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Aquaculture Spectrum™

The Indian Aquaculture Magazine

INDIA PRODUCES 9.3 LAKH MT OF SHRIMP IN 2021 - SAP'S SHRIMP CROP REVIEW

- Page 41

Nexgen Foods and Feeds Pvt Ltd completes its journey of 10 years in the aquafeed industry

Page 12

Protecting shrimp farming from biosecurity risks

Page 23

Increased value through Benchmark's holistic approach

Page 37

Ornamental Fish
The White Spotted Wonder Cichlid

Page 56

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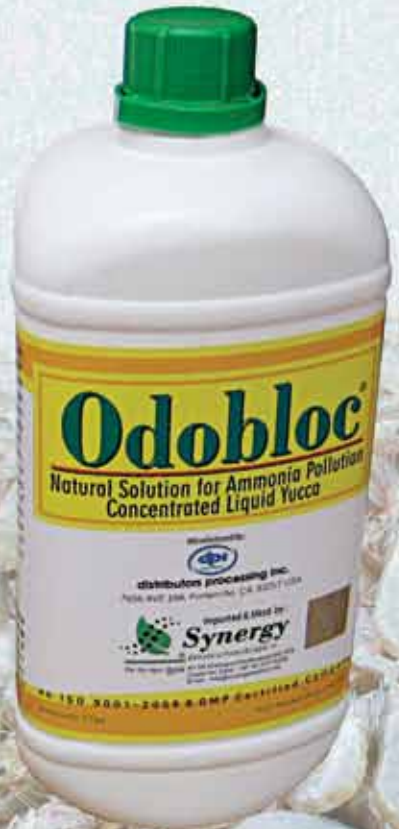

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The Indian Aquaculture Magazine

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EDITORIAL

Jaideep Kumar

The establishment of India's first commercial RAS farm in Telangana by a Hyderabad-based entrepreneur Aditya Rithvik Narra is a significant step towards modernization of aquaculture practices in India. The choice of Rainbow Trout as the candidate species could be the trump card as there are no producers of this cold-water fish in most parts of India except a couple of northern states. Effective marketing is the key to the commercial success of the programme and its success is sure to usher in more such projects especially in major cities of India.

Meanwhile, power shortages and increasing feed prices continued to be a major cause of worry for aquafarmers. While frequent power cuts, especially during the night hours severely impacted farming operations, feed prices were enhanced again in April by around Rs. 2.50 per Kg by most feed suppliers. Several farmers associations in Andhra Pradesh carried out protests and appealed to the government to save the situation. Seed stocking slowed considerably across the country. Hatcheries too cut down on production which is evident from the plummeting vannamei broodstock imports over the last few months.

Aqua India 2022 organized by the Society of Aquaculture Professionals is scheduled to be held at Chennai from the 23rd to 25th June. With the theme "Resilience, Recovery and Resurgence", and a plethora of eminent speakers, the event promises to provide ideas to the Indian aquaculture sector to adopt changes with changing times.

The April 2022 issue of Aquaculture Spectrum features an articles on "Protecting shrimp farming from biosecurity risks" by Rangareddy Koppula et.al, "The future of India's aquaculture sector depends on sustainable feed ingredients" by the Aker BioMarine, a global biotech innovator and krill harvesting company, a feature on Benchmark, the latest vannamei broodstock supplier to India, "Increased value through Benchmark's holistic approach" and an interview with Mr. A.V. Subrahmanyam, Managing Director and Dr. M. V. D. Malleswararao, Technical Director of Nexgen Foods and Feeds Pvt. Ltd., who are celebrating the completion of their 10th year in the Aquafeed industry. Our regular columns on "Shrimp Aquaculture – Industry Review" by Dr. P. E. Cheran and "Ornamental Fish" (*Tropheus duboisi* – the white spotted cichlid) by Dr. V.K. Dey, along with SPF shrimp broodstock imports and news from across the Indian and global aquaculture sector bring up the rest of this issue.

Jaideep Kumar

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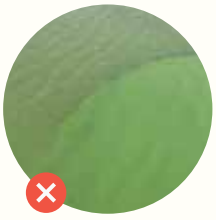
Desired water (yellow)

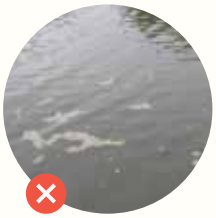
Desired water (green)

Unwanted plankton

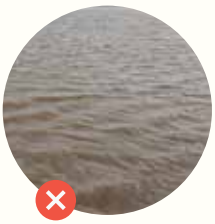


Overbloom

Plankton crash



Toxic gases



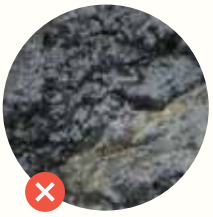
Turbid colour

Soil

Ideal soil quality

Undesired pond bottom

Black soil



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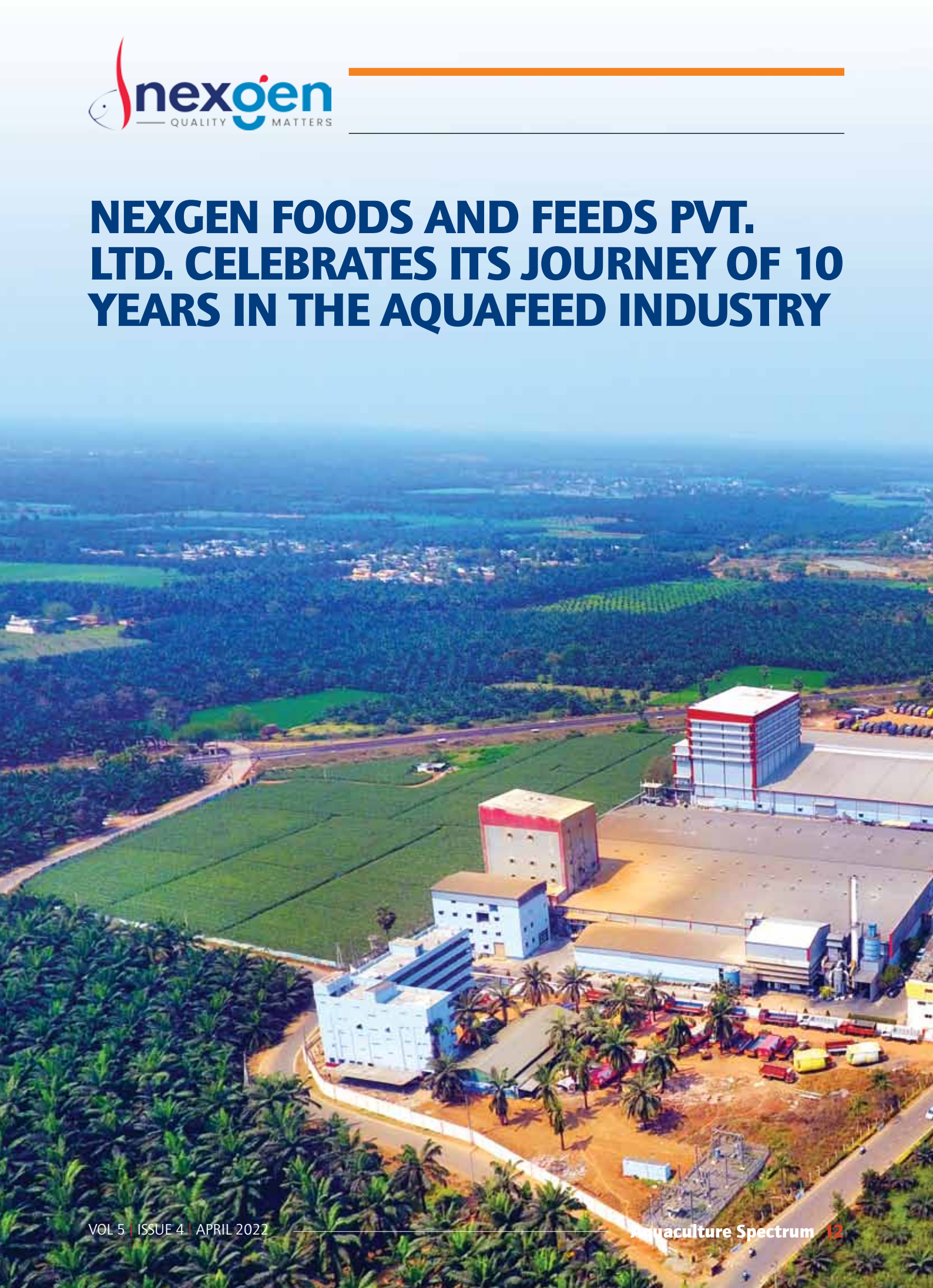
NEXGEN FOODS AND FEEDS PVT. LTD. CELEBRATES ITS JOURNEY OF 10 YEARS IN THE AQUAFEED INDUSTRY



Celebrating the successful completion of 10 years in Aqua feed Industry in India, we look back at the fairy tale journey of Nexgen Foods and Feeds Pvt. Ltd., which entered the industry with a bang, setting the highest standards in aqua feed quality and quickly emerging as one of the leading players in the sector. Aquaculture Outlook spoke to Mr. A. V. Subrahmanyam, Managing Director, Dr. M. V. Malleswararao, Technical Director and Prof. (Dr.) P. Haribabu, the Head - Technical of the company on their journey so far and their vision for the coming years.

Aquaculture Outlook: Firstly, congratulations on Nexgen Foods and Feeds completing 10 years in the industry in great style. How did this all come about? Let us know of your journey so far.

Mr. A. V. Subrahmanyam and Dr. M. V. D. Malleswararao: Having been farmers ourselves, we had first-hand knowledge of the challenges faced by farmers and their requirements to achieve smooth and successful crops time after time. We ourselves farmed fish in about 600 acres and our group had several

An aerial view of the Nexgen Foods and Feeds plant complex

Celebrating the completion of 10 years in the feed industry at a gala function organized at Vijayawada during March 2022

farmers who used to share their views, problems and needs. It was the result of these discussions that the genesis of Nexgen Foods and Feeds happened. We stared this venture in the year 2011 with 4 directors and about 120 employees. We now have a total of 10 directors in our board.

In 2012, we first launched floating feeds for fresh water fish under the brand name of "**Kingfish**" at our first plant at Bommuluru, near Hanuman Junction, Krishna District, Andhra Pradesh with a production capacity of 60,000 metric tons per annum. The response was highly encouraging right from the beginning and we could achieve a sale of 20,000 metric tons that year. We doubled our production capacity to 120,000 metric tons in 2013 and achieved a sale of 62,000 metric tons. We upgraded our feed mill the same year with a state-of-the-art Quality Control laboratory equipped with an NIR facility. In 2015, Kingfish emerged as India's number one floating fish feed brand, with a total sale of 115,000 metric tons. We initiated the Research and Development arm of the company in 2016 while touching a magic sale figure of 150,000 metric tons. "**ifeed**" our shrimp feed brand was visualized during November that year.

"**ifeed**" was officially launched on 9th January 2017 and in the debut year itself, we achieved a sale of 40,000 metric tons and touched 90,000 metric tons the following year. In 2020, "ifeed" achieved a supply of 136,000 metric tons while "Kingfish" achieved 200,000 metric tons. We enhanced our production capacity to 300,000 metric tons for "ifeed" and 200,000 metric tons for "Kingfish" in 2021 and plan to achieve our highest production this year. This has been our journey in the feed business so far.

AO: Do you have any technical collaboration with experts in India/abroad in feed formulation and what are your strengths that helps you maintain high quality standards in both fish and shrimp feeds?

AVS and MVM: When we envisioned the plan to enter into feed production, we spoke to several technical experts within India and abroad, attending several technical seminars and conferences. We listened to every word that each expert said with rapt attention and imbibed every bit of information that they shared. We also engaged the services of a leading consultant from the US, Dr. Tim O' Keefe for a brief period and have the best Indian technical experts within our fold. Some of the key factors that help us maintain our high quality standards are:

Quality of Raw material used: Almost every expert that we spoke to, advised us to focus our maximum attention on one major aspect – the raw material quality. We have been meticulously following this advice and this has shown results. We have our people to monitor "Quality at source. Our QC team approve the quality of the material after physical inspection as well as lab screening and are personally present when the vehicle is being loaded.

Equipment and Machinery: Our plant has advanced feed production technology with the latest machinery (IDAH for shrimp and Muyang for fish). This plant is supported by a modern QC lab with the latest equipment that help in screening of raw materials and finished goods.

Manpower: We have a qualified and experienced technical team who manage our plant 24 x 7. We also

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Mr. A.V. Subrahmanyam, Managing Director

have a dedicated marketing and technical services team who help the farmers in achieving the maximum output from the feed.

Feed Formulation: Sound formulation and a non-compromising policy is one of the main reasons for our roaring success and sustained growth. Our formulation is also season based to ensure best results in all 365 days of the year.

R & D backup: We have over time, developed a strong R & D wing that is called the Nexgen Innovation Centre (NIC). This wing carries out field trials both in our own R & D ponds as well as in farmers ponds almost 6 months prior to the actual launch of the feeds to ensure that the feed quality is best from the day 1 of use.

Feedback: We also have frequent interactions directly with the farmers at the grassroots level and give maximum weightage for their observations and views. This is the main yardstick to understand where we stand. All these aspects are responsible for our feed emerging as the number one super performance shrimp feed.

