# MPEDA NEWSLETTER

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# Contents

# On the platter.....!!

*Dear friends,*

*Happy New Year, Happy Vishu*!*

*The entire seafood industry was given the "*kaineetam*"** by RGCA when it put the first Indian made SPF vannamei brooders on sale to the Indian Hatcheries. I would only like to tell my friends that the delivery was not easy, not only was it caesarian – the babies were threatened with death on delivery. I firmly believe that truth and hard work will always triumph. I am truly grateful and indebted to Shri Sharad Pawar, the Hon'ble Minister for Agriculture and Shri Tarun Shridhar, JS Fisheries for their timely and fulsome support in this issue of national interest. I would also like to acknowledge that All India Shrimp Hatchery Association & Seafood Exporters Association of India both rose to the occasion.*

*Lack of sufficient numbers of SPF broodstock was one of the major bottlenecks for the smooth expansion of vannamei culture in India. Till now, we were importing the SPF broodstock from Broodstock Multiplication Centres in USA, Thailand and Singapore, which were very expensive, time consuming and reduction in performance due to transit stress. The development of SPF broodstock of vannamei will benefit the small and marginal shrimp farmer as he will be getting seeds at a cheaper rate. It will also ensure sustained production and profitability to the entire production and processing chain. RGCA project can give sustained production of 45000 broodstock annually, that too from the mother stock of the mother of SPF technology of L. vannamei – Oceanic Institute, Hawaii, USA.*

*This initiative,coupled with the supply of High Health seeds of BT from RGCA, we hope India will have a disease free farming season with a bumper harvest!*

*Thank you.*

*April 2013*
*Kochi-36*

*Leena Nair* IAS
*Chairman*

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* *Harvest festival celebrated in Kerala*

** *During Vishu, there is ritual to give a gift (normally cloth or coin) by elders to younger ones, which is termed as "Kaineettam" in Malayalam*

# MARKETING NEWS

## Marine Products Export during April 2012 – February 2013 surges in Quantity and Rupee value but dips in FE earnings

The export of marine products during April – February of the fiscal year 2012-13 aggregated to 813417 MT worth Rs. 16848.04 crores equivalent to US $ 3139.00 million as per the provisional data. Compared to the same period during the previous year seafood export has recorded a growth of 1.20% in terms of quantity, 8.85 % in terms of rupee value while there is a decline of 4.25% in terms of US$ value as detailed in Table 1. Market-wise exports in quantity and Rupee value are indicated in Fig. 1.

### Item-wise exports

Frozen shrimp continued to be the major export item accounting for 52.30 % of the total US$ earnings (Fig. 2). Shrimp exports during the period increased by 18.97%, 15.43% and 0.48% in terms of quantity, rupee value and US $ earnings respectively. But the unit value has declined by 15.54%.

Fish has retained its position as the principal export item in terms of quantity (Fig. 3) and the second largest export item in terms of value with a share of 37.15% in quantity and 17.48% in US $ earnings. While cephalopods showed a decrease in FE earnings, live and chilled items registered a positive growth (Table 2).

**Table 1.**

**Exports during 2012-13 compared to same period in 2011-12**

| Export details | 2012-13 (APR-FEB) | 2011-12 (APR-FEB) | *Growth %* |
|---|---|---|---|
| Quantity Tonnes | 813417 | 803767 | 1.20 |
| Value Rs. Crore | 16848.04 | 15478.41 | 8.85 |
| US $ Million | 3139.00 | 3278.39 | -4.25 |

**Fig.1: Market-wise exports: April 2012 - Feb 2013**

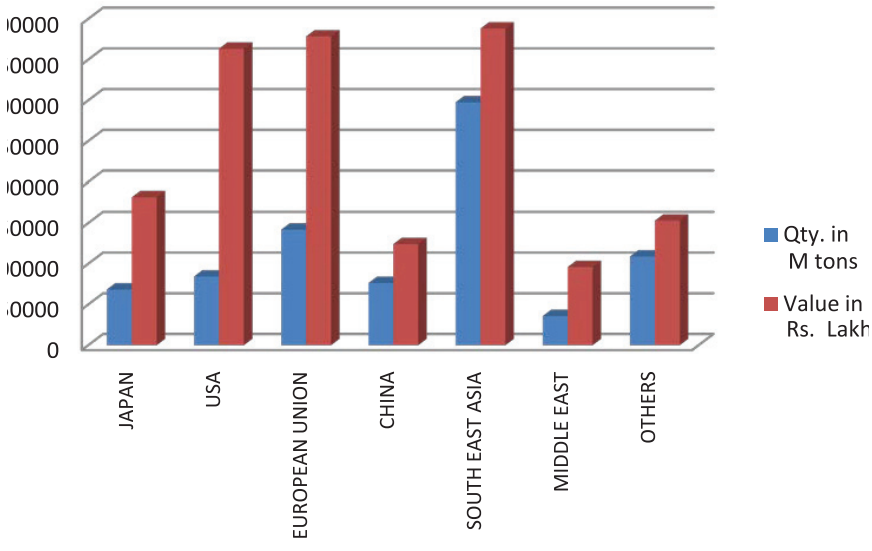



**Fig.2: Item-wise exports in value (Rs. lakh): April 2012-Feb 2013**

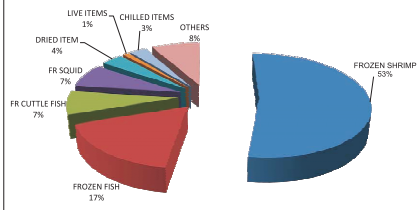
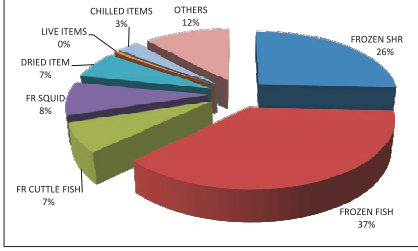



**Fig.3: Item-wise exports in quantity (MT): April 2012-Feb 2013**




### Market-wise exports

South East Asia became the largest buyer of Indian marine products with a share of 36.58% in volume and 23.04% in US $ earnings (Fig.4) . European Union (EU) is in the second place with a share of 17.45% in quantity and 22.46% in FE earnings (Fig.5). The third position in

US$ earnings is occupied by USA with 21.49%, followed by Japan (10.79%) and China (7.38%). The positions of different markets are indicated in Table 3.

Exports to South East Asia registered a decrease of 7.94% in terms of quantity and 12.91% in terms of US$ realization. Exports to USA had registered a positive growth of 31.06%, 29.42% and 11.95% in terms of quantity, rupee value and US$ realization respectively. Exports to Japan showed a decrease of 15.13%, 10.63% and 21.99% in terms of quantity, rupee value and US$ realization, mainly due to the slump in shrimp exports caused by the sudden inspection of shrimps consignments for Ethoxyquin residue by the Japanese authorities and subsequent rejections.

Export to Middle East countries showed a positive growth of 6.37%, 22.35%and 9.79% in terms of quantity, rupee value and US$ realization.

**Table 2: Item-wise export of marine products during April 2012 - Feb. 2013 compared to same period in 2011-12**

Q: Quantity in Tons, V: Value in Rs. Crores, $: USD Million, UV : Unit Value in $/KG

| Item | | Share% | April-2012 Feb-2013 | April-2011 Feb 2012 | Variation | % |
|---|---|---|---|---|---|---|
| **FROZEN SHRIMP** | Q: | 25.71 | 209113 | 175763 | 33349.09 | 18.97 |
| | V: | 52.43 | 8833.29 | 7652.36 | 1,180.94 | 15.43 |
| | $: | 52.30 | 1641.56 | 1633.66 | 7.90 | 0.48 |
| | UV$: | | 7.85 | 9.29 | -1.44 | -15.54 |
| **FROZEN FISH** | Q: | 37.15 | 302196 | 325377 | -23181.41 | -7.12 |
| | V: | 17.38 | 2927.42 | 3084.14 | -156.73 | -5.08 |
| | $: | 17.48 | 548.67 | 642.39 | -93.72 | -14.59 |
| | UV$: | | 1.82 | 1.97 | -0.16 | -8.04 |
| **FR CUTTLE FISH** | Q: | 7.08 | 57594 | 52129 | 5465.39 | 10.48 |
| | V: | 7.35 | 1238.83 | 1279.41 | -40.57 | -3.17 |
| | $: | 7.33 | 230.16 | 268.88 | -38.72 | -14.40 |
| | UV$: | | 4.00 | 5.16 | -1.16 | -22.52 |
| **FR SQUID** | Q: | 8.14 | 66242 | 71468 | -5226.24 | -7.31 |
| | V: | 7.31 | 1231.68 | 1124.95 | 106.73 | 9.49 |
| | $: | 7.32 | 229.74 | 241.49 | -11.75 | -4.86 |
| | UV$: | | 3.47 | 3.38 | 0.09 | 2.64 |
| **DRIED ITEM** | Q: | 6.86 | 55774 | 50021 | 5753.37 | 11.50 |
| | V: | 3.74 | 630.65 | 510.19 | 120.46 | 23.61 |
| | $: | 3.75 | 117.65 | 106.88 | 10.78 | 10.08 |
| | UV$: | | 2.11 | 2.14 | -0.03 | -1.27 |
| **LIVE ITEMS** | Q: | 0.46 | 3773 | 3926 | -152.88 | -3.90 |
| | V: | 0.98 | 165.14 | 141.87 | 23.27 | 16.40 |
| | $: | 0.98 | 30.74 | 29.84 | 0.89 | 3.00 |
| | UV$: | | 8.15 | 7.60 | 0.55 | 7.17 |
| **CHILLED ITEMS** | Q: | 2.88 | 23465 | 19416 | 4049.11 | 20.85 |
| | V: | 2.71 | 456.54 | 320.40 | 136.13 | 42.49 |
| | $: | 2.71 | 84.91 | 66.41 | 18.50 | 27.85 |
| | UV$: | | 3.62 | 3.42 | 0.20 | 5.79 |
| **OTHERS** | Q: | 11.71 | 95260 | 105667 | -10406.75 | -9.85 |
| | V: | 8.10 | 1364.49 | 1365.08 | -0.59 | -0.04 |
| | $: | 8.14 | 255.56 | 288.83 | -33.26 | -11.52 |
| | UV$: | | 2.68 | 2.73 | -0.05 | -1.85 |
| **TOTAL** | Q: | 100 | 813417 | 803767 | 9649.66 | 1.20 |
| | V: | 100 | 16848.04 | 15478.41 | 1,369.64 | 8.85 |
| | $: | 100 | 3139.00 | 3278.39 | -139.39 | -4.25 |
| | UV$: | | 3.86 | 4.08 | -0.22 | -5.39 |

