. Only Sagar Sampada has the exclusive facility known as CUFES or Continuous Under water fish egg cell sampler. This was installed in collaboration with National Oceanic and Atmospheric Administration, USA. Based on the preliminary data surveys available with us, we have a

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fairly good idea about the spawning grounds of pelagic fishes along Kerala coast,” he said. But these are initial results and CMLRE is planning to take it up in a big way in next five years along the Arabian Sea and the Bay of Bengal. Soon, CMLRE will share its academic finding to the general public by revealing the zones that are favourable habitat for specific fishes.

A similar data available with CMLRE came to the help of MPEDA when consignments of exported seafood faced rejections from the USA recently. “MPEDA contacted CMLRE recently when exports of non-compliance with Marine Mammals Act of USA ended up in some issue due to by-catch contamination. We provided MPEDA with our survey results on marine mammals and the by-catch and this helped in clearing the blockage of exported seafood. Since then, CMLRE has been working closely with the MPEDA.”

Another major contribution that CMLRE did for fisheries and environment studies has dismissed the general view that our seas are facing intense pressure due to anthropogenic activities.

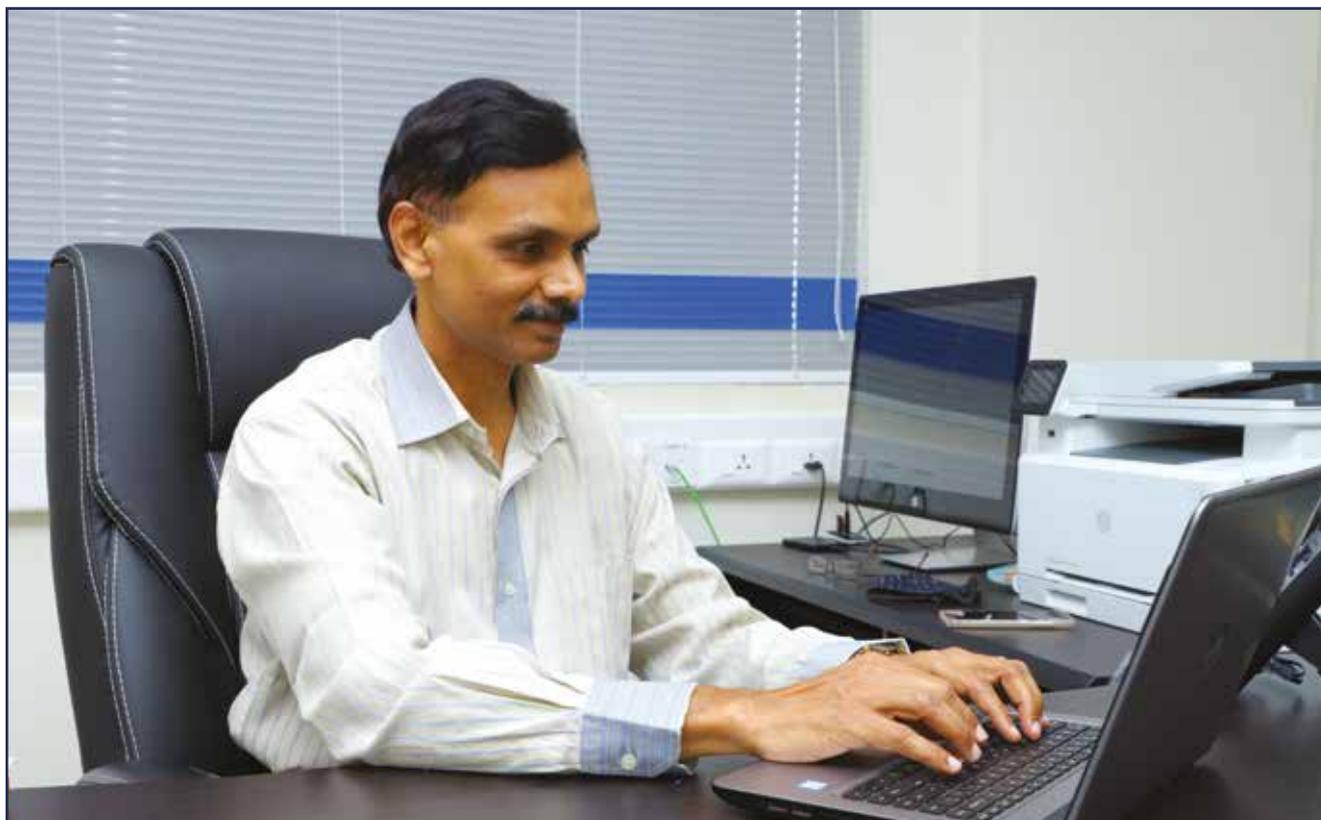
Apart from the deep-sea research, CMLRE has another major focus area of study about the ecosystem

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environment and dynamics that governs the fish distribution and its stock assessment.

“We have several programmes evolved over the years, from physics of the environment to its chemistry and how the physics and chemistry combine to support the biological component – smaller planktons, and how they go up to the tertiary level – the production of fisheries resources.” Two years back a massive year-long multi-disciplinary studies on Marine Ecosystem Dynamics of eastern Arabian Sea have been undertaken to understand the complex interactions between various components of this marine ecosystem. This brings the entire ocean ecosystem is under the purview of CMLRE research.

Such an attempt is extremely important as India is yet to have a stock-based harvest quota for marine resources. In countries like the US, there are clear stock assessment systems that give a clear idea about how much stock is available in a particular area on a particular season. This helps to design harvest pattern on a sustainable manner in comparison to the demand. “India is in the process of establishing such a data, but the process is very complex as we are in the tropics. We have also been establishing Maximum



*Dr G.V.M. Gupta, Director & Scientist-G*



*Shri Saravanane, Scientist-F*



*A researcher preparing the samples for PCR*



*Operation of Thermal Cycler*



*Taxonomic observation of Deep-sea samples*

Sustainable Yields using various parameters like primary, secondary and benthic production, following Trophodynamic modelling approach. According to the latest reports, an estimate of 4.32 million tons per year is the harvestable yield from the entire Indian Exclusive Economic Zone (EEZ)," he said.

The role played by the CMLRE in all these activities is very important. "The oceanographic and biodiversity information collected by CMLRE is being used in many international meetings like in Convention on the Conservation of Antarctic Marine Living Resources, also known as the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR), where CMLRE is the nodal agency representing India."

As part of its social intervention programme, CMLRE has established a hatchery for marine ornaments at Agatti, Lakshadweep islands to support the islanders. "The main focus is to develop and standardise breeding and rearing of ornamental fish in captive condition. The seedlings are then given to local islanders, where they

can use the technology for livelihood enhancement." More funds have been allotted to this programme also in the next phase for augmenting this facility.

CMLRE was functioning from a small premise inside Kendriya Bhavan at Kakkanad in Kochi and now it has moved to its own 10-acre-campus at Atal Bhavan at Puthuvype, Kochi.

The Institute will focus more on correlating the marine living resources of the country to its physical environment and developing an ecosystem approach to the management of these resources. Atal Bhavan was dedicated to the nation on February 23, 2019 by the Union Minister Dr. Harsh Vardhan in the presence of Dr. M. Rajeevan.

Funds to the tune of Rs. 40 crore has been spent to set up the infrastructure befitting an international research institute. "Referral Centre is being developed in a full-fledged manner with all the specimen from the deep sea, like a museum of deep sea living resources where

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the information will be kept with geo-reference tag.”

Right now, the rich trawl data by Sagar Sampada from the deep ocean are archived at one of the sister organisations of CMLRE, the Indian National Centre for Ocean Information Services (INCOIS), Hyderabad. INCOIS is the nodal agency where all the ocean related information is going to be stored and disseminated to the public as per the governing rules.

The data pool generated by CMLRE includes all the physical variables, the chemistry, plankton, microscopic organisms, fishery-related and biodiversity information.

Then there is the Ocean Biodiversity Information System (OBIS), formerly Ocean Biogeographic Information System, which is a web-based access point of information about the distribution and abundance of living resources in the ocean. This is a global programme, and for Indian Ocean there is IndOBIS, CMLRE is the nodal agency. “We have already made 1.2 lakh records

from our collection and past literature and made them available in the IndOBIS archival. This information will be very useful in demarcating ecoregions, to study how different environments have different habitats and what are the reasons behind formation of different ecobioregions. This is a continuous process and not a one-time information gathering process,” Dr. Gupta said.

With India marking out Rs. 4,000 crore investment in deep ocean mission in next five years, CMLRE is all set to play a big role, especially in documenting deep-sea biodiversity.

“We are going to set up an international marine taxonomic training centre. Mission has got multiple focus areas like non-living resources, ecosystem processes, monsoon related atmospheric ocean coupling interface. CMLRE is concentrating on biodiversity component.” The new campus of CMLRE is gearing up to be the hub of high profile researches in years to come.



*Dr Sherine and her team of researchers at work in the molecular taxonomy lab*



*Researchers analyzing the Fish Eggs and Larvae collected using CUFES*

### Eyes Turned to the Ocean Bed

Sagar Sampada is the pride of CMLRE, a unique possession that has been continuously trawling the ocean bed and turning the eyes to depths till now unknown to man. Every voyage of this vessel brings back not loads of fish, but information and raw material for research much more valuable, as it will go on to decide the future of fisheries. Not just that of the nation, but even in international levels.

Fishery and Oceanographic Research Vessel (FORV) Sagar Sampada was commissioned on November 06, 1984. It was constructed using the support from the Danish International Development Agency (DANIDA). Since then, the vessel had done nearly 400 expeditions across the world.

The vessel remains as a floating research platform for every oceanographic and deep-sea activities of CMLRE. With the maximum speed of 13 knots and an operational speed of 10 knots, the vessel having an endurance of 25 days can operate in all sea conditions with a capacity to accommodate for up to 35 crew and 22 scientists.

The Vessel is ice-strengthened to give support to India's Antarctic Scientific programmes for working as far south as 60° S Latitude. In her younger days, FORV Sagar Sampada went even up to Antarctica to join an international research mission to study the krill resources. The vessel has the permission to move beyond the territorial waters of India and call at any port in the world.

The prime research goals of FORV Sagar Sampada

are to do surveys to establish baseline information on the distribution and abundance of marine benthos, harmful algae, zooplankton, marine mammals, deep-scattering organisms and deep-sea demersal fishes within the Indian EEZ. It is also involved in exploration of marine hotspots, inventorying and documenting its biodiversity from intertidal region through all along the Indian EEZ and also in the areas beyond national jurisdiction (ABNJ).

The research activities cover Arabian Sea, Bay of Bengal, Lakshadweep Sea and Andaman Sea. Three years back, the vessel did a research voyage to Oman. Even while doing international voyages, the vessel focussed on ecosystem responses in Indian Ocean.

Sagar Sampada is equipped for geoscientific, meteorological, physical, and chemical oceanographic work, while having latest on-board research facilities for studying marine living organisms and their environment. It is capable of locating fish resources, assessing their extent of distribution and quantifying the fish stock in the column waters and on sea bottom through effective use of multiple gear like bottom trawl, pelagic and midwater trawls, supported by modern underwater acoustics and electronic data processing instruments and systems.

The data acquired through these integrated methods has a high degree of reliability in estimating the commercial fish stocks and those which are under-exploited, non-conventional and new to the fishery.

Along with this, the vessel carries out very directed and focussed research on spawning populations/grounds and young fish, information on which is essential for



*Display of voucher specimens at Referral Centre*

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fishery productions, conservation and management of resources. Oceanographic research, which is an integral part of marine fisheries research, is another core competency area of the vessel.

The physical, chemical and biological factors of the sea which influence and control the quality and levels of primary, secondary and tertiary production, life-history of fishes and special features such as upwelling, convergence, deep-scattering layers and marine pollution can be investigated using the facilities available in the vessel.

Such a range of studies is made possible through automatic data acquisition, water sampling and analysis of different parameters through sophisticated instruments. The studies made by FORV Sagar Sampada is also used to support the work on the meteorological research and climate observations.