The key features of this feed include providing fast growth, good survival, robust shrimp and low feed conversion ratio. A well managed farm stocked with good quality seed and using our feed can easily achieve breakeven point in 45-50 days and complete harvest within 90 days of culture.

AO: What is your market share in the fish and shrimp segments? What is your penetration within India and abroad?

AVS and MVM: Today Nexgen Foods and Feeds has a market share of 20% in fish feeds and 12% in shrimp feeds. Our major markets include the states of Andhra Pradesh, West Bengal, Bihar, Jharkhand, Tripura, Uttar Pradesh, Maharashtra, Tamil Nadu, Gujarat and Odisha. Our staff strength has also built up to 1500 personnel now. Over the years we have acquired almost all certifications required that comply with world quality standards while building the trust of our customers. These include – CAA registration, ISO certification, HACCP approval, EIA approval, BAP certification and Halal India certificate

AO: Why are the feed prices on the uptrend? Is the price increase in raw material forcing feed mills to look for alternate ingredients? Will this affect the quality in any way?

AVS and MVM: Farmers should be aware that the feed price is totally dictated by the prices of raw materials and there is hardly anything that a feed company can do about this, as It is the global demand that drives the prices of all ingredients. Shipping cost or container freight cost has increased fivefold since COVID-19 pandemic began. As a result, the cost of all imported raw materials has increased correspondingly. Within India too, the cost of several materials that we use have seen a quantum jump during the last 3 years. The cost of polythene bags used for feed bags have doubled; the price of minerals has doubled; the cost of boiler husk has seen a fourfold increase; soya lecithin that was Rs.100 a kilo is now Rs. 275. Similarly, the cost of fish meal, fish oil, whole wheat Maida and Soya meal have also increased beyond imagination. Recently, GST has been added on several ingredients which adds to the cost. Rise in feed prices was therefore inevitable and it was not in our hands.

Inspite of the steep increase in the prices of raw materials, Nexgen Foods and Feeds has not

The finished product godown of Nexgen Foods and Feeds

Farmers and other stakeholders in the sector complain of high feed prices all the time. On the other hand, let us look at the lease value that a farmer gives for leasing out a shrimp farm. It has become ridiculously high. Yet no one talks about this. Such high lease values make farming totally unviable unless the prices are high and the farmer gets and extraordinarily successful crop.

experimented with any new ingredient and we have not made any major changes in our formulation because of the fear that it might affect the product quality. Under such situations, we just cut down on our margins so that we do not have to alter feed prices. All the directors of Nexgen Foods and Feeds have their own businesses and do not depend on this venture specifically. So, we kept the formula unchanged so that the feed quality remains the same.

AO: You have an established feed brands for Carps and Shrimp. Is Nexgen Foods and Feeds looking forward to producing feeds for other species, particularly because species diversification is much talked about now and famers are also looking for other species to farm?

AVS and MVM: Apart from feeds for carps and pangasius, we also have feeds for Murrels and Tilapia. In fact, we have a strong R & D wing for Murrels on which we have been working a lot. We are also one of the very few plants in India that has a twin screw extruder; a machine that can produce feeds with 10% fat and 50% protein. So, we are prepared and can produce feeds for any finfish species at any point of time, whenever there is a demand.

AO: There is a lot of pressure now on aquaculture to use sustainable ingredients for feed production especially because products like fishmeal and fish oil are getting scarce. Are you looking for alternate ingredients as well?

AVS and MVM: Presently we are against taking risks with alternate ingredients as we fear that it might affect the quality of the finished feed. Like it is in the rest of the world, the Indian fish feed industry is also passing through a very challenging period. In order to experiment with alternate ingredients, we need to enhance the working capital, which at this juncture is painful. Bankers are not interested in increasing the OD limits. We will have to bring in new promoters for this.

AO: Functional feeds are gradually growing in popularity among farmers in India. What is your take on such feeds?

AVS and MVM: We believe that functional feeds will play a key role in the success of finfish and shrimp in the coming years to overcome specific disease issues being faced by the sector. In fact, a couple of years ago, we have launched a specific functional feed, that targets white gut and white faeces syndrome in vannamei. This has become quite popular among farmers and is being widely used now.

What is your outlook for the shrimp aquaculture industry in the coming years?

AVS and MVM: We expect that aquaculture will only increase further from here. The situation should be

comfortable because of the stable demand. In Andhra Pradesh, there is no profit in paddy and therefore most farmers will switch over to farming fish for better profitability.

AO: Unlike most other feed companies, Nexgen Foods and Feeds has only a limited range in Healthline products. Why is it so?

AVS and MVM: Actually, we were reluctant to enter into this business. However, our feed dealers expressed that most farmers were a confused lot with regard to Healthline products because there are so many of them available in the market, each claiming to be superior to the other. Further, there are no specific quality standards laid down by authorities for such products. So, they wanted us to provide them high quality products that were of the same quality standard as our feeds.

It was on their repeated request that we launched 4 key products that farmers use all the time – a water probiotic, a mineral mixture, Zeolite and a photosynthetic bacterial (PS) based probiotic for the pond bottom. Presently, the ingredients are imported from the best sources and blended/repacked here, but our own plant is under construction for production soon.

We really do not encourage the farmers to use any additives while using our feed as we already pack our feed with higher levels of key nutrients. We also do not use synthetic binders and prefer gluten-based binding. Feed is designed in such a way that it has a stability of a little over two hours and provides better digestibility.

AO: What are the other businesses that Nexgen Foods and Feeds is into? What are your future plans?

AVS and MVM: As you are aware, we already have a modern lab for water quality and seed quality analysis. This is to help our farmers get the best service possible. We are now starting a Shrimp hatchery in Visakhapatnam. We have already acquired the land for its development and applied for necessary permissions. The capacity of this hatchery would be 1 billion seeds per annum.

The Directors from L to R: K. Kushal, CEO; K. Prabhakar Rao, Director-Farms; A. V. Seshadri, COO; T. Srinivas, CMO; A. Chaitanya, Director-Operations; Dr. M. V. D. Malleswar Rao, Director-Technical; K. Rajashekhar Rao, Director-Operations; P. V. Ramana, Director; K. Satyanarayana Director-Infrastructures; K. Murali, Director; K. Appa Rao, Director Finance along with A. V. Subrahmanyam, Managing Director (sitting)

We also are into the seafood processing and export business mainly to support the farmers who use our feed and require our assistance in marketing their produce. It is marketed under the "Nexgen Foods and Feeds brand". Presently we get it done under a 3rd party arrangement and process about 10 MT per day which is around 300 MT a month. Our own plant is under construction and will be commissioned in August 2022. This will have a capacity of 40 MT per day.

We propose to develop another feed mill near Kharagpur in West Bengal for production of both shrimp and fish feeds which is mainly to cover West Bengal and the North Eastern states which are slowly emerging as a significant market now.

I must also add that Nexgen Foods and Feeds is involved in a lot of CSR activities. We support around 15 organizations as a part of this programme. We have donated Oxygen Plants during the Covid-19 pandemic, provided free groceries to flood affected people in Nellore, supplied books to schools and needy students, support orphanages and organizations that work for the blind. The activities continue as a part of our regular work schedules.

AO: What is the message that you wish to give the Shrimp farmers in the country?

AVS and MVM: We are presently in a period where quality and sustainability aspects are given utmost importance by seafood consumers the world over. It is therefore very important that our products meet the above requirements and for that we should farm scientifically, sustainably and stay abreast with the latest technology available. From our experience, we can firmly say that farmer involvement in all day-to-day activities of the farm is the key to success. Unnecessary expenditure on inputs should be avoided and efficiency enhanced. Placing adequate and experienced manpower at the farms and good seed selection are the other important aspects that determine the success in a farm.

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PROTECTING SHRIMP FARMING FROM BIOSECURITY RISKS

Rangareddy Koppula[1], Maria-Merce Isern Subich[2] and Ruth Garcia Gomez[3]

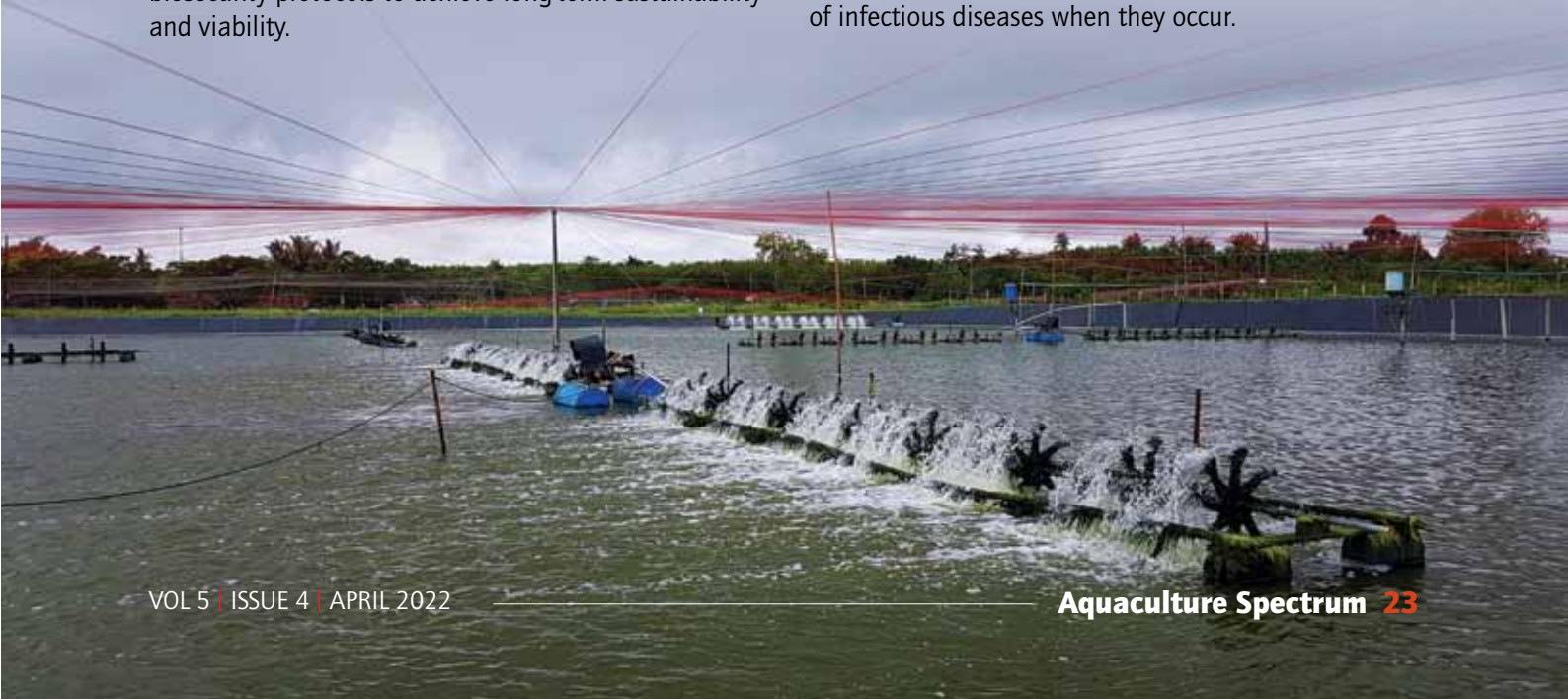
[1]Product Manager AHCP-Avanti Feeds
[2]General Product Manager Aquaculture Health-Adisseo
[3]BMD Fish Health and Farm Care APAC/ISC-Adisseo

Biosecurity strategies in shrimp farming

The continued growth in terms of expansion, intensification, and transformation of the shrimp farming sector world wide has entailed serious productive limitations, mainly associated with limited performance of farmed stock, low economic profitability, and development of infectious diseases. Current trends in relation to the limitation of the use of antimicrobials (including antibiotics, parasiticides, antifungal and antiviral veterinary drugs) in aquaculture, mainly associated with more stringent national regulations and consumer concerns, have motivated the shrimp farming sector to seek more sustainable and long-term alternatives to optimize and maintain the health of shrimp culture stock. Therefore, the shrimp farming sector is currently paying special attention to on-farm biosecurity protocols to achieve long-term sustainability and viability.

In shrimp farming, the relatively new concept of 'biosecurity', commonly known in the past as 'shrimp health and farm care', involves the design and implementation of preventive as well as corrective standardized protocols and operations to minimize the probability of introduction of infectious pathogens– including bacteria, viruses, parasites and fungi – into the shrimp farm from different sources and pathways – including water, soil, feeds, shrimp stock, equipment, vehicles, people and wildlife – and their subsequent distribution to the different shrimp farm production zones.

In other words, aquatic biosecurity outlines the protocols and operations put in place to protect your shrimp farm from infectious agents. These protocols and operations will reduce the risk of infectious agents entering and spreading within your shrimp farm, will prevent health issues emerging at the farm, and will reduce the impacts of infectious diseases when they occur.



Historically, the concept of shrimp health management and biosecurity was developed during the 70's and 80's due to the increased impact of infectious diseases in the sector, and it was primarily applied to the origin, movement, and health status of shrimp stock and shrimp health surveillance. Along the past decades, the concept of biosecurity in shrimp farming has deeply evolved in order to become a much broader approach, which encompasses the minimization of any pathogen risk entering and being distributed at the farm level.