**Provisional*

**Fig.4: Market-wise exports in quantity (MT): April 2012-Feb 2013**

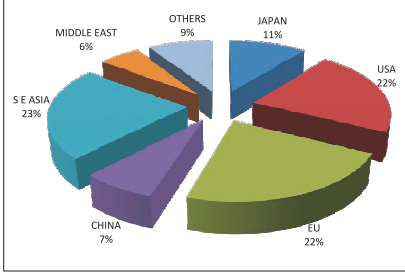
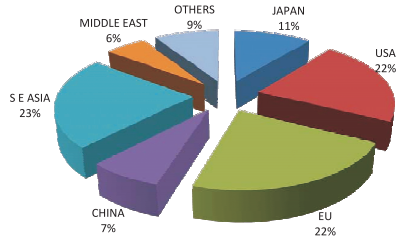



**Fig.5: Market-wise exports in value (Rs. lakh): April 2012-Feb 2013**




## Conclusion

Even though export has increased by 8.85 % in terms of rupee value, there is a decline of 4.26% in terms of US$ terms. The reason for this decline is broadly considered as depreciation of rupee value. The deficit in sea catch was largely compensated by farmed material. The Dollar value increased from an average ₹ 48.13 during 2011-12 to ₹ 54.31 during 2012-13. It is expected that with the reconciled figures for 2012-13, exports will notch upto US$ 3.5billion.

## Table 3. Market-wise export of marine products during April 2012 - Feb. 2013 compared to same period in 2011-12

Q: Quantity in Tons, V: Value in Rs. Crores, $: USD Million

| Country | | Share% | April-2012 Feb-2013 | April-2011 Feb-2012 | Variation | % |
|---|---|---|---|---|---|---|
| Japan | Q: | 8.41 | 68440 | 80645 | -12205.02 | -15.13 |
| | V: | 10.78 | 1816.49 | 2,032.58 | -216.09 | -10.63 |
| | $: | 10.79 | 338.67 | 434.12 | -95.45 | -21.99 |
| USA | Q: | 10.38 | 84404 | 64399 | 20004.79 | 31.06 |
| | V: | 21.57 | 3633.91 | 2,807.89 | 826.01 | 29.42 |
| | $: | 21.49 | 674.69 | 602.65 | 72.04 | 11.95 |
| European Union | Q: | 17.45 | 141908 | 141403 | 505.24 | 0.36 |
| | V: | 22.47 | 3784.84 | 3,496.57 | 288.27 | 8.24 |
| | $: | 22.46 | 704.85 | 740.84 | -35.99 | -4.86 |
| China | Q: | 9.38 | 76311 | 81069 | -4757.74 | -5.87 |
| | V: | 7.37 | 1241.60 | 1,185.93 | 55.67 | 4.69 |
| | $: | 7.38 | 231.72 | 248.24 | -16.52 | -6.65 |
| South East Asia | Q: | 36.58 | 297538 | 323150 | -25612.46 | -7.93 |
| | V: | 23.04 | 3881.52 | 3,953.71 | -72.19 | -1.83 |
| | $: | 23.05 | 723.66 | 830.83 | -107.17 | -12.90 |
| Middle East | Q: | 4.41 | 35868 | 33720 | 2147.54 | 6.37 |
| | V: | 5.70 | 959.85 | 784.49 | 175.35 | 22.35 |
| | $: | 5.75 | 180.33 | 164.25 | 16.08 | 9.79 |
| Others | Q: | 13.39 | 108947 | 79380 | 29567.30 | 37.25 |
| | V: | 9.08 | 1529.85 | 1,217.23 | 312.62 | 25.68 |
| | $: | 9.08 | 285.08 | 257.46 | 27.62 | 10.73 |
| Total | Q: | 100 | 813417 | 803767 | 9649.66 | 1.20 |
| | V: | 100 | 16848.04 | 15,478.41 | 1,369.64 | 8.85 |
| | $: | 100 | 3139.00 | 3,278.39 | -139.39 | -4.25 |

**Provisional*



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# FOCUS AREA

## RGCA produces SPF *L. vannamei* broodstock for the first time in India

Dr. E G Silas, renowned Indian Fishery Scientist and former Vice Chancellor of Kerala Agricultural University inaugurated the release of SPF *L. vannamei* broodstock produced by Rajiv Gandhi Centre for Aquaculture for the first time in India in a function held at Sirkali on 11th April 2013. Mr. Y Ravi, General Secretary, All India Shrimp Hatchery Association and Mr. D Ramaraj of the Society of Aquaculture Professionals received the same in the presence of Dr. B Meenakumari, Dy. Director General, ICAR, and Ms. Leena Nair IAS, Chairman, MPEDA and President, RGCA.

Specific Pathogen Free (SPF) *Litopenaeus vannamei* broodstock was developed in association with the Oceanic Institute, Hawaii, USA. The primary objective of this initiative is to produce selectively bred *Litopenaeus vannamei* shrimp broodstock (mother shrimp) that exhibit good hatchery performance for producing high quality shrimp seed which should exhibit faster growth and higher survival rate in commercial shrimp farms in India.

The production unit of SPF L.Vannamei Broodstock of RGCA is functioning from Mangamaripeta, Visakhapatnam, Andhra Pradesh. Specific Pathogen Free Post larvae imported from Nucleus Breeding Centre of Oceanic Institute, Hawaii, USA, shall be grown from PL to 40 gm in MPEDA/RGCA facility at Visakhapatnam. Six to eight months are required for growing PL to 40 gm size. The above project has the capacity to produce 45000 number of broodstock annually.


*Dr. E G Silas and Ms. Leena Nair IAS distributing SPF L. vannamei broodstock produced by RGCA to the stakeholders; Dr. (Mrs.) B Meenakumari, ICAR and Mr. Y C Thampi Sam Raj, Project Director, RGCA are also seen.*

Considering the established infrastructure for farming shrimps in India, it is reasonably easy for *L. vannamei* farming and can substantially contribute to marine product export from the country. However, one of the major obstacles for increasing the *L. vannamei* production is the non-availability of quality SPF broodstock in India in required quantities.

Currently shrimp hatcheries import *L. vannamei* broodstock from Broodstock Multiplication Centres in USA, Thailand and Singapore incurring high shipping cost and transit loss due to mortality. Average cost of broodstock when it reaches the hatchery is estimated at Rs.5000/-, and the higher cost of broodstock and transportation ultimately get transferred to the shrimp farmers who purchase seeds at a higher price (₹ 0.6 per seed). High cost of broodstock is also prompting some hatcheries to source broodstock from shrimp ponds which ultimately results in the production of poor quality seeds and subsequent crop loss to farmers. About 80% of the shrimp farmers are marginal and small scale farmers with 0.5 to 5 Ha water spread area and the success of the crop largely depends on the quality of seeds supplied to the farmers. Hence for sustaining the productivity and profitability of shrimp farmers, it is essential that quality seeds are provided to farmers at reasonable rate. In this circumstance, MPEDA initiative holds great significance.

Though *L. vannamei* is a native to the Pacific coast of central and south America, one of the major reason for *L. vannamei*'s popularity among shrimp farmers world-wide is due to the availability of selectively bred fast growing improved quality specific

pathogen free (SPF) and specific pathogen resistant (SPR) seeds. Selectively bred SPF *L. vannamei* also has the potential to grow under intensive culture conditions, tolerates a wide range of salinities & temperatures and require only lower protein diet and can also utilize the natural productivity of shrimp ponds in intensive culture conditions. It is generally considered to be more resistant to diseases and can mate and spawn easily under captivity and the survival rates during hatchery rearing are generally higher.

This project shall help Indian farmers to produce 1.35 lakh MT of additional shrimp for export worth around ₹.4,000 crores per annum by utilizing about 10,000 Ha water spread area for two crops per annum. Most importantly, this initiative will deliver quality broodstock to shrimp hatcheries and thus ensure the supply of quality seeds required for several thousands of small and marginal farmers at affordable price. The first batch of around 20,000 nos. of high quality SPF *L. vannamei* broodstock produced at RGCA facility at Visakhapatnam is ready for supply to approved shrimp hatcheries in India at half the price of imported stock.

*An RGCA brood stock centre. Inset: L. Vannamei*

# International Seminar-workshop on Mud crab Aquaculture and Fisheries management (ISMAF-2013)

Mangrove crabs (genus *Scylla*) are economically important and known for their rapid growth, high market value and ease in post-harvest handling, make them an attractive alternative to shrimp farming in coastal areas. However, the exploitation of this valuable component of small-scale coastal fisheries in tropical and subtropical Asia has increased in recent years. Unless effectively managed, mud crab populations will result in increased fishing pressure and subsequent decline in the natural habitat.

