MPEDA

Newsletter

VOL. XI NO.10 JANUARY 2024

Tilapia Lake Virus (TiLV)

A worldwide risk to Tilapia aquaculture

Busan International Seafood & Fisheries Expo 2023

Training programme on "Eco-friendly and Sustainable aquaculture "

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Ornamental fish
Congo tetra

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On the Platter

D.V. Swamy IAS
Chairman

Dear friends,

I wish you all a happy new year!

As you are aware, MPEDA has been at the forefront of interacting with the US Government in lifting the export restrictions on wild-caught shrimps to the USA, which was suspended in 2019 since our shrimp fishery was not certified under Section 609 of US Public Law to protect sea turtles. Since then, MPEDA has been working diligently, along with ICAR-CIFT, to develop a Turtle Excluder Device (TED) to be used in shrimp trawlers in our country. The TED designed by CIFT was meticulously finetuned as per the requirements of the US NOAA, and a series of successful field trials were conducted. The first field trials were done in June 2023 along the US coast, where MPEDA, CIFT, and US officials participated. These trials not only validated the effectiveness of the TED but also brought out further recommendations on the design, which were promptly incorporated in the prototype set for field trials in India.

With the visit of US NOAA officials to India on the horizon, MPEDA has taken the initiative to educate the stakeholders in the shrimp trawl fishery about the importance of fitting TED in the shrimp trawl nets. This includes familiarising them with the TED design and its potential economic impact on shrimp exports to the USA. A stakeholder workshop in Veraval in December 2023 saw active participation from fishermen associations, Department of Fisheries officials, and net manufacturers. Encouraged by the positive response, MPEDA plans to conduct more awareness programmes in January 2024.

MPEDA continued its seafood value addition skill development programmes and has organised five more training programmes in Veraval, Kolkata, Vijayawada, Chennai, and Bhubaneswar with overseas experts from Vietnam. These programmes have been a resounding success, thanks to the active participation of 168 stakeholders from various processing units and NETISH, NIFPHATT and CIFT officials. In these hands-on training programmes, 22 popular value-added products were made of shrimp, fish, and cephalopods. Skill tests were conducted for the participants at the end of the training programme as before, and seafood tasting sessions were arranged in the valedictory function. The trainees who excelled in the skill test were honoured in the valedictory function. I am confident that many of these trainees will carry forward the skills they have learned from the training programmes and assist their respective units in commencing the manufacturing and export of value-added products, thereby contributing to the growth of our industry.

Meanwhile, MPEDA has geared up to make its participation in Fish International Bremen scheduled from 25th to 27th in February 2024, and the Seafood Expo North America, Boston from 16th to 18th March 2024. Already, four exporters have evinced interest in joining MPEDA's pavilion in Fish International Bremen. The Seafood Expo North America has confirmed the participation of 13 exporters along with MPEDA, the largest seafood show in the American subcontinent.

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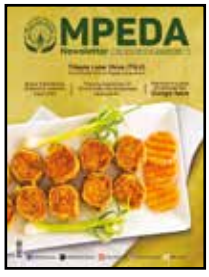

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MPEDA participates in Busan International Seafood & Fisheries Expo 2023

View of inauguration of India pavilion

View of India pavilion

Seafood consumption in South Korea grew on average 3.5 percent a year between 2000 and 2018, compared to the average 3% growth of meat products. The Korean seafood industry has promoted seafood as a healthy alternative to red meat. The major seafood species consumed in Korea are Alaska pollack, squid, mackerel, shrimp, crabs, Monkfish, anchovy, flat fish, oyster, and octopus. Korean consumers place a high value on freshness, origin, taste, cost and food safety. Price, quality and timeliness are the most important factors for seafood exports to Korea.

The major seafood items imported by South Korea under Chapter 03 of fresh and frozen marine products are frozen shrimp, fresh or chilled crabs, frozen octopus, frozen fish, frozen Alaska pollack, frozen Atlantic salmon, frozen cuttlefish and squid, frozen fillets of tuna, live fish, frozen fish meat (surimi) etc. South Korea's significant imports under Chapter 16 are prepared and preserved forms of shrimp, cuttlefish, squid, fish and molluscs. India has potential to export frozen shrimp, fresh or chilled crab, frozen octopus, frozen fish, frozen cuttlefish, frozen fillets of tuna and all the major items imported by South Korea under Chapter 16. South Korea import items worth USD 2,378 million, out of which India's contribution is meagre (2.04%). India has the potential to tap into the remaining market share.

Among shrimps exported from India, vannamei is the major item, followed by Indian black tiger, Indian brown shrimp, *poovalan* and *karikadi* etc. The export of Indian black tiger shrimp has shown significant growth of 73% by value and 82% by quantity during 2022-23.

There is ample scope for enhancing the export share of our major products like shrimps and surimi, which currently hold a major stake in India's exports to South Korea through process automation and quality maintenance. There is also scope to increase the share of exports of cephalopods and fish by meeting the product specifications and quality requirements of importers. There is further scope to enhance the production and exports under Chapter 16 through value addition.

Visitors enjoying Indian seafood at the cooking demo

In order to boost the export of Indian seafood in South Korean market, MPEDA participated in Busan International Seafood & Fisheries Expo 2023 (BISFE-2023) held from 1st to 3rd November 2023. Ten Indian seafood exporters participated as co-exhibitors

in the Indian Pavilion of 108 sq. m. The backdrop of the India pavilion was designed in a manner to showcase the Indian Seafood brand globally.

MPEDA stall showcased the diversity of frozen and ready to eat / serve value added seafood items. Publicity materials like co-exhibitors guide featuring the details of the participating exporters, pamphlets, product catalogue, commercial fish chart etc. were displayed and distributed among buyers. The Indian pavilion was a major attraction to all the delegates and visitors. MPEDA booth of the India pavilion had a live cooking demo and display of a wide variety of frozen seafood products sourced from Indian exporters.

CO- EXHIBITORS IN MPEDA PAVILION

1. M/s. Gadre Marine Export Pvt Ltd
2. M/s. Green Asia Impex Pvt Ltd
3. M/s. Ahmed Foods
4. M/s. Sonia Marine Exports Pvt Ltd
5. M/s. S.A. Exports
6. M/s. Quality Marine Exports
7. M/s. Monsoon Bounty Foods Manufacturing Pvt Ltd
8. M/s. Seacatch International (Forstar Group)
9. M/s. Favourite Exports
10. M/s. Sprint Exports Pvt Ltd

An interpreter was engaged to facilitate trade discussions with Korean buyers. Mr. Praveen Kumar, Director, Dept. of Commerce, Ministry of Commerce and Industry, Govt. of India and Mr. S. Asok Kumar, Deputy Director (P&MP), MPEDA represented the Indian delegation. Embassy of India, Seoul played a significant role in organizing the participation of India in the event. Mr. Nishi Kant Singh, Deputy Chief of Mission, Embassy of India, South Korea inaugurated the India pavilion and interacted with officials and exporters to understand their concerns about the Korean market.

Cooking demo

The cooking demo arranged in the India pavilion turned out to be a major attraction which served Indian, Korean and fusion dishes with Indian Seafood. The well-experienced Indian Chef Mr. Shyam Paliwal from Bombay Brau Restaurant, Haeundae, served hot dishes to the visitors and delegates.

More than 200 buyers visited the Indian Pavilion. The deputed officers briefed the buyers about the Indian seafood industry focusing on various aspects like the quality of Indian seafood, sustainability of the Indian seafood sector and strength of the Indian seafood processing sector, and also answered the queries. The trade inquiries received in the show are placed in the concerned section of this Newsletter.

Better market access can be gained by seeking more leverage under India - Korea CEPA as Indian seafood has to compete with ASEAN nations in the market. As the market is very quality conscious, Indian exporters have to comply with the regulations and gain confidence of the importers.

India needs to overcome the competition from China, Thailand and Vietnam in South Korea's seafood market and enhance its share of exports by promoting process automation and value addition. We can also tap the tuna market in South Korea by addressing the quality and product standards. Understanding the product-specific demand and standard requirements will help educate our exporters to enhance product quality and exports to South Korea. India could easily double the present export value by increasing its 5% share in the potential products of India under Chapters 03 & 16 by adopting various measures covering capacity building, quality assurance, product diversification and meeting export standards.

Co-exhibitors with officials of MPEDA, MoCI and EOI, South Korea

Active brand promotion and repeated participation in exhibitions such as BISFE by exporters will definitely help in improving access to Korean seafood consumers.

Table 1: Comparative analysis of South Korea import of Shrimp (all types)
(value in US$ thousand)

Rank	Exporter	Jan – Dec 2021	Jan – Dec 2022	Growth%
1	Viet Nam	3,71,341	4,48,087	21
2	Thailand	1,00,770	77,192	-23
3	China	71,528	77,090	8
4	Peru	22,157	61,070	176
5	Ecuador	74,842	57,636	-23
6	Malaysia	40,657	41,443	2
7	Argentina	26,074	28,401	9
8	India	13,947	26,689	91
9	Russian Federation	5,989	14,401	140
10	Indonesia	2,080	5,934	185
	Rest of the world	15,574	17,783	14
	Total	**7,44,959**	**8,55,726**	**15**

Source: Trademap

Table 2: Top ten exporters of fish and fishery products in the world
(value in US$ thousand)

Rank	Country	Exported value in 2020	Exported value in 2021	Exported value in 2022
1	China	1,83,34,622	2,10,65,929	2,20,78,950
2	Norway	1,07,77,732	1,34,88,449	1,52,20,502
3	Ecuador	53,58,907	70,38,097	1,00,37,581
4	Viet Nam	82,52,785	87,66,008	96,60,629
5	Russian Federation	47,25,264	59,58,655	80,50,697
6	Chile	53,19,554	62,01,252	78,55,467
7	India	57,45,702	74,52,938	76,30,520
8	Canada	48,47,374	70,62,248	64,69,554
9	Spain	43,62,323	54,55,274	55,92,853
10	Indonesia	48,23,379	52,62,704	54,99,179
	Rest of the World	7,03,22,932	7,96,90,167	8,23,85,745
	Total world export	**14,28,70,574**	**16,74,41,721**	**18,04,81,677**

Source: Trademap

Table 3: Top ten importers of fish and fishery products in the world (value in US$ thousand)

Rank	Country	Imported value in 2020	Imported value in 2021	Imported value in 2022
1	United States of America	2,24,90,829	2,96,00,318	3,16,86,174
2	China	1,26,63,969	1,41,49,671	1,91,33,527
3	Japan	1,28,03,294	1,38,17,625	1,48,57,350
4	Spain	71,74,651	87,06,509	89,64,413
5	France	62,51,511	76,75,288	79,84,470
6	Italy	59,93,026	76,18,260	76,21,881
7	Republic of Korea	52,66,889	57,39,428	64,68,949
8	Germany	57,88,990	57,89,742	62,68,216
9	Sweden	50,30,691	55,92,822	61,22,260
10	United Kingdom	41,41,698	43,17,789	44,29,445
	Rest of the World	5,27,18,521	5,97,84,571	6,44,97,333
	Total world import	**14,03,24,069**	**16,27,92,023**	**17,80,34,018**

Source: Trademap

Table 4. Top seafood suppliers to South Korea during 2022 under Chapter 03, 1604 and 1605 (value in US$ thousand)

Rank	Country	Chapter 03	Chapter 1604	Chapter 1605	Total	% of supply
1	Russian Federation	14,15,704	347	347	14,18,504	21.93
2	China	10,25,627	91,897	91,897	12,48,402	19.30
3	Viet Nam	6,76,805	60,014	60,014	9,15,955	14.16
4	Norway	5,92,611	17,062	17,062	6,10,093	9.43
5	United States of America	2,24,982	297	297	2,28,923	3.54
6	Peru	1,20,425	8,486	8,486	2,11,708	3.27
7	Japan	1,74,149	7,851	7,851	1,84,457	2.85
8	Thailand	96,925	15,827	15,827	1,70,218	2.63
9	Canada	1,30,778	1	1	1,32,265	2.04
10	Taipei, Chinese	1,19,643	1,661	1,661	1,21,318	1.88
	Rest of the World	10,70,395	35,477	35,477	12,27,106	18.97
	Total South Korea import	**56,48,044**	**2,38,920**	**2,38,920**	**64,68,949**	

Source: Trademap

Tilapia Lake Virus (TiLV) – A worldwide risk to Tilapia aquaculture

Abhay Kumar, Asha K. K. and Shravan Kumar Sharma
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Tilapia is a very important and cheap fish protein source in the world.
Tilapia is the second most popular fish farmed in the world after carp.