Therefore, major components of any shrimp farm biosecurity strategy are focused on managing any possible **source and pathway** for the introduction and spread of infectious pathogens within the farm:

- **Shrimp stock:** origin, genetic, movement, health status, risk management (e.g., disinfection prior transport), general surveillance and targeted surveillance.
- **Water and soil:** quality, surveillance, maintenance (e.g., disinfection during culture and prior stocking), waste water management, transport water management, and possible water contamination.
- **Feeds, including live and pelleted feeds:** origin, quality, raw materials, transport, storage, monitoring and possible contamination.
- **Equipment:** origin, maintenance, risk management (e.g., cleaning and disinfection), and movement.
- **Vehicles:** origin, maintenance, management (e.g., cleaning and disinfection), and movement.
- **People, including staff, visitors and contractors:** record-keeping, origin, and risk management (e.g., footbath, disinfection of shoes, hand washing and disinfection, and change of clothes).
- **Movement of stock, equipment, vehicles, and people:** record-keeping and management of targeted movements.
- **Wildlife, including vermin, pets, and wildlife:** assessment and risk management.
- **Early warning systems:** for major infectious diseases.

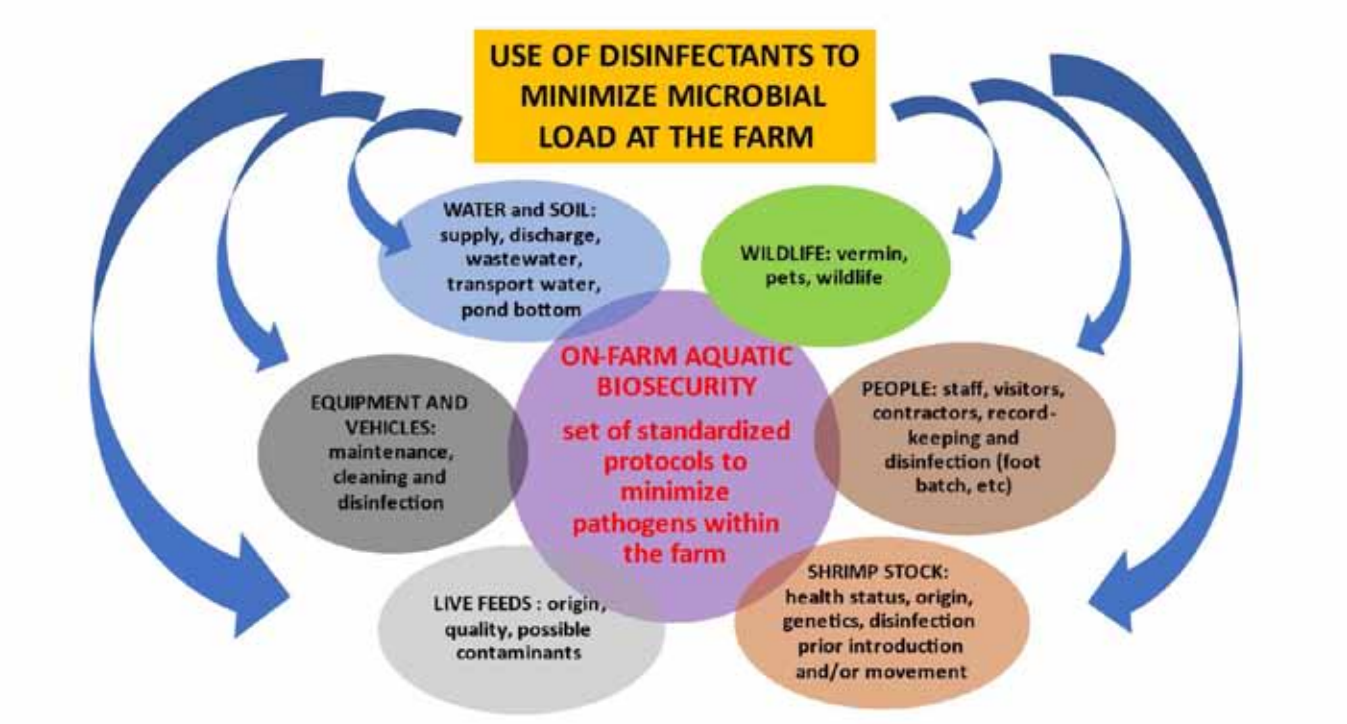


Figure 1 presents a general overview of the different sources and pathways of infectious pathogen introduction and spread within a shrimp farm (e.g.,water, soil, equipment, vehicles, feeds, shrimp stock, people, and wildlife), where the use of disinfectants is key to minimize the probability/ likelihood of infectious pathogen introduction and spread.

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• **Contingency and emergency planning:** in case of infectious diseases outbreaks and other critical situations.

• **Continuous training and capacity building of farm staff:** continuous awareness raising and capacity building of farm staff regarding biosecurity risks and the relevance of biosecurity protocols and operations is key for success. Biosecurity training programs must be customized and adapted to the different roles and responsibilities of farm staff.

Disinfectants are one of the most important 'biosecurity tools' towards the minimization of pathogen load at the shrimp farm, but they are not the only one: a standardized use of disinfectants at the shrimp farm must be combined with other biosecurity protocols and operations targeting stock, water, soil, feeds, equipment, people, and their movements, which should be developed to address any possible source of introduction and spread of infectious pathogens into the shrimp farm.

Item to be disinfected	When to disinfect	How to disinfect
Pond water	When filling up the pond and along the production cycle (weekly/ by-weekly, or as required based on farming conditions).	Application of a stock solution of the disinfectant in pond water near the aerators for better distribution.
Pond bottom/sediments	At harvest and prior stocking.	Application of a stock solution of the disinfectant in pond bottom (earthen or linen pond) and sides.
Pond water/pond bottom, equipment, stock, and other contaminated farm items, in case of an infectious disease outbreak	In case of a confirmed disease outbreak and/or abnormal mortality and/or abnormal clinic signs and symptoms.	Disinfection of pond water, pond bottom, equipment, stock, etc (any farm item susceptible to be contaminated with the infectious agent).
Equipment and material	Cleaning and disinfection.	Disinfection of farm equipment by dip (short time/high disinfectant dose) or by bath (long time/low disinfectant dose) after cleaning in regular bases (daily).
Vehicles	Cleaning and disinfection of wheels/ other parts of the vehicle when entering/exiting the farm and critical zones within the farm.	Cleaning and disinfection of wheels/other parts of the vehicle by dip (short time/high disinfectant dose).
People (staff, visitors, and contractors)	Standard disinfection protocols (e.g., footbath), and access limitations to authorized personnel.	Foot bath and disinfection of hands by dip (short time/high disinfectant dose). Badges and colour coding for specific working zones depending on the assessment of pathogen risks.
Shrimp stock	Health screening and disinfection.	Disinfection of stock prior stocking at the different production stages by dip (short time/ high disinfectant dose) or bath (long time/low disinfectant dose).
Shrimp broodstock	Health screening and disinfection.	Before breeding,to minimize microbial load and minimize stress levels, by dip (short time/high disinfection dose).

Table 1 presents a summary on the use of disinfectants applied at the different items and stages of shrimp farming, linked with contamination pathways.

Biosecurity protocols and operations should be preventive in nature, although corrective when and if needed. It should be cost-effective, affordable, focused on major primary, secondary and opportunistic pathogens encounter at the farm, and unchallenging to carry out. Further more, biosecurity protocols require frequent and adapted training of farm personnel.

The burden of diseases in shrimp farming

It is well known that disease pressure is increasing in aquaculture worldwide– although with certain degree of variability depending on farmed aquatic species, farming systems and intensification level. Semi-intensive to intensive shrimp farming systems in India have been facing a notable increase in infectious disease pressure in the past few years.

It should be highlighted that not only clinical and primary infections cause production losses, subclinical diseases and secondary infections are very common hidden threats in the shrimp industry, causing a major profitability decrease. Consequently, aquatic biosecurity protocols should place special attention to clinical as well as subclinical infectious diseases, with special emphasis on emergent pathogens.

As an example of important infectious pathogens, bacterial diseases caused by Vibrio spp., either as primary or as secondary pathogens still have a tremendous impact on shrimp farming, mainly leading to loss of production and limited profitability. Vibriosis is one of the most severe bacterial diseases in shrimp aquaculture and is caused by the infection of pathogenic and/or opportunistic Vibrio bacteria. It can lead to mortality of up to 100 percent and is estimated to cause the shrimp sector US$ 3 billion in global losses a year.

As an example of emergent infectious diseases, these past few years the shrimp farming industry has faced two relatively new, non-viral diseases that have had a major global impact on production: Early Mortality Syndrome or Acute Hepatopancreatic Necrosis Disease (EMS/AHPND), and Hepatopancreatic Microsporidiosis or EHP, named after the responsible pathogen (*Enterocytozoon hepatopenaei*). Estimated losses caused by these two new pathogens have been over $1 billion annually at global level.

Infectious diseases are commonly leading to production losses, low profitability, low growth rate, high mortality, and low quality of the final product, among many other problems. The use of effective disinfectants in shrimp farming is key for increased sustainability and profitability. Obviously, a well-structured cost effective on-farm biosecurity strategy designed to manage the aforementioned and many other aquatic pathogens must be preventive in principle; therefore, the use of disinfectants is crucial to minimize pathogen load within the shrimp farm.

Disinfectants are the first firewall against pathogens entering or increasing their population within the farm. They should be used following standardized disinfection protocols in order to be effective and their cost adequately amortized. Inadequate application of disinfectants (inadequate dosage, frequency of use, item to be disinfected) will lead to poor disinfection results.

What is a disinfectant?

Disinfectants are defined as chemical agents that are used especially on hard surfaces, equipment and in water to destroy, inactivate, or significantly reduce the concentration of pathogens (such as bacteria, viruses, parasites, and fungi).

Disinfectants can be classified in many ways, for example, based on their most common use, including water, air, and surface disinfectants. Although disinfectants are commonly classified into two broad groups, oxidizing and nonoxidizing. Most common disinfectants are oxidizing chemical products.

Why disinfectants are so important in cost-effective shrimp health management protocols?

Infectious diseases have been identified as the major threat to current shrimp farming production and its future expansion. Increased levels of intensification, extreme weather events and climate change challenges are some of the factors associated with the occurrence of infectious pathogens.

Disinfectants are a key component of any preventive on-farm biosecurity strategy, leading to a notable

decrease of pathogen loads in all steps of the production chain.

Adequate application of disinfectants will lead to better pond management and shrimp health improvement, promotion, and maintenance. As previously mentioned, there are many other components of a preventive on-farm biosecurity strategy, such as improved nutrition, use of functional feeds, active health surveillance, and early detection and action in case of disease outbreaks, among many others.

When thinking in the ecological triad (host-pathogen-environment) that is behind any infectious disease in shrimp farming: disease is the result of a prone environment, a susceptible host, and the presence of an infectious pathogens. Disinfectants are crucial in minimizing infectious pathogen related risks.

What are the desired attributes and merits of an aquaculture disinfectant?

What most farmers have in mind when thinking about the most desirable attributes and characteristics of a disinfectant is that these chemical products should be:

1. Affordable.
2. Easily available.
3. Safe for users, shrimp stock and environment.
4. Wide spectrum against primary and secondary pathogens (bacteria, viruses, parasites, and fungi).
5. Stable.
6. Highly effective.
7. Applicable to surfaces, water, and equipment.
8. Easy to use in all steps of the production chain.

AVANT-AQUADIS is a disinfectant product composed of a synergic combination of potassium sulphate salts – as a triple salt-based disinfectant –and sodium chloride. It belongs to the family of 'new disinfectants', which are composed of a 'synergic blend of different chemical products', as compared with 'traditional disinfectants', which are 'one single chemical product' (e.g., iodine, formalin, chlorine, ethanol).

New disinfectants such as AVANT-AQUADIS, have important comparative advantages and additional desirable attributes and merits as compared with traditional disinfectants, such as: broader spectrum against microorganisms, safer use, more environmentally friendly, longer action, less corrosive, and more stable in contact with organic matter, among many others. Therefore, new disinfectants have relatively higher prices compared with the traditional disinfectants such as hypochlorite, formaldehyde, iodine, or ethanol, based on their additional positive attributes.

Comparison between triple sulphate disinfectants, such as AVANT-AQUADIS,with traditional single-compound disinfectants

AVANT-AQUADIS has important merits compared with single-compound traditional disinfectants, such as hypochlorite, iodine, ethanol, formalin, etc. A summary of the most relevant attributes compared with single-compound products is provided:

- It is not rapidly inactivated by organic matter.
- It is highly stable and does not decompose rapidly.
- It has a wide spectrum against virus, bacteria, parasites, and fungi.
- It retains it antimicrobial activity even after storing for 2 years in appropriate dark and cool storage conditions.
- It is less corrosive than most traditional disinfectants.
- It is easy to use.
- It is safe and non-toxic for humans, farmed stock and the environment.
- It is 100% biodegradable.

A reference stock solution of 1% AVANT-AQUADIS remains stable for up to seven days. Furthermore, the stock solution is soil tolerant meaning that the same percentage solution can be used for a wide variety of disinfecting situations likely to be encountered.

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THE FUTURE OF INDIA'S AQUACULTURE SECTOR DEPENDS ON SUSTAINABLE FEED INGREDIENTS

Aker BioMarine, a global biotech innovator and krill harvesting company, has been present in the Indian aquaculture segment since 2017. Today, the company continues to help Indian aquaculture farmers produce better outcomes with its cost effective and sustainable krill meal ingredient.