Till date, Sagar Sampada continues to be the mainstay for research and training for numerous junior scientists, research students, postgraduate students and academic students on many facets of biological, physical oceanography and biogeochemistry.

### Supporting the industry with data

It is not every day that a premium academic institution get a regular engagement with an industry as vibrant as seafood industry. However, the work at CMLRE has a direct and immediate impact with the industry.

“The surveys done by FORV Sagar Sampada helps in bettering the results from capture fisheries. With this goal in mind, a military grade binoculars named Big Eye has been installed on board Sagar Sampada for efficient tracking and identification of marine mammals from safer distance,” said Saravanane N., Senior Scientist and Principal Investigator, Biodiversity Programme at CMLRE.

Deep sea mission is an integral part of the Blue Economy of the nation and CMLRE plays a significant role in it as it is the only competent research organisation having access to inaccessible regions like sea bed at depths of 2,000 to 3,000 metres. “We have already started surveys to identify biodiversity hotspots in Indian EEZ.”

Another key area of focus for CMLRE is the identification

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*A view of Deep-sea Fishery Laboratory*

and promotion of non-conventional fishery resources and to tap biodiversity available within Indian EEZ itself. Midwater trawl surveys have found the potential for harnessing unconventional fishery resources in sizeable quantities from mesopelagic region of Indian waters. “It is estimated that nearly 80-90 per cent of the available possibilities remain unused till now.”

Another very important contribution of CMLRE in bettering the academic-industry interface is the building up of one of the biggest database under the IndOBIS project. “More than one lakh samples have been digitally documented along with 3,000-plus voucher specimen in the Referral Centre,” Dr. Saravanane said.

The global inventory of deep sea species has been updated by describing more than a dozen species new to science belonging to various groups from worms, crustaceans to fishes from seas around Indian EEZ.

In addition, more than 50 species showing new geographical records in Indian waters were inventoried. CMLRE is in the process of getting accredited as a designated National repository for deep-sea organisms. The research projects of CMLRE continues to contribute significantly to address the spatiotemporal distribution of marine living resources in relation to its physico-chemical environment in the Indian EEZ.

With such a high volume of information that can have direct and huge impact on the seafood industry being systematically collected, studied and documented, CMLRE is building a knowledge-base that can better the prospects of the marine industry.

# Diversification of aquaculture is the need of the hour

**D**iversification of the product range from aquaculture is the need of the hour, said Mr. K. S. Srinivas IAS, Chairman of Marine Products Export Development Authority (MPEDA), as he addressed the webinar organised by the Authority along with Singapore India Partnership Office (SIPO) on October 13, 2020.

Right now, the seafood export is relying almost entirely on frozen food products. However, new market for live shrimp and crab is emerging, especially in countries like China. But we do not have the technology to keep shrimp alive for longer duration after harvest. Webinars and associations with agencies like SIPO are relevant in this context, Mr. Srinivas said.

The shrimp industry is almost a Five Billion Dollar one now and the Union Government has asked to scale up production and processing now. In 2019-20, the export value stood at Rs. 46,000 crore. The target set for next five years is Rs. one lakh crore.

Lauding the enterprising nature of Indian shrimp industry, Chairman has pointed out that when the indigenous Black Tiger breed developed some issues, the farmers adopted a foreign variety like Vannamei and became first in production and export of it.

Today, India is the topmost supplier to the US and one of the major suppliers to China and European Union.

Talking at the webinar, Audrey Tan, Director (Economic Development), Singapore-India Partnership Office, observed that associations like these could be mutually beneficial. Singapore has the advantage of being treated as a regional hub for seafood export and also its technological and innovation advancement could be used for effective attempts to double exports.

SIPO is working under the Ministry of Industry and Trade, Government of Singapore. Shrimp farmers from different parts of the country attended the webinar.



# Highlights of marine fish landings and boat arrivals in selected harbours of India during September 2020

Dr. Joice V. Thomas and Dr. Afsal V.V., NETFISH-MPEDA

The quantity of various fishery items landed and the details of boats arrived at the major harbours of India are being obtained on a daily basis by NETFISH through the Harbour Data Collectors deployed at the harbours. This report presents the species-wise, harbour-wise and state-wise estimations arrived at on analyzing the data obtained for 99 harbours during September 2020.

## Estimations on fish landings

The marine fish landings from 99 selected harbours during September 2020 totalled to 93892.86 tons, which was comprised of 36644.41 tons (39 per cent) of Pelagic finfishes, 32603.84 tons (35 per cent) of Demersal finfishes, 13696.63 tons (14 per cent) of Crustaceans (shrimps, crabs, lobsters), 10931.76 tons of Molluscs (squid, cuttlefish, octopus) and a meagre quantity of 16.23 tons of other items (Fig.1).

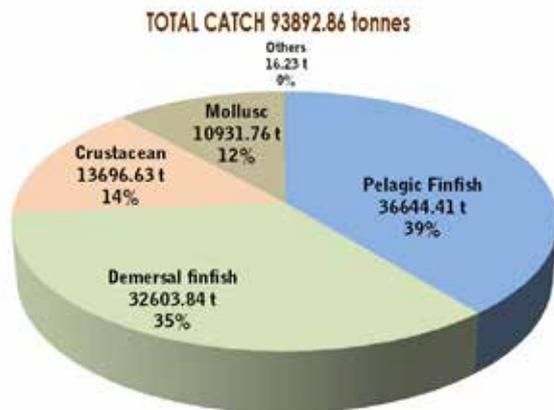


Fig. 1. Category-wise fish landings during September 2020

Landings of about 265 species of fishery items were recorded during the month, of which the major species were Ribbon fish (*Lepturacanthus spp.*), Croaker (*Johnnius Spp.*), Karikkadi shrimp (*Parapenaeopsis stylifera*), Bombay duck (*Harpadon nehereus*) and Japanese thread fin bream (*Nemipterus japonicus*) (Table 1).

Table 1. Major fish species landed during September 2020

Sl. No.	Common Name	Scientific Name	Quantity in tons
1	Ribbon Fish	Lepturacanthus Spp	10735.91
2	Croaker	Johnnius Spp	5121.71
3	Karikkadi shrimp	Parapenaeopsis stylifera	4720.16
4	Bombay duck	Harpadon nehereus	4393.55
5	Japanese thread fin bream	Nemipterus japonicus	3882.48

Considering the contributions of various fishery items in general, Ribbon fishes, Coastal shrimps, Cuttlefishes, Croakers and Tunas were found as the major items landed during the period and these 5 fishery items had together formed 43 per cent of the total catch (Fig. 2).

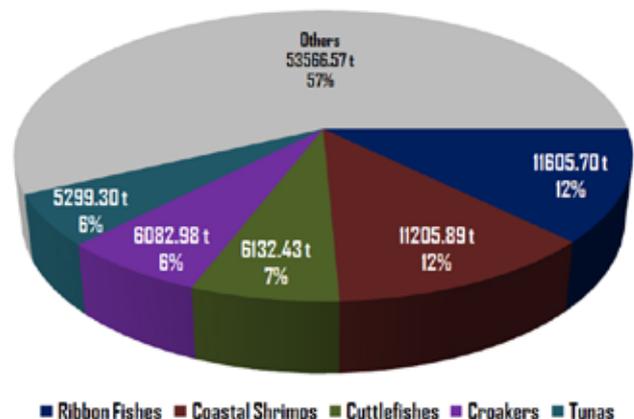


Fig. 2. Major fishery items landed during September 2020

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Table 2 presents the quantity-wise catch of various categories of fishery items recorded during September 2020. Among the Pelagic finfish resources, Ribbon fishes, Tunas and Bombay duck were the major contributors whereas among Demersal finfishes, the major contributors were Croakers and Threadfin breams. Major items among Shellfishes were Coastal shrimps, Cuttlefishes and Squids. The highest contributor among the coastal shrimps was the *Karikkadi* shrimp which registered a landing to the tune of 4720 tons.

Table 2. Category-wise landing of various fishery items during September 2020

Fishery item	Quantity in tons	% of total catch
Pelagic Finfishes		
Ribbon Fishes	11605.70	12.36
Tunas	5299.30	5.64
Bombay duck	4393.55	4.68
Indian mackerel	3190.48	3.40
Scads	2697.47	2.87
Anchovies	1784.27	1.90
Lesser Sardines	1427.79	1.52
Seer fishes	1260.49	1.34
Indian oil sardine	840.08	0.89
Shads	786.10	0.84
Barracudas	481.19	0.51
Trevally	432.77	0.46
False trevally	367.77	0.39
Indian Salmon	248.88	0.27
Sword fish	242.31	0.26
Mullets	240.75	0.26
Herrings	228.64	0.24
Queen fish	216.28	0.23
Dolphin fish	202.32	0.22
Other mackerels	152.31	0.16
Sail Fish	136.30	0.15
Needlefish	128.59	0.14
Marlins	105.58	0.11
Cobia	65.91	0.07
Silver Biddies	40.75	0.04
Sand whiting	18.91	0.02
Pompano	15.51	0.02
Milk fish	10.74	0.01

Flying fish	8.76	0.01
Sweet Lip	6.83	0.01
Halfbeak	6.17	0.01
Grouper	1.75	0.00
Wahoo	0.19	0.00
<b>Total Pelagic</b>	<b>36644.41</b>	<b>39.03</b>
Demersal Finfishes		
Croakers	6082.98	6.48
Thread Fin Breams	5191.46	5.53
Pomfrets	4377.00	4.66
Unicorn leather-jacket	3459.80	3.68
Trigger fishes	3366.99	3.59
Catfishes	3206.17	3.41
Lizard Fishes	3081.21	3.28
Sole fishes	904.98	0.96
Bullseyes	753.77	0.80
Reef Cods	355.86	0.38
Rays	334.24	0.36
Goat fishes	268.30	0.29
Sharks	261.13	0.28
Snappers	233.58	0.25
Pony fishes	207.53	0.22
Eels	128.04	0.14
Moon Fish	124.24	0.13
Perches	66.37	0.07
Rabbit Fish	56.12	0.06
Emperor breams	47.63	0.05
Indian threadfin	33.56	0.04
Sea breams	17.38	0.02
Parrot Fish	10.59	0.01
Indian halibut	9.97	0.01
Flat Heads	8.99	0.01
Mud skipper	7.75	0.01
Groupers	3.23	0.00
Pinjalo	1.45	0.00
Surgeonfish	1.42	0.00
Banded Grunt	1.15	0.00
Surgeonfish	0.95	0.00

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Total Demersal	32603.84	34.72
Crustaceans		
Coastal Shrimps	11205.89	11.93
Sea Crabs	1452.75	1.55
Deepsea shrimps	998.69	1.06
Lobsters	34.16	0.04
Mud Crab	5.13	0.01
<b>Total Crustaceans</b>	<b>13696.63</b>	<b>14.59</b>
Molluscs		
Cuttlefishes	6132.43	6.53
Squids	4361.08	4.64
Octopus	437.35	0.47
Whelk	0.90	0.00
<b>Total Molluscs</b>	<b>10931.76</b>	<b>11.64</b>
Others		
Pearl Spot	10.73	0.01
Tilapia	5.50	0.01
Others total	16.23	0.02
<b>Grand Total</b>	<b>93892.86</b>	<b>100.00</b>

### Harbour-wise landings

The total fish catch reported during the month from the selected harbours are presented in Table 3. Of the 99 harbours, the Veraval harbour in Gujarat had registered the maximum landing of 9099.29 tons (10 per cent) and it was followed by the New Ferry Wharf harbour in Maharashtra and Porbandar harbour in Gujarat with landings of 7290.68 tons (8 per cent) and 5422.52 tons (6 per cent) respectively. The least quantity of marine fish catch was recorded from Jagathapatnam harbour in Tamil Nadu (2.30 tons).