TiLV infected fish shows infection and death (80-100%) occurred within a few days.

A semi-nest RT-PCR with an improved detection sensitivity (7.5 viral copies per reaction).

Biosecurity measures to minimise fomite spread via equipment, vehicles or staff should also be implemented.

Abstract

Tilapia is the second most popular fish farmed in the world after carp and is considered as a chepa protein source. Tilapia is omnivorous, tolerates intensive farming and is resistant to disease. Global tilapia production in (FAO, 2020) was 6.5 million tons. An infectious disease has spread well in farmed and wild tilapia and affects the multi-billion-dollar tilapia aquaculture industry across the world. General biosecurity measures should be used to minimize contamination from equipment, vehicles, or personnel (eg. cleaning and disinfection). Final semi-nested RT-PCR analysis is more sensitive than nested RT-PCR (7.5 viral copies per reaction for TiLV).

Introduction

Important for the sustainability of the ecological system, tilapia is the second most farmed fish worldwide with an annual production of 6.5 million tons (FAO, 2020). The top tilapia producing countries include China,

Egypt, the Philippines, Thailand, Indonesia etc. The tilapia farming industry has been threatened by the death of fish farms in Israel and Ecuador (Bacharach *et. al.*, 2016). This is said to be the virus that causes Syncytial Hepatitis of Tilapia (SHT) in tilapia. The virus responsible for this mass death was identified as a novel orthomyxoid (RNA) virus termed Tilapia Lake Virus (TiLV) (Eyngor *et. al.*, 2014; Bacharach *et. al.*, 2016). Countries suffering from this tilapia disease include Israel, Ecuador, Colombia, and Egypt (Eyngor *et. al.*, 2014; Ferguson *et. al.*, 2014; Bacharach *et. al.*, 2016; Tsofack *et. al.*, 2016; Del-Pozoet. 2017; Fathi *et. al.*, 2017). It is usually manifested by lethargy, ocular lesions and skin erosion, and the mortality rate is over 80%. Histological changes include hyperemia of internal organs (kidneys, brain), gliosis, and perivascular lymphocyte invagination in the cerebral cortex; ocular irritation with endophthalmitis and lens cataract changes. Combining healthy fish with infected fish showed that infection and death (80-100%) occurred within a few days. PCR-based diagnosis to be established. This test can detect TiLV in tilapia and is essential to help control the worldwide spread of the disease.

Aetiological Agent

TiLV has been defined as a new virus in the Orthomyxoviridae family (Eyngor *et. al.*, 2014). Bacharach *et. al.* (2016) found that TiLV is a 10-segment negative RNA virus. Fragment sizes range from 456 to 1,641 nucleotides with a total genome size of 10.323 Kb Bacharach *et. al.* (2016).

Modes of Communication

Direct transmission is an important transmission method. (Eyngor *et. al.*, 2014).

Host Range

Susceptible Species - Mortalities attributed to TiLV have been in wild tilapia *Sarotherodon* (Tilapia) *galilaeus*, farmed tilapia *Oreochromis niloticus* and business hybrid tilapia (*O. niloticus X O. aureus*) (Bacharach *et. al.*, 2016; Ferguson *et. al.*, 2014; Eyngor *et. al.*, 2014).

Affected life stage - In an outbreak reported by Ferguson *et. al.* (2014) and Dong *et. al.* (2017) mainly fingerlings were affected. Dong *et. al.* (2017) reported approximately 90% mortality of red tilapia juveniles within one month of placement in cages.

Geographical distribution

Ferguson *et. al.* (2014) described a novel tilapia syncytial hepatitis (SHT) disease of suspected viral etiology in the offspring of Nile tilapia (*Oreochromis niloticus*) from Ecuador for the first time. In Israel, the large mortality rate of wild and farm-raised hybrid tilapia (*O. niloticus X O. aureus*) was recorded throughout the country and the causative agent was later identified as TiLV (Eyngor *et. al.*, 2008). Countries affected by this tilapia disease include Israel, Ecuador, Colombia and Egypt (Eyngor *et. al.*, 2014; Ferguson *et. al.*, 2014; Bacharach *et. al.*, 2016; Tsofack *et. al.*, 2016; Del-Pozo *et. al.*, 2017 Fathi *et. al.*, 2017). Studies have shown that the virus that causes SHT is genetically similar to TiLV (Bacharach *et. al.*, 2016). High mortality (20-90%) was observed and documented in a recent outbreak on tilapia farms in Thailand (Dong *et. al.*, 2017a). A portion of the genome from Thailand showed significant similarity (approximately 97% nucleotide identity) to the strain from Israel (Dong *et. al.*, 2017).

Signs of the Disease

- The mortality rate in tilapia farms is high (20-90%).

- Gross signs- Sick fish also had loss of appetite, pale colour, lower body, slow motion and swarming ceased before death (Dong *et al.*, 2017). Multifocal for ocular changes including combined skin erosions and ulcerations, lens opacity, and ocular), atrophy.

Fig. 1

Fig. 2

Fig. 3

Fig.1: Tilapia disorder outbreak in a commercial pond results in huge mortality. Fig.2: Diseased tilapia demonstrating shrinkage of attention and loss of ocular functioning. Fig. 3: Gross pathology of pores and skin includes multifocal erosions and ulcers (arrowheads) (Courtesy: Eyngor et. al., 2014).

PCR detection methods

Detection of the virus in infected tilapia fish is very important in the confirmation of infection or the presence of the virus. Eyngor *et. al.* (2014) developed an RT-PCR method for the detection of TiLV. Tsofack *et. al.* (2017) described a sensitive nested RT-PCR assay allowing the rapid detection of TiLV in fish organ. An improved PCR detection method for TiLV was published by Dong *et. al.* (2017b) by modifying the nested RT-PCR protocols into a semi-nested RT-PCR by omitting the primer "Nested ext-2" to avoid false positive results. Heavily infected samples will generate 2 amplicon bands of 415 bp and 250 bp while lightly infected samples will generate a single 250-bp amplicon band.

Control methods

Restrictions at the motion of live Tilapia from farm to wild and back shall be exercised. Biosecurity measures to control. (i.e. cleansing and disinfection) should additionally be carried out. Presently, there are no strategies to restrict the impact of a deadly disease in a contaminated farm. It has been recommended that broodstock development of disease resistant varieties or development of a vaccine may offer a long term possibility to manage the disease (Ferguson *et. al.*, 2014).

Conclusion

Syncytial Hepatitis in Tilapia (SHT) is a highly contagious disease among farmed and wild tilapia, one of the

Primer name	Sequence (5' to 3')	Amplicon size (bp)	Reference
First RT-PCR			
Nested ext-1	TATGCAGTACTTTCCCTGCC	415	Eyngor et al. 2014, Tsofack et al. 2016
ME1	GTTGGGCACAAGGCATCCTA		
Semi-nested PCR			
7450/150R/ME2	TATCACGTGCGTACTCGTTCAGT	250	Eyngor et al. 2014, Tsofack et al. 2016
ME1	GTTGGGCACAAGGCATCCTA		

OPTIMIZATION OF RT-PCR CONDITIONS

Step	Reagents	Volume (µl)	Thermocycler parameters
First RT-PCR	100-400 ng of total RNA	1.5	Reverse transcription
	2X buffer	12.5	50°C, 30 min
	10 µM primer Nested ext-1	1	Denaturation 94°C, 2 min
	10 µM primer ME1	1	25 cycles of
	SuperScript One-Step		• Denaturation 94°C, 30 s
	RT/Platinum *Taq* mix (Invitrogen)	0.5	• Annealing 60°C, 30 s
	Sterile water	8.5	• Extension 72°C, 30 s
	Total reaction	25	Final 72°C, 5 min
Semi-nested PCR	The first PCR product	1	Denaturation 94°C, 2 min
	10X buffer	2	25 cycles of
	10 mM dNTP	0.4	• Denaturation 94°C, 30 s
	10 µM primer 7450/150R/ME2	0.5	• Annealing 60°C, 30 s
	10 µM primer ME1	0.5	• Extension 72°C, 30 s
	Taq DNA polymerase (5 units/µl)	0.2	Final 72°C, 5 min
	Sterile water	15.4	
	Total reaction	20	

world's most important fish for human consumption. It is an emerging global scourge to tilapines aquaculture, which is a multi-billion-dollar industry. Biosecurity measures to minimise fomite spread via equipment, vehicles or staff (i.e. cleaning and disinfection) should also be implemented. Most recently a semi-nest RT-PCR with an improved detection sensitivity (7.5 viral copies per reaction) over the nested RT-PCR (Dong *et al*., 2017) has been introduced to detect the infection.

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Preliminary workshop on the development and implementation of Turtle Excluder Devices (TED) at Veraval

Net manufacturers inspecting new TED design

Mr. Anilkumar P., Joint Director (Marketing) MPEDA addressing to the stakeholders

MPEDA, in collaboration with CIFT, organized a preliminary workshop on the development and implementation of Turtle Excluder Devices (TED) at Veraval on 20th December 2023. A total of forty participants, including net manufacturers, actively engaged in this session.

The event commenced with a welcome address by Dr. Joice V. Thomas, Chief Executive, NETFISH. Mr. Anilkumar P., Joint Director (Marketing), MPEDA emphasized the significant impact of the US ban on sea-caught shrimp and underscored the need for stringent TED implementation in Indian trawlers. Dr. Ashish Jha, Scientist-in-Charge, CIFT, Veraval, offered felicitation.

Mr. Sakthivel A., Assistant Director (Marketing Services), MPEDA provided a comprehensive overview of US laws and the TED implementation framework in India. Dr. Madhu V. R., Principal Scientist, CIFT, Kochi presented the design and specifications of TED in accordance with NOAA guidelines. The participants were given a demonstration of the CIFT designed TED.

Mr. Vaniya Kishore Kumar, Assistant Director, MPEDA Regional Division, Veraval delivered the vote of thanks, concluding the session dedicated to advancing marine conservation and ensuring sustainable practices in our fishing industry.

Group photo of stakeholders and officials

Hands-on training programme on seafood value addition

MPEDA organized a three-day hands-on training program on seafood value addition at Veraval, Kolkata, Vijayawada, Chennai and Balasore from 29th November to 17th December 2023. These programs were to enhance the skills of seafood processing workers, thereby promoting the production of popular value-added products and to enhance the value-added products exports from the country.

Participants received hands-on training to make 22 popular value-added products from shrimps, fish and cephalopods under the guidance of Vietnamese experts Mr. Tran Quoc Son and Mrs. Chu Thi Tuyet Mai.

Products trained during the 3 days training programme

Shrimp Products			
1	Nobashi (Stretched Shrimp)	7	Marinated shrimps
2	Breaded Nobashi shrimp	8	Peeled and Deveined tail on skewers
3	Butterfly sushi shrimp	9	Cooked PDTO shrimp
4	Cooked PTO ring shrimp	10	Cooked & peeled shrimps
5	Breaded butterfly shrimp	11	Shrimp burger (from broken shrimp)
6	Breaded popcorn shrimp	12	Breaded fritter shrimp
Fish Products			
13	Fish fillet (pangassius)	15	Chilled Sashimi grade tuna loins/Fillets
14	Breaded fish fillet (pangassius)		
Cephalopod products			
16	Squid cut rings	20	Pineapple cut squid
17	Breaded squid rings	21	Dusted squid rings
18	Squid burger	22	Pineapple cut cuttlefish
19	Sushi Cuttlefish		

Veraval

The training program in Veraval was conducted at the processing plant of M/s. Castlerock Fisheries Pvt. Ltd., GIDC, Veraval from 29th November to 1st December 2023. The inaugural function of the programme was attended by Mr. Bharat Mathani, Mr. Deven Shah from M/s. Castlerock Fisheries Pvt. Ltd., Mr. Vaniya Kishore Kumar, Assistant Director, MPEDA Regional Division, Veraval, Vietnamese experts Mr. Tran Quoc Son and Mrs. Chu Thi Tuyet Mai, MPEDA and NETFISH officials, CIFT scientists, exporters, trainees from the seafood industry.