The future of aquaculture in India, and all over the world, heavily depends on sustainable and functional feed ingredients, such as krill. Antarctic krill products have emerged as strong contenders for aquaculture due to their sustainable sourcing and significant health benefits. When it comes to aquaculture, studies and review papers all conclude that there are many benefits of krill meal.

A look below the surface to better understand the krill biomass

Krill might be small in size, but they are big in benefits. Krill is a species of zooplankton invertebrate that exist in every ocean around the globe. Living in the pristine and unpolluted waters of the Southern Ocean, Antarctic krill are virtually free of environmental contaminants and toxins. Antarctic Krill (*Euphausia superba*), are among the largest of the 85 known krill species and make up one of the world's largest single species marine biomass. About the same size as a paper clip, krill move in huge swarms throughout Antarctic waters and spend most of their life feeding on microscopic algae. They play a key role in the ecosystem, being an integral part of the survival of many marine species. Antarctic krill is one of the most abundant marine biomasses on the planet.

The benefits of krill in aquaculture

For more than a decade, krill meal has been a sustainable option for improving aquaculture feed quality for farmed fish and shrimp around the world. Being a rich source of omega-3's in phospholipid form, in addition to the range of amino acids and micro nutrients, krill is by nature a well-suited package of nutrients to support healthy growth in fish and shrimp.

Krill helps benefit optimal growth and survival in farmed fish and shrimp, and it also aids in the prevention of skeletal deformities and helps with stress resistance. Associated cost benefits are possible by using krill meal instead of other feed options.

India, a key market for krill

India is considered one of the world's largest markets for shrimp and known to many in the industry as the "shrimp garden of the world". In 2020-21, the country exported nearly 11.5 million tons of seafood, with frozen shrimp comprising the majority. Shrimp farmers in India continue to seek ways to improve profitability and productivity, with higher survival rates and larger-sized shrimp serving as key opportunities.

"India is a major exporter of shrimp to the U.S., European and Asian markets, and its position in the shrimp industry will depend on its ability to remain competitive, run sustainably and meet higher productivity targets – through bigger and healthier shrimp. The dietary feed plays a major role in helping shrimp producers achieve these goals, which is why it is essential to uncover the functional ingredients, such as krill meal, that can help them achieve optimal results," said Atul Barman, Director & General Manager, Aker BioMarine India.

Aker BioMarine partners with ICAR on new shrimp study

A new study, conducted by India's Central Institute of Brackishwater Aquaculture (ICAR) and Aker BioMarine, concluded that krill meal is a beneficial functional ingredient for Whiteleg shrimp (*Penaeus vannamei*) dietary feed. The eight-week feeding trial revealed that inclusion of 4 to 6% krill meal in the diet can lead to higher body weight and greater survival among the shrimp.

"The shrimp industry is in pursuit of more sustainable and beneficial dietary feeds, and it is important to

understand how functional ingredients, such as krill meal, can lead to better outcomes. This recent shrimp study out of India indicates that krill meal inclusion, at levels between 4 to 6%, can have a positive effect on shrimp survival, body weight and fatty acid concentration in the body," said Lena Burri, Director R&D, Animal Nutrition and Health, Aker BioMarine.

Run from the ICAR facility in India, this feeding trial analysed the impact of krill meal on shrimp diets with moderate (12%) and low (6%) fishmeal concentrations. Varying amounts of krill, between 0 to 6%, were added to these diets, which the shrimp received thrice daily throughout the experiment.

Key findings include:

• Shrimp fed 6% krill meal in the diet had the highest body weight at the end of the study.

• Shrimp survival was significantly increased in the groups fed 4% and 6% krill meal in the diet.

• When 6% krill meal was included in the diet, the shrimp showed a higher content of n-3 polyunsaturated fatty acids.

• 2% krill meal in a diet containing 12% fishmeal significantly increased the expression of six immune-related genes in the hepatopancreas of the shrimp.

"The results of this experiment show that krill meal, when supplemented in amounts between 4 and 6%, is a beneficial functional ingredient for both moderate and low fishmeal diets. This finding is based on the increased growth performance in the groups consuming krill meal and overall improved survival rates, leading us to our conclusion that krill meal can be a viable supplement to fishmeal in shrimp feeds," said Dr. Ambasankar, ICAR.

QRILL Aqua, a superior ingredient from biotech leader, Aker BioMarine

QRILL Aqua is a sustainable, nutrient-rich feed ingredient made from grinded and dried Antarctic krill. It functions as a feeding stimulant leading to increased feed uptake and enhanced growth. QRILL Aqua is also proven to improve health of fish and their stress tolerance. QRILL Aqua is a unique solution as it contains phospholipid-bound omega-3 fatty acids, proteins, astaxanthin (the biologically active antioxidant) and minerals.

QRILL Aqua is produced by Aker BioMarine, a global biotech innovator responsible for building a global and sustainable industry for harvesting krill. Aker BioMarine, a 15-year-old company, is part of the Aker Group, established in 1841. For more than 180 years, Aker has explored and innovated. The company has always been dedicated to nature's resources and along the way, it has pioneered industries with new ideas, methods and products.

Raising the bar in the industry

Since day one, the team at Aker BioMarine has believed in a world where everyone would have access to quality nutrition and good health without compromising the future of the planet. When it comes to aquaculture, sustainability is essential, and it's a core part of Aker BioMarine and QRILL Aqua.

60% of global fish stocks are either overfished or fished to capacity. A shift away from overfished marine ingredients is needed for sustainable growth in aquaculture. QRILL Aqua is a reliable and sustainable sourced marine ingredient that enables farmers to to do more with less.

Global challenges such as loss of biodiversity, resource scarcity and climate change will impact and drive the future of the ocean. Creating long-term worth in a global fishery requires a business approach that values both opportunity and responsibility. Aker BioMarine is not just harvesting krill in the Antarctic in a sustainable way – the company is helping to improve the health of the oceans.

Ensuring the well-being of the krill biomass and the Antarctic ecosystem is Aker BioMarine's top priority. With the unwavering commitment to management through best practices, precautionary actions, and contributions to science and monitoring, Aker BioMarine is working actively to protect ecosystems, reduce industrial footprints, and contribute to healthy and sustainable nutrition systems.

Aker BioMarine's Antarctic krill fishery was recently awarded an A-rating from the Sustainable Fisheries Partnership (SFP) in the 2021 review. This marks the seventh consecutive year that the company received this recognition from SFP, an independent, non-profit organization responsible for the most up-to-date assessment of stocks and fisheries. An A-rating from SFP is only achieved if the fishery earns more than eight points (out of 10 possible), indicating very well-managed fisheries. Aker BioMarine's Antarctic krill fishery topped the list for the 2021 review, earning between eight to 10 points in all categories – the highest among the evaluated fisheries.

In addition to the company's sustainability position, Aker BioMarine is 100% vertically integrated. By owning and operating its entire value chain, traceability and transparency are always top of mind. The company's integrity and standards are raising the bar in the aquaculture industry.

Growing the aquaculture market in India

Aker BioMarine has been creating an impact in the Indian aquaculture segment since 2017. In the last couple of years, the company has seen very solid market growth and demand for QRILL Aqua in shrimp aquaculture. Currently, Aker BioMarine caters to large and medium size customers in the market who are looking to include krill meal to produce grower diets for enhancing shrimp growth. Others include krill in functional feed for better stress tolerance.

"As Indian aqua feed millers are looking to reduce dependence on fish meal due to sustainability concerns as well as issues related to the inconsistent quality, supply and price, krill meal is becoming a more attractive option," said Atul Barman, Director & General Manager, Aker BioMarine India. "Krill meal is a highly sustainable and traceable material with consistent quality and stable supplies and pricing."

Due to a growing demand and the need to reduce turnaround time, Aker BioMarine set up a local warehouse in Chennai to keep buffer stock for large customers and to cater to immediate requirements of medium sized customers.

At Aker BioMarine (QRILL Aqua), the teams are committed to customer centricity. In India, the team is helping their customers stand out in the marketplace by sharing global product expertise and market insights.

"We are applying our global research and experience to help our customers find local solutions; we are even doing trials of low inclusion of krill in shrimp diets under local conditions," added Barman. "For our customers, we have sought to be more than just a supplier. We are a partner, who brings valuable insights, introduces new market opportunities, and guides our customers for growth and product expansion. By working in sync to co-create unique value, we are pushing the industry forward. Our constant endeavour is to build strong strategic partnerships with aqua feed producers and together, help the Indian shrimp industry find success."

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Today, aquaculture produces more than half of the fish used for human consumption. With a growing global population and an increasing demand for sustainable sources of quality protein, the aquaculture industry must adapt and develop to meet the challenges. This requires a deep understanding of its emerging needs and adoption of new technologies and innovations across the value chain.

Benchmark plc is a leading aquaculture biotechnology company, pioneer in sustainable solutions for aquaculture production. Its mission is to drive stability in aquaculture by delivering products and solutions that improve reliablity and profitability for aquaculture producers through better yield, quality, animal health and welfare. Benchmark focuses on three complementary business areas that are critical to the productivity and sustainability of aquaculture across the production cycle:

- **Genetics**
- **Advanced Nutrition and**
- **Animal Health**

Benchmark companies present in India:

Nutrition

Benchmark Advanced Nutrition operates in the global market as **INVE Aquaculture**, a leading brand established in the market more than 30 years ago. With local offices and teams in 27 different countries, we are always ready to assist customers with our expert advice and breakthrough solutions that span our three domains which are essential to aquaculture production:

Delivering continued genetics improvements
Improved genetics provide a crucial starting point for production efficiencies and health resilience

Adding value at key points in the production cycle
High performance nutritional solutions for shrimp and marine fin fish enhancing health and production efficiency

Leading provider of specialized health solutions
Specialized solutions for some of the most persistent disease and fish welfare challenges

optimization of animal nutrition, careful management of animal health and rigorous control of the culture environment. Through INVE's three research centres in Belgium, Italy and Thailand, we bring the tools and methodologies at the forefront of the aquaculture industry to allow our customers to grow sustainably.

Genetics

Benchmark Genetics is the global leader in aquaculture genetics, and it is present in every major aquaculture market for a wide range of species. Benchmark focuses in three main species with five in-house breeding programmes for **Salmon, Shrimp, and Tilapia**. With over 240 professionals, including 22 geneticists and researchers, Benchmark Genetics places at the reach of our customers all the knowledge and the extensive accumulated experience gained in 30 breeding programs for 20 aquatic species. This experience and know-how, together with our highly bio secure production and customer centric technical support has positioned **Benchmark Genetics as the world's leading genetics supplier for the salmon farming industry**. Benchmark Genetics comprises the companies Benchmark Genetics Norway AS, Benchmark Genetics Iceland H.F., Benchmark Genetics Chile, Spring Genetics and Benchmark Genetics Shrimp, and has breeding centres located in Norway, Iceland, Chile, the USA, Brazil, and Colombia.

Benchmark genetics shrimp

Benchmark operates a world-leading breeding program for Penaeus vannamei. From its modern and biosecure Elite Multiplication Centre in Fellsmere, FL, USA, Benchmark Genetics Shrimp develops, produces,

and globally distributes genetically improved, high performing SPR/SPF Shrimp strains with improved growth and efficiency, specially adapted to modern farming conditions. Benchmark applies in its product development the latest breeding technologies such as DNA tools, parental assignment and Genomic Selection, to improve growth levels and resistance to diseases such as WSSV and AHPND.

Our stock

Our stocks have a broad genetic base originating from multiple geographical sources, making it possible for us to select for today's conditions and future needs, and to develop strains genetically adapted to the different farming conditions.

Biosecurity

As the core of the breeding program, biosecurity is the main priority in all our operations. Our Elite Multiplication Centre in Fellsmere, US is situated 30km from the sea, securely isolated from other aquaculture productions or wild shrimp sanitary risks. Our strains are SPF certified by the University of Arizona (UAZ); health surveillance status conducted with the chain of custody of a U.S. Department of Agriculture (USDA) accredited veterinarian. All our strains are SPR for TSV, IHHNV, NHP, and our BMK Protect strain is also resistant to WSSV and AHPND.

Global Knowledge at your service

We work in tight collaboration with our sister companies Benchmark Genetics Norway (former Akvaforsk Genetics) and INVE to continually develop and optimize the value of our offer to the global shrimp market. Our customer centric strategy is consolidated by our local qualified sales and technical teams, providing a committed customer technical service, before, during and after the delivery.

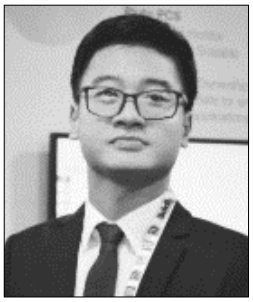
Product range available for the global market

SPF SPR BMK Protect®

SPF SPR BMK Yield®

SPF SPR BMK LowSal®

For more information, please contact:



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Cypermethrin	10%

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Enrofloxacin	50% & 80%
Doxycycline	50 % & 80%
Oxytetracycline	80%
Neomycin	50% & 20%
Ciprofloxacin	50%
Trimethoprim	16 %
Sulphamethoxazole	80%

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SHRIMP CROP REVIEW 2021

Society of Aquaculture Professionals, Chennai

The Society of Aquaculture Professionals organised a review of the shrimp crop in 2021 on February 24, 2022 in Chennai, India. The exercise involved estimation of shrimp production by regions, discussion on challenges experienced by shrimp farmers and other stakeholders in 2021, and prediction of trends for production in 2022.