Table 3. Harbour-wise catch quantity reported during September 2020

Sl. No.	State	Harbour	Fish Catch Quantity
1	Gujarat	Veraval	9099.29
2		Porbandar	5422.52
3		Vanakbara	5300.18
4		Mangrol	4150.20
5		Jafrabad	1771.16
6		Okha	1324.72
7		Kotada	657.62

8	Maharash- tra	Ghoghla	403.49	
9		DIU	385.60	
10		Chorwad	76.05	
11		Sutrapada	53.40	
12		New Ferry Wharf	7290.68	
13		Sasoon Dock	1636.72	
14		Arnala	1073.43	
15		Ratnagiri	944.70	
16		Uttan	767.62	
17		Harne	729.48	
18		Satpati	720.78	
19		Vasai	431.58	
20		Alibagh Koliwada	399.09	
21		Sakharinate	268.15	
22		Versova	229.26	
23		Onni Bhatti Dabhol	154.51	
24		Dahanu	136.66	
25		Malvan	61.96	
26		Taramumbri, Devgad	27.85	
27		Goa	Cutbona	367.73
28			Malim	288.91
29	Vasco		155.00	
30	Chapora		4.32	
31	Karnataka	Malpe	4916.06	
32		Mangalore	3203.26	
33		Bhatkal	573.20	
34		Honnar	349.23	
35		Gangolli	326.62	
36		Karwar	230.57	
37		Tadri	195.39	
38		Amdalli	175.26	
39		Belekeri	78.07	
40		Kerala	Sakthikulangara	1695.20
41			Neendakara	1354.65
42			Kayamkulam	1059.50
43			Munambam	1031.81
44			Beyapore	713.86
45	Vypin		647.65	
46	Cheruvathur		504.05	
47	Thoppumpady Cochin		348.01	

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48		Chellanam	327.32
49		Mopla Bay	306.00
50		Koyilandi	258.58
51		Ponnani	241.41
52		Puthiyappa	209.80
53		Thangassery	195.75
54		Vaadi	139.60
55		Chettuva	107.79
56		Thottappally	97.88
57		Munakkakadavu	95.74
58		Vizhinjam	37.77
59		Azheekkal	19.79
60	Tamil Nadu & Pondicherry	Nagapattinam	2170.88
61		Chennai	2168.29
62		Thengaipattinam	1155.89
63		Tharuvaikulam	1028.64
64		Colachel	1001.97
65		Karaikal	700.81
66		Pazhayar	416.83
67		Pondicherry	250.85
68		Cuddalore	227.57
69		Poompuhar	150.47
70		Tuticorin	128.26
71		Mudasalodi	106.59
72		Pulicat	77.54
73		Chinnamuttom	62.70
74		Pamban	62.41
75		Kodiyakarai	41.30
76		Rameswaram	36.78
77		Mallapatnam	29.09
78		Mandapam	21.48
79		Kottaipattinam	10.08
80	Jagathapattinam	2.30	
81	Andhra Pradesh	Visakhapatnam	1700.51
82		Nizampatnam	695.90
83		Kakinada	628.24
84		Machilipatnam	397.31
85		Yanam	243.76
86		Vodarevu	203.95
87		Pudimadaka	187.72
88	Odisha	Paradeep	1446.38
89		Balramgadi	939.88
90		Dhamara	763.39
91		Bahabalpur	600.30
92		Balugaon	187.66

93	West Bengal	Petuaghat Deshpur	3138.50
94		Digha Sankarpur	2735.16
95		Namkhana	1869.52
96		Raidighi	1495.90
97		Kakdwip	1280.56
98		Soula	892.15
99		Fraser Ganj	862.92

### State-wise landings

Gujarat recorded the highest marine landings during the month, which was to the tune of 28644.24 tons (31 per cent) (Fig. 3). Maharashtra in the second position had contributed 14872.45 tons (16 per cent) and followed by West Bengal with a total landing of 12274.70 tons (13 per cent). The state which reported least landing during the period was Goa, with a contribution of 815.95 tons (1 per cent) of marine fish catch.

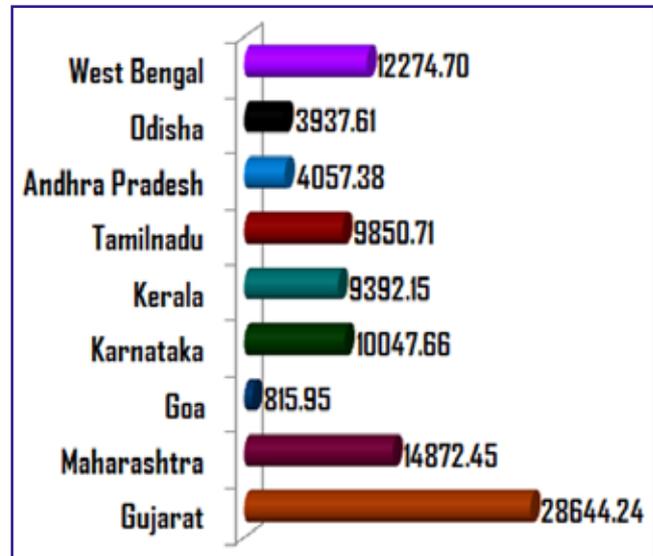


Fig. 3. State-wise fish landings (in tons) during September 2020

### Estimations on boat arrivals

A total of 43757 boat arrivals were recorded during September 2020, of which the highest recording was from Veerval harbour (2632), and it was followed by Arnala harbour with 2070 boat arrivals and Mangrol harbour with 1960 boats.

The Jagathapattinam harbour had registered the least boat arrival (25) during the month. The top ten harbours in terms of boat arrivals are enlisted in the table 4.

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Table 4. List of top ten harbours which recorded more boat arrivals during September 2020

Sl. No.	Harbour	No. of boat arrival
1	Veraval	2632
2	Arnala	2070
3	Mangrol	1960
4	Vanakbara	1312
5	Porbandar	1278
6	New Ferry Wharf	1126
7	Petuaghat Deshpran	1062
8	Sakthikulangara	1027
9	Neendakara	957
10	Digha Sankarpur	905

### Summary

In September 2020, a total of 93892.86 tons of marine landings and 43757 boat arrivals were reported from 99 major fish landing sites of India.

The Pelagic finfishes were the major contributors to the landings and Ribbon fishes and Coastal shrimps were the most landed fishery items in general.

Gujarat had recorded the maximum landing during the month. The Veraval harbour in Gujarat reported the highest fish landing as well as the maximum boat arrivals during the month.



# Retail demand reduces COVID-19 pain for seafood industry

Matt Craze

**T**he seafood industry has spent much of this most-unusual year coping with low prices and disruptions caused by the COVID-19 pandemic. After weathering the initial forces of the storm, the industry can see a much brighter future on the horizon, according to a poll of leading retailers commissioned by the Global Aquaculture Alliance (GAA).

Survey respondents reported a huge increase in seafood sales as consumers learned to cook favourite dishes at home after restaurants shuttered their doors. The intuition is that a consumer who usually ordered salmon fillet dining out will now cook fish at home for their families, theoretically adding many new customers.

### Bringing it home

The statistical evidence of the seafood-at-home craze is overwhelming. One U.S. supermarket chain surveyed reported a 40 per cent increase in salmon and shrimp demand and a doubling in snow crab sales. Increased Google keyword searches this year for salmon and shrimp underpin the theory that consumers have started to cook seafood at home en masse.

“The silver lining is that people have found out, ‘Hey I can cook this at home, it’s one of the easiest proteins to cook, I am eating healthy and it’s done well for us,’” said Rich Castle, director of seafood at Giant Eagle, which has supermarkets in five States.

Ivan Vindheim, CEO of salmon-farming giant MOWI, said during a recent DNB webinar that the salmon industry’s sales are only down 10 per cent compared with a year ago, despite the collapse of food service. It’s conceivable, he added, that increased retail demand could entirely replace lost volumes “with enough time.” Ever since the pandemic led to lockdowns in Europe and the United States in March, consumer behaviour has busted several myths that have been hotly debated at seafood conferences for years. One fallacy was that U.S. consumers were reluctant to cook seafood at home. There was a very sudden increase in retail seafood sales in March when vast swathes of the country first went into lockdown, said Guy Pizzuti, a seafood buyer for supermarket chain Publix.

“On March 1, nobody knew how to cook seafood,” Pizzuti said. “But by the end of March, they knew how to cook it.”

## FOCUS AREA

The pandemic in Europe and North America triggered frenzied behaviour among its citizens, generating the equivalent food and beverage demand of seven back-to-back Thanksgivings, said Frank Yiannas, deputy commissioner for food policy and response at the Food & Drug Administration (FDA). At the same time, foodservice demand collapsed.

“Fifty cents of every dollar spent on food is spent on food away from home, so that dried up,” Yiannas said in a webinar back in July. “What we saw at the beginning of the pandemic was not too much food but supply chain issues. Too much food in the wrong places.”

Seafood was the most susceptible protein to price collapse given its dependence on foodservice sales channels and reliance on air freight, according to Urner Barry. D-Trim salmon fillets from Chile fell to the lowest values seen since 2015 and shrimp continued to trade at painfully low values caused by a multi-year market glut.

The drastic decline in prices may have a primary reason behind this remarkable increase in retail sales, which tempted consumers to go beyond canned tuna and try cooking other species from home said Rabobank analyst Gorjan Nikolik. Most surveyed retailers said it was premature to pinpoint the exact reason why seafood demand rose so sharply. Motivating factors include the slowing down of daily life, prompting families to cook meals from scratch.

“Retail has managed to do relatively well in the pandemic and save the seafood industry and saved a lot of companies,” Nikolik said.

Given the global health crisis, consumers also may have switched to fish from other proteins for health reasons, boosting their immune system by eating a protein that is packed with heart-healthy omega-3 fatty acids. What the retail sector does know is that the 2020 seafood craze is species-agnostic and has boosted both the fresh and frozen categories.

The trend is also global. Brazilian, Canadian, European and Korean retailers have all experienced a surge in seafood sales as consumers cook at home more. Producers from European sea bass farmers to Asian shrimp exporters are thinking of ways to deliver more value-added products and market directly through online channels as some volumes will shift from retail to foodservice forever.

“People have time to experiment cooking at home, and we’re pleasantly surprised [by retail volumes] as it is relatively easy and quick to prepare,” said Andreas Sotiropoulos, Executive Director of Diorasis International, the backer of No. 2 Greek sea bass and sea bream farmer Philososh. “People are not as scared of it as they had been.”

### The return of restaurants

Two main questions loom as normal life beckons. The first is if the retail seafood boom will endure, especially as people resume busy lifestyles. And the second surrounds the recovery of the foodservice industry in a post COVID-19 environment.

These two areas are interwoven. How willing are consumers to keep cooking at the rates they have been in recent months, especially as they go back to their offices and families attend after-school activities with their children? The uptick in convenience kitchen appliances such as instant pots and air fryers suggests people are looking for short-cuts amid the pressure of preparing and serving meals on a daily basis. Meal-kit companies like Blue Apron and HelloFresh have experienced a resurgence in sales this year. Companies equipped to sell directly to consumers through online channels will continue to thrive with all consumer products including food, according to Sheryl Kingstone, a consumer trends expert at S&P Global. “Food-at-home fatigue is real,” said Sysco CEO Kevin Hourican. “Consumers are ready to re-engage with restaurants.”

Supermarket chains are preparing marketing campaigns to keep the boom alive. Food Lion, a U.S. supermarket chain owned by Ahold Delhaize, will use online channels and co-marketing campaigns to keep consumers eating seafood at home, said seafood category manager Josanna Busby.

“We want to try and capitalize on this to try and provide more information to consumers to keep the trend going,” Busby said. “We would do so through online channels, through media chats, through e-commerce and through co-marketing programmes.”

The dynamic also depends on the economic recovery of restaurants and cafés. As many as 100,000 U.S. restaurants have closed either long-term or permanently, according to the National Restaurant Association (NRA). And then there’s the changing of seasons. The slow recovery in restaurant sales

## FOCUS AREA

was partly due to the summer weather, allowing an array of outdoor dining options like sidewalk seating and other creative solutions. There is no evidence suggesting restaurants can prolong the positive trend with indoor alternatives in North America, according to Jeff Sedacca, the CEO of seafood importer Sunnyvale Seafood.