View of the inaugural function

25 participants from 20 different processing facilities, 3 NETFISH State Coordinators, 2 MPEDA officials and 2 CIFT Scientists were trained. After the training, a skill test evaluation was conducted for all trainees on the third day, wherein the ability of the trainees to prepare value-added products were assessed and the top three ranks were announced, qualifying them for a national-level skill Olympiad.

The valedictory function in Veraval was attended by Mr. Ketanbhai Suyani, SEAI Regional President, Dr. Ashish Jha, Scientist in-charge from CIFT, Dr. Sajid Yusufzai, Principal, College of Fisheries, and Mr. Gopal Pavar, Deputy Director, EIA. Certificates were distributed to the trainees.

Additionally, a seafood tasting session was also conducted showcasing 22 products along with Indian-style preparations, reinforcing the importance of value-added products in the seafood export industry. Products prepared during the training were displayed and served during the tasting section.

View of skill test and evaluation

Participants along with trainers & officials

View of tasting session

Value-added products prepared during the training

Kolkata

The training program in Kolkata was conducted at the processing unit of M/s. IFB Agro Industry Ltd. from 3rd to 5th December 2023. The inaugural session graced by Mr. Soumitra Chakraborty, Vice-President of SEAI, West Bengal as the Chief Guest. Also, in attendance were Mr. S.G. Dwivedi, Joint Director, EIA, Kolkata, officials from MPEDA Regional Division, Kolkata and State Coordinators of NETFISH.

25 participants from 21 processing facilities were trained, including officials from NETFISH and CIFT. The training was assisted by Mr. Jignesh Visavadia, Mr. Atanu Ray, and Dr. Girija Behere, State Coordinators of NETFISH–MPEDA. After the training, participants independently prepared value-added products and provided feedback.

After the training program, all trainees underwent a skill test evaluation conducted by Dr. Swarnaduti Nath, Assistant Professor at WBUAFS, Mr. Soumitra Chakarborty, CEO of IFB Agro Industries Ltd., and experts from Vietnam. The top three ranks were announced, qualifying participants for a national-level skill Olympiad.

The valedictory function in Kolkata was attended by Dr. S.S. Dana, Vice-Chancellor, WBUAFS, Mr. Amitabha, MD, M/s. IFB Agro Industries Ltd., Mr. Alok Kumar De, AVP-HR, M/s. IFB Agro Industries Ltd., Mr. Soumitra Chakarborty, SEAI, Regional Vice-President, Ms. Kabita Mishra, Deputy Director, EIA Kolkata, Mr. Dhirit Ekka, Deputy Director, MPEDA Regional Division, Kolkata and others. Certificates were distributed to the trainees, and a seafood tasting session was conducted, showcasing 22 products. The program concluded with a formal vote of thanks by Mr. Darshanlal, Assistant Director, MPEDA Regional Division, Kolkata.

View of inaugural function

View of training session

View of training session

View of valedictory function

Value-added products prepared during the training

Vijayawada

The training program in Vijayawada was held from 7th to 9th December 2023 at M/s. Sandhya Aqua Exports Pvt. Ltd., Pamarru, Vijayawada. The programme commenced with the inaugural function attended by Mr. K. Anand Kumar, Secretary, SEAI, Andhra Pradesh region & Director of M/s. Sandhya Marine Exports Pvt. Ltd., Mr. A. Jeyabal, Joint Director, MPEDA Regional Division Vijayawada, Dr. Tummala Suguna, Technical Officer & Director of Aquaculture Research, APFU, Vijayawada, Mr. Akash Swamynathan, General Manager, M/s. Sandhya Aqua Exports Pvt. Ltd., trainees from ICAR-CIFT and NIFPHATT officials, Vietnamese experts Mr. Tran Quoc Son and Mrs. Chu Thi Tuyet Mai, MPEDA officials, NETFISH officials, exporters and trainees from the seafood industries.

28 participants from 14 different processing facilities were trained for preparing the 22 popular value- added products. After the training program, a skill test evaluation was conducted for all trainees, with the top three ranks qualifying for a national-level skill Olympiad. The valedictory function in Vijayawada was attended by dignitaries including Dr. N. Yuvaraj IAS, Secretary Govt. of Andhra Pradesh, Industries and Commerce Department, Mr. Chintapalli Sudheer, Regional Vice-President of SEAI- Andhra Pradesh region, and Dr. P. Viji, Senior Scientist at ICAR-CIFT, Vizag, Mr. E. Harish, Director (Operation), M/s. Sandhya Aqua Exports Pvt. Ltd. Pamarru, experts from Vietnam, Mr. A. Jeyabal, Joint Director, MPEDA Regional Division, Vijayawada, seafood exporters of Andhra Pradesh region, participants and officers in charge of MPEDA from Vizag, Bhimavaram and other industry experts. Dr. N. Yuvaraj emphasized the importance of value-added seafood products for earning foreign exchange, encouraging participants to commercialize their training. Certificates were distributed, and a seafood tasting session was held, showcasing 22 products.

View of inaugural function

Certificate distribution

Trainees and officials; products prepared during the training also can be seen

Skill test evaluation

Value-added products prepared during the training

Chennai

The value-added training program in Chennai was held at M/s. Abad Overseas Pvt. Ltd., Irungattukottai, Sriperumbadur from 11th to 13th December 2023. The programme commenced with an inaugural function attended by Dr. Ansar Ali A., Deputy Director of MPEDA Regional Division Chennai, Vietnamese experts Mr. Tran Quoc Son and Mrs. Chu Thi Tuyet Mai, NETFISH officials, exporters, and trainees from the seafood industry.

25 participants from 20 different processing facilities participated in the training. State coordinators from NETFISH assisted in local language to clear doubts and enhance understanding. After the training program, a skill test evaluation was conducted for all trainees, with the top three ranks announced based on their ability to prepare value-added products.

The valedictory function, held at Hotel Sign-INN on 13th December 2023, featured trainees demonstrating their skills by preparing value-added products like butterfly shrimp and skewers. Mr. Jayapalan G., Joint Director (i/c), EIA, Mr. Avhik Bishnu, Assistant Director, EIA, Chennai, Mr. Athif Mohammed, Manager, M/s. Abad Overseas Pvt. Ltd., Chennai represented SEAI (TN), Mr. Mohana Krishna, Managing Partner, M/s. NNK Exports Pvt. Ltd., Chennai, Mr. Kumar, Director, M/s. Nectar Exports Pvt. Ltd., Mr. Ranjan, Proprietor, M/s. Harrison Exports, Tuticorin, Mr. Andrew Thomas Antony, Managing Director, M/s. Douzou Exports, Tuticorin were present. Certificates were distributed, and a seafood tasting session showcased products like fish fingers, fish nuggets, breaded butterfly shrimps, crab claw, and fish cutlets.

The training sessions have sparked enthusiasm among seafood processors, leading to anticipated increased investments in the production and export of value-added seafood products. Notably, M/s. Douzou Exports, Tuticorin, and M/s. Nector Exports Pvt. Ltd., Pondicherry, both attendees of the training, have stated plans to establish new processing units with a focus on value addition in Chennai and Karnataka, respectively.

View of inaugural function

View of training session

Certificate distribution

View of tasting session

Participants with trainers, MPEDA, NETFISH & NIFPHATT Officials

Value-added products prepared during the training

Balasore

The training program in Odisha took place at M/s. Highland Agro Food Pvt. Ltd., Balasore from 15th to 17th December 2023, commenced with an inaugural function attended by Mr. Archiman Lahiri, Deputy Director, MPEDA Regional Division, Bhubaneswar, Mr. Kamlesh Mishra, seafood exporter, Mr. Dipti Mahapatra, DDF Balasore region, Mr. GVN Srinivas, President, M/s. Highland Agro Food Pvt. Ltd., Mr. Biranchi Narayan Panda, Secretary of Odisha State Shrimp Farmers Association, Vietnamese experts Mr. Tran Quoc Son and Mrs. Chu Thi Tuyet Mai, as well as other MPEDA officials, NETFISH Coordinators, exporters, and trainees from the seafood industry.

During the training, 29 participants from 22 different processing facilities were trained. Following the training program, all trainees underwent a skill test evaluation and were assigned to prepare value-added products. The top three ranks were announced, and the trainees were given the opportunity to share their experiences with others.

The valedictory function was attended by exporters, Mr. Rabindra Kumar Jena, Chairman M/s. Highland Agro Food Pvt. Ltd., Mr. Priyadarshinee Mallick O.A.S. (S), Additional District Magistrate (Rev.), Mr. Archiman Lahiri, Deputy Director, MPEDA Regional Division, Bhubaneswar, Dr. Gopal Anand K. Assistant Director, MPEDA Regional Division, Bhubaneswar and the Vietnamese trainers. Certificates were distributed to the trainees. A seafood tasting session was also conducted showcasing 22 products along with Indian-style preparations, reinforcing the importance of value-added products in the seafood export industry.

On 18th December 2023, a showcasing and tasting program was held at the Regional Division office, Nayapalli, Bhubaneswar. Mr. Suresh Kumar Vashishth, IAS, Principal Secretary of the Fisheries and Animal Resource Development Department, Govt. of Odisha, while praising MPEDA for organizing the training, has also suggested involving the Department of Fisheries staff in these programs for mutual benefit, and expressed hope to enhance the exports of value-added seafood products with a pool of trained workforce. The event was attended by various dignitaries, including Mr. Zahir Mohammed, DGM - F&B Manager of hotel NOCCI, Mr. GVN Srinivas, President of M/s. Highland Agro Food Pvt. Ltd., Mr. Dilip Kumar Sahoo O.A.S. (S.S), Director of Directorate of Export, Promotion & Marketing (DEPM), Bhubaneswar, Odisha, Mr. Kamlesh Mishra, Dr. Bharat Majhi, Deputy Director of EIA Bhubaneswar, representatives from SEAI, seafood exporters, Mr. Murali Jena, Joint Director of the Dept. of State Fisheries, Paradeep Fishing Harbour office bearers, Mr. Kamal Sahoo, Assistant Director of FIEO (Federation of Indian Export organizations), Mr. Rajat Choudhary, Project Manager of ECRICC, MPEDA officials, and members of the press and media.

View of inaugural function

View of training session

View of the audience and the trainees

View of tasting session

Value-added products prepared during the training

Marine landing report November 2023

Dr. Afsal V.V. & Dr. Joice V. Thomas
MPEDA-NETFISH

MPEDA-NETFISH is engaged in real-time data collection from around 100 major fishing harbors and landing centers in India for supporting traceability and MPEDA's catch certification system. Regular tracking of marine landings is done through the Harbour Data Collectors stationed at selected locations. They collect information on incoming fishing vessels and approximate catch landed by these vessels, specific to each species. The collected data is uploaded to the MPEDA catch portal daily. This report presents an overview of the trends observed in marine landings during November 2023.

I. Observations on catch landings

In November 2023, data on marine catch landings was gathered from 85 fish landing sites scattered along the coastal states of India. The cumulative catch for the month amounted to 94,053.47 tons. The pelagic finfishes dominated the catch with a substantial 64% share, accounting for 59,821.97 tons. Demersal finfishes followed at 22%, contributing 20,433.35 tons to the overall catch. Crustaceans claimed a 6% share, representing 5,970.76 tons, while molluscs contributed 8% share, with 7,827.39 tons (refer Fig. 1).