India registered the highest ever production of farmed shrimps in 2021, estimated at 930,000 MT. Expansion of shrimp farming area, increase in the number of crops and conversion of fish farms to shrimp farms contributed to the increase in production. Cyclone Yaas, floods and unseasonal rains hit shrimp production in West Bengal, Odisha and South Andhra Pradesh and resulted in lower production from these regions. Andhra Pradesh continued to remain as the largest shrimp producing state of India. The state produced nearly 75% of the total Indian Shrimp production while three of its districts, Krishna, West Godavari and East Godavari, produced 75% of the state's production. Disease outbreaks due to WSSV, EHP and pathogenic vibrio limited the shrimp production while Industry managed the second wave of COVID-19 without much impact on shrimp production. Rapid increase in the raw material pricing resulted in the rise of feed prices and impacted profitability. Introduction of SPF Black tiger shrimp proved to be a success and has created a lot of

Estimated Farmed Shrimp Production in 2021 by region

Region	Estimated Shrimp Production (MT)
Gujarat	28,000
Rest of West Coast of India (Kerala, Karnataka, Goa & Maharashtra)	8,000
Tamil Nadu	23,000
South Andhra Pradesh (Nellore, Prakasam and Guntur districts)	1,14,000
Krishna	1,30,000
West Godavari	2,70,000
East Godavari & Rest of North AP	1,60,000
Odisha	70,000
West Bengal	88,000
Rest of India (Punjab, Haryana, Rajasthan, Uttar Pradesh & Chhattisgarh)	9,000
Unaccounted	30,000
TOTAL	**9,30,000**

expectations among the stakeholders. However, most of the segments of the farmed shrimp sector had a tough time in managing the operations as profitability was reduced.

Gujarat: Gujarat, once predicted to be a sizeable shrimp producing state, has been in decline in the last few years due to carrying capacity challenges. Introduction of SPF Black Tiger shrimp in 2021 was a welcome development for Gujarat as it enabled the farmers produce high value, large size shrimp using lower stocking density (8 - 15 shrimp/m^2). The state ended up producing an estimated 28,000 MT of shrimp in the year, of which 3500 MT came from Black Tiger shrimp production. No major farming-related problems were reported except for occasional occurrence of WSSV and EHP in vannamei production.

Tamil Nadu: The state witnessed a higher success rate in farming vannamei in 2021 compared to previous years. However, reduction in pond area used for stocking and lower stocking densities meant that production in 2021 remained the same as in previous years. Farmers in Tamil Nadu were better placed in terms of farm gate price as the price of shrimp increased after June 2021. Most of the farmers in this region booked better profits compared to farmers from other states.

South AP: The region covered major farming areas of Nellore district (Kota, Gudur, Nellore town and Kavali), Prakasam district (Ongole, Chinnaganjam, Peddaganjam and Beeramgunta) and Guntur district (Bapatla and Karlapalem). While Nellore and Prakasam districts mainly produced vannamei, Guntur district went for more BT shrimp production in 2021. The success rate was high in Nellore district in those farms using groundwater and in Guntur district's BT shrimp production. Kavali area has had consistent production of shrimps in recent years due to strict adherence to crop holidays between February and May every year. Unseasonal, heavy rains and floods hit southern parts of Nellore district and many farmers lost their crop just before harvest.

Krishna district: Krishna district saw an expansion of farming areas, increased in the number of crops (average culture period was 70 days), stocking shrimp in ponds that were previously used for fish farming especially in the second season of 2021, resulted in production increase by 40%. Shrimp is also produced in polyculture with fish in the district and these fish ponds are larger in sizes when compared to shrimp ponds. Except for Machilipatnam and Nagayalanka, shrimp farming is done in low salinities in Krishna district and this is another factor in the success of shrimp sector in the district.

West Godavari: This district is the single largest region both in terms of farming area(ha) and shrimp production. Nearly 30% of the total shrimp production in India comes from this district in the state of Andhra Pradesh. Shrimp production expanded in 2021 and reached an estimated 270,000 MT. The reasons for increased production included expansion of farming to newly developed areas, reduced number of days of culture that increased the number of crops per year, rotation of crops from fish to shrimp in the period between July and November. Disease outbreaks were quite severe in summer months in the district. Many farmers resorted to harvesting at 60 - 80 count (12 - 16 g) due to concerns about EHP and running mortality.

East Godavari & other districts of North AP: This region includes Amalapuram, Kakinada, Vishakhapatnam, Srikakulam and Vijayanagaram. East Godavari is the second largest shrimp producing district of India and the estimated shrimp production in 2021 was 180,000 MT. Failure of crops due to EHP, WSSV and slow growth affected the shrimp production in East Godavari. Second crop was unsuccessful in EG compared to other districts of AP. Crop failures forced some shrimp farmers to opt for fish farming in the last quarter, but they were hit by poor farm gate prices of fish in 2021. Expansion of farming is not happening in East Godavari like in WG and Krishna districts. Large numbers of shrimp hatcheries are located in EG and they produce around 40% of the Indian PL production.

Odisha: Shrimp production from Odisha state increased sizeably in 2021 compared to 2020. Though the rains and floods because of Yaas cyclone affected certain parts, shrimp production registered an increase in 2021. Majority of the farms practise modern faming methods while traditional farms produced close to 8000 MT in 2021. Expansion is happening in certain pockets and the state has high potential for growth in shrimp farming. While Odisha and West Bengal face cyclones, the increasing occurrence of cyclones during shrimp farming season is a cause of concern in both the states.

West Bengal: The state was expected to produce more than 100,000 MT in 2021 but cyclone Yaas damaged the standing crop between May and June. An estimated quantity of 20,000 MT of shrimp was lost because of inundation of ponds, outbreak of diseases immediately after rains, and the destruction of infrastructure. Due to cashflow challenges, many farmers stayed away from the second crop. An estimated 88,000 MT of shrimp was produced in 2021 from West Bengal. The estimate includes shrimp production of around 15,000 MT from the traditional farming regions in and around the Sundarbans.

Rest of India: Several states in the northern part of India have entered shrimp farming in the recent years after pond culture in saline soils in the states of Haryana and Punjab showed initial promise. An estimated 9000 MT of shrimps were produced from these regions and most of the production occurred in Haryana (4000 MT). Higher cost of inputs as well as the lack of local processing plants remain as hurdles for shrimp farming growth in these regions.

Hatchery Segment: Shrimp post larvae production reached an all-time high of 100 billion, produced by about 585 hatcheries, predominantly located in Andhra Pradesh and Tamil Nadu. The highest ever number of broodstock of around 280,000 were imported in 2021, however no imports in July and August cascaded to lower shrimp production and exports in the subsequent months. Breeding companies began to offer different lines – ranging from WSSV resistant to super growth lines – in the year. Two Broodstock Multiplication Centers (BMC) became operational with an annual capacity of more than 100,000 animals.

There was a renewed interest among the farmers to do monodon farming as this species is not getting impacted by EHP and white faecal disease issues, presumably due to its feeding habits. But to increase the availability of the broodstock, the Government has to expedite the supply of broodstock from RGCA's monodon program at Andaman, consider the end of ban of broodstock imports from EMS (AHPND) affected countries and make the BMC of Moana start their operations at the earliest.

Diseases: No major new diseases were reported in 2021. However, WSSV continued to cause outbreaks from time to time in different regions and white faecal disease was reported widely. Vibrios may be becoming more virulent as farms were reporting problems when Vibrio population exceeded even 102 CFU/mL.

Conclusions: India reached a record high production of farmed shrimp in 2021 due to increased demand for frozen shrimp from USA. While it looked like a successful year for Indian shrimp farming, most stakeholders from shrimp hatchery operators to exporters had reduced profitability or even losses due to disruptions in logistics and increased cost of operations. Excess production of PLs, reduced stocking in Gujarat, West Bengal, Odisha and South AP limited the market size for the second season, thereby forcing hatcheries to sell PL at a low price. Feed companies had a tough time with unexpected price increase of raw materials like fishmeal and soybean meal and the increase in freight cost added to their losses. The farm gate price went high during the last quarter and exporters paid soaring prices to sustain their supplies to the export market. International market prices remained constant most of the months while Indian farm gate prices were high for all sizes during the last few months of the year. Stakeholders in general expressed optimism about shrimp production in 2022 but also cautioned about the steady loss of competitiveness of shrimp farmed in India.

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Leading the way

KONA BAY

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IMPORT OF SPF *L.VANNAMEI* TO INDIA DURING FEBRUARY 2022 TO APRIL 2022

S. NO	NAME OF THE HATCHERY	SUPPLIER	DATE OF RECEIPT	QUANTITY RECEIVED
FEBRUARY 2022				
1	Meenakshi Hatcheries Pvt. Ltd	SIS; Hawaii	01.02.22	1000
2	Vaisakhi Bio-Resources Pvt. Ltd	SIS; Hawaii	01.02.22	1000
3	Saran Saai Hatcheries	SIS; Florida	03.02.22	580
4	Sandhya Aqua Exports Pvt. Ltd	SIS; Florida	04.02.22	600
5	Adithya Bio Resources	SIS; Florida	05.02.22	600
6	Golden Marine Harvests	SIS; Florida	06.02.22	800
7	CP Aquaculture (India) Pvt. Ltd - Mukkam	Kona Bay; Hawaii	07.02.22	600
8	Sri Mahalakshmi Hatcheries - Nellore	Kona Bay; Hawaii	07.02.22	600
9	CP Aquaculture (India) Pvt. Ltd - Bhogapuram	Kona Bay; Hawaii	07.02.22	1200
10	CP Aquaculture (India) Pvt. Ltd - Nellore	Kona Bay; Hawaii	07.02.22	600
11	Golden Marine Harvests - Unit II	Benchmark Genetics; Florida	10.02.22	800
12	Tropical Shrimp Hatchery	Kona Bay; Hawaii	11.02.22	400
13	NSR Aqua farms Pvt. Ltd	Kona Bay; Hawaii	11.02.22	1200
14	BMR Marine Products Pvt. Ltd - Unit II	Sea Products; Texas	11.02.22	1200
15	Saivasista Hatcheries	Kona Bay; Hawaii	11.02.22	1000
16	Sai Marine Exports Pvt. Ltd	SIS; Florida	12.02.22	1200
17	Sapthagiri Hatcheries	Kona Bay; Hawaii	14.02.22	1200
18	Venkata Sai Hatcheries	Kona Bay; Hawaii	14.02.22	1200
19	Gayathri Hatcheries	SIS; Hawaii	15.02.22	1272
20	Sheng Long Bio-Tech (India) Pvt. Ltd	SIS; Florida	18.02.22	960
21	Amaze Shrimp Hatcheries	SIS; Florida	19.02.22	400
22	Crystal Aqua Marine Hatcheries Pvt. Ltd	Kona Bay; Hawaii	21.02.22	600
23	Crystal Aqua Marine Hatcheries Pvt. Ltd	Kona Bay; Hawaii	21.02.22	200
24	BMR Shrimp Hatcheries	Kona Bay; Hawaii	21.02.22	1200
25	Srinivasa Hatcheries	Kona Bay; Hawaii	21.02.22	900
26	Tejaswi Sea Food Hatcheries	SIS; Florida	23.02.22	600
27	KPR Hatchery	SIS; Florida	23.02.00	600
28	Sarada Hatcheries - Unit I	SIS; Florida	23.02.22	600
29	Sri Venkateswara Shrimp Hatcheries Pvt. Ltd	SIS; Florida	25.02.22	1200
MARCH 2022				
30	Vaisakhi Bio-Marine Pvt. Ltd	SIS; Hawaii	01.03.22	1040
31	Calypso Aquatec Pvt. Ltd	Benchmark Genetics; Florida	05.03.22	400
32	Sri Sai Hatchery & Prawn Culture Pvt. Ltd	SIS; Florida	06.03.22	600
33	Sai Balaji Hatcheries	Kona Bay; Hawaii	07.03.22	600
34	Anuradha Hatcheries	Kona Bay; Hawaii	07.03.22	600
35	SrivarahaMahalakshmi Hatcheries Pvt. Ltd	Kona Bay; Hawaii	07.03.22	600
36	Royal Hatcheries	SIS; Hawaii	12.03.22	600
37	Seven Star Hatchery	SIS; Hawaii	12.03.22	424
38	Jay jay Gold	SIS; Hawaii	12.03.22	318
39	SS Hatcheries - Unit II	American Penaeid; Florida	13.03.22	600
40	Coastal Aqua Pvt. Ltd	SIS; Florida	13.03.22	1200
41	Meenakshi Hatcheries - Vizag	Benchmark Genetics; Florida	13.03.22	400
42	BMR Exports - Tindivanam	Benchmark Genetics; Florida	13.03.22	1200
43	Vaisakhi Bio Marine Pvt. Ltd - Unit IV	SIS; Florida	16.03.22	600
44	Vaisakhi Bio Resources Pvt. Ltd - Plant II	SIS; Florida	16.03.22	600
45	Raj hatcheries (Madras) Pvt. Ltd	Benchmark Genetics; Florida	19.03.22	600
46	Winner Marine Hatchery	SIS; Florida	23.03.22	600
47	Shrimp Improvement Systems (India) Pvt. Ltd	SIS; Florida	23.03.22	560
48	Lotus Sea Farms	SIS; Florida	23.03.22	600
49	Ravi Hatcheries	Benchmark Genetics; Florida	23.03.22	600
50	Sandhya Aqua Exports Pvt. Ltd	Benchmark Genetics; Florida	23.03.22	600
51	Sun Shine Marine	Benchmark Genetics; Florida	23.03.22	400
52	TMR Bio-Marine	SIS; Florida	24.03.22	1200
53	Raj Hatcheries (Bengal) Pvt. Ltd	Kona Bay; Hawaii	28.03.22	600
54	Geekay Hatcheries Pvt. Ltd	Kona Bay; Hawaii	28.03.22	800
55	Vaisakhi Bio-Marine Pvt. Ltd - Unit II	Kona Bay; Hawaii	28.03.22	850
56	Aquatic Farms Ltd	Kona Bay; Hawaii	29.03.22	600
57	Sree Hatchery	American Penaeid; Florida	30.03.22	400
58	Makineedi Hatcheries	SIS; Florida	30.03.22	600
APRIL 2022				
59	NGR Aquatech Pvt. Ltd	Kona Bay; Hawaii	01.04.22	1200
60	Shree Kanaka Matsya Hatcheries	Kona Bay; Hawaii	01.04.22	600
61	Sai Lalitha Hatchery	Benchmark Genetics; Florida	01.04.22	600
62	Sri Manjunadha Hatcheries	Benchmark Genetics; Florida	01.04.22	600
63	Seven StaarAquatech	SIS; Florida	03.04.22	400
64	Apex Frozen Foods Ltd	SIS; Florida	09.04.22	1000
65	Pavani Hatcheries	SIS; Hawaii	09.04.22	600