### In this economy?

The one remaining question surrounds the state of the U.S. economy. Most retailers said the economic stimulus package, which provided the country's poorest citizens with a USD 600 every week until July, was propping up the retail seafood boom to some extent. Congress has yet to resolve a second stimulus package, and there is a 40 per cent chance of a recession in the next two years, according to renowned billionaire hedge fund investor Ray Dalio.

Producers will be discussing downstream strategies in boardrooms around the world, making adjustments and potentially adding processing capacity to sell more finished directly to consumers. There is even a trend in the food service space towards value-added items, said Tony Downs, category director seafood at

Sysco. Restaurants are currently experiencing worker shortages, and it makes no sense to have kitchen staff peeling shrimp for USD 15 an hour when "you can have it done for you," Downs said. Most foodservice and retail industry players agree on one thing: The marketplace for seafood in North America and elsewhere has changed forever, and the only debate is to what degree. Companies that do the best in a post COVID-19 world will be those that embrace these emerging consumer trends.

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# 25<sup>th</sup> anniversary of the Code of Conduct for Responsible Fisheries

October 2020 marks the 25<sup>th</sup> anniversary of the Code of Conduct for Responsible Fisheries (the Code). Developed by the Food and Agriculture Organization of the United Nations (FAO), the Code aims to “strengthen international legal frameworks for more effective conservation, management and sustainable exploitation and production of living aquatic resources.” It provides guidance across ten areas, including fisheries and coastal area research, management and operations, and serves as a voluntary set of measures for flag, coastal and port States. Responsible fisheries management is integral to achieving Sustainable Development Goal (SDG) 14: Life Below Water. It’s a complex process, but over the past 25 years, the Code has offered guidance that can support efforts in the sector.

Research from 2012 shows that States with higher levels of compliance with the Code benefit from increased fisheries sustainability. However, implementation of the Code is made all the more difficult by political, geographic and economic challenges; fisheries lie far from shore, often in areas outside of national jurisdiction. It can be difficult and costly for relevant administrations to monitor, control and survey what happens on vessels out of sight, and manage the fisheries they operate within.

Recent advances and innovations in technology can provide cost-effective, scalable solutions to support government implementation of the Code. At Global Fishing Watch, we believe it’s vital to seize these opportunities. The use of mandatory and publicly available vessel identification and tracking, electronic monitoring of fishing and carrier vessels and revolutionary machine learning algorithms that identify risky behaviour are a few examples of such solutions. In addition to utilizing technology, collaboration will aid in effective fisheries management and the realization of many SDG 14 targets. A concerted approach among coastal, port and flag State governments, science, industry, international governmental organizations and non-governmental organizations will allow a coherent and consistent fisheries management system to be put in place. From ancient times, fishing has been a

major source of food for humanity and a provider of employment and economic benefits to those engaged in this activity. The wealth of aquatic resources was assumed to be an unlimited gift of nature. However, with increased knowledge and the dynamic development of fisheries after the second world war, this myth has faded in face of the realization that aquatic resources, although renewable, are not infinite and need to be properly managed, if their contribution to the nutritional, economic and social well-being of the growing world’s population is to be sustained.

The widespread introduction in the mid-seventies of exclusive economic zones (EEZs) and the adoption in 1982, after long deliberations, of the United Nations Convention on the Law of the Sea provided a new framework for the better management of marine resources. The new legal regime of the ocean gave coastal States rights and responsibilities for the management and use of fishery resources within their EEZs which embrace some 90 per cent of the world’s marine fisheries. Such extended national jurisdiction was a necessary but insufficient step toward the efficient management and sustainable development of fisheries. Many coastal States continued to face serious challenges as, lacking experience and financial and physical resources, they sought to extract greater benefits from the fisheries within their EEZs.

In recent years, world fisheries have become a market-driven, dynamically developing sector of the food industry and coastal States have striven to take advantage of their new opportunities by investing in modern fishing fleets and processing factories in response to growing international demand for fish and fishery products. By the late 1980s it became clear, however, that fisheries resources could no longer sustain such rapid and often uncontrolled exploitation and development, and that new approaches to fisheries management embracing conservation and environmental considerations were urgently needed. The situation was aggravated by the realization that unregulated fisheries on the high seas, in some cases involving straddling and highly migratory fish species, which occur within and outside EEZs, were becoming a matter of increasing concern.



# Capacity building training programme on Tuna Long Line

Vinoth. S. Ravindran, A. Sakthivel and Joice V. Thomas

The demand for fish and fishery products in the world market has been on a steady increase. The marine fish production in India has increased to 3.49 million MT during 2018-19 from a meagre 0.53 million MT in 1950, owing to the overall development taken place in the fishing sector. However, the capture fisheries side has been showing signs of stagnation over the last many years though recorded a marginal rise of 2.1% in overall marine fish production during 2019 compared with the production in the previous year. In this context, maximum utilization of the valuable catch for export purpose as well as for domestic consumption by deployment of modern facilities on board fishing vessels maintaining highest quality standards is highly important.

The world demand for tuna resources is ever increasing and there is scope for better economic returns in terms of foreign exchange earnings. Tuna fishing in India has so far not reached to the level as seen in foreign countries, though rapid development had taken place in the exploitation of marine fishes during the last decade. Tuna fish is a delicacy item in Japanese market and therefore it fetches high price if the high-quality tuna in sashimi form is exported to Japan. Many countries even a developing country like Brazil proved their ability by sending sashimi products to Japan markets. Unfortunately, India could not reach to that level owing to lack of awareness among tuna fishers in our country and dearth of facilities on board for better harvest/post-harvest handling and preservation. In India, tuna, mainly Yellow Fin Tuna caught with long line, is preferred for exports. However, such exploitation is minimal mainly due to lack of technical know-how on long line fishing. In this backdrop, MPEDA decided to impart skill development training programme to fishers involved in tuna fishing in the major states like Kerala, Tamil Nadu and Andhra Pradesh, where tuna fishing is found prevalent. MPEDA had taken efforts in the end of the last decade and conducted many on board trials with the help of an Australian trainer. Noticing no much momentum on the long line fishing for tuna in the

country, MPEDA took the second innings of long line tuna fishing trials this year in deep sea tuna long liners with the help of fishermen from Thuthoor, Kanyakumari district in Tamil Nadu. The results of this endeavour indicate that good quality tuna fish can be landed by adopting deep sea long line fishing, thus paving the way for better exports and good earnings to the fishermen community.

## Material and method

The tuna training programme was executed by NETFISH, the extension arm of MPEDA. Southern coastal States such as Tamil Nadu, Andhra Pradesh and Kerala were selected for conducting the on board tuna training programmes. Preliminary meeting was conducted on June 30, 2019 by the MPEDA and NETFISH officials with stakeholders from various fishermen union of Thuthoor, Chinnathurai, Eraviputhen Thurai, Poothurai, Erayiyumen Thurai (Thuthoor Village Panchayat) Vallavilai, Marthandam Thurai, Neerodi (Kollemcode Town Panchayat). The concept of training to other fishermen by the fishers from Thuthoor was well intimated and after series of meetings with the fishermen in the region, a list of 10 fishermen interested to take part in the MPEDA initiative as trainers was prepared. Fishermen from Thuthoor region are traditional masters of deep-sea fishing having a good knowledge of long line fishing and well versed with the marine waters in the entire 2.37 million square km of exclusive economic zone of India. Besides this, six more trainers from Thuthoor region were later selected for going to Andhra Pradesh for the training. The 16 trainers (Table 1) were selected by NETFISH, Tuticorin region, based on their deep sea long line fishing skills and experience.

## Area of fishing

Training programmes were conducted in both Arabian Sea and Bay of Bengal region (Fig 1 & 2). Trials in the Arabian Sea were done in the selected long line vessels

# COVER STORY

from Cochin (Thoppumpady) and Thengapattanam fishing harbours while the voyages from Tharuvaikulam, Nagapattanam, Karaikal and Kakinada fishing harbours were conducted in the Bay of Bengal region.

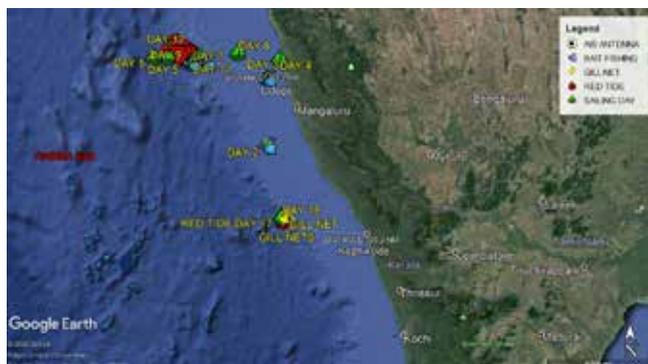


Fig 1. Long line fishing zones in the Arabian Sea (West Coast)

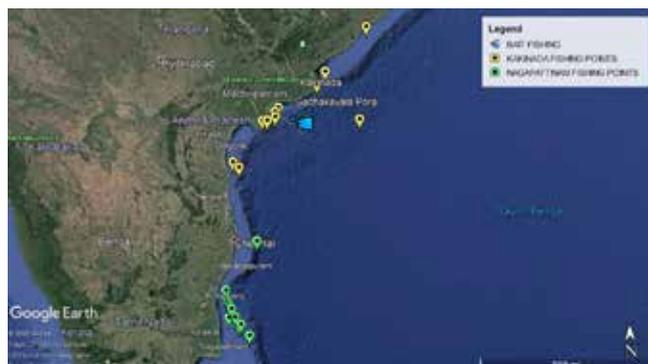


Fig 2. Long line fishing zones in the Bay of Bengal (East Coast)

Table 1. List of Trainers selected from Thuthoor region for conducting the on board tuna long line training

Sl. No.	Trainer's Name
1	Gilbert C
2	Antony Raj. D
3	Jede Bruno Bensikar. B
4	Jegan. P
5	Robinson Paniadimai
6	Feksy
7	Raju Nazereth
8	Stalin Jenitto Benziger. B
9	Anu.G
10	Sheldan
11	Thatheyus Amaladhasan

12	Jayesh Kumar J
13	Stalin P
14	Vinu Ouseabh
15	Raju A
16	Sargin Nayakam A

Trainers were familiarized with Standard Operating Procedure (SOP) of handling Tuna at Fisheries Training and Research Institute, Dr. J. Jayalalitha Fisheries University (FTRC), Parakkai. The trainers were also empowered on Gilled & Gutted processing on board at M/s Marble Valley Sea Foods Pvt. Ltd., Subramaniapuram, Tamil Nadu. List of interested fishing vessels to be engaged in the training were collected after due discussion with the State Fisheries Departments and the Fishing Vessel Owners' Associations in the respective states.

Fishing vessels were equipped with long line and its accessories for conducting the deep sea long lining trials. Materials used for preparation of tuna long line, bait line and other tools used in the fishing are given in Table 2.