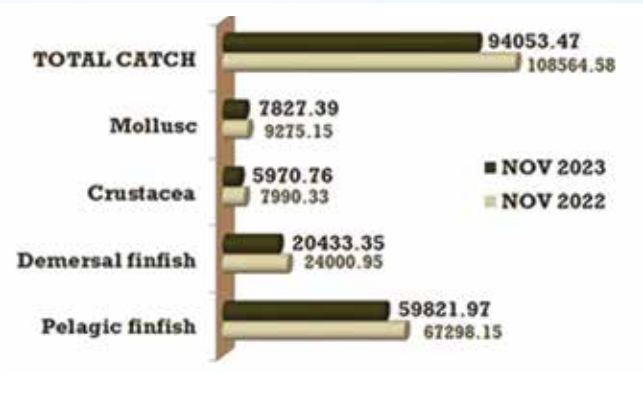

Fig.1: Catch composition of marine landings (in tons) in November 2023

Sl. No.	Common name	Scientific name	Quantity (tons)
1	Indian oil sardine	*Sardinella longiceps*	18,725.90
2	Indian mackerel	*Rastrelliger kanagurta*	11,967.38
3	Ribbon fish	*Lepturacanthus savala*	7,997.79
4	Japanese threadfin bream	*Nemipterus japonicus*	2,680.73
5	Indian squid	*Uroteuthis duvaucelii*	2,634.81

Table 1: Top five species landed during November 2023

The catch landings within the specified period showcased a diversity of 254 species, encompassing both marine finfishes and shellfishes. The five dominant species of the month were *Sardinella longiceps, Rastrelliger kanagurta, Lepturacanthus savala, Nemipterus japonicus* and *Uroteuthis duvaucelii* (refer Table 1).

An analysis of the group-wise landing data revealed that sardines, mackerels, ribbon fishes, croakers and coastal shrimps were the dominant species landed in the month (refer Fig. 2). These top five fishery items accounted for 58% of the total catch. Other notable landed items included cuttlefish, threadfin breams and squids.

Sardines, mackerels and ribbon fishes dominated the pelagic finfish landings, while croakers and threadfin breams were the major demersal catches. Coastal shrimps constituted over 70% of the total crustacean harvest, with Karikkadi shrimp (*Parapenaeopsis stylifera*) being the most abundant species, with a catch of 1,520.88 tons. Squid and cuttlefish were the primary molluscs landed during the month.

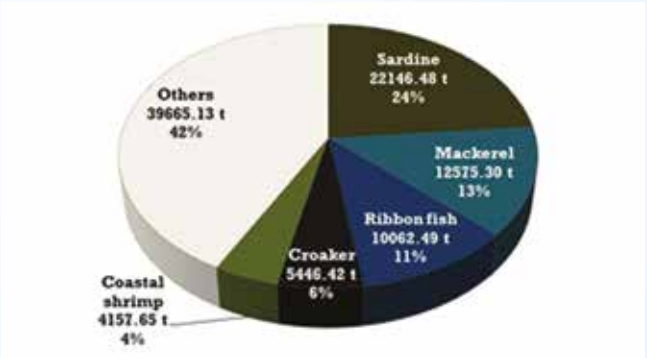

Fig. 2: Major five fishery items landed in November 2023

State-wise landings

The north-western states of Maharashtra and Gujarat recorded the highest marine fish landings in November 2023 (refer Fig. 3). Maharashtra headed with 26,996.12 tons, accounting for 29% of the total catch, followed by Gujarat with 17,763.99 tons (19%). The south-western states of Karnataka and Kerala also made significant contributions, with 15% and 14% of the total catch, respectively. Together, the western coastal states accounted for 79% of the total marine fish landings. The eastern coastal states, on the other hand, had lower

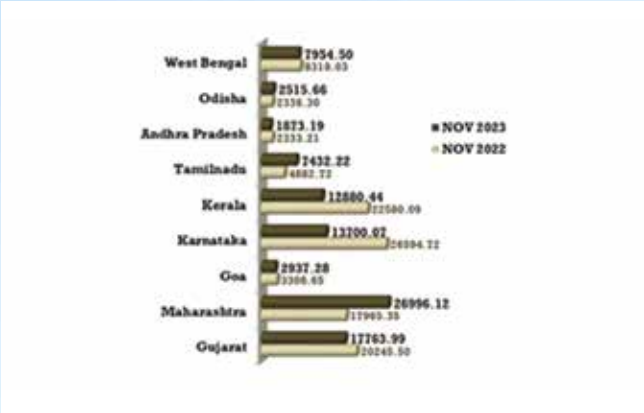

Fig. 3: State-wise Marine Landings (in tons) in November 2023

landings, with Tamil Nadu and West Bengal in the lead, each contributing around 8% to the total catch. Odisha and Andhra Pradesh had the lowest landings among the eastern coastal states.

Harbour-wise landings

Ratnagiri-Mirkarwada harbour in Maharashtra recorded the highest fish landings in November 2023 among the 85 selected fish landing sites. Table 2 lists the top ten harbours in terms of total catch quantity landed.

II. Observations on boat arrivals

The number of fishing vessel arrivals recorded from the 85 designated fish landing sites totaled 35,599. Kerala recorded the highest number of boat arrivals, with 7,297, accounting for 20% of the total. Gujarat,

Sl. No.	Harbour	Quantity (tons)
1	Ratnagiri-Mirkarwada	9,578.60
2	Sakharinate	5,207.24
3	Vanakbara	4,830.99
4	Veraval	4,523.23
5	New Ferry Wharf	4,117.61
6	Mangrol	3,975.39
7	Porbandar	3,946.25
8	Munambam	3,671.03
9	Sasoon Dock	3,600.75
10	Mangalore	3,515.84

Table 2: Top ten harbours based on catch landings

Maharashtra and Tamil Nadu were next in line (refer *Fig. 4*). Considering the harbour-wise boat arrivals, the Mangrol and Porbandar harbours in Gujarat were in the top, with 1,809 and 1,633 boat arrivals, respectively.

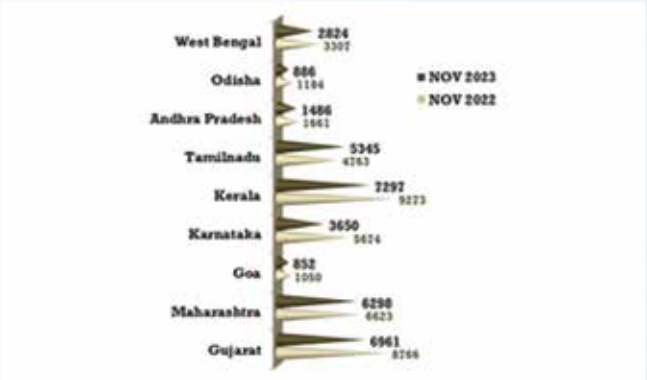

Fig.4: State-wise boat arrivals (nos.) in November 2023

Summary

During November 2023, marine landings and boat arrivals from the 85 major fish landing sites in India totaled 94,053.47 tons and 35,599 vessels, respectively. A decrease of about 10,000 tons in catch landings and 4,000 vessels in boat arrivals was noted when compared to the previous month.

Pelagic finfish resources remained the major contributor to the overall catch, with Indian oil sardine (*Sardinella longiceps*) emerged as the most landed species of the month replacing Indian mackerel. Maharashtra remained in the top position in terms of catch landing and whereas Kerala attained the highest position in terms of number of boat arrivals.

Among the various landing sites, Mirkarwada harbor retained its top position in catch landings, while Mangrol harbor continued having the highest number of boat arrivals.

Monthly outlook forecast report

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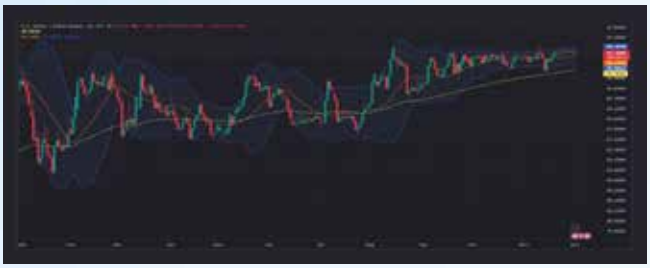

USD INR

The Rupee continues to trade with low volatility trading a range of less than 10 paise for maximum trading sessions. A new all-time high of 83.42 was made this month due to an unexpected outage in the interbank order matching system.

According to the daily candlestick chart, the technical analysis suggests that the presence of positive momentum still stays intact, with the currency pair maintaining an upward trend above the crucial 100-day EMA (yellow line). Additionally, the 14-day Relative Strength Index (RSI) remains above the midline of 50.0, signaling potential upside in the pair.

In the context of the subdued volatility, the Bollinger Bands have contracted, signaling an approaching spike in volatility. A breach of the historical low at 83.47 could trigger a potential upward move towards 84. On the other hand, the rupee's short-term strength is vulnerable, with 83.00 and 82.80 serving as significant support levels.

EUR USD

Closing the month with substantial gains, the EURUSD pair is positioned below its three-month high of 1.1017, marking an impressive climb of over 500 pips from its opening at 1.0574. November unfolded as a pivotal month, initiating an upward trajectory for the pair as markets factored in expectations of Fed rate cuts as early as March '24. The recent dovish stance by typically hawkish Fed member Christopher Waller further weighed on the dollar, compounded by weaker-than-expected economic data. The month commenced with discouraging US labor market data, signaling a softening economy, coupled with a cooling down of inflation, both contributing to the dollar's decline. In stark contrast, Eurozone and Germany's PMI data exceeded expectations, easing the fear of recession in the Economy. The current scenario looks bullish for the EUR USD pair, with markets assigning a 46.1% probability of a 25 basis point rate cut as early as March '24. This sentiment contrasts with the ECB's position, as indicated by President Lagarde's recent comments who highlighted the challenge of reducing inflation to the target of 2%, attributing the recent decline to the fall in crude oil prices. The ECB anticipates potential rate cuts, but not before July. The contrast in timelines between the Fed rate cut expectations and the ECB's stance may provide the much needed support to the pair

EURUSD opened at 1.0574. On the daily candlestick chart the pair has been following a bullish trend resulting in EURUSD to gain around 450 pips touching a 3-month high of 1.1017. The pair is expected to show a decent amount of resistance at 1.09, surpassing the resistance at 1.09 could drive a move towards the next resistance level at 1.1072. Currently, the pair is trading above 1.08, if the EURUSD falls below the 1.0850 mark, it could highlight the 1.07 support level. Current factors show 1.10 has a major role to play in deciding whether the bulls will continue to dominate the bears or not. A breakthrough above the 200- Week EMA could drive the market to 1.1250. The pair remains in the upper range of the upward sloping regression channel while the Relative Strength Index hovers marginally above 55, indicating still indicating less bears.

GBP USD

Sterling had a positive month as it gained almost by 4.5% and a 2-month high of 1.2733. The major factor that led to the growth of the pair was the fall in the dollar index and the positive economic data from the UK front. The cooling inflation in the US economy and the dovish comments hinting towards rate-cuts in 2024 led to a fall in the US treasury yields. The chances of rate-cuts in the month of March increased to 41% which was earlier around 21%. The hawkish comments from the BoE governor signal that the fight against inflation is still on and he will do" what it takes" to bring inflation back to its 2% target. Plus, the Manufacturing and the Services data of the UK economy came bullish, supporting the currency. Overall the future outlook for the sterling remains positive as the recent positive data suggests that Britain will avoid recession in 2024. Plus, the 27 Billion pounds tax-cut announced by the UK government are further helping the currency. But if the UK economy fails to perform better despite the government's measures, the pound may face a risk of downside.