66	Hybrid Ebi Hatcheries Pvt. Ltd	SIS; Hawaii	09.04.22	1200
67	Avanti Feeds - Unit I`	SIS; Florida	16.04.22	1200
68	Royal Hatcheries - 1	Syaqua; Florida	17.04.22	600
69	Aqua Prime International (India) Ltd	Syaqua; Florida	17.04.22	600
70	Ravi Hatcheries LLP	SIS; Florida	22.04.22	600
71	Sun Hatcheries - Unit II	SIS; Florida	23.04.22	400
72	Best India Marine Harvests	Kona Bay; Hawaii	25.04.22	570
73	Sapthagiri Hatcheries	Kona Bay; Hawaii	25.04.22	1200
74	Sapthagiri Hatcheries - Unit II	Kona Bay; Hawaii	25.04.22	1200
75	Varun Hatcheries	SIS; Florida	27.04.22	600
76	Blue Bay Culture	Benchmark Genetics; Florida	27.04.22	400
77	BKMN Aqua	Benchmark Genetics; Florida	27.04.22	800
78	Srinivasa Hatcheries	Kona Bay; Hawaii	29.04.22	1200
79	Srinivasa Hatcheries - Unit II	Kona Bay; Hawaii	29.04.22	1200
80	Sri Manjunadha Hatcheries	Syaqua; Florida	29.04.22	600

Source: CAA Website, AQF-RGCA, MPEDA

IMPORT DETAILS OF SPF *P. MONODON* CONSIGNMENTS QUARANTINED AT AQF (FEBRUARY 2022 TO APRIL 2022)

S. NO	NAME OF THE HATCHERY	SUPPLIER	DATE OF RECEIPT	QUANTITY RECEIVED
FEBRUARY 2022				
NIL				
MARCH 2022				
1	Vaishnavi Aqua Tech	Moana Technologies LLC; Hawaii	08.03.22	1020
2	Unibio (India) Hatcheries Pvt. Ltd	Aquaculture De La Mahajambal; Madagascar	06.04.22	350
3	Gayathri Bio Marine - Unit II	Aquaculture De La Mahajambal; Madagascar	06.04.22	800
4	Unibio (India) Hatcheries Pvt. Ltd	Aquaculture De La Mahajambal; Madagascar	22.04.22	562
5	Gayathri Bio Marine - Unit II	Aquaculture De La Mahajambal; Madagascar	22.04.22	390
6	VaishnaviAquatech	Moana Technologies LLC; Hawaii	26.04.22	1500

Source: CAA Website, AQF-RGCA, MPEDA

AQUACULTURE OUTLOOK

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- **HP Boost** - Boosts hepatopancreas function with functional ingredients
- **Healthy Gut** - Maintains healthy microflora in gut and limits Vibro Sp in gut

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Shrimp Aquaculture

- Industry Review

Decisions of the Government of Andhra Pradesh on enhancing electricity tariff for aquaculture establishments as well as its use, has hit both the hatchery operators as well as the farmers hard, seriously impacting their profitability equations. While power tariff will more than double for over 95% of the farmers across the state, restrictions in power use is a blow for the hatcheries as they have to deal with live stocks that require uninterrupted power. In addition to this, frequent power cuts are also causing serious hindrances in operations. This has now turned out to be one of the main reasons for low interest among farmers to go for stocking.

Farm Front

The ongoing crop in the East and West Godavari districts of Andhra Pradesh had stabilized and culture was progressing smoothly after three months of continuous incidences of diseases. Farms that were harvested early due to disease are planning to restock during May end to June. Several farms have reached harvest sizes and harvests have commenced. Majority of the harvests are taking place between 70-60 counts. Running mortality is also seen in many areas which is one of the reasons for harvest. On the whole, ponds stocked at lower densities

are faring considerably better in terms of growth and survival. However, they too get affected by disease when farms in surrounding areas are affected.
In Krishna district, *vannamei* culture is progressing well and most farms have reached above 70 - 60 C. In Guntur district, stocking of BT seed has been completed and around 70% of the farms in the area have stocked SPF *monodon* this year. Culture is progressing well with low survival in some ponds being the only issue faced by farmers. *Vannamei* culture is also advancing well with farmers having stocked just recently. Several farmers in Gudur, Nellore and Ongole who opted to stock seeds from wild monodon broodstock or pond reared broodstock due to unavailability of SPF seeds have lost their crop as it got affected by WSSV. It was generally seen that wherever SPF *monodon* showed speedy growth, the survival was poor at less than 30 - 40%.

Farms in Kavali area will commence stocking during June - July after the crop holiday. Corporate farms of Bhiramgunta that had stocked vannamei are expected to harvest at 60C in June. Although white faeces disease was observed throughout the culture period, its intensity seemed to have considerably reduced this year. Most of the affected ponds will recover quickly and resume feeding if managed well immediately at the onset of the disease. Reducing feed in affected ponds, treatment with good sanitizers, followed by measures to improve the pond bottom and frequent probiotic applications seem to assist in bringing the pond back to normal.

According to Madhu Talluri, Technical Director of SGS Aqua Solutions, harvesting has commenced and progressing fast. However, stocking of seeds is considerably slow. Though EHP is still a problem, a majority of farmers are able to manage inspite of having EHP positive ponds. The major crisis now is the increased feed and power costs.

EHP infections are widely prevalent in **West Bengal** this year, both in farms that opted for direct stocking as well as in farms that stocked nursery reared seeds. Some farms reported that nursery seeds reached only 2.5 to 3.0 gms in 25 - 30 days of culture in grow-out ponds, while the growth was slightly better at 5 - 6 gms in the corresponding period in ponds stocked at lower stocking densities of 20 - 25 pcs/m^2. Most farms are now stocking seeds in batches and generally stock the second batch only after the first batch of seeds reach close to the breakeven point. As a result of these changes, overall farming activity in several areas in the state is considerably less. A farmer from Narghat area reported that presently, only four truckloads of feed is being received each week, as against four truckloads received each day during the corresponding period last year.

In Odisha, it is reported that around 100 million seeds have been stocked till April and it is likely to touch 200 - 250 million by the end of June 2022. EHP infections and slow growth issues prevail, especially in ponds that have opted for stocking densities of 50 pcs/m^2 or more. This condition is not seen in ponds that are stocked at lower densities. Farmers believe that this year, the quality of seeds that have been stocked are considerably better than the seed quality last year and hope for a better crop. As the estimated biomass in ponds are good, farmers plan for multiple partial harvests (atleast three) so that they can harvest bigger sizes during the final harvest. Seeds stocked during February has presently reached 15 gms.

In **Tamil Nadu**, shrimp farming continues to be a difficult activity and farmers are not motivated owing to repeated failures. Farmers in several areas do not follow standard operating procedures and as a result their farms get affected by diseases, which subsequently spread to farms that are better managed as well. In North Chennai, several farmers are struggling owing to WSSV outbreaks as well as due to high salinities. It is reported that salinities in several ponds have gone beyond 40 ppt and the salinity in creek water has touched 60 ppt. In Nagapattinam area, most farms that were stocked early were affected by WSSV. It is reported that stocking has happened twice in some farms and both times they were affected with WSSV. Some farms in the area have recently stocked SPF monodon seeds. Though EHP has been widely reported all along the entire Tamil Nadu coast, it appears that the virulence is gradually reducing and farmers are hopeful that EHP could be overcome within the next couple of crops by reducing stocking densities and strictly following EHP preventive measures and best management practices. In Vedaranyam and Pattukottai areas, some of the ponds that were not hit by disease have reached sizes of 12 - 15 gms and culture is progressing smoothly. Most southern districts in the state received copious rain during April and stocking is expected to increase from end of May to June.

Not much momentum is seen in **Gujarat** aquaculture yet this year. Most of the farmers are waiting to stock SPF monodon seed. However, delays in seed supply is hitting them hard. Several farms that had completed water filling over a couple of months ago, are yet to get seed and ponds are infested with filamentous algae. Some farmers in Valsad area stocked wild monodon seed owing to the delay in SPF seed supply and paid the price as the entire areas were washed away with WSSV infection. Overall, stocking densities are reduced due to monodon stocking and the total area under culture is also reducing considerably in Gujarat owing to repeated failures, high power tariff and lack of financial support from the dealers. **According to Saji Chacko**, CEO of Onaway Group, Gujarat, seed stocking of both vannamei and monodon is progressing slowly and WSSV infection seen early in the crop, especially in monodon is dissuading many farmers from taking risks.

Hatchery Front

This is one of the worst periods for Shrimp hatcheries as rising cost of production and weak seed markets are forcing most hatcheries to function at a low key. Large operators running multiple hatcheries are shutting down some facilities and operating only at 50 - 60% of their existing capacities. **According to Madhusudhan Reddy**, Director, Saranya group, Andhra Pradesh, power has presently become the major issue as the hatcheries in the state of Andhra Pradesh are allowed to use only fifty percent of the power allocated to them owing to a serious power crisis in the state. Hatcheries are charged exorbitantly if power is used in excess. Operating hatcheries on diesel gensets is very expensive and increases the production costs considerably. Seed production is slow as the present seed demand is very weak.

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THE WHITE SPOTTED WONDER CICHLID

Classified as "vulnerable" in the IUCN Red List of threatened species,Tropheus duboisi, popularly known as the White Spotted Cichlid is a graceful fish, endemic to Lake Tanganyika in Africa. It is characterised by a unique colour transformation as they grow from young juveniles to adults. ***Read on to know more.....***

The juvenile Tropheus duboisi with spectacular white and blue polka dots on its body

The adult Tropheus duboisi with a blue head and vertical yellow band

The colouring of the torso in young *Tropheus duboisi* is very spectacular; jet black with white and blue polka spots (hence the name White Spotted Cichlid). As it matures, this cichlid loses its spots and develops a blue head with a vertical yellow band. Because of this, fish of different ages seem to be of different species. White spotted cichlid has a large head compared to its body, which grows narrower towards the tail, along with a fan shaped caudal fin. It can grow up to a maximum size of 5 inches. In nature, they swim among the rocks and hides in caves while feeding on algae and small invertebrates that live on the surface of stones. Under natural conditions, they usually prefer to live alone and occasionally we might see them in pairs.

Males and females have identical coloration; however, there are a few subtle differences between sexes that may help to differentiate them. Males are usually larger in size, and have a more upturned nose and bigger lips than females. Generally, males grow at a faster rate and display their adult colours sooner. Males' coloration is often bolder than females' and they like to show it off when courting females. But the only guaranteed way to distinguish them is by examining the genital papillae, which are rounded in females and pointed in males.

Duboisi cichlids are active swimmers and need a tank of atleast 50 gallon to thrive comfortably. Tank should be well planted, with plenty of rocks, sandy substrate, driftwoods and hiding places. This fish is accustomed to an oxygen rich environment, so requires bubblers at all times,even if there are plants in the tank. Water temperature should always be kept between 23°C and 27°C, with pH 7.8 - 9.0 and hardness 10 - 20 dGH. It is essential to have regular water changes. These fish are aggressive and highly territorial so they should be kept in a group of 12 or more. Though they peacefully cohabitate with other species, they squabble among themselves in the aquarium until a pecking order is established. Due to the territorial nature of these species, new individuals should not be added to an existing colony, as they disrupt the hierarchy. They can be kept together with *Petrochromis, Julidochromis, Lamprologus, Spathodus, Eretmodus, Tanganicodus* and *Mbuna Cichlids* found in Lake Tanganyika. Some popular dither fish like rainbow fish, dwarf gouramis, tetras etc can be kept in the tank to deviate male aggression.