Table 2. Material used for the Tuna Long Line Training

No	Items	Quantity
<b>Material for tuna long line</b>		
1	4- number hook – For Tuna & Sword fish	500 no.s
2	180 number roll – Mother line	100 kg
3	160 number roll – hanging sub line	90 kg
4	2 ½ mm rope – Tying on 2 and 5 lit cans	10 rolls
5	3 1/2 mm rope – Tying to AIS antenna float & 25 litre cans	1 roll
6	2 litre cans - Float	150 no.s
7	5 litre cans- Float	50 no.s
8	25 litre cans- Float	20 no.s
9	Arrows – To shoot at Tuna, Sword and Sail fishes	1 no.
10	Harpoon - To shoot at Tuna, Sword and Sail fishes	2 no.s
11	Hook seal – hook holding stand	3 no.s
12	Clip (roll clip) – Joining rolls	1Pkt
13	Rotator clip – (Karakkal) joining rolls	500 no.s
14	Clip player	2 no.s
<b>Material for bait line</b>		
15	50 number roll – Bait fishing line	1 roll
16	Weight 500 gm – Bait fishing- to sink the bait line	1 Gunny bag (50 kg)

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17	Weight 600 gm Bait fishing- to sink the bait line	1 Gunny bag (50 kg)
18	14- number Hooks – Bait fishes hooks	1000 no.s
19	15 -number hooks – Bait fishes hooks	1000 no.s
20	Gilt(Gold) – to attract bait	All colours(1 bundle)
21	Ring Mall - For making Kachcha	6 m
22	Ring for collecting bait from Sintex	2 no.s
23	Ring for collecting bait from Kachcha	2 rings
24	5 mm rope – Kachcha ring rope	1 roll
Other material		
25	Knife	1 pkt
26	Nail cutter	5 no.s
27	Lock & Cane	5 no.s
28	Hand hook	3 no.s
29	Flag post	15 no.s
30	Signal light	20 no.s
31	Automatic identification System (AIS)	5 no.s
32	Sintex tank(1000 L)	2 no.s
33	0.5hp motor for fresh water flow	2 no.s

### Long line for fishing

Long lines of length 14-16 nautical miles with 350 hooks were used for tuna fishing and a vertical hook and line of 20-80 meters length with 50 hooks were prepared for bait fishing. Fishermen made use of their traditional knowledge on natural factors such as wind speed, the water quality and turbulence, the phase of the moon, the depth of the water, their earlier catch records including that of the fellow fishermen at sea etc. for determining the bait and tuna catching zones. As per the fishermen, yellow fin tuna are caught generally at 22-25°C water temperature at depths ranging from 60 to 180 m. They also recorded that the catch was better when the sea was moderately windy rather calm. According to fishermen, darker skies also help tuna fishing. Again, the tuna fishing ground is determined also by the movements of dolphins in sea. Dolphin is believed to lead shoals of yellow fin tunas and tunas would follow dolphins in search of their common food, the Malabar Trevally. The long line fishing trails were conducted using Gill netter cum Long Line vessels and Trawler cum Long Line vessels of 20m in length with an engine power of around 240 hp.

### The dimensions of the Tuna Long Line:

1. The mother cord (180 no.) extends to about 14-16 nautical miles, tied with 350 no.s. of hooks (4. no size)
2. The hanging lines (160 no. line) with hooks hang to 80 m, 60 m and 160 m alternatively
3. The hanging lines are spaced about 75 m apart
4. Cans of 2 litre, 5 litre and 25 litre are used as floats

### The dimension of the Long Line for bait fishing

Long line (50 no. line) of about 20-80 m are used with multiple hooks (14 & 15 no.s.) spaced 1.5 m apart. Gilt is used to attract bait fishes



Fig. 3. Making of Hook on Line for bait fishing



Fig. 4. Weight to be tied to sink the bait fishing line



Fig. 5. Making of Kachcha for maintaining live bait in sea



Fig. 6. Making hand net for handling live bait



Fig. 7. Making floats with 2 L cans to be tied to the long line



Fig. 8. A hook made to take tuna from seawater



Fig. 9. Making of signal lights and poles for AIS



Fig. 10. Making of signal lights and poles for AIS

## Bait for tuna fishing

The baits used in trails were mainly *Carangoides malabaricus* (Malabar Trevally), locally called Mundakan Parai, Kolivaalai, and Kolisai. The baits were kept in live condition in happa and tanks for clinging on to hooks in the long line for tuna fishing.

## Method of catching the bait

In the deep sea, lights were used to attract the bait fishes. Bait line was placed vertically in water with the help of sinkers. Fishermen engaged in bait fishing throughout the night, usually for 3-6 hours depending on the catch. Usually about 350-700 bait fishes are caught and maintained live in “Kachchaas” (Happa) inside the sea. One ‘Kachchaa’ can hold up to 250-300 bait fishes of about 150-200 gms at a time. From the ‘Kachchaas’ the fishes are transferred to 1000 L Sintex tanks which can hold up to 250-270 bait fishes with a good flowing seawater circulation system.



Fig. 11 & 12. Trainers and trainees engaged in bait fishing at sea



Fig. 13 & 14. Maintaining live baits in Kachchaas in open sea and tubs



Fig. 15. Removing live baits from open sea Kachchaas



Fig. 16. Maintaining live baits in 1000L Sintex tanks

## Shooting of Long Line for tuna

About 7-8 fishermen were engaged for shooting the long line manually of which 3-4 fishermen act as main shooters and other 3-4 fishermen supported them by unrolling the lines, clinging bait to the hooks at regular intervals, deploying the floats, attaching antenna and buoys for the AIS. This procedure is done from around 3.30 am to 7.00 am during which about 300-350 hooks are shot. The mother chord holding a set of 350 hooks will extend to about 14-16 nautical miles in length. The vertical hangouts of hooks were alternated in 50m, 80m and 160 m depth. This length is set based on the zone where the bait fishes dwell more. Yellow fin tuna come up from about 400-450 m depth for feeding on the bait (*C. malabaricus*) which usually forages on such depths (50-100m).



Fig.17. A live bait (*Carangoides malabaricus*) clung to the hook for fishing



Fig. 18. Deploying Hook and Line in sea for Tuna fishing

## Hauling of Long line

Hauling of the long line is done usually following two timings: 1. Hauling starts at around 2.00 pm, which is 5-7 hours after shooting, and lasts till 9.00 pm (locally called a 'single'). The fishes including Yellow Fin Tuna are very fresh and 80 % of the catch comes live on the hooks. This timing for hauling is only recommended for getting sashimi grade tunas. However, the yield is very low in this method of hauling where only 4-7 % of the hooks are with fishes. The percentage may be even lowered because the fishes are hooked mainly in daylight.

# COVER STORY



Fig. 19 & 20. Yellow fin tuna caught on long line during the training



Fig. 21 & 22. Trainees and trainers with catch of big sword fishes



Fig. 23 & 24. Sword & sail fishes caught by long line

## COVER STORY

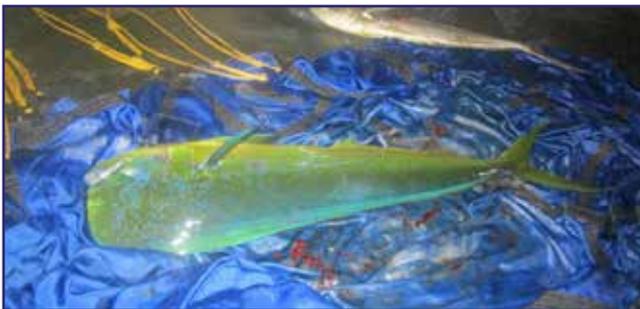


Fig. 25. A Mahi mahi fish caught by long line



Fig. 26. A Carangid and other fishes caught by long line

The other method of hauling starts by 7.00 pm, which is 12 hours after shooting, and lasts till 7.00 am of the next day (locally called a 'double'), where the percentage of catch is more, mainly because

- standing time of the long line is about 20 hours after shooting
- more fishes are caught during evening and night.

The percentage of yield will be about 10-18 % of the hooks. But in this type of operation, there are chances of around 2 % of total fishes to be partially spoiled. Around 40 % fishes lifted were found dead (second grade to first), but still in good condition. About 50-60 % of fishes were live.

Both timings of hauling of long line were adopted during the programme. However, normally the crew prefer and insist on the second kind of operation because they are of the opinion that increase in quantity of fishes will increase their revenue. During fishing, the fishermen have to put a lot of effort to withdraw the fishes from the water. Some fishes which were caught in the hooks drags the line even for about 2.30 hours, during which the fishing activity is greatly delayed which in turn interfere with the quality of the fishes because the fishes

stay in water for a longer period of time struggling. Such tuna was killed with harpoons and lifted by hooks and put on the deck with great effort.

Tuna caught alive were stunned by hitting on the head between the eyes with a rubber hammer to avoid struggling on board as it may lead to lactic acid accumulation in the tissues and thereby leading to undesirable colour and texture change of the muscles. Hygienic handling on board the vessel was given prime importance with the tuna always handled on plastic sheets. Moreover, clean ice was used for preservation in the ratio 1:1 after it being chill killed/slurry treated for a minimum of 30 minutes to 1 hour in order to retain the meat quality and making it suitable for exports. Fish was never dragged on the floor or bruised during the trials.

### Usage of carrier canoe in Tuna Long Line fishing

Thuthoor fishermen usually carry a 'vallam' or fibre canoe with 9-10 hp outboard engines while going for deep sea tuna fishing to reduce diesel expenses of the mother ship and to bring good quality Yellow Fin Tuna (YFT). The 'vallam' is dragged behind the fishing boat from the port of embarkation. As it is pulled along, there is no additional fuel expense incurred. During fishing, this boat is kept at the first point with 2 to 3 persons on it, where the long line deployment starts. Then the mother boat goes forward deploying the long line. After 4 to 5 hours of shooting, the boat starts from the first point and collects the fish, which are caught on the hooks. Bait will be fixed on the emptied hooks by the fishermen on the boat. The harvested fishes are kept in the 'Thoota arai', or a chamber with circulated water in the carrier vallam so that the quality of the fishes is not affected. The fishes will be handed over to the mother boat later. When vallams are used for partial harvesting, the mother boat can delay the time of hauling main line, by the time additional fishes can also be caught. The vallams are used for bait fishing too.



Fig 27. A Thuthoor fishing boat along with a vallam for tuna harvesting at sea

# COVER STORY

## Processing on-board

The fishes were chill killed/slurry treated and stored in ice. For fishes above 30 kgs, which has a good export market value, G & G processing is done by veining, gilling and gutting. Care was taken much to avoid the chances of getting temperature shock and heat burns due to the exposure of the fishes to sunrays. The fishes were stored in good quality ice at 4°C in the fish hold.



Fig. 28 & 29. Onboard slurry ice processing of Yellow fin tuna



Fig. 30. Icing and storage of Tuna in fish holds



Fig. 31. Onboard cleaning after fishing activity



Fig. 32. Onboard cleaning after fishing activity

## Auction of fishes

Auctioning of fishes was done at the respective harbours from where the vessel started its voyage. MPEDA, well in advance of the arrival of the training fishing vessels informed through its offices to various exporters about the catch composition and quantity so that the catch could be transported to the factory without much delay. Public auction was made at all the respective harbours.



Fig. 33. Scooping of Tuna meat for grading during auction



Fig. 34. Icing of tuna at the fishing harbour before auction



Fig. 35. Scooping of yellow fin tuna in the presence of exporters and Sri Lankan Buyers at Nagapattinam

## COVER STORY



Fig. 36. & 37. Auction of long line caught Tuna and Sword fishes at Tharuvaikulam

The price largely depends on the international demand and number of firms participating in the auction. Middlemen also play a major role in auctions at most of the harbours.

### Results

A total of 17 trainings entitled as “On board Skill Development Training Programme on Tuna Long line fishing for Enhancing Revenue of Fishers and Exports” were conducted between January 2020 to March 2020 in which the first voyage was conducted from Kerala followed by 12 in Tamil Nadu and 4 in Andhra Pradesh. By the programmes the fishers were taught the long lining techniques for catching fast moving fishes like Tuna, Sword Fish, Marlin etc, and the improved preservation methods onboard to maintain better quality of the fishes for export and domestic market. The training programme was ultimately aimed to ensure better prices for the fish caught as well as to promote sustainable fishing practice. Details of trainings conducted are given in Table 3.