The GBPUSD pair has witnessed a significant rally in the month of November, reaching 1.2733 from 1.2096, increasing by 637 pips, i.e. 5.27% increase over the month, as it looks like we are pricing in Federal reserve rate cuts already. The recent candlestick from the last week indicates that the bears have prevailed over the bulls. It appears that despite attempts to sell in the market, buyers have countered with more buying, resulting in a downward push in prices. The 200-week Exponential Moving Average (EMA) around 1.2740 has proven to be a robust resistance, illustrated by the formation of an inverted hammer in the final week of the month. Presently, prices are situated in the golden zone of the Fibonacci retracement. The price movement in the upcoming week of December will be pivotal in determining the market direction. We could see the prices consolidating in this zone. Notably, the 50-week EMA is positioned below the 200-week EMA. If prices decline below the 1.2585 level, the initial support is anticipated near the 50-week EMA at 1.2415. On the other hand, a breakout above the golden zone could propel prices towards the 200-week EMA around the 1.2740 level. Monitoring these levels will be crucial in assessing the market's trajectory in the coming weeks.

JPY USD

While the USDJPY has been on a massive bullish run since the start of the year, it has recently trended lower following numerous failed attempts to break through overhead resistance at the 152.00 level. Following the most recent downturn, which was driven by decreasing US rates, the pair has landed at the threshold of a crucial floor near 147.25. The Japanese Yen has strengthened by over 3.4% against the US Dollar since reaching its yearly and monthly peak. As December unfolds, the battlefield is set for potentially deeper USD decline. On the last day of November, the USDJPY was moving back towards the early day bids near 147.50 as the US Dollar received a choppy boost from better-than-expected US GDP growth numbers and a dovish appearance from Federal Reserve (Fed) members to balance after Nov 28 hawkish Fed peak. The possibility of lower US interest rates in the first half of next year has weakened the Dollar, and also impacted Yen. Meanwhile, the belief that internal Japanese inflation may have grown sufficiently to force the Bank of Japan to halt its extremely loose monetary policy will also boost the Yen in upcoming month

The USDJPY opened at 151.66, however, a note of caution emerges with the potential formation of a double top in the USDJPY, particularly following the rejection of the 2022 high at 151.94 observed in the first half of the month. The US dollar encountered challenges against the yen, it eventually found support around the crucial 147.80 level. The USDJPY stayed under the 50-day EMA but maintained position above the 200-day EMA, signaling a near-term bearish yet longer-term bullish trajectory. A breach above the 148.40 resistance could

drive movement towards the 50-day EMA. Conversely, a decline below 147.80 might activate the 146.67 support level and trend line. The 14-day RSI at 43 suggests potential USDJPY movement towards the 146.67 support before entering oversold conditions. If the RSI supports the pattern materializes, there looms the possibility of a substantial downturn, with the pair potentially descending as far as 140.00 in the weeks ahead.

WORLD

The global equity markets rallied last month as fears of further rate hikes by the major central banks including the Fed, receded following the slowdown in the global economy leading to inflation starting to ease off. The Dow finished off last month over 2000 points higher and set the trend for the rest of the world markets. December is likely to see a lack of volatility and nervousness in the market, at least till the Fed meeting on 12- 13th December wherein the Fed could provide further clarity to the expectations on rate hike and thereafter rate cuts in the next year. That would be one of the main market moving factors in the coming months and any signs that we could see some rate cuts in the second half of the year will help in consolidation in the markets. In the meantime, traders will focus on the global economic slowdown which seems to be gathering some pace. We could see some sell off in the market if upcoming economic data strengthens the perception of such a global slowdown but with trading volumes likely to ease off in the second half of this month before the year end, market swings are likely to be capped. Thus along with the fact that chances of any rise in global geopolitical tensions appear less now, should reflect in lack of volatility.

To put it in a nutshell, traders are going to take it easy this month and December might not provide us with any nasty surprises. Buying on dips would probably be the best strategy for the month.

Capacity building programme for SC and ST Fishers

Mr. Suresh Kuzhikkattu, President, Kanchiyar Grama Panchayath inaugurating the programme

Mr. Johnson D' Cruz, Deputy Director distributing biosecurity kits to the trainees

Kochi

MPEDA Regional Division, Kochi organised a one-day capacity building programme for Scheduled Tribe Fishers on "Biosecurity and personal hygiene aspects" at Kanchiyar Service Co-operative Bank Hall, Kanchiyar, Idukki district on 13th December 2023. The registered fishers were identified with the support of the Department of Fisheries, Idukki district, Kerala. 28 fishers from Tribal Fisheries Co-operative Society, Cheruthoni, who are engaged in traditional fishing in and around Idukki dam, participated in the training programme.

The programme covered topics like MPEDA's role in the seafood industry, introduction to aquaculture, biosecurity, personal hygiene aspects, post-harvest handling of fish and schemes and services provided by Kerala State Fisheries Department in Idukki district. The technical sessions were conducted by officials of MPEDA Regional Division, Kochi including Mr. Johnson D'Cruz, Deputy Director, Mr. Bijimon P., Junior Technical Officer, Ms. Manjusha K., Field Supervisor and Mr. Rajesh K.R., Fisheries Development Officer from the Department of Fisheries in Idukki district. The programme concluded by distributing aid material kits containing raincoats, T-shirts, tracksuits, and backpacks to 28 participants.

View of technical sessions

Mumbai

MPEDA Regional Division, Mumbai organized two capacity building programmes in Saoner, Nagpur District, Maharashtra. On 27th December 2023, farmers and fishers from the SC category attended the program, while those from the ST category attended on 28th December 2023. A majority of the participants were members of the Kalptaru Fish Farmers Producer Organization in Nagpur.

Dr. Sandeep Gore, Assistant Professor, College of Fishery Science, Nagpur inaugurated two training programmes at Shri Vitthal Rakhumai Mandir Hall in Saoner. Mr. Baijanath Dongare, President of Kalptaru Fish Farmers Producer Organization and Mr. Chandrashekhar Gajbiye, Secretary of KFFPO attended the programme. A total of 60 trainees attended the two capacity building programmes.

The technical sessions were handled by Mr. Mangesh Gawde, Field Supervisor, MPEDA Regional Division, Mumbai, Mr. Shailendra Relekar, Assistant Professor, College of Fisheries Science, Nagpur, Mr. Aman Thakre, Manger, KFFPO. The importance of biosecurity in the land based aqua farms and in cage culture systems, importance of the Best Management Practices (BMP), record keeping of all the inputs, water quality parameters etc. in aquaculture practices, various diseases of fish (causes and preventive measure along with the importance of sanitation in reducing disease outbreaks), personal hygiene and hygienic handling of equipment in fish farming etc. were explained during the technical session.

On 27th December 2023, the valedictory function was organized in the presence of Mr. Shailendra Relekar and Mr. Sandeep Gore, Assistant Professors (Processing), COF Nagpur whereas on 28th December 2023 Mr. Shailendra Relekar, Assistant Professor (Processing), COF Nagpur and Mr. Sai, Technical Manager, Growel were present. Certificates and aid materials were distributed to the trainees. Mr. Rajiv Rathod, Assistant Professor, College of Fishery Science, Nagpur and Coordinator for Cluster Based Business Organisation (CBBO) by NCDC, New Delhi helped in organizing both the programmes.The programme ended with a vote of thanks proposed by Mr. Mangesh Gawde, Field Supervisor, MPEDA Regional Division, Mumbai.

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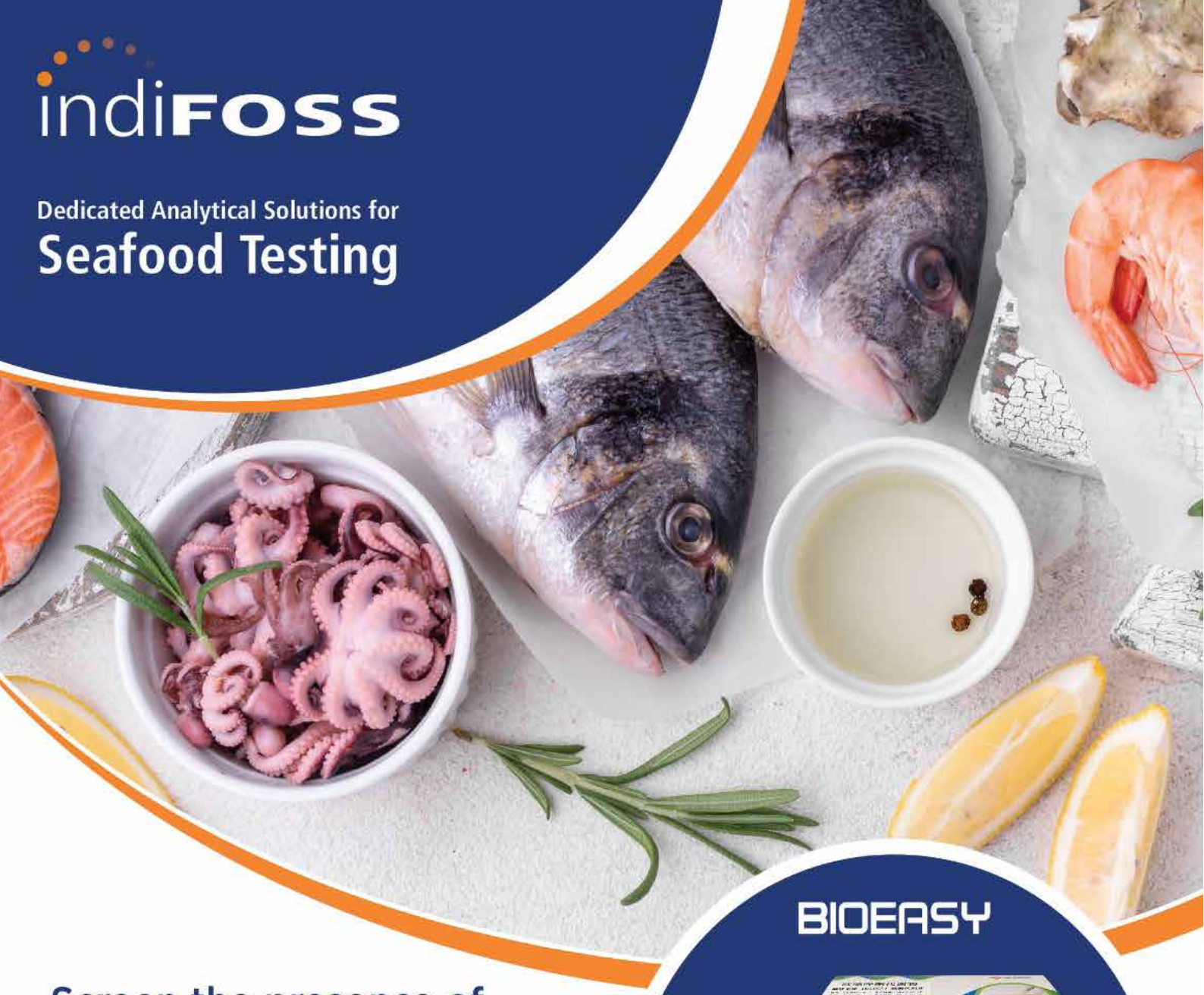

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RAINBOW IN A BOWL

Ornamental fish – Congo tetra

V.K. Dey

V.K. Dey has over three decades of experience in diverse sectors of the seafood industry in the 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 the 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.

Phenacogrammus interruptus, belonging to the family *Characidae*, originates from the Zaire River basin in the Congo, Africa, hence its popular name "the Congo tetra". They are less known compared to their famous cousins, Neon and Cardinal Tetra. However, they are popular, colourful and commonly available among the African Tetras. With its elongated body, big eyes and large scales, the Congo tetra is considered the jewel among tetras. The appropriately conditioned male is brilliantly coloured; a wide band of gold running along the top half of the body that changes to an electric blue-green below the middle line. The dorsal, anal, caudal and ventral fins develop extensions with maturity and all have a white edging which is clearly seen when the fish is observed against a dark background. The female is less colourful and mostly displays a gold/brown colouration while the caudal fins are square in shape and do not develop fin extensions. The middle rays of the caudal fins are very long in the male. Along with its fluorescent colors, the tail fin develops into a most beautiful feathery appendage.