In this connection, Rajiv Gandhi Center for Aquaculture, the R & D wing of MPEDA, organized an **International Seminar-Workshop on Mud Crab Aquaculture and Fisheries Management (*ISMAF-2013*)** in collaboration with the Aquaculture Department of the Southeast Asian Fisheries Development Center (Philippines) at Sirkazhi, Tamil Nadu, India from 10 to 12 April, 2013. The prime aim of this 3-day seminar-workshop was to bring together the mud crab scientists, industry practitioners/ stakeholders, and the academe from various parts of the globe to discuss the present status of the industry, share insights on relevant issues and identify the problem areas for further research and development on mud crab aquaculture and fisheries management for a sustainable mud crab industry. The seminar-workshop included presentation on the status of mud crab Industry in India, Philippines, Myanmar, Thailand, Indonesia, Bangladesh, Malaysia and China, and technical sessions on biology, ecology & physiology, genetics, domestication & selective breeding, husbandry, nutrition & diseases, fisheries resource management, post harvest product development and marketing.

*Lighting the traditional lamp by Dr. (Mrs.) B Meenakumari, Deputy Director General (Fy.) of ICAR.*

This was the first of its kind of seminar-workshop in India related to mud crab. The previous symposia on mud crab were held in Australia (1997), Philippines (1998, 2004), Vietnam (2001) and China (2009). The event witnessed a strong representation from India and abroad. A total of 110 Indian and 28 foreign delegates representing twelve countries (Philippines, China, Myanmar, France, Thailand, Australia, Kenya, Malaysia, Indonesia, Palau Island, Bahrain and Bangladesh) participated in the seminar-workshop.

The ISMAF-2013 was inaugurated by Dr. (Mrs.) B Meenakumari, Deputy Director General (Fy.), ICAR on 10th April, 2013 at Technology Transfer, Training & administrative Complex of RGCA, Sirkazhi, Tamil Nadu. The inaugural function was presided over by Ms. Leena Nair IAS, Chairman, MPEDA & President, RGCA. Mr. Y C Thampi Sam Raj, Project Director of RGCA welcoming the dignitaries and the audience, summarized the initiation and aim of the seminar-workshop. In her presidential address, Ms. Leena Nair has pointed out the significant transition from shrimp-centric aquaculture to diverse species aquaculture and how the heavy disease-induced losses to shrimp farms have aided this shift. She highlighted the importance of the innovative research and role of MPEDA as a whole and RGCA in particular, in mud crab research.

Dr. (Mrs.) B Meenakumari, Deputy Director General (Fy) of ICAR generously supported the initiatives taken by RGCA in mud crab research and highlighted the importance of the mangrove crab research in India. Felicitations were offered by Dr. (Mrs.) Emilia T Quinitio, Scientist and Head, Technology Verification and Demonstration Division, Aquaculture Department, SEAFDEC, Philippines and Mr. T Munuswamy IAS, the District Collector of Nagapattinum Dt., Tamil Nadu.

During this occasion, Dr. E G Silas, Chairman of Scientific Advisory Committee of RGCA was felicitated for his enormous contribution to RGCA's Aquaculture Library. Dr. Silas later delivered the keynote address for the ISMAF-2013 correlating the current issues and future perspective of mud crab industry and research in India.

There was a small function of releasing of SPF *L. vannamei* brood stock produced by RGCA to the stake holders. The programme ended with vote of thanks by Dr. Anup Mandal, Manager of Central Genetics Lab of RGCA. ●


*Presidential address by Ms. Leena Nair IAS, Chairman, MPEDA & President of RGCA*


*Inaugural address by Dr. (Mrs.) B Meenakumari, Deputy Director General (Fy), ICAR*


*Dr. E. G. Silas being felicitated by Chairman, MPEDA & President of RGCA*


*Dr. (Mrs.) B Meenakumari felicitating Dr. Emilia T Quinitio of SEAFDEC, Philippines*


*Dr. E G Silas delivering the keynote address for the seminar-workshop*

*A section of the delegates during the inaugural programme of ISMAF-2013*

# MPEDA – RGCA opens the first and exclusive Mud Crab Hatchery in India

Mangrove crab or mud crab (*Scylla serrata* ) is an economically important species found in all estuaries, coastal lagoons and near shore waters of India. Due to their delicacy and high nutritional value, mud crabs attain very high demand in export and domestic markets. Mud crab aquaculture in India totally depends on the wild stock and due to over dependence on the wild crabs for farming, fattening and soft shell crab culture operation, the existence of the natural stock is diminishing. Realizing the magnitude of mud crab industry and importance of hatchery produced seed, MPEDA started a pilot scale hatchery operation at its R&D facility of RGCA located at Thoduvai, Nagapattinam District in the year 2004 with the technical assistance of SEAFDEC, Philippines.

*Dr. (Mrs.) B Meenakumari, Deputy Director General (Fy), ICAR is inaugurating the new mud crab hatchery complex at Thoduvai, Nagapattinam District, Tamil Nadu. Ms. Leena Nair, Chairman, MPEDA & President, RGCA and Dr. E G Silas, Chairman, Scientific Advisory Committee, RGCA are also seen.*

After several trials on technology upgradation, RGCA achieved a record survival of 36% from Zoea 1 to Megalopae in the hatchery phase and consistently getting a survival of around 18%. Now, MPEDA-RGCA has come up with a world class state-of-the art mud crab hatchery facility at Thoduvai, Nagapattinam District, Tamil Nadu having production capacity of 1 million crablets per year.

The hatchery was inaugurated by Dr. (Mrs.) B Meenakumari, Deputy Director General (Fy.), ICAR on 9th April, 2013. Ms. Leena Nair IAS, Chairman, MPEDA & President, RGCA, Dr. E G Silas, Chairman, Scientific Advisory Committee, RGCA and Dr. (Mrs.) Emilia T Quinitio, Scientist and Head, Technology Verification and Demonstration Division, Aquaculture Department, SEAFDEC, Philippines were present on the occasion.

Representatives of mud crab farmers, department officials, academicians and stakeholders from various parts of India and abroad were present during the event. The inauguration was followed by a sale of 1000 baby crab seeds produced from the hatchery. ●

*The dignitaries observe different phases of mud crab hatchery*

*Sale of baby crab seeds produced from the hatchery to the farmers*

# Live food production for ornamental fish breeding units

**Brian Andrews, Australia**

*Mr. Brian Andrews, ornamental fish expert from Australia was one of the speakers of the recently organized Aqua Aquaria India 2013. Mr. Brian Andrews is probably one of the few experts available with firsthand experience in mass production of ornamental fishes on commercial basis. Few years ago, he was operating one of the largest commercial ornamental fish production units and now he seems to be retired, but actively helping other entrepreneurs. He has written a book on ornamental fish breeding recently and it has been accepted very well by the ornamental fish industry worldwide for its practical approach.*

*He had visited few ornamental fish breeding units in Maharashtra, Tamil Nadu and Kerala and has given suggestions on live food culture, which are as follows in his own words:*

## (1) HATCHING ARTEMIA

It came to my attention very late in my visit that some farmers may not be ensuring to keep the pH at 8 or above for the water they hatch artemia. If it drops below 8, which happens easily when salt is added to very soft water, the artemia will hatch, but dies soon after hatching.

This can be easily solved by adding sodium bicarbonate (bicarb, cooking soda) at about 1 heaped teaspoon to 10 litres of water. This will not raise the pH to above pH 8.4, which is totally safe. At the same time, you can maintain pH above 8. I always do this when hatching artemia in fresh water with salt added. Some people even add it to sea water for hatching high densities of artemia. As always, the ideal is to monitor the pH by testing, but if this can't be done, the bicarb can just be added.

## (2) HARVESTING ARTEMIA

I understand there is resistance from at least some farmers to use anything but AAA grade artemia (or similar high grade) which gives a very high hatch rate. This makes harvesting easier, but can be false economy, as the cost of very high grades are often (always?) out of proportion to the hatch rate. It means that one pay much more to get just a few percent higher hatch rate. (I have been told the reason for this is that marine shrimp farmers, in Australia at least, insist on the higher hatch rate to avoid cyst contamination – and they can afford it!)

Provided that one can separate both the hatched and unhatched cysts (which the shrimp farmers prefer not to have to do), from the hatched artemia nauplii, this is fine for ornamental fish production.

Two methods for harvesting are described extensively in my book, and to save re-writing it all, I will copy and paste, though this is fairly long. It describes how to exploit the fact that hatched cysts float and unhatched cysts sink, leaving close to pure nauplii – certainly clean enough for freshwater ornamental fish. I have used the system for decades.

### Harvesting artemia (brine shrimp)

The harvesting process involves separating the brine shrimp from both hatched and any unhatched cysts. The following quick and easy two-part harvesting method exploits the fact that hatched cysts float and unhatched cysts sink. Therefore, it can be used with cysts which have low or high hatch rates.

### *Part 1*

(a) When the brine shrimp is ready for harvesting, **switch off heaters if in use and remove them once they have cooled.**

(b) Remove aerator lines from the hatching cone and cover the cone to keep out light completely.

(c) Leave for 15 to 20 minutes. During this time, the hatched, empty, brown-coloured cysts float to the surface, while any unhatched cysts sink to the bottom. As oxygen levels decline, the swimming brine shrimp nauplii slow down and eventually concentrate near the bottom.

Drain off the brine shrimp and any unhatched cysts from the bottom of the cone into a bucket. If there is no built-in drainage system they can be siphoned off using a siphon pipe which has rigid part to enable the pipe to be

pushed easily to the bottom of the cone. Any unhatched cysts, which would have settled out first, are first to appear, evidenced by an initial brown colour. These are followed by a bright orange-coloured flow of concentrated brine shrimp.

(d) If the hatch rate is *high* there will be very little or no brown colour of unhatched cysts preceding the orange flow of pure brine shrimp. If it is clean enough, the brine shrimp can be fed without further removal of cysts. (If there is brown colour, go to Part 2.)