Table 3. Details of the voyage conducted for long line training programme

Sl. No.	Training period (voyage start & return dates)	Name of the Harbour	Name & Reg. No. of the Fishing Vessel engaged	Name of Trainers engaged	No. of Trainees attended
1	20 days (8 <sup>th</sup> to 27 <sup>th</sup> Jan.2020)	Thoppumpady	Bewina IND-TN-10-MM-2435	3	13
2	9 days (8 <sup>th</sup> to 16 <sup>th</sup> Feb. 2020)	Nagapattinam	Amudha Mozhi IND-TN-06-MM-6523	2	10
3	8 days (9 <sup>th</sup> to 16 <sup>th</sup> Feb. 2020)	Nagapattinam	Amudhan IND-TN-06-MM-1133	2	10
4	3 days (8 <sup>th</sup> to 10 <sup>th</sup> Feb. 2020)	Nagapattinam	Anbu Saktivel IND-TN-06-MM-5148	2	10
5	9 days (17 <sup>th</sup> to 25 <sup>th</sup> Feb. 2020)	Nagapattinam	Amudha Mozhi IND-TN-06-MM-6523	2	10
6	10 days (17 <sup>th</sup> to 26 <sup>th</sup> Feb. 2020)	Nagapattinam	Mahalakshmi IND-TN-06-MM-875	2	10
7	11 days (19 <sup>th</sup> to 29 <sup>th</sup> Feb. 2020)	Nagapattinam	Sahana IND-TN-06-MM- 5756	2	10
8	10 days (6 <sup>th</sup> to 16 <sup>th</sup> Mar. 2020)	Tharuvaikulam	Sam IND-TN-12-MM- 5192	2	9

## COVER STORY

9	14 days (11 <sup>th</sup> to 25 <sup>th</sup> Mar. 2020)	Nagapattinam	V.K.Kalaivanan IND-TN-06-MM- 5480	2	9
10	9 days (17 <sup>th</sup> to 25 <sup>th</sup> Mar. 2020)	Nagapattinam	K.M. Mugesh IND-TN-06-MM- 5023	2	9
11	13 days (19 <sup>th</sup> to 31 <sup>st</sup> Mar. 2020)	Karaikal	S. Kavitha IND-PY-PK-MM- 767	3	9
12	9 days (20 <sup>th</sup> to 28 <sup>th</sup> Mar. 2020)	Thengapattanam	Jesus Friends IND-TN-06-MM- 3914	2	9
13	7 days (22 <sup>nd</sup> to 28 <sup>th</sup> Mar. 2020)	Thengapattanam	Arul Niraindhalaval IND-TN-06-MM- 5228	1	9
14	6 days (3 <sup>rd</sup> to 8 <sup>th</sup> Mar. 2020)	Kakinada	Anada Sagar IND-AP-E2-MM-26	2	7
15	9 days (5 <sup>th</sup> to 13 <sup>th</sup> Mar. 2020)	Kakinada	Perla Nukaraju IND-AP-E3-MO-2770	2	7
16	9 days (5 <sup>th</sup> to 13 <sup>th</sup> Mar. 2020)	Kakinada	Perla Satyam IND-AP-E3-MO-4279	2	
17	13 days (11 <sup>th</sup> to 23 <sup>rd</sup> Mar. 2020)	Kakinada	Kameswara Rao IND-AP-E2-MM-734	2	7



Fig. 38. Send-off of training boat from Nagapattinam



Fig. 39. Flag off of a training boat from Tharuvaikulam

### Tuna Long Line training from Thoppumpady, Kerala

The first batch of the training programme was commenced on the first week of January 2020 from Thoppumpady fishing harbour, Kerala.

The training was conducted in a fishing vessel named 'BEWINA' with registration no: IND-TN-10-MM-2435, constructed under the "Blue Revolution Scheme" of the Government of Tamil Nadu. The team on board was headed by Dr. Vinoth S. Ravindran, State Coordinator, NETFISH - Tuticorin.

Two expert trainers, Mr. Antony Raj. D from Eraviputhen Thurai and Mr. Stalin Jenitto Benziger, from Vallavilai, Thuthoor region with about 25 years of experience in traditional Tuna deep sea long line fishing were the trainers of the programme.

Refrigerated Sea Water (RSW) circulation system technicians, Mr. Nithin & Mr. Prathamesh Kholi also took part in the voyage. The fishing vessel with 11 trainee crew members sailed off from Thoppumpady Fishing Harbour on January 8, 2020.

## COVER STORY



Fig. 40 & 41. Participants of the first onboard tuna skill development programme in the FV 'BEWINA'

The crew returned to Thoppumpady harbour on January 26, 2020 with a good catch of around 3000 Kg of fishes comprising Yellow fin tuna - 1143 kgs, Marlin - 400 kgs, Sword fish – 320 kgs, Sail fish – 290 kgs and other fishes – 800 kgs. The open auction of these fishes held on January 28, 2020 between 5.00-7.30 am at the harbour, in the presence of officials from MPEDA, NETFISH, Department of Fisheries, Tamil Nadu, representatives from Boats Owners' Association, exporters, etc., fetched around Rs. 5.65 lakhs for 3000 kgs. The unit value of fishes caught by long lining was around Rs. 180 - 190/- per kg, whereas earlier the same fishes caught by gill netting used to fetch only Rs. 100-120 per kilogram at this harbour. The details of fishes auctioned and the price received in the voyage from Kerala is given below (Table 4).

Table 4. The details of fishes auctioned / price received in the voyage from Kerala

Sl. No.	Fish Name	Total Catch (Kg)	Price/kg(Rs)	Total Amount (Rs)
1	Yellow Fin Tuna (grade I)	863	170.00	146,710
2	Yellow Fin Tuna (grade II)	280	150.00	42,000
3	Skip jack [gill net]	320	82.81	26,500
4	Marlin	400	204.00	81,600

5	Sail fish	290	298.27	86,500
6	Sword fish	320	382.81	122,500
7	Dolphin fish	155	150.32	23,300
8	Shark	40	337.50	13,500
9	Carangid	7	285.71	2,000
10	Dryfish			2,300
			TOTAL	546,910

Table 5. Expenditure/Profit statement of FV BEWINA for the voyage conducted from Kerala

Sl. No.	Item	Total Expense
1	Diesel 2000 L @ Rs 70/lit	140,000
2	Ice 500 blocks @ Rs 70/block	35,000
3	Ration	25,000
4	Other expenses (Berthing charge, agent commission etc.)	20,000
5	Total Expenditure (1 to 4)	225,000
6	Total Income	546,910
7	Net Profit	321,910

The expenditure incurred and net profit earned for the voyage by FV BEWINA is given in Table 5. The boat owner Mr. Berknit said that the training voyage could successfully train the crew and was profitable. The boat further sailed for long line fishing for tuna in the same region.

### Price realization

Higher price was received for the material brought by long line fishing due to better quality and appearance. A difference of around Rs. 70 was observed in the case of Tuna fish brought by long line when compared to tuna brought by gill net fishing. Gilled and Gutted (GG) tuna fish brought by the vessel fetched Rs. 50 more than non-GG tuna fish brought by long line. It showed that better price realization is possible in case of fish landed by long line and GG form inculcating good handling practices in fishing vessels. Price recorded more for even shrimps and other fishes brought by trawl net operated during the bad weather condition, but preserved after chill killing. This points to the fact that good handling and preservation on board will help to bring fishes in good condition to shore and thereby can fetch better price to fishermen.

The better price realization is clearly noticed in the

## COVER STORY

case of fish brought by long line and preserved in better manner on board after chill killing, gilling and gutting. It also emphasizes the need of more training programmes in this line to educate fishermen in the long line fishing and to practise chill killing and other good handling practices on board.

However, in certain training voyages that landed their catch after 20<sup>th</sup> of March 2020, the COVID 19 restrictions such as lockdown of fishing harbours, strict regulations for landing, transportation and export, unavailability of skilled and unskilled labour severely affected the price of Yellow Fin Tuna and other fishes. Due to the above reason, the fishes, including yellow fin tuna fetched about Rs. 70-100 lesser than the average market price. Also, during few training trips Long line for catching YFT could not be operated due to bad windy weather in the Bay of Bengal.

### Highlights of the programme

1. Seventeen fishing trips were conducted in Kerala, Tamil Nadu and Andhra Pradesh
2. As many as 16 experienced tuna long line fishing trainers from Thuthoor region of Kanyakumari District were further trained on good handling practices on board. Fishermen were trained on long line tuna fishing, good handling and preservation techniques on board
3. Better price was obtained for the tuna fishes brought by long line and preserved in good condition on board
4. Boat owners expressed willingness to continue the fishing operations on long line tuna fishing as trained.
5. Exporters expressed happiness on the quality of fish landed by this training programme and suggested to arrange more fishing vessels on long line tuna fishing by conducting training programmes in other harbours as well.
6. Awareness could be generated among fishermen and exporters that good quality tuna fish could be produced from Indian waters at par with international standards.

### Way forward

The promotion of deep sea long line tuna fishing can be made by organizing more training and awareness programmes of this type so that fishermen can fish the untapped deep sea tuna resources in Indian waters.

Training has to be given to fishermen or boat owners on scoop testing and grading of tuna on meat quality. Fishing vessels have to be arranged in clusters to go for long line tuna fishing at the same time, so that sufficient quantity of good quality tuna fish can be landed in harbours attracting more exporters to buy it.

Linkages between tuna fishers and exporters has to be made so that exporters could get good quality tuna fish in sufficient quantity as per the requirement of the exporters and fishermen will get higher price for their fish catch. Mechanization of the tuna fishing on board has to be facilitated, such as installation of mechanical winches and electric stunners for stunning tuna on board. The financial assistance shall be extended to fishers from government for the procurement of long line and other accessories to promote long line deep sea tuna fishing in India.

### Interesting observations made during the programme

Red tide is a phenomenon caused by algal blooms. This is mainly caused by micro algae, viz dinoflagellates and diatoms. The upwelling of nutrients from the sea floor causes such algal blooms. Explosive multiplication of this algae can even discolour seawater and hence its name. Such algae can produce toxins called saxitoxin, gonyautoxins etc, which can accumulate in shellfish and if ingested can lead to paralytic shellfish poisoning (PSP).

They are also called Harmful Algal Blooms (HABs). The algal bloom also depletes oxygen and clogs the fish gills which can result in mass fish kills. Noctiluca scintillans and Trichodesmium spp. have been reported from the EEZ of India to form such algal blooms. During the voyage of FV 'Bewina', such an algal bloom was noticed on day 17 at northwest region off Kozhikode coast. The algae were found to be spread over a very large area.

Another interesting factor noticed during the voyage was that when fishes such as tuna, sail fish and swordfishes are hooked in the long line, they stay in the seawater live or dead till the line is pulled back. During this period, the hooked fish are eaten up by predatory fishes, mainly sharks. The interesting part of this being most of the shark-bitten fish was made part of the menu for the crew the next day.

# COVER STORY



Pic. 1. A shark-bitten sail fish



Pic. 2 A Yellow Fin Tuna bitten by a shark



Pic. 3. Red tide spread over few nautical miles in the Arabian sea region

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The advertisement features a large, vibrant image of several large, cooked shrimp arranged on a white plate. The shrimp are garnished with sliced avocados, olives, and fresh herbs. The background is a mix of blue and orange gradients.

# *King of the Aquarium*





V.K. Dey

V K Dey has over three decades of experience in diverse sectors of seafood industry in Asia-Pacific region. He was the Deputy Director of MPEDA and then associated with INFOFISH, Malaysia. As part of INFOFISH, he was involved in several studies related to seafood industry in the Asia-Pacific region and beyond, including setting up of Aqua-technology Park for ornamental fish. MPEDA has published *Living Jewels*, a collection of his articles on ornamental fish.

**S**ymphysodon, popularly known as discus, is a genus of cichlids, native to the Amazon River basin in South America, found in slow-flowing streams with alkaline water. It feeds on aquatic invertebrates. Though there are many ornamental cichlids, the discus is more popular than any other fish, as they are most beautiful and peaceful freshwater fish in the world. They are sometimes called 'King of the Aquarium' because of their majestic and regal colours.

Discus is more social in nature than other cichlids, with the possible exception of angelfish, but due to their demand on water quality; they are usually not kept with several other species of fish.

Today, there are many species, subspecies and hybrid varieties of discus in the market. The wild forms are blue discus (*S aequifasciatus haraldi*) the green discus (*S aequifasciata*), Heckel discus (*S discus*) and brown discus (*S aequifasciatus axelrodi*). The wild blue discus is distributed in the rivers of Peru and Brazil while green discus is found mainly in the Peruvian Amazon.

The blue discus has a wide variety of blue colouration with some being more blue while others have blue stripes on the body, head and fins. The green discus has also varying degree of colours ranging from yellowish green to olive green and solid green to light brown and have green stripes and red spots on the sides of the body.

The wild Heckel discus named after Johann Jacob Heckel in 1840 in Rio Negro, is characterised by a dark fifth band, popularly known as the "Heckel band", and has both red and blue varieties. This is said to be the most difficult discus to keep, as it prefers softer and warmer waters than other species. Under this, there are two subspecies, *S discus discus* and *S discus willischwartzi*. The brown discus, found near Belem and Rio Urubu, is most popular and common among hobbyist. It has a brown body with colour ranging from yellowish brown to rusty reddish brown and has colourful streaks on its fins.