Since it is an active shoaling fish, it should ideally be kept in a larger tank. They do best in a well lit and moderately planted community aquarium. As far as water parameters are concerned, a pH of 6.8 and GH 7 is ideal. The temperature should be kept between 24° and 25°C. They will do well in slightly acidic water with a pH ranging from 6 - 7. Although soft water is

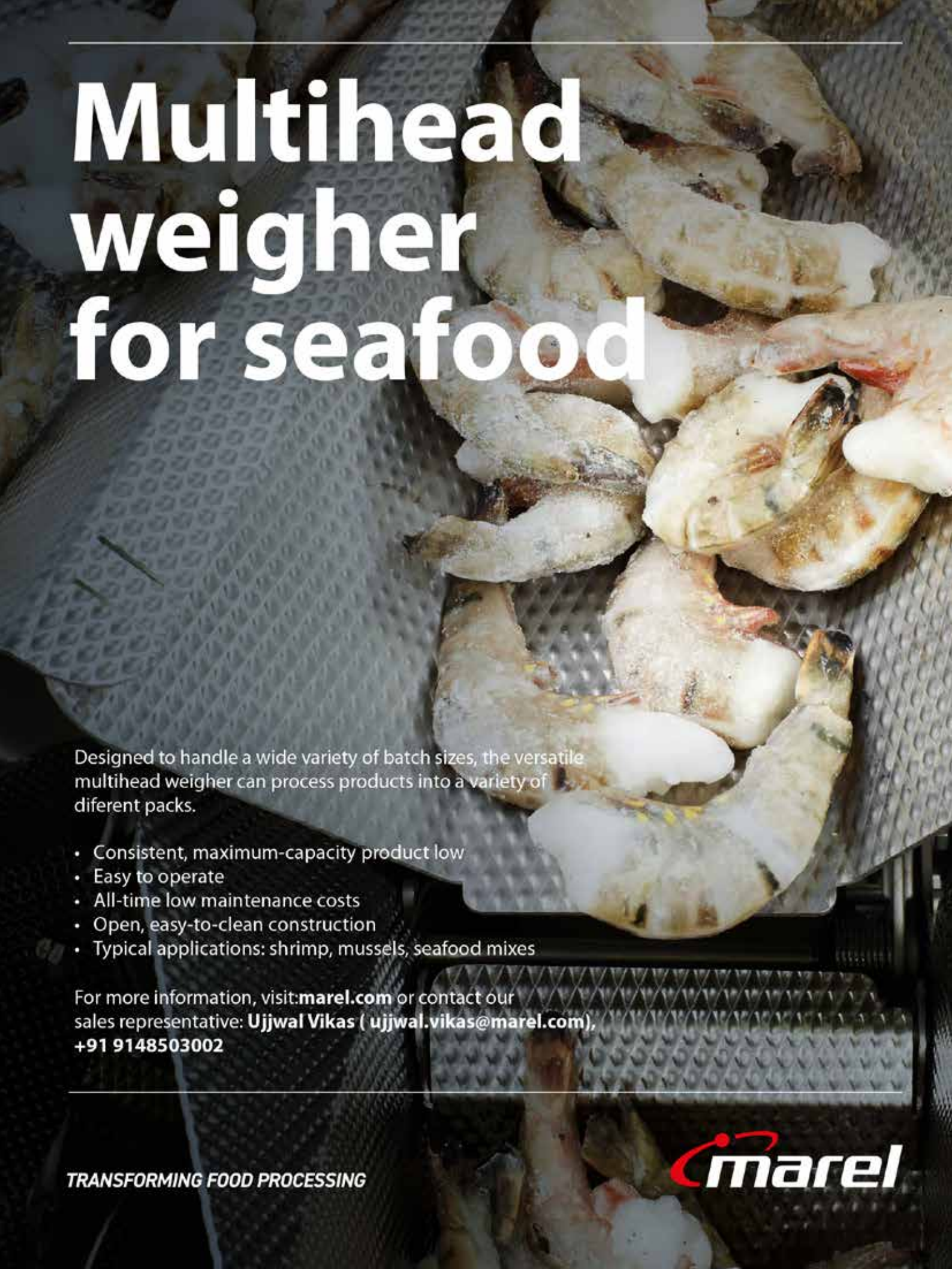
recommended, they can adapt to harder conditions. They are sensitive to poor water quality and frequent water changes are very important with good circulation.

They accept all types of foods but benefit from good quality flakes containing colour enhancers, in addition to frozen foods like bloodworm, daphnia and brine shrimp. They will show their best colour if given a high quality diet. Males grow up to 8 -10cm, while females are slightly smaller and less colourful. Males develop beautiful iridescent blue colouration as they mature, as well as greatly extended filaments on the dorsal and caudal fins. Mature males are more colourful and have longer anal fins than females. They are egg scatterers and will occasionally breed in the community tank when conditions are right. Softer water, with lower pH and an increase in light intensity may all contribute towards spawning success.

They prefer soft, peat filtered water and a darker substrate. They are most comfortable with lower light levels which can be provided by floating plants. The beautiful rainbow colours of this fish will also show off best in lower light levels. Wild caught specimens usually have longer finnage with more pronounced colours and are therefore more popular

A medium sized tank is preferred for breeding. Two males for every female are required and they should be fully adult, about 18 months old. The tank should be set up with a lot of fine leafed potted plants. The water pH should be between 6.5 – 6.8 and very soft, not more than GH 4. There should not be any artificial lighting and no direct light on the tank as the eggs and fry are light sensitive. The males and females should be separated and conditioned with lots of live food for about 5 - 7 days at a temperature of 25°C and released in the breeding tank, females first. There will be a lot of courtship display from the males followed by some chasing, when the eggs are laid. A well-conditioned female can produce up to 300 eggs. The eggs are quite large and non-adhesive and will be scattered everywhere. Once spawning is over the adults should be removed. The eggs take about 6 - 7 days to hatch and a further 3 or 4 days before the fry are free swimming. The fry is quite large and can eat newly hatched brine shrimps.

During the first week, after they become free swimming, the fry should be fed on rinsed brine shrimp 3 or 4 times a day. There is no need to change any water at this stage. During the second week, 3 to 5 percent of water exchange can be made, ensuring that the same temperature and pH of water is maintained. By the third week, the fry can be fed on crushed flakes and brine shrimp and the water change should be gradually built up to 10 percent daily. By the fourth week, the fry will either have to be thinned out or moved into larger tanks. As the fry grow, water exchange should increase up to 25 percent but not more; this will ensure better growth rate. Once the fry reach 3 - 5 cm they are ready for marketing.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Three days training programme conducted for ST aqua farmers

MPEDA-NaCSA organised two three-days training programmes from 18th to 20th December and from 27th to 29th December 2023 on "Best Management Practices of Prawn/Shrimp & Diversification of Economical Species in Aquaculture" held at Bharuch and Surat districts of Gujarat.

The three-day training focused on diversification of aquaculture species, including GIFT Tilapia, scampi farming, mud crab farming, antibiotic use, NaCSA activities, seed selection and feed management, cage culture introduction, biosecurity measures, disease prevention, better cage culture management practices, CAA role in aquaculture, CAA certifications, and application for CAA certification.

Mr. R. J. Patel, Hansot Sarpanch, Bharuch District, Gujarat inaugurating the training programme

Technical session by Mr. Ashish Hodar, Field Manager, NaCSA

View of officials and trainees with the certificates

Bharuch, Gujarat

The training programme in Bharuch district was held from 18th to 20th December 2023 at Hansot Taluka attended by 20 progressive ST farmers of Abheta, Katpor and Kantiyajal villages. The training was inaugurated by Mr. R. J. Patel, Hansot Taluka Sarpanch followed by the technical session. The sessions were handled by Mr. Ashish Hodar, Field Manager, NaCSA, Mr. Venkata Ramana, Regional Coordinator, NaCSA, Dr. Rajesh Vasava, SRA, CoEA, and Mr. Hemang Chudasama, CAA Consultant, Surat.

The training ended with the valedictory function on 20th December 2023 in which certificates and stipends were distributed to the trainees.

Mr. G. Alexander, Assistant Director, MPEDA, SRD, Valsad & Mr. Bhavin M. G., JTO, MPEDA, SRD, Valsad inaugurating the training programme

View of officials and trainees with the certificates

Surat, Gujarat

The training programme in Surat district was held from 27th to 29th December 2023 at Olpad Taluk attended by 20 progressive ST farmers of Mandroi Village, Surat. The training was inaugurated by Mr. G. Alexander, Assistant Director, MPEDA Sub Regional Division, Valsad followed by the technical session. The sessions were handled by Mr. Ashish Hodar, Field manager, NaCSA, Dr. Rajesh Vasava, SRA, CoEA, Dr. Smit Lende, In-charge, CoEA, Mr. Hemang Chudasama, CAA Consultant, Surat.

Certificates and stipend were distributed to the trainees during the valedictory programme on 29th December 2023.

Training programme on "Eco-friendly and Sustainable aquaculture"



View of technical session handled by MPEDA officials

View of field visit

Mr. Johnson D' Cruz, Deputy Director, MPEDA distributing certificate to the trainee

Kochi

MPEDA Regional Division, Kochi organized a three-days general training programme on "Eco-friendly and sustainable aquaculture through species diversification" at Lalam Block panchayat Hall, Pravithanam, Kottayam district from 20th to 22nd December 2023. The training was mainly oriented for a sustainable and diversified aquaculture production through adoption of Better Management Practices (BMPs). The training programme was inaugurated by Smt. Rani Jose, President, Lalam Block panchayat.

The training was imparted on MPEDA's role in the seafood industry, aquaculture practices, recent trends, and various species like Asian Seabass, GIFT, and Etroplus. It covered stock assessment, feed management, disease management, harvesting methods, pre-harvest testing, post harvest management, marketing, value addition, farm enrollment, and FFDA's aquaculture schemes. Field visits were conducted to HDPE lined ponds, aquaponics units, cage culture units, and Tilapia culture biofloc units.

The technical sessions were handled by officials of MPEDA Regional Division Kochi including Mr. Johnson D' Cruz, Deputy Director, Mrs. Preetha Pradeep, Technical Officer, Mr. Bijimon P., Junior Technical Officer, Mrs. Manjusha K., Field Supervisor, Ms. Athiramol P. and Mrs. Ancy Issac, Project Coordinator, Pala Mathsyabhavan.

After the technical sessions, an interactive session was held where questions raised by participants were clarified. An evaluation of the training and feedback was collected from the trainees. This was followed by a valedictory function in which the certificates were distributed to the 18 trainees.

Kolkata

View of technical session

View of field visit

Distribution of certificates

MPEDA Regional Division Kolkata organized a three-day training program from 6th to 8th December 2023, focused on "Eco-friendly sustainable aquaculture" for general beneficiaries in Kumarpur, Contai-I, East Medinipur District. 20 trainees participated in the program.

The technical sessions were handled by officials of MPEDA Regional Division, Kolkata including Dr. K. Pau Biak Lun, Assistant Director, Mr. K. Ramanjaneyulu, Junior Technical Officer, Mr. Anirban Maity, Field Supervisor and Mr. Biswajit Ojha, Field Manager, NaCSA. Mr. Nilotpal Kayal, Assistant Director, Department of Fisheries, West Bengal also handled one session.

The training covered various topics in aquaculture, including seed selection, stocking, water quality, grow assessment, feed management, infrastructure requirements, farm enrollment, diversification, species selection, common diseases affecting shrimp, cluster farming, Aqua One Centre role, Better Management Practices, aquaculture activities in West Bengal, Department of Fisheries support initiatives under the Pradhan Mantri Matsya Sampada Yojana (PMMSY), and export rejections. It also discussed measures to prevent and mitigate challenges in the aquaculture industry.

On 7th December 2023, a field visit was arranged for the trainees at Saria village of East Medinipur district to get practical knowledge of culture practices. The training concluded with distributing certificates to the trainees.