(e) If there are unhatched cysts first, followed by bright orange, continue draining until the bright orange water flow changes to clear water, then stop draining. This would normally take about 25% of the total hatch volume; sometimes more, sometimes less, depending on how well the hatched brine shrimp has settled to the bottom.

(f) Now pour the water containing the harvested brine shrimp through a 180 micron screen or net, which will retain the brine shrimp. While it is contained in the screen or net, gently rinse the brine shrimp with freshwater. This removes any residual hatch water and free-swimming bacteria in the water. (Provided hatching equipment is kept well cleaned, it is not absolutely necessary to wash the brine shrimp in freshwater but it is preferable to remove bacteria and any other contamination.)

(g) Once it is washed, return the concentrated brine shrimp to a suitable volume of freshwater (not salty) and provide aeration. It must now be fed to the fry immediately as it will die fairly soon in freshwater.

If it is to be held for feeding later in the day then salt must be added to keep it alive. This will require about 10 grams of coarse salt per litre of holding water, to give about 10 ppt of salt.

(Because a high degree of accuracy is not necessary, a volume of 10 ml of salt can be used to give 10 grams instead of weighing it.)

### Part 2

(a) If the hatch rate is *low* then the sinking, unhatched cysts (recognizable by their brown colour preceding the bright


orange flow of hatched brine shrimp) need to be removed. In this case, top up the bucket of harvested brine shrimp with *freshwater* and aerate it vigorously for 5 minutes to revitalize (re-oxygenate) the brine shrimp. (The reduced salinity decreases the buoyancy of the cysts, causing them to sink faster, which helps.)

(b) After aerating and revitalizing the brine shrimp, lift the outlet of the aerator line and peg it at 30 to 40 mm (1.2 to 1.6 in) below the surface of the water, where it must continue to aerate vigorously. This keeps water oxygenated and brine shrimp active, but does not agitate the water sufficiently to keep unhatched cysts suspended. These cysts then settle out onto the bottom after 10 to 15 minutes, and the original brown/orange colour becomes progressively brighter orange, as shown in figures 1 and 2.

*Fig. 1. The harvested brine shrimp after being revitalized by vigorous aeration with the outlet of the airline at the bottom. Unhatched cysts are still suspended in the water and colour it brown. The outlet of the air supply line is now lifted and pegged just below the surface.*

*Fig. 2. The same brine shrimp after about 10 minutes, after unhatched cysts have settled out. The water is now coloured bright orange by the pure brine shrimp.*

(c) When this process is complete, slowly and carefully pour off the clean brine shrimp, leaving the brown unhatched dregs behind. The brine shrimp can now be washed in freshwater and fed to the fry, or it can be re-salted, aerated and kept alive for use later in the day.

Note that in some cases, the unhatched cysts may be slower in hatching rather than totally unviable. It can be worthwhile to test them by hatching them for a further 24 hours to see if a second harvest can be obtained.

## (3) CULTURING MOINA

Elements of the methods that I used for culturing daphnia, closely related to moina, may be found useful in culturing moina in India. Again, for convenience I will take this from my book:

Daphnia (*Daphnia magna, Daphnia pulex*)

Various methods have been described for culturing daphnia. Probably the most common of these uses algal blooms to feed it and it is harvested at the peak of a growth 'pulse'. The semi-continuous culture system described here was used for years by the author to culture daphnia on a continuously harvestable basis. Although this has not been done by the author, this culture method could also be worth to trial moina and bosmina.

### Culture method

**Culture facility.** Concrete ponds of 20, 000 litres (5300 gal) are used in the system described. (See Fig. 3.) Smaller ponds can also be used, but these are likely to be less stable and reliable. Feeding rates need to be adjusted proportionately. Daphnia generally prefers cooler water (18 to 22°C/64 to 72°F). So the ponds may need to be covered in the warmer months. Covering with seventy percent shade-cloth helps to reduce the water temperature and also restrains the growth of filamentous algae. Deeper water (and hence proportionately smaller surface area) also helps to reduce temperature gain during the day. At least four separate culture systems are recommended to produce a constant flow of daphnia and also to minimize the chances of a total loss of the cultures.

**Inoculation.** Each 20, 000 litre (5300 gal) pond is inoculated (seeded) with around 250 to 300 ml (0.5 to 0.6 pt) of live daphnia. (This volume is of pure daphnia, meaning after water is drained out using a fine net.) The pond is then left overnight, and given its first feed the following day.

**Feeding.** To feed the cultures, chicken liver is liquidized with about 25% water, either by volume or weight, as they are quite similar. (Adding water makes liquidizing easier. Other liver can probably be used, but chicken liver is very soft and liquidizes well.) Vitamins consisting of two parts fish vitamin/mineral premix (powder) and one part vitamin C can be added to enrich the liver food at a rate of about 30 ml of each to 5 litres (1.3 gal) of liquidized liver. This is fed to the cultures either daily or every two days, depending on need.

NOTE: Cultures are fed only as much as they can clear from the water preferably overnight, but in not more than two days. Over-feeding will deteriorate water quality. At full production, approximately 300 to 400 ml (0.6 to 0.8 pt) of liquidized liver fed

to each 20, 000 litre pond every one to two days should be sufficient; less when ponds are first inoculated. No aeration is used in the described system.

**Harvesting.** Cultures will peak in 10 to 15 days, and from then onwards it can usually be harvested at 4 to 7 day intervals. Cultures must always be harvested sustainably, leaving sufficient numbers behind to ensure strong growth for the next harvest. The harvestable lifespan of ponds varies, but can continue for weeks. When ponds decline in output, they are cleaned, refilled and re-inoculated from good ponds. Bloodworms (Chironomid larvae) are also likely to thrive spontaneously in these systems, and can be harvested as a by-product. ●

*Fig. 3. Covered daphnia culture ponds. (Amatikulu Hatchery, South Africa.)*

# Ornamental Fish Awareness Programmes in Maharashtra

## A. Awareness Programmes on Marine Ornamental Fish Breeding and Rearing in Malvan

The MPEDA Mumbai Regional Office, in cooperation with the Mangrove cell of the Maharashtra Forest department co-organised two programmes on awareness of marine ornamental fish production and trade at Malvan, Sindhudurg district, Maharashtra. The programmes were organized on 27th February and 21st March 2013 in cooperation with GOI-UNDP-GEF project- Mainstreaming Coastal and Marine Biodiversity implemented by the Mangrove cell.


There are no marine ornamental fish production units in Maharashtra and the awareness programmes were aimed at promoting setting up of marine ornamental fish breeding units through MPEDA schemes. The programme also emphasized on conservation of marine ornamental fish resources. Dr. Mangesh Shirdhankar, Professor, Head of Department, Fisheries Resources, Economics, statistics and Extension Education explained various varieties of Marine Ornamental fishes available in Konkan Coast. After small introduction regarding MPEDA's work in Ornamental Fish sector by Mr. Suhel Jamadar of UNDP, Mr. Mangesh Gawde, Programme Manager (OFD) explained MPEDA schemes for setting up ornamental fish breeding units. Twenty three participants attended the awareness programme on 27th February 2013, out of which ten were from women self-help group from Vengurla block whereas fifteen participants from Malvan fishermen group attended the programme on March 21. Some of them are collecting fishes from wild by cast net or collecting it from fishers. Participants, Mr. Deepak Dhuri and Mr. Rupesh Prabhu informed that they are getting Scats, Lion fish, butterfly and electric blue damsels in off Malvan Coast which are given to agents for marketing elsewhere.


## B. Awareness Programme in Karda Risod Block of Washim District

The Krishi Vigyan Kendra Karda, Block Risod, District Washim has organized one awareness programme for rural youth from Risod block. Twenty five farmers from Risod block attended the training programme. The training was handled by Mr. Mangesh Gawde, Programme Manager (OFD), Maharashtra who explained scope and business potential in Ornamental fish

breeding and rearing, domestic market trend and species of high demand in domestic as well as international market and MPEDA's ornamental fish development schemes. He has also explained the preparation of business plan. After the session, all the farmers had visited ornamental fish farm of KVK, Karda.

## Awareness Programme in Amaravati

Mr. Vinod Bonde, member of MPED Authority has organized one awareness programme at Amaravati on 13th March 2013, which was attended by 20 farmers from nearby area. Mr. Mangesh Gawde, Programme Manager (OFD) gave lecture on MPEDA's Ornamental fish breeding and rearing schemes and explained the scope and potential of this business sector and also explained them procedure to avail financial assistance from MPEDA. ●

# ISMAF delegates visited the Mud Crab Aquaculture Demonstration Farm, Karaikal

A field visit was scheduled as a part of the International Seminar-workshop on Mud Crab Aquaculture and Fisheries management (ISMAF 2013) on 12th April, 2013. Around 100 delegates visited the crab aquaculture demonstration farm of RGCA, situated at Karaikal, UT of Puducherry. Various phases of mud crab farm operation including nursery rearing, grow out and soft shell crab production were explained in detail to the delegates. Six size groups of crablets ranging from 1.0-4.5 cm were reared at the farm. Soft shell crabs produced at the soft shell crab production pond and marketable sized crabs harvested from the crab grow out ponds were displayed during the demonstration.

*Dr. George John, Scientist 'H' and Advisor (DBT) and member of Evaluation and Scientific Committee of RGCA is inaugurating the soft shell observation platform at RGCA demo farm at Karaikal, UT of Puducherr. Mr. Y C Thampi Sam Raj, Project Director, RGCA and Dr. Emilia T Quinito, Scientist, SEAFDEC, Philippines are also seen*

Newly constructed soft shell observation platform was inaugurated during the occasion by Dr. George John, Scientist 'H' and Advisor (DBT) and member of Evaluation and Scientific Committee of RGCA in presence of the delegates. The field visit was followed by an interactive session in which all the doubts raised by the delegates regarding mud crab farming were addressed by RGCA officials. Delegates were very much impressed with the state- of- the- art facilities for nursery rearing, grow-out culture and soft shell crab production at RGCA demonstration farm.