Breeding of discus is difficult because it should be maintained under the desired water quality and temperature. The ideal pH is 6–7 at a temperature of 27–30°C. Male discus matures in 12–16 months while females attain maturity in about three years. The mature male has distinct forehead hump and pointed spine on the dorsal fin. This fin will be more rounded in the female. Discus can grow up to 10 inches in length taking a variety of feeds, preferably brine shrimp. Discus raise their young ones in a unique manner. The male and female both care for the eggs and young ones. The young ones usually feed on the mucus secreted by the adult discus. There are well known discus breeders like Jack Wattley, Florida, USA who introduced Cobalt Blue and Cobalt Flash, Dr Eduard Schmidt Focke and Bernd Degen, Germany and Gan Kian Tiong, Singapore, to name a few. There are discus clubs all over the world that give suggestions and advice on various aspects of rearing and breeding of discus. The most popular among them is the Discus Club of Singapore, which conducts an annual show on discus where new strains are introduced to the market.

There are a few domesticated strains in the market today. They are:

**Blue turquoise discus** – These are entirely blue coloured and have a metallic sheen. There are some high bodied, solid blue, red striated and high fin varieties. Many of these are developed in the US by the world famous discus breeder, Jack Wattey and also in Germany.

**Red turquoise discus** – has turquoise body with red striations running horizontally from the head to the base of the tail. Several varieties of this strain are now available in the market with yellowish body colour and others with red body and blue striations.

**Pigeon blood discus** – creamy red base colour with bright red stripes and trimmed off black stripes and spots. Some have more or less black stripes or spots.



# Amazon Sword spruces up the aquarium



**E**chinodorus, commonly known as burhead or Amazon sword, is a genus of plants in the family Alismataceae, native to the Western Hemisphere from the central United States to Argentina. It is also known as Water-plantains. Amazon sword has its scientific name “Echinodorus” derived from Ancient Greek echios – “rough husk” - and doros – “leathern bottle” - alluding to ovaries, which in some species are armed with persistent styles, forming prickly head of fruit. Though commonly found in freshwater marshes and wetlands, some of the species are commonly cultivated in artificial aquatic habitats.

## Description

The plants are annual or perennial, growing emerged, floating-leaved, or found seasonally submersed. The

leaves are glabrous to stellate-pubescent with or without rhizomes. Stolons, corns and tubers are absent with non-septate roots. Leaves are sessile or sometimes petiolate with or without translucent markings as dots or lines. Inflorescences racemes generally appear when emerged out of water. Flowers are bisexual and generally subsessile to pedicellate. Fruits are plump in nature and often longitudinally ribbed or sometimes flattened.

## Cultivation

Echinodorus are by nature marsh and bog plants that can grow submersed. Many species are grown in aquariums. They prefer good light and grow best in a deep, nutrient-rich substrate. Most will grow in variable water conditions, though the majority need tropical or

## AQUACULTURE SCENE

sub-tropical temperature ranges. Propagation is by division or by adventitious new plants developing on submerged flowering stems. The larger species make magnificent specimen plants for the larger aquarium, though they may form aerial leaves in good conditions. If the inflorescence forms submersed, small plantlets will be formed instead of flowers. If grown emerged and kept humid, flowers and seeds will normally readily form. The seeds can be grown in damp sand in warm, damp conditions. It is generally observed that the additional supply of CO2 often helps in strong growth. Many species are popular in the aquarium or pond. The Amazon sword plants are one of the most popular and easy to grow aquarium plants for their attractive form and general hardiness.

### General characters & taxonomy

Type:	Rosulate
Form:	Emerged or Submerged
Origin:	South America
Growth rate:	High

Height:	20 – 50+ cm
Light demand:	Low
CO2 :	Low
Temperature:	Medium (23-28°C)
Order:	Alismatales
Family:	Alismataceae
Genus:	Echinodorus
Reproduction:	Rhizome/ Seeds/ Adventitious shoots

There are about 62 species, 2 subspecies, and 2 varieties are listed and the commonly found species that are popular among aquarium hobbyists and aquascapers are; *Echinodorus amazonicus*, *Echinodorus grandiflorus*, *Echinodorus uruguayensis*, *Echinodorus grisebachii*, *Echinodorus cordifolius*, *Echinodorus grandiflorus* & *Echinodorus palifolius*.



# How to control the spread of shrimp aquaculture pandemics

Aditya Dash\*

“New Zealanders did something remarkable in our fight to beat COVID-19. We united in unprecedented ways to crush the virus.”  
– Jacinda Ardern, Prime Minister, New Zealand

Soon, it will be a year since the world has been fighting the COVID-19 pandemic. The shrimp aquaculture sector has been fighting its own pandemics since its inception. There was the devastating White Spot Virus (WSSV) pandemic of the late 1990s. Then the Early Mortality Syndrome (EMS) outbreak in 2012s and the latest DINV pandemic, currently in China. As a feed manufacturer once pointed out, while there was a huge increase in areas devoted to shrimp aquaculture, there was not a proportional increase in shrimp supply.

The decrease in shrimp supply as a result of the disease further exacerbates problems of overcapacity in the shrimp feed mills and shrimp processing units. In 2015, Andy Shin, senior scientist at the Fish Vet Group, estimated that the Asian Shrimp industry has lost over USD 20 billion due to diseases. This was highlighted by Lauren Kramer in an article for the Global Aquaculture Alliance (GAA), where she mentioned a letter by the Sustainable Fisheries Partnership (SFP) urging governments and the private sector to improve their shrimp disease management protocols.

# AQUACULTURE SCENE

The major pain is suffered by the smallholder shrimp farmer, who is most likely to fall into a debt trap. Assuming that a proper aquatic disease control mechanism is implemented and exports (due to increased production) increased by roughly 20 per cent, that would be almost Rs 10,000 crore in additional export revenue.

This is a huge amount, and it will be of immense help to the country during this time. While the private sector has been addressing the issue, some really great results can be achieved with active government intervention too.

The Indian Council of Agricultural Research (ICAR) has established the National Surveillance Programme for Aquatic Animal Disease (NSPAAD). This is a step in the right direction. The solution to the COVID-19 and other shrimp pandemic involves the key words that should be common to all concerned citizens by now – test, trace and isolate.

A nationwide network of labs equipped with PCR machines and technicians is needed now so that the mantra of test, trace and isolate can be effectively implemented. It should be realistic to assume that with the current COVID-19 pandemic, PCR technicians are in short supply.

The Marine Products Export Development Authority (MPEDA) continues to build a network of labs across the coastline, which is of huge help to the farmers. The existing PCR testing technology would require a separate test to check for each shrimp virus; there are currently 14 shrimp pathogens to watch out for. What is also of use is the early detection of these diseases, so that the farmer does not keep wasting money on feed and other inputs.

Australia's Commonwealth Scientific and Industrial Research Organisation (CSIRO) has developed a novel technology called MultiPath.

This has been commercialised by a very promising start-up company Genics headed by Dr Melony Sellars. This new technology can detect up to 14 shrimp pathogens in one go and meets the current gold standard as far as specificity and sensitivity are concerned. Apart from that, the turnaround time is really fast. As of now, if Indian shrimp farmers want to

avail this new technology, they need to ship out their samples via DHL all the way to Australia. The MPEDA should look into possible collaboration opportunities with a company like Genics.

Apart from detecting the disease, a plan to identify and contain outbreaks need to be in place. This means monitoring farms and ponds which test positive and to help farmers in the disinfection process in order to stop the disease from spreading. When a pond is detected with a specific pathogen, a certain protocol needs to be followed to prevent the spread of the disease. This is where the government's boots in the ground approach will work best. While prevention is the best strategy, it must be acknowledged that for the most part eradication will remain a distant dream.

Farmers need to adapt to new farming methods and technologies which ensure that disease outbreaks do not result in huge crop losses. A possible solution could be something like the "Synbiotic" approach by Dr David Kawahigashi, of Hawaii. Through a combination of probiotics and prebiotics, they take a natural approach which focuses on enhancing the health of the shrimp, so that the shrimp does not succumb to viruses. It is also time to look into bacteriophages as a technological solution. This has been developed by the Central Institute of Brackish Water Aquaculture (CIBA) and also by Poland-based Proteon Pharmaceuticals.

The MPEDA should be credited with their foresight. In order to reduce India's dependence on imported brood stock, which could also be a source of importing diseases, they have built their own brood stock multiplication centre and are also building their own Nucleus Breeding Centre. This will give a big boost to domestic production of brood stock and it will further reduce the risk of importing viruses from other countries.

A stable supply chain is in the interest of everyone. A more holistic approach towards disease management is needed. It is high time that we all get together and tackle the diseases in the aquaculture sector.

\* The author is Managing Director of Ram's Assorted Cold Storage Ltd, the seafood exports division of Suryo Group. He is also a member of Marine Products Export Development Authority.



# Audits to ensure implementation of Covid-19 Guidelines

Inspections were held in processing units by officials of MPEDA field offices in Bhimavaram, Chennai, Kochi, Mumbai, Mangalore, Tuticorin, Veraval and Vizag to ensure adherence to Covid19-guidelines as prescribed by MPEDA.

## Panvel

The officials of MPEDA Sub Regional Division, Panvel visited the processing plants of M/s. H. N. Indigos Pvt. Ltd. and M/s. West Coast Frozen Foods Pvt. Ltd. and it was observed that the units were fully aware of COVID 19 guidelines and properly implemented in facility as well as in all operations. Regular awareness sessions were held to all workers and staff by supervising team as per COVID guidelines.

At main entry of unit itself, security team was posted with all necessary precautionary items like temperature

scanner, hand sanitizers, record keeping of visitors etc. Units had its own SOP and it was implemented.

## Veraval

MPEDA Regional Division, Veraval officials visited the processing plants of M/s. Jagadish Marine Export and M/s. Vanita Cold Storage, to ensure the implementation of COVID guidelines. During the inspection, it was observed that the units are following the guidelines properly. Few minor deficiencies noticed were explained to the parties, which were rectified immediately by the units.



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# US firm launches new shrimp broodstock for India

US-based shrimp breeding company Shrimp Improvement Systems (SIS) has introduced the Hardy Line vannamei shrimp broodstock into India, aiming to foster fast growth of shrimps, notwithstanding diseases. This line has been developed to face the tough conditions prevalent in farms. Thus, it is more tolerable to disease outbreaks, does not lose its ability to grow fast, and has high fecundity. It is proven that this shrimp line can grow up to 0.347 grams per day with SR (survival rate) of 87 per cent and biomass of around 8.6 T/ha in 100 days in India, Lakkaraju Satyanarain (Tikku), the consultant of SIS in India told BusinessLine. With increasing annual production, he said, shrimp farming in India faces numerous challenges, mainly various viral, bacterial and fungal diseases, and environmental problems. Some of the diseases that has infected shrimps are white spots, white faeces, EHP, and running mortality syndrome, among others.

company believes farmed shrimp species have much potential for further genetic improvement, such as in their growth rates, he said. SIS conducts a commercial genetic improvement programme for shrimp aquaculture with established techniques of selective breeding already being used in other agribusinesses. Its programme is based on proprietary-developed pure lines selected for specific economic characteristics, over 30 generations. It is designed to produce the best Specific Pathogen Resistant (SPR) and Specific Pathogen Free (SPF) shrimps, enabling customers to benefit from the shortest possible transfer of genetic gains achieved from each breeding session.

### India's shrimp output set to drop by 20 per cent this year on reduced stocking

Overall, the competitive advantages of SIS' shrimps are fast growth, high fecundity, resistance to the Taura Syndrome Virus (TSV), and freedom from specific pathogens. SIS' commercial lines have consistently demonstrated that under the right conditions, it can grow to 40 grams in 100 days (over 3.5 grams per week), to produce more than 6.5 million nauplii over the productive lifetime of a female, and have general hardiness to stress and disease resistance.