Feeding

Tropheus duboisi cichlids are mainly herbivores and spend most of their time scraping algae from the rocks, both in an aquarium as well as in the wild. Lettuce and spinach are highly recommended and at least one of these should be added in the diet daily. Spirulina-

Pointers

- The White Spotted Cichlids first gained popularity among hobbyists in the 1970s and are still one of the most popular cichlids to this day.
- Based on their distribution and appearance there are several variants of *Tropheus duboisi* cichlids like *Tropheus duboisi bemba* (Wide Band Duboisi), *Tropheus duboisi karilani* (Narrow Band Duboisi), *Tropheus duboisi maswa* (Wide Yellow Band/ Broad Band Duboisi) and *Tropheus duboisi kigoma*.
- Duboisi cichlid is primarily suitable for experienced aquarists, as handling this species is very challenging.

based feed and shrimp mix are recommended as the major constituent of their diet. Soft and easily digested foods, such as brine shrimp and insect larvae, should be avoided at all costs. Their diet should contain low protein value since their digestive tracts aren't well equipped to process high-protein food.

Breeding and Seed production

Reproduction in captivity is not very difficult and it is ideal to keep 9 or more females with 1 - 2 males in the tank for easy breeding. Males are quite aggressive in their attempt to coax females to spawn, whereas it is quite tough to bring females into breeding condition. Fish become sexually mature at the age of 10 - 14 months. As a stimulant for spawning, frequent water changes may be done. Before spawning, the male digs a hole in the ground. The female throws several eggs in this hole, on the wall of the aquarium or on a flat stone, and then picks them up in her mouth. Then she swims to the male, takes his milt into her mouth and fertilise the eggs. Female does this until the number of eggs reaches about 30 pieces. Then it hides in a previously chosen shelter. Once a female has spawned and is brooding her young, she should be removed so as to prevent undue harassment by the dominant male. Incubation lasts from 24 - 28 days. Mouthbrooding females usually do not fast during incubation and will in fact eat with their tank mates, although perhaps not as aggressively. The fry are robust and large enough to take brine shrimp nauplii, microworm and powdered dry foods once they become free swimming. In captivity the *Tropheus duboisi* cichlids normally live for around 5 - 8 years.

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Dr. V K Dey, has over three decades of experience in diverse sectors of Seafood Industry in Asia-Pacific region. He joined MPEDA in 1979 and has been working in various capacities till 2000. He worked with INFOFISH from 2000 - 2008 as Coordinator, Consultancy Services and is currently attached with Bay Harvest International as their Senior Consultant. While working with INFOFISH, he was involved in several studies related to seafood processing, product development and marketing in the Asia Pacific region and beyond, including preparation of project report for setting up of Aqua-technology Park for Ornamental fish. He has to his credit several articles on Ornamental fish including a compilation of articles published as a book, "Living Jewels" by MPEDA.

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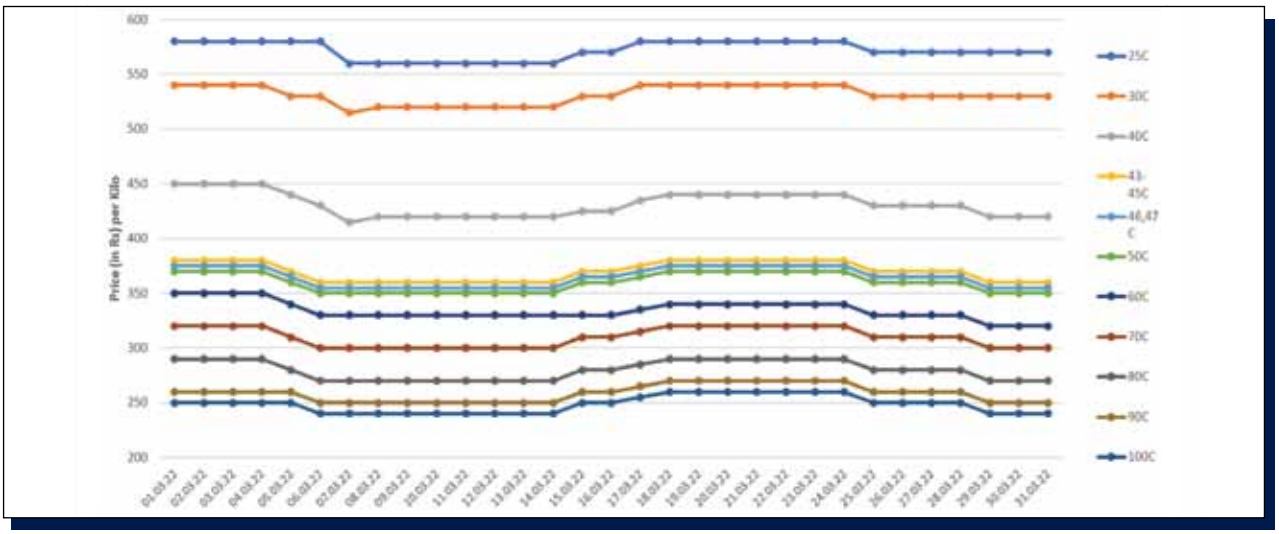
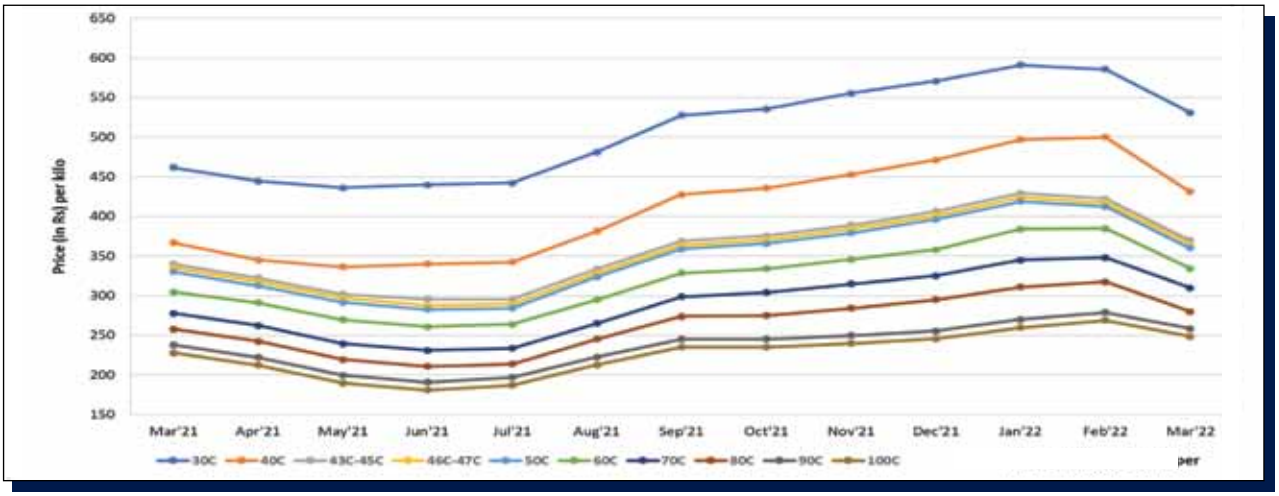
AQUA BRAHMA SHRIMP PRICES

Daily trend in *P. vannamei* prices (March 2022) in Andhra Pradesh



● **Where C denotes count/ kilo**

Fluctuation in price (monthly mean values) of *P. vannamei* for a period of 1 year (March 2021 to March 2022)



● **Where C denotes count/ kilo**

● After gaining steadily for a period of 8 straight months, prices of *L. vannamei* registered a significant drop during March 2022. The decline was by Rs. 20/- Kg for 100 and 90C shrimp while it was by Rs. 40/- per Kg for 80 - 70C, by Rs. 50/- per Kg for 50 - 60C, by Rs. 55/- per Kg for 30C and by Rs. 70/- per kg for 40C vannamei. Within March 2022, the prices dropped by Rs. 10-30/Kg for various counts during the first week, regained the same prices during the third week only to drop again in the last week of the month. Prices for all counts finished at Rs. 10 - 30 lesser than prices at the beginning of the month.

● In comparison with the prices of March 2021, the monthly mean prices were higher by Rs. 25/- per Kg for 100C - 80C vannamei and by Rs. 30/- per Kg for 70C - 50C. The prices for 40C and 30C were higher by Rs. 65/Kg and Rs. 70/- per Kg respectively during the same period.

● While WSSV and Vibrio outbreaks abated, Running Mortality Syndrome was widely reported which caused farmers to go for early harvesting. Seed stocking continued to be slow as frequent power cuts, power tariff hike, increase in feed prices and possible impact of summer heat made the farmers to rethink about immediate stocking. Prices could continue to remain stable as availability of raw material in the market continues to be less.

UKRAINE WAR LEAVES ANIMAL FEED MANUFACTURERS FURTHER HIGH AND DRY

The Russia-Ukraine face-off has triggered a global shortage of grains important for animal feed production widening the already shrinking margins of Indian animal feed manufacturers, who are struggling to cope with the steep rise in raw material prices, on the one hand, and escalating demand, on the other. They are forced to absorb a larger part of the increase in the prices of raw materials so as to not lose their consumers. The prices of maize and soybean meal, the two chief ingredients of animal feed have increased substantially.

Manufacturers have gone for a small price hike of its products so as not to put much pressure on the cost of production of the farmers and not to compromise on quality. A few manufactures have requested the government to allow the import of soybean meal, which is 40 percent cheaper in the international market, to reduce the burden on the feed industry. Manufacturers may get some relief with rabi season arrival next month and the kharif season arrivals in October-November.

Source: Moneycontrol.com

POWER CRISIS IN ANDHRA PRADESH TO INCUR 30 – 40% LOSS TO AQUA INDUSTRY

The Aqua sector in Andhra Pradesh is facing power cuts and fears that if this trend continues, a loss of 30 – 40 percent in production is imminent. The Chairman of Ananda Group, the shrimp processing companies, opined that food processing industries need continuous power supply and any disruption disrupts production and damages products. As an alternative, industrial units depend on generators to ensure production without interruption. However, diesel prices are touching ₹ 110 per litre. Moreover, it is impossible to run generators when power goes off for hours together, because production cost will rise by more than 50 percent, making the products economically unviable. He added that processors in the state would be unable to meet their export commitments due to power disruptions and several employees could also lose their jobs.

Source: Deccan Chronicle

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ENTREPRENEUR SUCCESSFULLY CULTURES KASHMIR'S POPULAR RAINBOW TROUT IN HYDERABAD

Kashmir's popular rainbow trout is now cultured in Kandukur of Rangareddy district of Telangana by a Hyderabad-based entrepreneur Aditya Rithvik Narra. He has succeeded in mimicking the conditions conducive for Rainbow Trout and is likely to get a yield of one tonne of Rainbow Trout per day which is much sought after by food connoisseurs and health aficionados for its good source of protein, good fat and vitamins. With an investment of about Rs 25 crore in phases, the culture is already into six months and the first harvest is expected in November. The unit will produce about one tonne trout on a daily basis and will be sold in domestic and export markets. The price per kg is expected to go up to 2,000 a kg.

The entrepreneur has spent over six years on research on Recirculating Aquaculture Systems (RAS) in India and abroad before taking up the pilot project. In his unit, stainless steel tanks are used and water is recirculated.

Following its success, the company has commenced its commercial operations. Specially made chillers are used to maintain water temperatures between 5 and 15 degrees centigrade at all times. The water is sterilized by a UV filter before it is used in the RAS system.

The rainbow trout eggs are imported from the US and are hatched. Some of the produced fingerlings are sold to other farmers. The remaining are used by the company for eggs. The company has 36 hatchery trays, nursery in 20 tanks and 48 grow out units. The produce will be chemical free and will have traceability from eggs arrival to harvest. Rainbow trout will be the primary breed and others like tilapia, eel, sea bass, desi koi and others will be included. The company also offers turnkey solutions including consulting, design, supply of eggs, feed and others. It offers to buy back fish from them.

Source: Telangana Today

PHILEO UNVEILS ITS TILAPIA FUNCTIONAL NUTRITION PROGRAMME THAT INCREASES ITS FOOTPRINT IN AQUACULTURE

Gathering more than 10 years of its work in the Tilapia industry, Phileo, by Lesaffre launched a dedicated programme called "Program Aquasaf Tilapia" which aims to improve gut health and support disease prevention strategies. This was conceived to maximise productivity, profitability and sustainability in Tilapia farming using Phileo's functional yeast probiotics and postbiotics. Phileo used the knowledge gained from more than 10 R & D programmes carried out in China, Thailand, Vietnam, Brazil, Mexico and Philippines using different products and their combination both in lab and field conditions.

This programme provides recommendations to address some of the most impacting challenges faced by the producers such as mortalities associated with bacterial infections. "**Program Aquasaf Tilapia**" details how Safmannan – Phileo's yeast postbiotic reduces pathogen related mortalities by upto 50% and how substantial improvement of feed conversion, growth and fille yield can be achieved by exploring synergies with other Phileo brands such as organic selenium enriched yeast – Selsaf or yeast probiotic – Actisaf.

Tilapia farming is often hindered by seasonal diseases and hence specific actions throughout the production cycle are needed.