*Soft shell observation platform at RGCA demo farm at Karaikal, UT of Puducherry.*

The technical sessions organized during ISMAF 2013 will be covered in the May 2013 issue of MPEDA Newsletter.

*Dr. Emilia T Quinito, Scientist, SEAFDEC, Philippines with RGCA demo farm officials during the demonstration.*

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# NEWS SPECTRUM

## Floating tsunami trash turns to be a huge headache

The tsunami that ravaged Japan in March 2011 created the biggest single dumping of rubbish, sweeping some five million tonnes of shattered buildings, cars, household goods and other rubble into the sea.

About three-and-a-half million tonnes, according to official estimates, sank immediately, leaving 1.5 million tonnes of plastic, timber, fishing nets, shipping containers, industrial scrap and innumerable other objects to float deeper into the ocean.

Marine experts poring over the disaster say the floating trash adds significantly to the Pacific's already worrying pollution problem.

For many years, and possibly decades, the items will be a hazard for shipping; a risk for sea mammals, turtles and birds; a hitchhiking invitation for invasive species; and a poorly understood threat to wildlife through plastic micro-particles.

"In a single stroke, the tsunami dumped 3,200 times the amount of rubbish that Japan discharges annually into the Pacific", said Robin des Bois, a French environmental group that is studying the problem.

"In plastic alone, the volume is the equivalent to several decades of accumulated waste in the Atlantic and Pacific."

Early last year, the first debris started to wash up on shores of Oregon, Washington and southern Alaska and the Canadian province of British Columbia. They were foam and buoys that have 'high windage', meaning objects that sit proud of the waves and are easily pushed by the wind. They were followed by other items that sometimes spoke poignantly of the disaster on the other side of the ocean.

They included a Harley-Davidson motorbike in a container, a football with the owner's name on it, a crewless ship and two massive concrete docks on styrofoam floats. The docks came from the fishing port of Misawa in Aomori prefecture, yet washed up in Oregon and Washington eight months apart. One dock was rinsed down with bleach as a bio-precaution after it was found to be studded with dozens of foreign species of algae and barnacles.

The docks' odyssey may explain why there has been no massive landfall of debris.

"NOAA's data suggests that the debris is no longer in a mass or a patch," said an expert . "Rather, it has spread out across the vast North Pacific Ocean since it was introduced nearly two years ago." Indeed, exactly where the trash is and how much remains is unclear. — AFP

## Puffer fish proliferate as predators vanish

The extraordinary abundance of puffer fish in the Arabian sea off Kerala since 2007 could be due owing to a decline in the population of top predators in the marine ecosystem, a study conducted by scientists at the Central Marine Fisheries Research Institute indicates.

The study, reported in the latest issue of *Current Science* , attributes the increasing biomass of puffer fish to the excessive fishing of top predators like the cobia (Rachycentron canadum) and different species of catfish in the ecosystem.

The study carried out by K.S. Mohamed and others says the

increased biomass of puffer fishes from 2007 signalled the beginning of a 'trophic cascade' in the Arabian Sea, marked by reciprocal changes in the population of predator and prey species. It says the loss of predatory control had a top-down effect on the population of puffer fish. From 2007, there have been reports of puffer fish wreaking havoc off the coast of Kerala, damaging fishing nets and causing extensive loss to traditional fishermen. The problem is acute during the post-monsoon period. Puffer fish tear fishing nets to shreds. They also attack other catch, particularly squids and cuttlefish, adding to the fishermen's loss.

Belonging to the family Tetraodontidae, puffer fish is a mid-level carnivore characterised by four sharp, plate- like teeth and a spiny, loose-skinned rib-less body that can take in water to become a prickly ball.

Because of these features, it is shunned as prey by most predatory fishes. Puffer fish are toxic for humans because of the presence of Tetradotoxin (TTX), a neurotoxin causing asphyxiation and death, in their body. An assessment of the fish catch statistics in Kerala by the research team showed that catches of Tetradontids were meagre during the 1970s, 80s and 90s but increased sharply from 2006.

Among the puffer fishes caught, the smooth-backed blow fish (L.inermis) was the major species, followed by the fat puffer (Arothron), and the porcupine fish (Diodon).

# Letter: What's the industry's role in IUU fishing?

Editor's note: The following is a commentary submitted to SeafoodSource by Ned Daly, special project advisor for SeaWeb.

NOAA's recent announcement that it will be working with ten countries to address their failures to control illegal, unreported and unregulated (IUU) fishing activities under their flagged vessels follows similar action by the European Union last year to list countries that had failed to meet EU IUU regulations. This all comes at a time when other governments, the conservation community and many in industry are working together to develop responses to IUU fishing.

Along with significant social and environmental impacts, IUU fishing is estimated at a USD 10 billion to USD 23 billion loss for the global fishing industry. The seafood industry will benefit significantly from this new set of tools and actions, but it is the coordination and integration of these tools with each other and with industry traceability efforts that will be most valuable to the seafood industry. These collaborative endeavors not only allow global actions to be more efficient and effective in protecting marine and seafood resources, but they also provide industry with a great opportunity to easily engage and contribute to the fight against IUU fishing.

What is IUU fishing? According to Chatham House — which has developed a great online resource about IUU fishing — at its broadest, illegal fishing takes place where vessels operate in violation of the laws of a fishery. This can apply to fisheries that are under the jurisdiction of a coastal state or to high seas fisheries regulated by regional fisheries management organizations (RFMOs). Unreported fishing is fishing that has been unreported or misreported to the relevant national authority or regional organization, in contravention of applicable laws and regulations. Unregulated fishing generally refers to fishing by vessels without nationality, or vessels flying the flag of a country that is not party to the regional organization governing that fishing area or species and fishing other areas not covered by management arrangements without specific authorization.

One way a seafood company can help address IUU fishing is through traceability of its supply chain. A great resource for all seafood companies, but particularly for companies just starting to think about traceability, is a comprehensive overview of international traceability efforts produced by Mariah Boyle, at FishWise "Without a Trace II: An Updated Summary of Traceability Efforts in the Seafood Industry."

However traceability alone cannot address IUU fishing. It is a complex problem occurring at different scales and in different forms all across the globe. Tony Long, Director of the Global Campaign to End Illegal Fishing with the Pew Charitable Trusts explained, "To deter IUU fishing activity requires a shift from business as usual, in which illegal fishing is a low-risk, high-reward activity, to one in which the threat of sanctions is real and the opportunity to exploit the system is not worth the cost. This is why the industry is vital to making a difference; they must close the market to illegal catch by uniting to demand greater transparency from the moment the fish is caught to when the consumer buys it." Long has an acute understanding of how to tackle such a difficult issue, after 27 years in the Royal Navy tracking vessels that don't want to be found.

"There is no silver bullet that will adequately address the problem of IUU fishing but if processors and retailers mandated that IMO numbers be part of all traceability arrangements and that FAO Port State Measures are adopted then much greater transparency in fishing operations will be achieved," Long added.

Identifying vessels that are fishing illegally, developing the process for information sharing across national borders, better national rulemaking, the need for globally coordinated measures that combat illegal fishing — these are the basic building blocks to combat illegal fishing and the foundation of Pew's global strategy.

Steve Trent, the executive director of the Environmental Justice Foundation (EJF), sees the value of better-coordinated IUU efforts at the local level. "Improving information sharing between coastal countries and importing countries is crucial to effectively addressing IUU fishing." EJF runs a community surveillance project in West Africa that allows fishing communities to document and report illegal fishing by trawlers that supply the global seafood market. EJF's work with fishing communities has resulted in a number of high-profile arrests of illegal trawlers, seizures of IUU fish, and a dramatic reduction in inshore illegal fishing in Sierra Leone. Trent added, "we now need to significantly increase transparency in the global fishing sector by establishing a Global Record of fishing vessels and ending the use of Flags of Convenience. Industry has a central role to play in achieving this."

Beyond the obvious value to the industry of better-coordinated government and international efforts to protect seafood resources from IUU fishing, there is a more compelling reason for seafood companies to engage in and support IUU efforts beyond their own traceability. The impacts of illegal fishing on the seafood industry go beyond liability issues in the supply chain. IUU fishing can threaten long-term assured supply of an entire fishery or threaten the market reputation of species or geographies.

There are a number of parallels between the issue of illegal logging and IUU fishing and some lessons to be learned from the terrestrial world. Like fishing, forestry often focuses on a few species that are commercially viable in the marketplace. So while there may seem to be plenty of fish in the sea and plenty of trees in the forest, illegal extraction can wreak havoc on, and often targets, the most commercially valuable species. In the criminal context, illegal, unregulated, and underreported does not mean unorganized.

Phil Guillery, the systems integrity director at the Forest Stewardship Council International, demonstrated this point when he said "companies like big box DIY stores in Europe and the U.S. see illegal and unsustainable logging generally as a threat to long-term assured supply. Addressing illegal logging is not only a sustainability strategy—it's a procurement strategy."

Tom Kraft with Norpac Fisheries Export sees a similar trend developing in seafood.

"There is no question that the larger retailers and club stores are seeing seafood sustainability as a procurement issue to be addressed now, in order to avoid supply disruptions in the future. IUU products in the supply chain are seen as counterfeit product that diminishes the product integrity and the retailer's brand," said Kraft. "We are finding broad support for electronic product traceability that enables transparency around capture data, processing, and species identification."

The work Pew, FishWise, EJF, WWF, and others are doing to develop a strategy around the variety of enforcement, legislative and inter-governmental efforts underway will support industry traceability efforts and provide industry a platform for addressing some of these longer term threats IUU poses to the seafood industry. "Our strategy at Pew is to promote identifying vessels that are fishing illegally, developing the process for information sharing across national borders, better national rulemaking and globally coordinated measures that combat illegal fishing — these are the basic building blocks to combat illegal fishing and protect these resources," said Long.