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# Researchers identify a new family of bony fishes

A group of international scientists from India, Germany, United Kingdom and Switzerland have described a new family of bony fishes from the Western Ghats, and named it *Aenigmachannidae*. A year after the discovery of the enigmatic Gollum Snakehead, *Aenigmachanna gollum* from the rice fields of northern Kerala, scientists have now carried out detailed studies on its skeleton and genetic assembly that revealed that this species, and its congener *Aenigmachanna mahabali*, represents a new family different from Channidae, in which both species were initially placed.

The research team comprised scientists from the Senckenberg Natural History Collections in Dresden (Germany), the Natural History Museum in London (UK), Natural History Museum in Berne (Switzerland), Indian Institute of Science Education and Research (IISER) - Pune, Nirmalagiri College in Kannur, and the Kerala University of Fisheries and Ocean Studies Cochin. Research and close observation of the high-resolution images suggested that members of *Aenigmachannidae* are living fossils and comprise an ancient Gondwanan lineage that survived the break-up of the supercontinent and the northward drift of the Indian subcontinent, about 100 million years ago.

"The recognition of *Aenigmachannidae* as a new family of bony fishes comes six years after the description of Kryptoglanidae, another unique family of freshwater fish endemic to Kerala. The presence of two unique endemic families of freshwater fishes in Kerala is unparalleled, and indicates the exceptional diversity

and endemism of fishes in this part of the world" said Rajeev Raghavan, Assistant Professor, Kerala University of Fisheries and Ocean Studies, who was part of the study.

The gollum snakehead, *Aenigmachanna gollum* and the mahabali snakehead, *Aenigmachanna mahabali* are known to occur in the aquifers and subterranean channels connected to paddy fields and dug-out wells in Malappuram and Pathanamthitta districts of Kerala. While *Aenigmachanna gollum* was discovered by pure chance in a rice field not long after the devastating floods that raged in Kerala in August 2018, *Aenigmachanna mahabali* was discovered opportunistically from a dug-out well. "The aquifers of Kerala have a wealth of enigmatic and relic fauna, the diversity of which we are only slowly uncovering. But subterranean ecosystems are under high levels of threat due to indiscriminate ground water extraction and pollution, and introduction of alien species in the dugout wells," said Neelesh Dahanukar, Research Scientist, IISER, Pune, who co-authored the paper.

"Throughout my career, I have worked on many strange fishes, but the Gollum Snakehead is easily the weirdest of them all. If I had been asked whether such a fish existed in the Western Ghats or anywhere in the world, I would have said, no way. Yet here it is" remarked Ralf Britz, based at the Senckenberg Museum at Dresden, Germany, who led this paper. Results of this study was published in 'Scientific Reports', the open-access mega-journal of the Nature Publishing Group.

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# Indian shrimp exports to US increase by 6.6 per cent to 31,676 tons in August 2020

Indian shrimp exports to the US increased 6.6 per cent year-on-year in August at 31,676 tons after recording a decline during May-July 2020 due to pandemic related constraints, according to the latest data of US agency National Oceanic and Atmospheric Administration. Total shrimp demand in United States for August is also on the higher side at 82,233 tons as against 70,153 tons in the previous year.

India is the largest producer of farmed shrimps in the world and accounts for nearly 6 per cent of the global fish production. During 2019, India accounted for 2,82,584 tons of shrimps from the total US import of 698,445 tons.

During the initial days of the lockdown, the seafood sector was working at about 20-25 per cent capacity with most of the laboratories closed. Labour and vehicle movement was also constrained in most of the coastal states. Seed stocking and seeding was also on the lower side with farmers concerned about a glut in the market without exports.

The Marine Products Export Development Authority has reported that in the initial period of lockdown, there was 30-40 per cent reduced stocking of shrimps by farmers. It also led to cancellation of several orders, reduced and delayed payments, slowdown of cargo movements, difficulty in getting new orders and renewal of existing orders.

Export of frozen shrimps from India to all markets during 2019-20 was pegged at 6.52 lakh tons, which fetched foreign exchange worth USD 4,89 billion. US, the largest market, is followed by China with 1,45,710 tons.

Frozen shrimp exports which earned Rs 34,152.03 crore (USD 4,889.12 million), retained its position as the most significant item in the basket of seafood exports, accounting for a share of 50.58 per cent in quantity and 73.21 per cent of the total dollar earnings. Shrimp exports during the period increased by 6.04 per cent in dollar value and 6.20 per cent in volumes.

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# Himachal to start 'RAS tech' land fish farming

Himachal Pradesh will start land-based fish farming using RAS technology under Pradhan Mantri Matsya Sampada Yojana (PMMSY) to raise different breeds of fish throughout the year. The State will set up 15 fish ponds using RAS technology under this scheme during next five years beginning from 2020-'21 to 2024-'25.

The first batch of fish farmers will be sent to National Fisheries Development Board, Hyderabad for training in latest aquaculture techniques under cold water fisheries using RAS Technology.

The RAS technology is a new way to farm fish under which fish is reared in indoor tanks with limited use of water in a controlled environment instead of traditional method of fish rearing in water reservoirs, open tanks, ponds and rivers.

The regular supply of limited quantity of clean water is ensured at a controlled temperature and dissolved oxygen content that is optimum for growth in a closed and containment system. The method is ideal for fish farmers of the state during shortage of water in summer as farmer can supplement their income with little use of water through inland fisheries using RAS technology. Out of total 15 fish farms, five fish farms will be set up in general waters in Una, Mandi, Kangra (Palampur and Pong dam) and Sirmaur districts and ten in cold water fisheries under the RAS technology in Kinnaur, Sirmaur, Shimla, Mandi, Chamba and Kullu districts during next five years aiming at enhancing fish production and productivity in the state in an integrated and holistic manner.

It is estimated that total 40 ton per unit annual fish production will be achieved in general RAS unit while in cold water RAS there are four ton and 10 ton production capacities units, which will meet the growing demand of trout fish in metropolitan cities and will generate additional employment and economic activities in the respective regions.

When all 15 fish farms will be operationalised,

approximately 270 ton fish is expected to be produced annually, said Fishery Minister Virender Kanwar. He added that rainbow trout will be reared in cold water RAS and in general water RAS Pangasius, Tilapia, Common carp will be reared.

Initially, the land-based fish farms will be set up in cold water areas in Kullu, Mandi, Chamba, Sirmaur, Shimla, and Kinnaur districts and in the beginning two new fish farms in district Kullu and Kinnaur will be set up during the year 2020-'21 under PMMSY in the State.

The new fish farms in Himachal Pradesh will be set up in private sector and it is estimated that around Rs. 5 crore private investment will be received for infrastructural development for setting up new land based fish farms under RAS technology in next five years under PMMSY.

The government will provide incentives to the private sector for setting up fish farms under RAS technology under which financial assistance at the rate of 40 per cent to general category and 60 per cent to SC/ST/women of the total unit cost will be provided to the entrepreneurs under the scheme.

RAS technology fish farms of Rs. 50 lakh, Rs. 20 lakh unit costs are proposed to be established under PMMSY keeping in view of the topography and geography different regions of this hill State.

At present, fish is reared all the year around, although summers are most favourable for growth of fish. RAS technology is expected to boost fish growth all the year around irrespective of weather conditions.

The new fish farms will help farmers raise different varieties of fish throughout the year using lesser water to produce a higher yield and also enables reuse of the waste water for agriculture/ domestic and irrigation purposes while in regular fish farming, water from the ponds or tanks need to be completely pumped out and thrown away since it gets saturated with toxic ammonia, said Virender Kanwar.

-www.sunpost.in



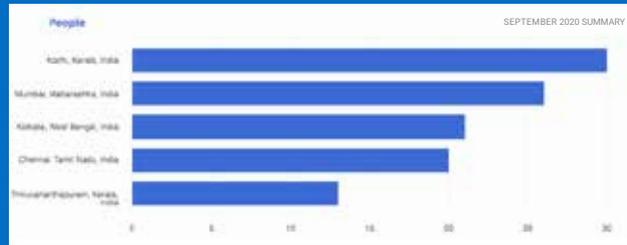
# facebook

Page followers - 14.9k

Page Like - 14.7k

Reach - 50k

Engagement - 12k



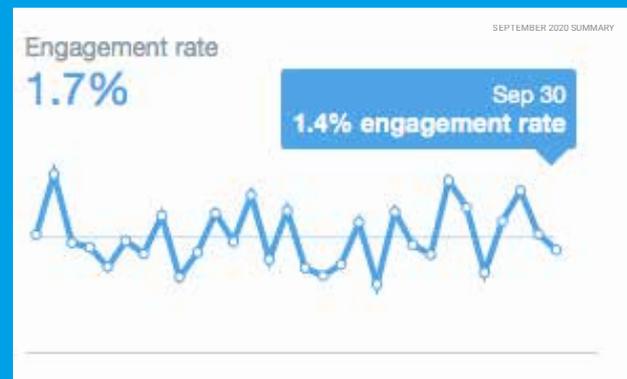
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**Followers - 2,228**

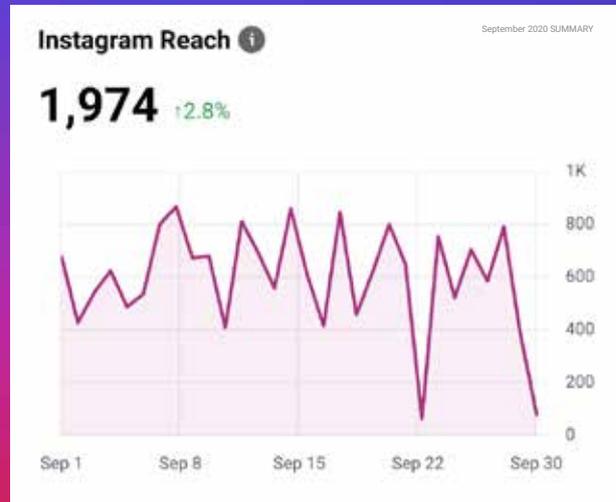
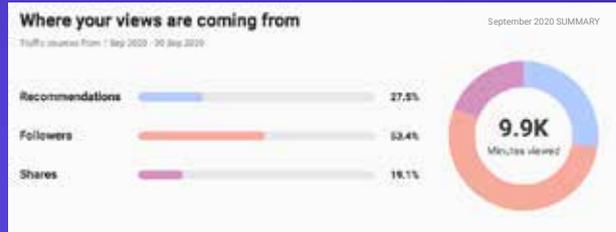
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**Interactions - 4.8 K**

**Impression - 16.9K**

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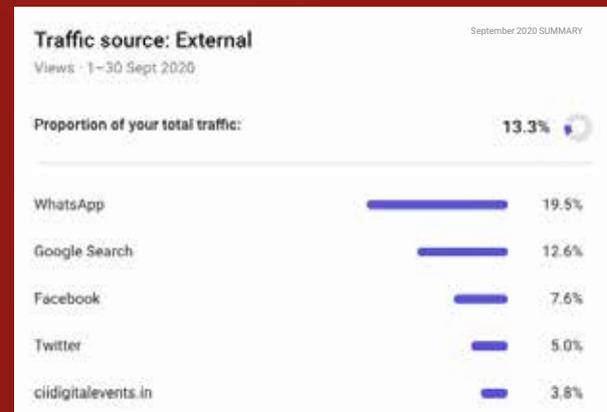
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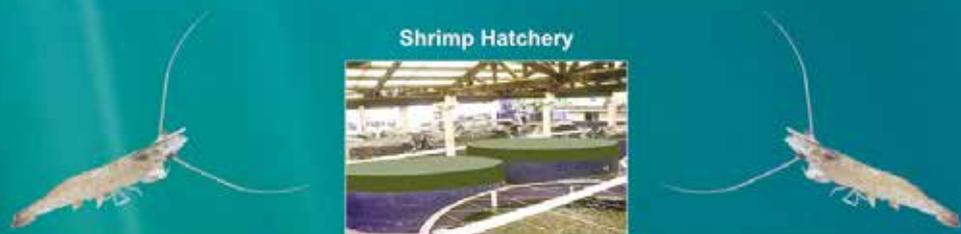


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