Details of the SPF *P. vannamei* brooders imported & quarantined at AQF during November 2023

Sl. No.	Name of the stakeholders	State	Country of origin/ supplier	Date of receipt of the lot at AQF arrival	Broodstock imported (nos)		
					Male	Female	Total
1	Sun Glow Marine	Tamil Nadu	American Penaeid, Florida	01.11.23	180	180	360
2	B Tech Hatcheries	Andhra Pradesh	SIS, Florida	01.11.23	400	400	800
3	Seven Staar Hatchery	Tamil Nadu	SIS, Florida	03.11.23	200	200	400
4	Sri Sai Hatchery & Prawn Culture Pvt. Ltd	Andhra Pradesh	SIS, Florida	03.11.23	250	250	500
5	DSR Hatcheries	Andhra Pradesh	Kona Bay, Hawaii	03.11.23	276	276	552
6	DSR Hatcheries	Andhra Pradesh	Kona Bay, Hawaii	03.11.23	276	276	552
7	Blue Park Hatcheries (India) Pvt. Ltd	Andhra Pradesh	Kona Bay, Hawaii	03.11.23	402	402	804
8	Vaisakhi Bio-Resources Pvt. Ltd	Andhra Pradesh	SyAqua Americas Inc, Florida	05.11.23	200	200	400
9	Pavani Hatcheries	Tamil Nadu	American Penaeid, Florida	08.11.23	300	300	600
10	Sree Kamadhenu Aquatech Pvt. Ltd	Andhra Pradesh	SIS, Florida	08.11.23	200	200	400
11	Vaisakhi Bio-Marine Pvt. Ltd - Unit II	Andhra Pradesh	American Penaeid, Florida	10.11.23	300	300	600
12	CP Aquaculture (India) Pvt. Ltd - Gudur	Andhra Pradesh	American Penaeid, Florida	16.11.23	250	250	500
13	CPF (India) Pvt. Ltd	Tamil Nadu	American Penaeid, Florida	16.11.23	250	250	500
14	Saran Saai Hatcheries	Andhra Pradesh	SIS, Florida	16.11.23	200	200	400
15	Sri Siva Jyothi Exports & Imports India Pvt. Ltd	Andhra Pradesh	SIS, Florida	16.11.23	300	300	600
16	Aquatic Farms Ltd	Odisha	Kona Bay, Hawaii	17.11.23	330	330	660
17	TMR Bio Marine	Andhra Pradesh	SIS, Florida	18.11.23	300	300	600
18	Raj Hatcheries Madras Pvt. Ltd	Tamil Nadu	SyAqua Americas Inc, Florida	20.11.23	250	250	500
19	Avanti Feeds Unit I	Andhra Pradesh	SyAqua Americas Inc, Florida	20.11.23	200	200	400
20	Vaisakhi Bio-Marine Pvt. Ltd	Tamil Nadu	SyAqua Americas Inc, Florida	20.11.23	300	300	600
21	Aquatic Farms Ltd	Odisha	American Penaeid, Florida	21.11.23	200	200	400
22	Suhaan Enterprises Pvt. Ltd	Andhra Pradesh	SIS, Florida	22.11.23	300	300	600
23	Shree Kanak Matsya Hatcheries	Odisha	Kona Bay, Hawaii	24.11.23	330	330	660
24	Sandhya Aqua Exports Pvt. Ltd	Andhra Pradesh	Kona Bay, Hawaii	24.11.23	330	330	660
25	CPF (India) Pvt. Ltd	Tamil Nadu	American Penaeid, Florida	24.11.23	250	250	500
26	Bindu Hatcheries	Andhra Pradesh	SyAqua Americas Inc, Florida	24.11.23	250	250	500
27	Anjaneya Marine Hatcheries	Andhra Pradesh	SyAqua Americas Inc, Florida	24.11.23	250	250	500
28	East Coast Hatcheries	Tamil Nadu	SyAqua Americas Inc, Florida	24.11.23	250	250	500
29	Fedora Sea Foods Pvt. Ltd	Andhra Pradesh	SIS, Florida	29.11.23	200	200	400
	TOTAL				**7,724**	**7,724**	**15,448**

Details of the SPF *P. monodon* brooders imported & quarantined at AQF during November 2023

Sl. No.	Name of the stakeholders	State	Country of origin/supplier	Date of receipt of the lot at AQF arrival	Broodstock imported (nos)		
					Male	Female	Total
1	Unibio (India) Hatcheries Pvt. Ltd	Tamil Nadu	Aquaculture De La Mahajambal; Madagascar	28.11.23	104	104	208
2	Unibio (India) Hatcheries Pvt. Ltd	Tamil Nadu	Aquaculture De La Mahajambal; Madagascar	30.11.23	104	104	208
	TOTAL				**208**	**208**	**416**

Details of the SPF *P. vannamei* brooders imported & quarantined at AQF during December 2023

Sl. No.	Name of the stakeholders	State	Country of origin/ supplier	Date of receipt of the lot at AQF arrival	Broodstock imported (nos)		
					Male	Female	Total
1	East Coast Hatcheries	Tamil Nadu	American Penaeid, Florida	01.12.23	204	204	408
2	Priyanka Enterprises	Andhra Pradesh	American Penaeid, Florida	01.12.23	300	300	600
3	Ravi Hatcheries	Andhra Pradesh	American Penaeid, Florida	01.12.23	300	300	600
4	Aqua Prime International (India) Pvt. Ltd	Andhra Pradesh	SyAqua Americas Inc, Florida	02.12.23	200	200	400
5	Sri Manjunadha Hatcheries	Andhra Pradesh	SyAqua Americas Inc, Florida	02.12.23	400	400	800
6	Sheng Long Bio Tech (India) Pvt. Ltd	Tamil Nadu	SIS, Florida	03.12.23	360	360	720
7	Sea Park Hatcheries Pvt. Ltd	Andhra Pradesh	Kona Bay, Hawaii	08.12.23	330	330	660
8	Sapthagiri Hatcheries - Unit II	Andhra Pradesh	Kona Bay, Hawaii	08.12.23	606	606	1212
9	Gayathri Hatcheries	Andhra Pradesh	SyAqua Americas Inc, Florida	10.12.23	200	200	400
10	CP Aquaculture (India) Pvt. Ltd - Mukkam	Andhra Pradesh	American Penaeid, Florida	11.12.23	600	600	1200
11	Srinidhi Marine Biotechnologies	Andhra Pradesh	American Penaeid, Florida	11.12.23	250	250	500
12	Coastal Aqua Pvt. Ltd	Andhra Pradesh	American Penaeid, Florida	11.12.23	300	300	600
13	Lotus Sea Farms	Tamil Nadu	SIS, Florida	13.12.23	300	300	600
14	Srinivasa Hatcheries	Andhra Pradesh	SIS, Florida	13.12.23	300	300	600
15	Srinivasa Aqua Hatcheries	Andhra Pradesh	SIS, Florida	13.12.23	200	200	400
16	Regal Bio Marine Hatchery	Tamil Nadu	American Penaeid, Florida	13.12.23	275	275	550
17	CPF (India) Pvt. Ltd	Tamil Nadu	American Penaeid, Florida	13.12.23	600	600	1200
18	Samudra Hatcheries Pvt. Ltd	Andhra Pradesh	SIS, Florida	14.12.23	230	230	460
19	Padmavathi Hatchery	Andhra Pradesh	American Penaeid, Florida	14.12.23	400	400	800
20	Star Aqua Hatchery	Tamil Nadu	SIS, Florida	16.12.23	150	150	300
21	BKMN Aqua (56-3 (379)/2023)	Andhra Pradesh	SIS, Hawaii	17.12.23	250	250	500
22	Sri Venkateswara Shrimp Hatcheries Pvt. Ltd	Andhra Pradesh	SIS, Florida	17.12.23	300	300	600

To be continued...

Sl. No.	Name of the stakeholders	State	Country of origin/ supplier	Date of receipt of the lot at AQF arrival	Broodstock imported (nos)		
					Male	Female	Total
23	Sapthagiri Hatcheries - Anakapalli	Andhra Pradesh	SIS, Florida	17.12.23	300	300	600
24	Gaayathri Bio Marine	Andhra Pradesh	SyAqua Americas Inc, Florida	17.12.23	200	200	400
25	Sai Marine Exports Pvt. Ltd - Unit II	Andhra Pradesh	SyAqua Americas Inc, Florida	17.12.23	200	200	400
26	Srinidhi Biotechnologies	Andhra Pradesh	SyAqua Americas Inc, Florida	17.12.23	300	300	600
27	KPR Hatchery	Andhra Pradesh	SIS, Florida	18.12.23	200	200	400
28	Sarada Hatcheries - Unit II	Andhra Pradesh	SIS, Florida	18.12.23	200	200	400
29	Sri Mahalakshmi Hatcheries - Vizag	Andhra Pradesh	SIS, Florida	18.12.23	600	600	1200
30	Makineedi Hatcheries	Andhra Pradesh	SIS, Florida	20.12.23	400	400	800
31	BMR Industries Pvt. Ltd	Tamil Nadu	Kona Bay, Hawaii	22.12.23	444	444	888
32	KKR Aquatics	Odisha	Kona Bay, Hawaii	22.12.23	396	396	792
33	Sea Way Hatcheries Pvt. Ltd	Tamil Nadu	SIS, Florida	23.12.23	200	200	400
34	Sai Gnaneswary Hatcheries	Andhra Pradesh	SyAqua Americas Inc, Florida	23.12.23	200	200	400
35	Vaisakhi Bio-Marine Pvt. Ltd - Unit IV	Tamil Nadu	Blue Genetics, Texas	24.12.23	400	400	800
36	Aqua Star Shrimp Hatchery	Tamil Nadu	SIS, Florida	29.12.23	150	150	300
	TOTAL				**11,245**	**11,245**	**22,490**

Details of the SPF *P. monodon* brooders imported & quarantined at AQF during December 2023

Sl. No.	Name of the stakeholders	State	Country of origin/ supplier	Date of receipt of the lot at AQF arrival	Broodstock imported (nos)		
					Male	Female	Total
1	Unibio (India) Hatcheries Pvt. Ltd	Tamil Nadu	Aquaculture De La Mahajambal; Madagascar	07.12.23	104	104	208
2	Unibio (India) Hatcheries Pvt. Ltd	Tamil Nadu	Aquaculture De La Mahajambal; Madagascar	10.12.23	104	104	208
3	Golden Marine Harvest - Unit VI	Tamil Nadu	Aquaculture De La Mahajambal; Madagascar	12.12.23	115	116	231
4	Golden Marine Harvest - Unit VI	Tamil Nadu	Aquaculture De La Mahajambal; Madagascar	14.12.23	115	116	231
5	Mas Aqua Techniks Pvt. Ltd - Plant II	Andhra Pradesh	Aquaculture De La Mahajambal; Madagascar	17.12.23	115	116	231
6	Mas Aqua Techniks Pvt. Ltd - Plant II	Andhra Pradesh	Aquaculture De La Mahajambal; Madagascar	19.12.23	115	116	231
7	Unibio (India) Hatcheries Pvt. Ltd	Andhra Pradesh	Aquaculture De La Mahajambal; Madagascar	21.12.23	115	116	231
	TOTAL				**783**	**788**	**1,571**

Seafood HACCP basic training programme in Kolkata region

Inauguration of training by Mr. Rajarshi Banerji, President, SEAI, West Bengal region

View of training session

Participants with their digital certificates

Participants with MPEDA officials

MPEDA Regional Division, Kolkata organized a 4-days training programme from 12th to 15th December 2023 on seafood HACCP for the technologists working in various processing units of Kolkata. This is the 137th HACCP training programme of MPEDA and 8th edition for this year. The training was conducted with the objective of effective implementation of HACCP based food safety programmes in the seafood industry. 25 participants attended the training.

The training started with an inaugural session on 12th December 2023. Mr. Dhirit Ekka, Deputy Director, MPEDA Regional Division Kolkata welcomed all dignitaries and participants to the training programme. The training was inaugurated by Mr. Rajarshi Banerji, President, SEAI, West Bengal region. In his keynote address, highlighted the present scenario of the Indian seafood export and importance of HACCP implementation. Mr. Vinod V., Deputy Director (QC) delivered a technical speech on the occasion.