Boyle at FishWise is working with NGO partners, companies, and governments to develop specific opportunities for the seafood industry to support these key international efforts. "Our hope is to continue to work with industry and give them a voice in IUU discussions and strategy development and to educate companies on what is happening legislatively, through NOAA, NGO, and inter-governmental efforts," Boyle said. Below are some of the key opportunities FishWise and colleagues are working to engage seafood businesses and others to support efforts to stop IUU fishing:

1. Support the ratification of the UN FAO Port State Measures Agreement (http://www.fao.org/fishery/psm/en) by engaging foreign offices, suppliers, and partners to encourage more nations to ratify the agreement because more rigorous port inspections will limit the scope for illegal product to enter the market.
2. Governments and seafood businesses should require the use of an IMO number that uniquely identifies a fishing vessel throughout its life and therefore improves transparency of vessel operations and ownership and is unaffected by name, flag or changes of owner.
3. Include in your supplier code-of-conduct (yes, you should have one) a prohibition on the use of flags of convenience that fail to meet their international obligations.
4. Improve your supply chains' traceability by reviewing its data

and information systems, protocols, and conducting risk assessments.

5. Support Congressional efforts to address IUU fishing and traceability in the supply chain.
6. Support NOAA's efforts to address IUU fishing and work with other countries to strengthen fisheries legislation and enforcement.

If you are a seafood business and would like to learn more about these issues or get involved in any of these efforts, SeaWeb can connect you with organizations, projects, and opportunities to protect seafood resources from IUU fishing. Contact Ned Daly at ndaly@seaweb.org or go to our website, www.seafoodchoices.org.

*SeafoodSource staff*

# China firm banks on rising tuna, mackerel demand

**By Mark Godfrey, SeafoodSource contributing editor reporting from Beijing, China**

Domestic demand for tuna and squid is driving profits and expansion at one of China's largest offshore catch fisheries firms, which recently added new tuna-fishing vessels to its fleet. Shanghai Kaichuang Marine International Co. is predicting its profits will soar 90 percent year over year in 2012 — to CNY 125 million (USD 20 million, EUR 16 million) according to earnings guidance to investors, as reported by analysts at Chinese securities houses tracking the firm's stock. The firm sells tuna and horse mackerel in China under its Longmen brand name.

Kaichuang, which will report its 2012 earnings in April, this month added its new large-scale Jinhu No.9 tuna vessel into service on 9 March. The vessel has an annual catch capacity of 80 million tons, twice the level of normal fish boats according to China Investment Securities. The Jinhu No.8 boat entered into service in 2012 and lifted the firm's skipjack capacity from 34,000 tons in the first half of 2012 to 52,000 tons by year's end.

The company will in 2013 expand operations in West Africa, the Antarctic and Greenland as well as the Faroe Islands. Kaichuang benefits from growing demand and rising prices for fish in China as well as government subsidies for fuel and new boats. CIC Securities points to bonito prices that rose 25 percent in the past 12 months, a CIC Securities analyst told SeafoodSource.

Skipjack prices roses 22 percent year over year in 2012 and will rise 5 percent in the first half of 2013, predicts the CIS analyst. The analyst said that, provided oil costs remain stable, Kaichuang's profits will hit CNY 163 million (USD 26 million, EUR 21 million) in 2013 and rise to CNY 192 million (USD 31 million, EUR 24 million) in 2014. The use of tuna has soared in China in part due to the rapid spread of Japanese-style dining and fast food, as well as convenience food sold in fast-expanding grocery chains like Japanese-owned 7-11.

*-SeafoodSource*

# US seafood chain sales rebound

**By Christine Blank, SeafoodSource contributing editor**

Sales at both full-service and limited-service U.S. seafood chains soared in 2012 as the economy rebounded, according to new data provided exclusively to SeafoodSource.

Full-service seafood restaurant chain sales climbed 4.5 percent in 2012, compared to 2011, according to preliminary information from foodservice consulting firm's Technomic Inc.'s Top 500 Chain Restaurant report, which will be released in mid-April. The seafood category follows the overall restaurant industry growth of 4.9 percent in 2012. "It is certainly encouraging to see overall industry growth rates return to levels not seen since 2007," said Ron Paul, president of Technomic.

The full-service seafood sales growth rate of 4.5 percent in 2012 was remarkable, since the category grew only 2 percent in 2011. "Red Lobster drives that sales growth, since it comprises such a large portion of the full-service seafood segment. Red Lobster's sales grew 4.5 percent in 2012," Mary Chapman, director of production innovation for Technomic, told SeafoodSource.

Sales growth at Darden Group-owned Red Lobster can be attributed to a number of changes in the past

year, including improvements to its menu, an increased focus on value, and changing the interior design of its stores, according to Chapman. "Red Lobster has been working consistently on … increasing and promoting the quality aspects — such as fresh, seasonal, and wood-fired — of the products they are serving. They also continue to offer price promotions, to increase value to the people who are concerned about value," Chapman said.

Captain D's was the star in the limited-service sector in 2012, with an earnings increase of 7.8 percent, according to the early data from Technomic. "Their sales have been up for four or five consecutive quarters. Sun Capital, which owns Captain D's, is working on menu and brand positioning before expanding," Chapman said.

In addition to upgrading its core menu items, Captain D's has launched a "Fire Grilled" menu that has been positively received by guests, Captain D's CEO Phil Greifeld told SeafoodSource last year. Captain D's television commercials, store re-design program, and numerous other efforts have also contributed to an increase in the chain's profitability, according to Greifeld. The story is not so great for Long John Silver's, which had a sales drop of 3.1 percent in 2012, according to Technomic. "Their new parent company has made many of the same efforts as Captain D's, including menu positioning. Hopefully, those changes will take effect as time goes by, but our numbers show they haven't yet," Chapman said.

Among casual seafood operators, Bonefish Grill is one of the casual category leaders with a spike in sales of 11.2 percent in 2012. "Bonefish is also leading in our consumer research. They do well with executing and promoting the freshness of their food and utilizing social media," Chapman said.

*-SeafoodSource*

# MSY not ideal solution for fisheries management

**By Mike Urch, SeafoodSource contributing editor**

Fisheries should be managed so that they are profitable, otherwise fishermen won't go out to fish. And fishing for maximum sustainable yield (MSY), which is a main criterion of the EU's revised Common Fisheries Policy (CFP), is not the best way to achieve this objective.

So said Professor Sidney Holt when giving one of the Buckland Foundation's annual lectures in March. "The value of the catch has to be more than the cost of catching it. Setting TACs (total allowable catches) is the worst possible way to manage a fishery.

"You don't just use the brakes when driving a car. You have to manage the input not the output, which depends on recruitment [to the fishery]." The recruitment number can be the most variable, Holt said. "It can change by a factor of 100 year to year."

Regarded as one of the founders of fishery science, Holt was speaking on the theme, "Why, or why not, maximum sustainable yield (MSY)? Contemporary thoughts on the rational management of fisheries" at Fishmongers' Hall in London.

Although MSY forms a major constituent of the revisions now being sought for the CFP, the concept had first been introduced by the U.S. government at a conference in 1949 as a management objective for stopping Japanese fishing vessels coming into its waters to catch salmon.

There were no territorial waters in those days, Holt said, but added that the U.S. government sought to claim that it was fully utilizing the resources within what became its 200-mile limit or exclusive economic zone.

Maximizing yields using surplus production models is an unscientific method of managing fish populations, according to Holt. "You can't use it to take account of selectivity. You're catching too many fish when they're young. This is the issue.

"You've got to look at the relationship between growth and death. How much more [death] is caused by fishing than nature?"

Ian Boyd, who preceded Holt as Buckland Professor for 2012/13, and spoke after him, agreed that there is little justification for the maximization of yield approach.

"If MSY is to be used then make it a limit not a target," said Boyd.

Boyd went on to say that in his view fishing for MSY also ignores fundamental aspects of the ecosystem such as the need to leave enough fish in the sea for other parts of the food chain including mammals and seabirds. To do this means reducing the proportion of the fish stocks that is harvested.

Both speakers agreed that fishing

in European waters should be reduced. Less fishing effort would mean more profit for those left in the fishery, and it would also provide a better balance between the components of the food chain that are harvested by fishermen, mammals and birds.

Determining the reduction in fishing effort required was difficult. There was a suggestion from a delegate that to achieve maximum economic yield in a fishery that was completely unregulated would mean reducing fishing effort by a massive 80 percent.

This size of reduction would not be necessary for fisheries regulated by the current CFP. However, because of the practice of discarding, scientists — and therefore fisheries ministers — didn't know how much fish was already being harvested, which would be necessary before a reduction in fishing effort could take place. Said one delegate: "We don't know what is caught in the North Sea as 45 percent of the total catch is thrown away (discards) without being recorded."

A discard ban — another objective of the revised CFP — was much in favor with delegates, although there were very few fishermen in the audience and not all are thought to agree with this approach. It was mentioned that there was a better understanding of fisheries management in the Netherlands because fishermen and scientists work better together there.

As Colin Bannister, a trustee of the Buckland Foundation, put it in his summing up of the proceedings: 'Fisherman have a great deal of knowledge that is worth tapping into.

"The ideals of fisheries management are relatively simple," Bannister told delegates at the beginning of the proceedings. "But the practice is actually very difficult." However, as the proceedings concluded he did think there was "light at the end of the tunnel."

Speaking afterwards he said: "Scientific advice for the crisis stocks is now aiming to establish a fishing rate rather than a stock biomass," said Bannister. "Fishing rates are now falling in the most critical fisheries, and are closer to MSY, which even though not the ideal is nevertheless a step on the way to the profitability that [Professor Holt] is seeking."