Source: efeedlink.com

AQUAFARMERS SHOCKED BY POWER TARIFF HIKE

The State government's latest decision to revise power subsidy has come as a shocker to the aquaculture farmers in the state. With the revised tariffs, the electricity bills of aquaculture farmers will now be more than doubled. Power tariff in Andhra Pradesh was the lowest among all states at Rs 1.50 per unit to aqua culture in the State and it was implemented in 2019. But now the State government released the GO revising power tariffs for aquaculture.

According to the latest order, farmers cultivating both shrimp and fish below five acres have to pay Rs 1.50 per unit while farmers cultivating more than five acres have to pay Rs 3.85 per unit. Rs 3.85 shall be charged for all the fish/shrimp tanks located outside the aqua zones, irrespective of the extent of the tanks. The power tariff concession shall be extended to fish/shrimp tanks based on the e-fish data for the time being. Later, the power tariff concession will be extended to the fish/shrimp culture tanks registered under APSADA Act, 2020, according to the GO.

Farms have also been hit by frequent power cuts necessitating them to use diesel generators for power production which is a very expensive affair. Continuous power is required in shrimp culture operations for aeration, water filling and water exchange.

Source: Krishjagran.com

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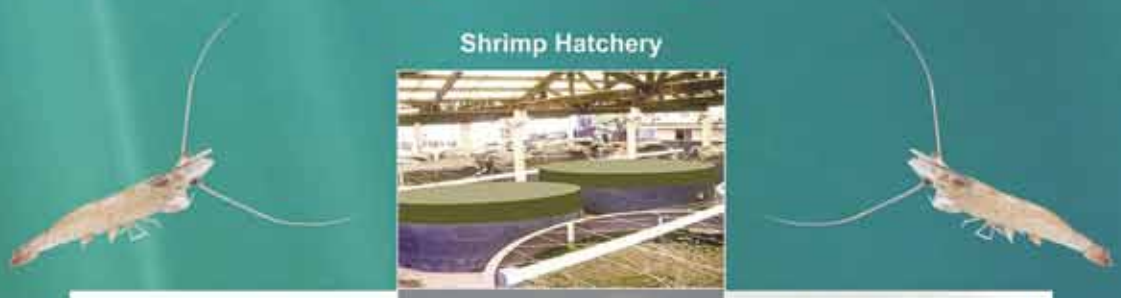

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NEWLY PATENTED DIAGNOSTIC TOOL FOR WSSV

Scientists have developed a handy diagnostic tool that detects the shrimp pathogen known as the White Spot Syndrome Virus (WSSV). The peptide-based diagnostic tool by scientists of Agharkar Research Institute (ARI), an autonomous institute of the Department of Science and Technology (DST) has been granted patent on 31st March 2022 as an alternative biorecognition element.

The high valued super-food; "shrimp" is susceptible to a wide range of viral and bacterial pathogens and the probability of occurrence of infections is rather high. Infection caused by the WSSV to farmed penaeid shrimps results in huge crop losses. Technologies for early and rapid detection of pathogens on the field will help fish and shell-fish farming, which provides significant export revenue to the country which is a leading supplier of shrimp to the USA.

To provide a handy, self-use diagnostic for WSSV, Dr. Prabir Kulabhusan, Dr. Jyutika Rajwade and Dr. Kishore Paknikar developed a lateral flow assay using gold nanoparticles for easy visualization of the results. Instead of using poly-/mono-clonal antibodies in assay development, the ARI scientists selected twelve amino acid containing peptides from a phage display library by biopanning. This was a time and costsaving approach, eliminating the need for immunization of laboratory animals to obtain the antisera. With the use of peptides, cold-chain requirements for storage are reduced and the assay becomes production friendly.

"Our data indicates high specificity (100%) and sensitivity (96.77%) of the assay, early detection from hemolymph, highly reproducible results with a time-to-result of only 20 minutes," said Dr. Jyutika Rajwade. The inventors have published this research in Applied Microbiology & Biotechnology and Journal of Molecular Modelling.

Source: indiaeducationdiary.in

INSURANCE COVERAGE FOR FISHERIES, AQUACULTURE UNITS ABYSMAL IN INDIA - FAO REPORT

Given the low penetration of insurance products in the fisheries sector, the FAO World Review of Capture Fisheries and Aquaculture 2022 has suggested involvement of public and private insurance service providers to undertake proactive measures to turn the tide on fisheries and aquaculture insurance in India. With weather playing truant in the fisheries sector, the involvement of insurance service providers should be encouraged for the overall competitiveness and efficiency of service delivery in the sector.

Source: The Hindu Businessline

SHRIMP BIOMASS ESTIMATION USING SONAR

Maryland-based growth company **Minnowtech**, in partnership with OTAQ, a company that is already developing sonar technology for aquaculture has developed **BRS – 1**, a sonar biomass detector that can help shrimp farmers get control of their production data and maximize their outputs.

The BRS-1 counts individual shrimp and can extrapolate that information to biomass with 95 percent accuracy. The device can be deployed in any size pond and generate reliable biomass counts that can be accessed via an online portal. Since biomass is probably the biggest data blind spot in farm operations, if we can provide this number, farmers' day-to-day activities can be more efficient and strategic. Estimating biomass with 95 percent accuracy means that when shrimp farmers wake up in the morning, they can see if their shrimp population has remained stable from the night before. Along with tracking survival, it also lets producers adjust their feeding schedules and predict harvest dates – which leads to a huge cost savings for farm inputs.

Source: The Fishsite.com

PAINLESS FISH SLAUGHTERING PROJECT IN INDIA

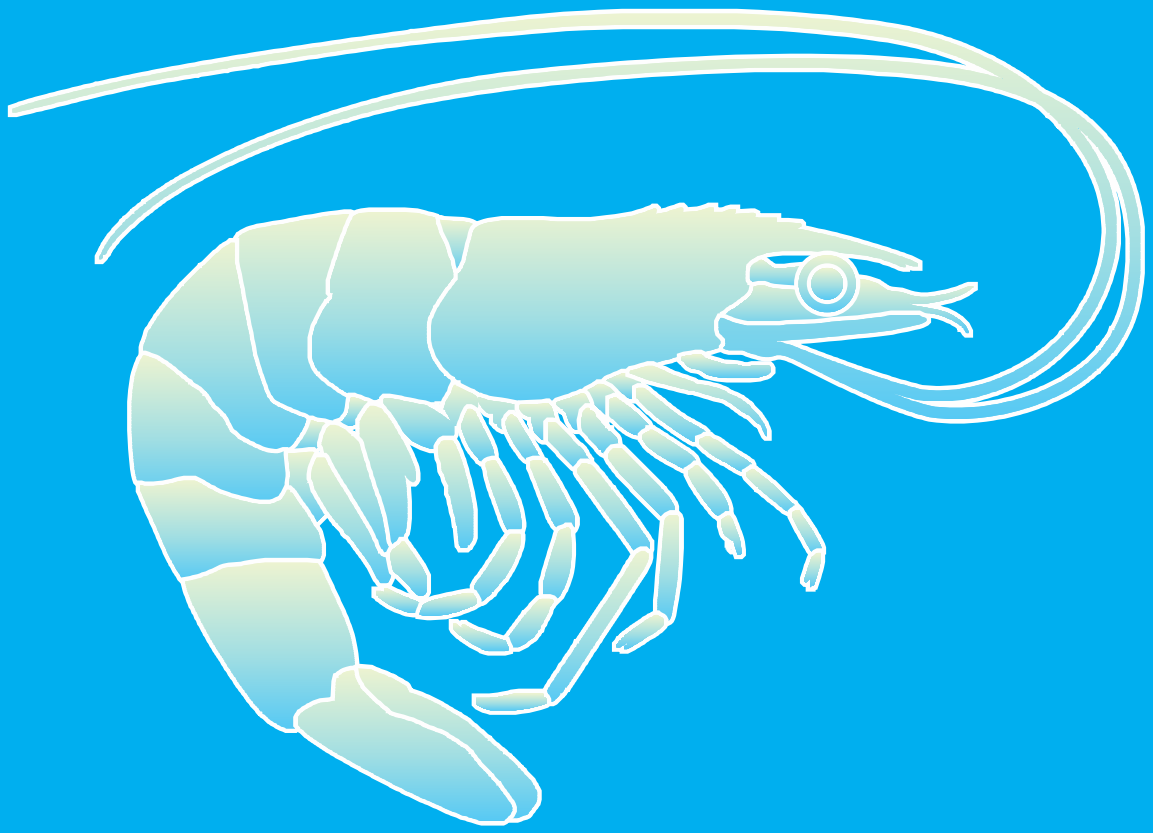
A new project is looking into improving slaughtering techniques in India's pangasius farming sector. The project is a collaborative effort involving Fish Welfare Initiative (FWI) and Sage, a cafe and store chain in Hyderabad, which is FWI's first corporate partner.

Fish are sentient beings capable of feeling pain and distress. By itself, this necessitates an improvement of slaughter practices to reduce induced distress and pain for a large number of individuals. While slaughter only makes up a comparatively small part of fishes' lives (i.e., a few minutes to one hour), the inflicted pain can be particularly intense. In most fish across the globe, during capture, fish are usually crowded in nets for a considerable period of time before asphyxiating in air or on ice.

This process causes severe distress and pain. Research in the past few decades has been uncovering more welfare-friendly alternatives to conventional fish slaughter with the goal of minimizing pain and distress. Stunning prior to killing is a promising method to desensitize the animals and avoid pain in their last minutes of life.

" Although slaughter is often challenging and almost invariably involves some suffering, we believe our work with Sage is a critical step towards implementing pre-slaughter stunning in a country where, to our knowledge, it has never been practiced before for fish," explains Jennifer Kirsch, director of international programs at FWI. While the process was not yet perfect, some fish were spared unnecessary, prolonged suffering during this killing process. This stunning method could be used by small-scale fish farmers across India to ensure high animal welfare and related benefits like better product quality.

Source: The fishsite.com



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UPCOMING AQUACULTURE EVENTS

AQUA INDIA 2022
Date: 23 – 25 June 2022
Location: Feathers Hotel, Ramapuram, Chennai, India

AQUACULTURE CANADA AND WAS NORTH AMERICA 2021
Date: 15 - 18 Aug 2022
Location: St. John's Convention Centre, St. John's, Newfoundland, Canada

AQUACULTURE EUROPE 2022
Date: 27 - 30 Sep 2022
Location: Rimini, Italy

MUCOSAL HEALTH IN AQUACULTURE 2022
Date: 03 - 06 Oct 2022
Location: Madrid, Spain

WORLD AQUACULTURE 2020
Date: 29 Nov – 02 Dec 2022
Location: Singapore

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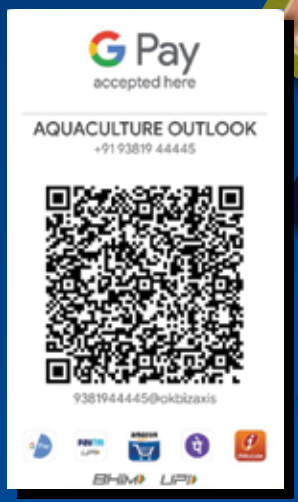

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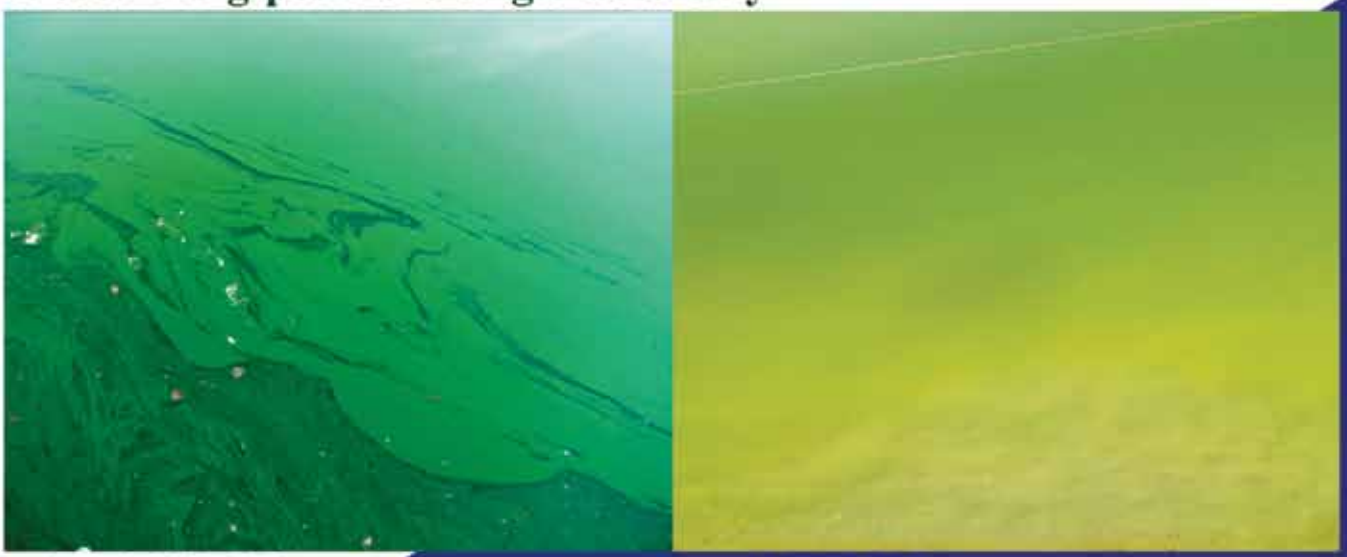

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