Mr. Vinod V., Deputy Director (QC), MPEDA, Mr. Subray Pawar, Assistant Director, MPEDA Regional Division Mumbai and Dr. K. Pau Biak Lun, Assistant Director, MPEDA Regional Division Kolkata were the faculty members. After the training sessions, a post-training evaluation was conducted. The trainees were issued digital training certificates upon successful completion of the training.

The valedictory function was graced by Mr. S. G. Dwivedi, Joint Director, EIA, Kolkata and the function ended with vote of thanks proposed by Mr. Darshan Lal Dhondiyal, Assistant Director, MPEDA Regional Division Kolkata.

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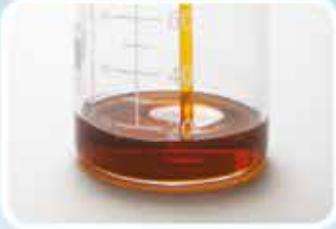
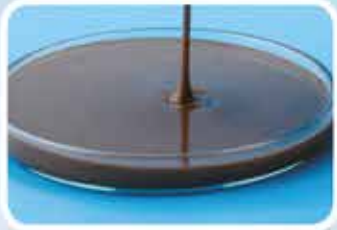

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3	Ji Hoon, Lee Manager Hi Trading Co. Ltd. No. 1102, International Fish Market B/D 35, Wongyang – Ro, Seo-Gu Busan, South Korea Ph.: +82 10 7677 8128 +82 51 962 2228 Email: hitrade01@naver.com *Black Tiger Shrimp, Vannamei*	4	Janghoon Park CEO Kunmin F & C Co. Ltd. 903 VIP B/D, 426 Gonghang daero, Gangseo-gu, Seoul, 07654, South Korea Ph.: +82, 70, 7012 2122 Mob: +82 10 4621 1582 Email: kunminfnc@daum.net Website: www.kunmin.com *Vannamei, Black Tiger Shrimp*
5	Lim Jehyuk IM Representative C.J. Cheiljedang 330 Dongho-ro, Jung-gu, Seoul CJ CheilJedang center, WooX 4560 South Korea Ph.: +82 10 4910 5321 Email : jaehyuk.im1@cj.net *Frozen Shrimp*	6	Seung Ho, Park Assistant Manager Soma Project Co. Ltd. Dong Jin Plaza 601, 11, Chungang ro Deogyang-gu, Goyang-si South Korea Ph.: +82 31 974 6606 Email: somaproject25@gmail.com *Frozen Shrimp*
7	Deyu International Ph : 01 572 501 8676 0631 7287609 Email : yugianjie@naver.com *Freeze Dried and Frozen Shrimp*	8	Grilled Korean Beed Dimsum 620 Haeundae-ro, Haegon-dae-gu, Busan Rackmuet, South Korea Ph.: +82 01 044274554 *Chilled Shrimp*
9	Jeong Mok CEO Korea Jeongssi Fisheries Trading Co. Ltd.342, Haemangaro, Gunsan-si Jeollabuk-do, South Korea Ph.: +82 010 8957 2509 Email: 992340784@qq.com *AFD Shrimp*	10	Suhyun Park Manager Sunbu trading 206, Wonyangro 224 Seogy, Busan South Korea Ph.: +82 51 231 5413 4 Email: sunbu5414@naver.com *Shrimp*

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11	Choi sung Young Purchase manager Jaeho Products Co. Ltd. 196, Jangnim-rd, Saha-gu Busan South Korea Ph.: +82 10 5097 9201 +82 51 507 92019 Email: csy8088@jaeho.co.kr *Vannamei, Black Tiger Shrimp*	12	Kwon Soohwan Director DAHAE TRADING 706, 35 Wongyang-ro, Seo-Gu, Busan Republic of Korea Ph.: +82 10 4813 3161 Email: dahye3161@naver.com *Frozen Shrimp*

CRAB

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FISH

1	Karen. M J Song KEM Trading Co. Ltd. Geumjeong-gu, Busan South Korea 148E, Marine Corps Drive Dededo 96929 Ph.: +82 1 671 480 6882 Email : kemkarensong@gmail.com Mackerel, Ribbon Fish, Skipjack Tuna, *Grouper, Snapper*	2	Lynn Chiu Sales Representative Fue Shin Fishery Ltd. 17F.2, No. 6, Minquan 2nd Road Qianznen dist., Kaohsiung City 806 Taiwan (R.O.C) Ph.: +8867 537 8685, +886 979 509 006 Email: lynnchiu@fueshin.com.tw *Frozen fish*

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1	Kyung Chul Jo Deputy General Manager HAE Seong Co. Ltd. 1710, 40 Cheongpa to, Yongoan gu Seoul South Korea Ph.: +82 41 956 4079 *Seafood*	2	Benigmo Quiveir Chile Supplier Giant Squid Ph: + 56 976953661 Email: duaopesifuero@gmail.com *Squid*
3	Park Hee – jin Officer Oceans Global 35, 906-1, Wonam-ro, Sao-gu, Busan South Korea , Ph.: +82 02 3775 2293 Email: hjpark@fog.foosung.com Website: www.oceansglobal.co.kr *Frozen Shrimp, Fish*	4	Suk Soo Kim CEO KumCheon Technology 2-2, Beotkkot-ro, 60beon-gil, Jinhae-gu Changwon-si, Gyeongsangnam-do South Korea, Ph. : +82 55 545 3253, Mob.: +82 10 2619 5014 Email: kct1546@naver.com *Frozen Shrimp, Fish, Squid*

5	Kim Sang Hee General Manager (sales) 4F, Ocean Square building, Gangnam fu Seoul 06032, South Korea Ph.: +82 2 419 8121 Mob: +82 10 5074 5415 Email: sales3@osinc.kr *Frozen Shrimp, Fish*	6	Mark Representative Grand creation Tranding Co. Ltd. No: 52-1, l.n. 77, Denglin Rd., Wugu Dist. New Taipei City, 248, Taiwan (ROC) Ph.: +886 2 22941510 Email: mark.yen@msa.hinet.net *Scampi, Fish*
7	Do Ngoc Tai General Director / President TAIKA Seafood Corporation Lot N, Nghlep Industrial zone Hiep commune, Chau Thanh district Soctrang Province, Vietnam Ph.: +84 913 890 033 Email: ceo@taikaseafood.com.vn *Seafood*	8	Chaewon, Jeong Director SEP Resource Co. Ltd. 8/40, BF, 202, Dasanigeum ro Gyeonggi do 12284, South Korea Ph.: +82 031 560 9851 Email: sepseafood@gmail.com *Shrimp, Black Tiger Shrimp, Squid*
9	Beom Su, Park, Manager Chun Woo Trading Co. Ltd. Room No 205, Wonyang Plaza B/D, 105 onyang Ro, SEO-GU, Busan South Korea Ph.: +82 10 6440 0757 Email : chunwootrading@naver.com *Frozen Shrimp, Squid, Fish*	10	Genie Park Manager Da- Kyoung Fisheries Co. Ltd. Office No: 332, Wooyang Cold Storage building No: 234, Chungmy-daero, seo-gu, Busan, Korea Ph.: 051-254-0506, Mob.: 010-4222-3947 Email: ghpark00@hanmail.net *Squid*
11	Mathew Hung Sales & Marketing Director Fisherman's Hometown International Co. Ltd. Taiwan Ph.: +886 939 392 126 Email: mathew.hung@taiwanfisher.com.ts Website: www.taiwanfiher.com.tw *Milkfish, Shrimp*	12	Sung Min, Kim President Mido Trading No: 803, 35, Wonyang-RO SEO-GU 49277, Busan, South Korea Ph.: +82 51 253 4392 Email : leonsm@naver.com *Squid*
13	Simon Lin General Manager Kao Hsin Enterprise Np. 22-69, Xlliao Rd, Daliao Dist. Kaohsiung city 831, Taiwan (ROC) Ph.: +886 07-652-8966, +886 07-652-9123 +886 0913-558-269 Email: kaohsin966@gmail.com *Fish, Shrimp*	14	Jong – Hyeon son CEO Heung Gwang Co. Ltd. 614, Busan International Fish Market 35, Wonyang-Ro, Seo-Gu Busan, South Korea, Ph.: +82 51 245 1711, +82 51 220 8448, Mob.: 82 10 3586 1711 Email: jooilson@hanmail.net *Shrimp, Ribbonfish, Sardine, Tuna*

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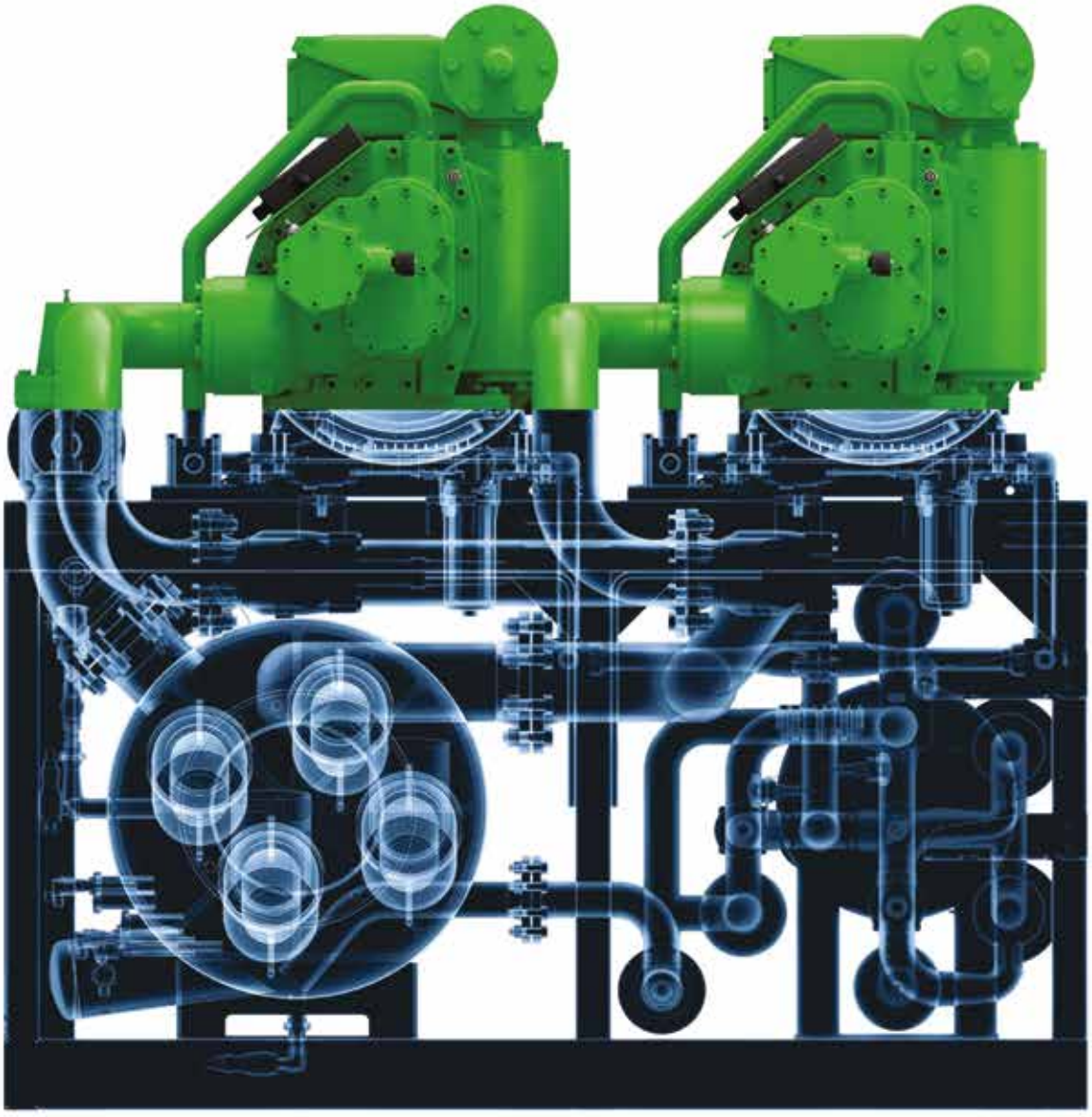

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