*-SeafoodSource*

# China's fishing sector enjoys subsidy surge

28 March, 2013 - Newly released data shows China spent a record RMB 23.9 billion (USD 3.8 billion, EUR 3 billion) subsidizing fuel for its fishing vessels in 2012, compared to RMB 17.1 billion (USD 2.8 billion, EUR 2.1 billion) in fuel subsidies paid to fishing vessel owners in 2011, a year-on-year increase of 63.8 percent. Subsidies for scrapping vessels and "preserving fish resources" will total RMB 400 million (USD 64.3 million, EUR 50.2 million) this year, according to the Ministry of Agriculture in Beijing in a statement this week. Subsidies also go to freshwater fishers: from 1 April to 30 June, the Yangtze River and Hanjiang River basins in Hubei province will be closed to fishing in order to encourage restocking of the rivers with fish.

The fisheries sector gets an impressive share of subsidies compared to some other areas also administered by the Ministry of Agriculture. Compared to RMB 23.9 billion (USD 3.8 billion, EUR 3 billion) for fisheries, grain farmers for instance will only get RMB 15.1 billion (USD 2.4 billion, EUR 1.9 billion) in 2013 to help them improve yields.

Seafood products producers can also apply for subsidies supporting "stocking and processing of raw agricultural products" through which 18 types of processing rooms and facilities are subsidized by the ministry to a maximum 30 percent of the cost of construction. This fund was worth RMB 500 million (USD 80.4 million, EUR 62.8 million) in 2012.

Another RMB 200 million (USD 32.2 million, EUR 25.1 million) was assigned in 2012 for the building of 756 demonstrative aquatic breeding farms in 26 provinces: each qualified applicant farm gets RMB 250,000 (USD 40,207, EUR 31,395) under the scheme, which is part of an overall government effort to keep inflation of food prices (a particular fear of Chinese officials) under control.

While China has been criticized for subsidizing its manufacturing industries, the country's seafood catch and processing firms are also being cushioned with government handouts. Beneficiaries of subsidies include fishing firms like Shanghai-based Kaichuang Marine and state-controlled CNFC Overseas Fishery Co. The firm made RMB 50 million (USD 8 million, EUR 6.3 million) in the first nine months of 2012 but took in RMB 80.5 million (USD 12.9 million, EUR 10.1 million) in diesel subsidies. CNFC took RMB 60.5 million (USD 9.7 million, EUR 7.6 million) and RMB 61.8 million (USD 9.9 million, EUR 7.8

million) in subsidies and profits, respectively, in 2011. CNFC and Kaichuang both receive subsidies to build and renovate its larger vessels.

Home to the world's largest marine fishing fleet and aquaculture sector, China is not keen to publicize subsidies to its offshore fishing fleet given sensitivities over China's role in overfishing and illegal fishing globally. China's "offshore marine fishing" catch totaled 12.4 million tons in 2011 according to the Ministry of Agriculture, which didn't provide a 2012 figure.

Government support for the fishing and aquaculture sector could be as much as RMB 500 billion (USD 80.4 billion, EUR 62.8 billion) when regional and national subsidies for rural-based fish farmers are taken into account. China's aquaculture and fisheries sectors are both benefitting from a general ramp-up in government spending to spur rural growth and lift incomes among peasants, seen by Chinese policymakers as the most disadvantaged section of society but also a new source of consumption spending. In 2011, the central government paid a record RMB 1 trillion (USD 160.8 billion, EUR 125.6 billion) in subsidies to the so-called "three peasant" sectors of society: rural infrastructure, farm families and agricultural enterprises. The figure was set to rise to RMB 1.2 trillion (USD 193 billion, EUR 150.7 billion) in 2012.

Aquaculture appears to benefit less, at least in direct subsidies. The Ministry of Agriculture for instance announced RMB 400 million (USD 64.3 million, EUR 50.2 million) in national subsidies in 2011 for fish seedlings. Subsidies are also being ramped up regionally, with local governments in aquaculture hot spots like Hainan offering regionalized subsidies.



Faced with limited land and water resources, China has in recent months made much of developing territorial waters to produce food. Zhang Hongzhou, an analyst at the S. Rajaratnam School of International Studies (RSIS) in Singapore points to the recent 18th Party Congress Chinese where leaders pledged that they would enhance China's capacity for exploiting marine resources. "With strong commitment from the top, Chinese officials and marine experts advocate that the country's food system be more maritime-based. Development of aquaculture and offshore fishing is being prioritized."

*SeafoodSource.com*

# India seafood exports to China hold steady

**By Mark Godfrey, SeafoodSource contributing editor reporting from Beijing, China**

26 March, 2013 - Provisional Indian figures for 2012 show India's shipments to China held steady last year, despite a difficult first half which saw Indian imports battle newly stringent China sanitary rules. India sold 77,865 tons valued at USD 172 million (EUR 134 million) to China in 2012, said Shri N Ramesh, director of marketing at India's Marine Products Export Development Authority (MPEDA). USDA and data from China shows India shipped USD 149 million (EUR 116 million) worth of product in 2011.

"There was no significant drop in exports to China in 2012," said Ramesh, though MPEDA's figures contradict data from USDA that suggests India's exports to China dropped sharply in 2012 on 2011. Shipments from January to October totaled USD 78 million (EUR 61 million), according to the USDA data that shows India in 2011 sold USD 149 million (EUR 116 million) worth of seafood to China.

New requirements by China's quarantine authorities have increased costs for Indian seafood exporters shipping to China, claims the spokesman at MPEDA, a unit of the Indian ministry of commerce. A requirement by China's General Administration of Quality Supervision, Inspection and Quarantine (AQSIQ) for a certificate from the exporting country competent authority (EIC in case of India) for every consignment has "increased the transaction cost," Ramesh told SeafoodSource.

The top three categories of Indian exports to China in 2012 were frozen shrimp at 3,694 metric tons (MT) and USD 25.81 million (EUR 20 million), followed by frozen fish at 61,795 MT and USD 117.67 (EUR 92 million) respectively. Species with the highest demand this year are Vannamei shrimp, ribbon fish, yellow and silver croaker as well as pomfret, squid and cuttlefish. India also exports significant amounts of sole, eel and reef cod to China.

A free trade agreement between India and the Association of Southeast Asian Nations (ASEAN) means some of India's products may be going through ASEAN states, which also have a free trade pact with China. While ASEAN exports to China have soared, prices for lower value fish compare unfavorably to prices earned in export markets like the EU and U.S. Indeed, future export volumes to China will "depend on the offer made by the Chinese buyers," said Ramesh.

There are other signals that India may be shifting its focus to a higher-margin sustainable brand of seafood, leaving lower value processing to China. India retains many export advantages, explained Ramesh. Aside from volume, "about 70 percent of our shrimp exports are produced by sustainable and traditional aquaculture."

"Through the effective regulations and stricter quality control regime by MPEDA, Indian seafood exporters are able to maintain their track record of exporting residue free aquaculture products to U.S., EU, Japan and other leading markets. Indian capture fisheries are managed sustainably, with stricter monitoring and nationwide conservation measures like fishing bans for 45 to 65 days. Also, we have limited fishing vessels (90 percent of which are traditional fishing crafts) and no industrial fishing vessel or activity."

"Indian seafood has a very good reputation and demand due to quality and consistent supply and [because we are] not necessarily operating on price factor," said Ramesh.

While MPEDA has yet to open its office in Beijing — as it said it would in 2011— the country appears set to increase its marketing presence in its giant neighbor. For instance, the India pavilion at the 2013 fishery expo in Dalian will be doubled in size in 2013. "We would also like to explore publishing ads in seafood related magazines in China. The Embassy of India in Beijing has posted a separate link on their website for promotion of Indian seafood export. We are also in the process of translating our main publications into the Chinese language."

Indian seafood firms like Mumbai-based Sonia Fisheries and Marine have been shipping significant amounts of ribbon fish, frozen, into China. Vendors from India have also sold quantities of kingfish, Indian mackerel and sardines. Indian-sourced cuttlefish from Yemen has also been shipped into China. Indian exporters have cited less penurious health and sanitary authorities as well as acceptance of whole-round fish and faster payment terms, compared to the EU market.

*-SeafoodSource*

# NOT TOO MAACH

Ilish, or hilsa, rules the hearts of Bengalis. And, over the past few years, it has been breaking their hearts as well. The high demand for ilish has led to over-fishing and the catch has been decreasing steadily and alarmingly over the past decade.

A fish that lives in the sea but breeds in the river, the ilish has changed its migration habits in recent years, moving towards neighbouring Bangladesh. According to reports, Bangladesh has cornered the market on ilish today, producing more than half the global yield. But even there, it's in short supply.

Many Bengalis, alarmed over scientists' warnings about the fish's imminent extinction, are disconsolate about the prospect of even contemplating life without ilish, especially, the ilish from the Hooghly in West Bengal or Padma in 'Opar Bangla' (as Bangladesh is referred to often).

Bengalis, depending on which side of the border they're from — 'Ghotis' from West Bengal and 'Bangals' from erstwhile East Bengal — debate passionately about the taste of ilish from the Hooghly or the Padma. The 'Ghotis' wax eloquent about Hooghly's ilish and their 'Bangal' cousins sneer at such lowly claims. But they're united in their opinion that it's only the ilish caught from these two rivers that's worth putting on the table. Ilish from the Irrawady in Myanmar, or the Tapti in Gujarat, is simply not worth even talking about, forget biting into. But then, little do most Bengalis know that at least 40 per cent of the ilish available in Kolkata's markets is from the Tapti, and about 10 per cent of what's imported from Bangladesh is from the Irrawady. This piece of news would be enough to infuriate any Bengali worth his mustard oil. Rakhi Purnima Dasgupta, author of books on Bengali cuisine, says the ilish from Gujarat is bland. "Maybe it has something to do with the river," she adds. Arup Das, a fish expert at the West Bengal University of Animal and Fishery Sciences says: "The rivers of Bengal carry a lot of detritus and planktons that the ilish gorges on. The Tapti doesn't. So the taste may be different." But then, many Bengalis have been eating the ilish from the Tapti and have not been able to tell the difference.

But what if ilish were to disappear from both the Hooghly and Padma? Would Bengalis here, like their expat cousins in the US, consider shad as an alternative? "No way. Ilish is ilish and there's no alternative to it," says Bagchi emphatically. Dasgupta would rather go without 'Banglar ilish' than be caught having ilish from Gujarat or shad. In fact, that's what fish experts recommend: that Bengalis forego their ilish for a couple of years at least to allow the fish to return from the verge of extinction. But will Bengalis make this supreme sacrifice? Or can they? "Will humans stop driving because the world has limited reserves of fossil fuels," asks food columnist Anjan Banerjee. Well, you have your answer there.

## Something fishy here

In 2003, a Texas-based company called Yorktown Technologies built a better zebrafish. Company scientists extracted DNA from jellyfish, sea anemones and sea coral and combined it with zebrafish DNA to create a new kind of fish – one that glows bright red, blue, green and purple. Called GloFish, these became the first genetically engineered pets in the US. They are commercially available at petshops in all of America except California, selling for $5 to $6 apiece.

Genetically modified fish aren't new. Most species of goldfish have been crafted by inter- and crossbreeding. In fact, the original goldfish was silvery gray in colour; the red-gold version, so common these days, was originally a rare variant.

Most dog breeds have been genetically modified, writes Emily Anthes atAeon.com. "Starting with the gray wolf, and using nothing more than selective breeding, we created a whole new universe of creatures. Among the 400 or so dog breeds that exist today, there are canines with round, floppy ears (the

basset hound) and pointed, erect ones (the German shepherd); dogs with smooth, silky coats (Afghan hounds) and rough, wiry ones (Airedale terriers); pooches with long, graceful legs (the Italian greyhound) and short, stubby ones (the corgi). Thanks to our careful breeding, the dog is now the most morphologically diverse species on Earth," she says.

The problem with meddling with genetics is that sometimes the animal may be harmed. "Over time, we selected for increasingly extreme versions of a breed's idealised traits…Today, bulldog puppies have heads so huge that they can't fit through the birth canal – most are delivered via Caesarean section – and their faces are so squashed that they have trouble simply breathing," writes Anthes.

Ultimately, the question that governs all genetic tweaking is – will it harm the animal being tweaked? And that is the question designer pet - makers have to answer.

*For more: aeonmagazine.com*

# Demand for aquaculture supplies to soar

An industry market research firm is predicting that worldwide demand for aquaculture supplies and equipment will swell to USD 63.6 billion (EUR 49.6 billion) by 2017.

A new Report, World Aquaculture: Feed, Equipment & Chemicals, released by the Freedonia Group, indicates a transition from extensive to intensive aquaculture production will drive demand, pushing up prices in fish meal and fish oil.

"The continued trend toward intensive aquaculture is also expected to positively affect demand for other aquaculture supplies," Freedonia said in a release. "More intensive production requires the use of a greater variety of equipment, including pumps, filters, feeders, water quality monitors, and water treatment equipment. As stocking densities rise, demand for feed supplements and pharmaceuticals will benefit."

The report shows Asia, and specifically China, has been the source of the most growth from 2002 to 2012. As Chile recovers from a salmon disease, the report predicted South America was poised to expand its aquaculture.

*-SeafoodSource*

# Thailand's shrimps are dying en masse, and no one can figure out why

Typically, prawn farmers in Chanthaburi province stock their ponds in January or February, with the intention of harvesting that crop just before April's Songkran holiday. This year, however, things have turned out differently.

"Only 30% of all farmers have started stalking," says Chakarin Pecharoen, Chairman of the Chantaburi Shrimp Farmers Club. "[The last quarter of 2012] netted a decrease of around 20-to-30%. But I have a deep feeling that the production in this first quarter might turn out to be something very horrible."

Many shrimp ponds in Chanthaburi and throughout Thailand remain bone dry at this late point in the season because of fears about a scourge affecting crustaceans regionwide. EMS (Early Mortality Syndrome) is a phenomenon as mysterious as it is deadly and in the past three years, it has threatened to undermine Asia's commercial shrimping industry. Reports of EMS first surfaced in 2009 in China, where farmers noticed that their prawns had begun dying en masse, without any identifiable cause.

In the commercial shrimping industry, where occasional epidemics are par for the course, a Chinese die-off failed to qualify as news. However, as the months proceeded and dead shrimp continued to pile up, the statistics became too massive to ignore.

By 2011, shrimp farms in China's Hainan, Guangdong, Fujian and Guangxi provinces were suffering losses as great as 80%. Without a specific pathogen to blame, farmers christened the disease according to its immediate effect – Early Mortality Syndrome.

From China, EMS made the leap to Vietnam and to Malaysia, where it left similarly massive swathes of devastation. In 2011 and 2012, EMS wreaked havoc on Vietnam's shrimping industry. The province of Tra Vinh saw 330 million shrimp die in the month of June 2011 alone. Aquaculture news outlet The Fish Site used terms like "widespread devastation" in describing the outbreak. Malaysia, where EMS first emerged in 2010, displayed a similar pattern. Between 2010 and 2011, its commercial prawn industry demonstrated a year-on-year decrease in production of roughly 42%.

"It's a huge phenomenon," says Daniel Gruenberg, CEO of Sea Garden Foods, an aquaculture and shrimp farming company in Chonburi province. "Just to give you a measuring stick, I had some friends that sell [prawn feed] and if they look at their year-on-year feed sales they're down 70% to 80%. It's massive."

In Thailand, EMS has not racked up a death toll as large as those seen in China and Vietnam. However, since the phenomenon's 2011 appearance in the Kingdom, its effect has been drastic, and increasingly difficult to ignore.

EMS first arrived in the eastern provinces of Chanthaburi and Rayong, where it has caused year-on-year decreases in prawn production as high as 40% by some accounts.

Even worse than the EMS itself is the panic it has engendered among local farmers. Gruenberg speculates that as many as 80% of the shrimp farmers in eastern Thailand have chosen to leave their ponds dry, rather than risk their capital by stocking shrimp that may or may not survive to maturity.

Though his estimate employs figures more cautious than Gruenberg's, Dr. Putth Songsangjinda, Director of the Marine Shrimp Culture Research and Development Institute, concurs.

"The real problem is panic among shrimp farmers," he says. "With

farmers delaying their stocking, it could adversely affect Thailand's whole shrimp production."

For Thailand's billion-dollar-plus yearly shrimping industry, these drops in production could prove catastrophic. The country's shrimp exports are already in a less-than-ideal state, having suffered steady declines since their peak in 2000. With a 26.7% year-on-year drop in production between 2011 and 2012, the industry is ill positioned to withstand further shocks.

Though contained for the most part to the east of the country, outbreaks of EMS have begun to show up in Thailand's southern provinces as well. So far, no one has conducted an extensive economic study of EMS's impact on the Asian prawn fishery, but it numbers in the millions of US dollars, if not billions.

With so much money on the line, both shrimp farmers and academic researchers have entered a race to find the phenomenon's cause, but so far, it remains an enigma. Authorities can't even agree on whether or not it's a disease. Dr. Putth hesitated to call EMS an epidemic because, in order for something to earn that status, its cause must be known. In the case of EMS, all scientists and farmers have to go off of are its effects.

EMS causes a prawn's hepatopancreas (essentially a liver and pancreas combined) to malfunction. This in turn interferes with the animal's ability to digest food, thereby weakening it and leaving it susceptible to disease. (The technical name for EMS is Acute Hepatopancreatic Necrosis Syndrome (AHPNS), though EMS has entered more common usage, owing at least in part to its brevity.)

Prawns typically run afoul of EMS while in the post-larval phase, which in general lasts for the first 35 days after they are planted in a shrimp pond. Though academics studying the phenomenon remain skeptical as to whether or not EMS can also affect mature shrimp, farmers such as Gruenberg insist that it can and does.

After at first assuming that a virus had caused EMS, researchers soon widened their range of possible culprits to include genetic abnormalities, bacterial infections, toxins and shifting environmental conditions.

A March 2013 disease advisory for EMS released by the Network of Aquaculture Centres in Asia-Pacific summarized the situation bluntly: "So far, no causative agent has yet been found and the disease is still considered idiopathic."

Gruenberg believes that he may have found the cause, but his experiments are still in the initial stages and he prefaces his description of them with a caveat that they at best constitute a "working hypothesis."

He believes that selective breeding in one of the most widely farmed specie of shrimp – L. vannamei – has led to the current catastrophe. By selecting shrimp for fast growth, Gruenberg contends that breeders have inadvertently selected for weak immune systems as well.

With inadequate immune systems ("like an AIDS patient," says Gruenberg) these shrimp become susceptible to infection from a parasite known as Gregarine, which acts somewhat like a crustacean version of malaria.

Gruenberg and his team have set up a series of experimental shrimp ponds in which they are trying to save shrimp from EMS by feeding them copepods – a nutrient-dense zooplankton that can help compensate for the prawns' ravaged digestive capabilities and weakened immune systems.

So far, Gruenberg's experiments have turned out well, but he has yet to apply them on a scale large enough for the victory to qualify as decisive.

"Normally if a pond starts getting EMS, within a few weeks you're going to be getting 100% mortality," he says, "but we were able to save about 50% of the prawns at [the experimental] pond. So that opened our minds to nutrition as one possible solution."

In the mean time, Southeast Asia's prawn farmers have little choice but to sit by and anxiously await a cure.

When asked about how bad things could get if the EMS outbreak continues, Chakarin, Chairman of Chanthaburi Shrimp Farmers Club, responds simply, "I dare not say."