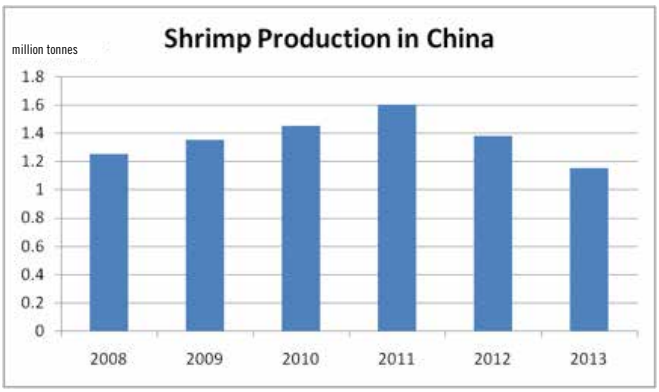
The state of shrimp production in China in 2013

By Zhong Yuming, Dong Qiufen, Zhang Song and Yang Yong

Factors behind a decline to 1.1 million tonnes in 2013 and suggestions to overcome challenges in 2014

In 2013, total shrimp production in China for both freshwater and marine environments was estimated at only 1.1 million tonnes, a decline of 20% from the 1.4 million tonnes produced in 2012. The decline was primarily due to a drop in vannamei shrimp production, which accounts for 77% of the 2013 production at about 0.85 million tonnes. Some 6% of production was monodon shrimp at about 60,000 tonnes and the rest comprised *Penaeus chinensis, P. japonicus* and other penaeids with a total production of about 190,000 tonnes.

The production in 2013 was the worst since 2008. In this article, we examine the challenges and problems encountered by the shrimp industry in 2013 and suggest some strategies to resume production in 2014.



Source: GOAL 2013

Diseases: the first challenge

In general, there are no clear signs to predict when a disease outbreak will happen. From 2010, the early mortality syndrome or EMS resulted in crop losses for farmers. In the first two years (2010-2011), EMS was confined to a few isolated areas, but in 2012 and 2013, it affected farms all over China. The worst year was 2013, when it became a nightmare for some shrimp farmers. According to the Fisheries Advance magazine of China, 50% of shrimp farms in the South of China such as in Guangxi, Hainan and Zhanjiang provinces reported crop failures. In the summer of 2013, this rose to nearly 80% of farms. Some farms could only harvest 1.5 tonnes/ha/crop of small shrimp of size 150/kg. Previously in 2009, the same farms harvested 14 tonnes/ha/crop.

To prevent EMS outbreaks, farmers tried many methods, such as improving pond conditions, increasing water exchange, decreasing stocking density, and using many pond additives for shrimp health to combat EMS. Many of these did not work. Biofloc technology is still a relatively new culture technology for most farmers. Polyculture with fish is workable but is only popular in eastern Guangdong province and in the west of Fujian province. Here, farmers stock shrimp with tilapia, grass carp, common carp, catfish and short-neck clam in brackish water pond at various densities.

Harvesting vannamei shrimp

EMS is the biggest issue for farms in South China. However, it has not been reported in the north east of China, such as Tianjin and Liaoning provinces. Here the winter is very cold and farmers have just one crop per year and the harvest is usually small at 7.5 tonnes/ha in earthen ponds and stocking density of 80-120 postlarvae (PL)/m^2.

Combating EMS: the second challenge

The second challenge is finding an effective treatment for EMS. There are many ways to treat diseases, such as maintaining adequate water quality, feeding shrimp with health additives and even using antibiotics in some farms; however, there currently is no effective method to prevent or overcome EMS. Some treatments have been successful in some ponds, but unsuccessful in others. Each farmer has an experience on one or many treatments for a particular disease, but no one farmer has been able to fully replicate a particular method proposed by another farmer successfully as pond conditions differ. For some farmers, the worst case scenario is when a farmer is unable to make a decision on what treatment to use when a disease happens and incurs high mortality as a result. There is a monetary loss from the loss of stock and cost of treatments, while there is also an opportunity cost when the farmer misses a farming season. This is especially the case in Southeast China where the culture period is limited to a few months of the year. Experienced farmers have adopted the idea that EMS cannot be treated but merely mitigated by trying to reduce losses as much as possible.

After EMS happened in the summer of 2013, farmers are taking precautions on how to prevent EMS based on their experience. According to *Fishfirst* magazine of China, there are six steps to reduce risks.

1. Using suitable postlarvae: Farmers usually choose PL10 for marine ponds and PL15 for brackish water ponds. Some may check the health condition of postlarvae with the help of service teams from pond/aquaculture suppliers or feed companies.
2. Disinfecting the pond water with high density calcium hypochlorite, followed by aeration for at least 2 days.
3. Keeping the pH between 8.0±0.2 for one month after stocking. Quick lime is used to control pH following rains.
4. Controlling feeding and reducing leftover feed to maintain good water quality.
5. Maintaining dissolved oxygen (DO) above 4mg/L for shrimp health and using probiotics when the weather is good and when DO is more than 6 mg/L.
6. Increasing minerals in pond water when shrimp are moulting.

These experiences may not completely overcome EMS, but may help reduce the risk of EMS occurring. When EMS is seen in the pond, farmers usually stop feeding, increase pH to 8.0 using quick lime, and switch on all aerators to improve water quality.

Bad weather: the third challenge

Together with diseases, farmers also face bad weather, especially in 2013. In the South, farmers were troubled by long periods of rain and colder pond water temperatures. Typhoons hit the coastal areas from the southeast to southwest of China more than 10 times in 2013. Before the arrival of a typhoon, farmers try to harvest quickly if shrimp is of marketable size. When this is not possible and shrimp are too small, they can only wait for the typhoon to pass. Usually, a typhoon leaves behind damaged shrimp ponds. The government estimated that because of disease and typhoon, occurring together, more than 80% of shrimp farmers lost money in some areas in 2013. The shrimp price was more than 50 CNY/kg (USD 8.33/kg for size 80) at the end of 2013 because there were fewer shrimp in ponds and supply was short.

Quality of postlarvae: the fourth challenge

A generally poor performance of postlarvae was reported in 2013. Most of the shrimp died at 40-50 days after stocking and farmers had to clean ponds and restock ponds. Usually, most farmers only depend on their experience to assess the condition and quality of postlarvae when purchasing. No tests are conducted. Stocking time depends on farming areas. Usually farmers stock postlarvae in April in the South, in May in the Southeast, and in June in the North. Farmers reported that both postlarvae from farm raised broodstock (second generation) as well as first generation (F1) postlarvae produced from imported broodstock performed poorly. This was common in most shrimp farming areas. Many farmers stocked postlarvae in the pond many times, but most of them lost the stock and did not know why.

This may be because most Chinese hatchery companies do not have their own specific pathogen free (SPF) broodstock supply and they have to import broodstock from the US or some other countries regularly. There is a general perception within the Chinese shrimp industry that in 2013, the quality of imported broodstock was not as good as before. According to the *Fisheries Advance* magazine of China, the performance of postlarvae produced from such low quality imported SPF broodstock was not much different from postlarvae from pond raised broodstock. Furthermore, when farming environments were unfavourable, it was observed that even postlarvae from imported broodstock easily succumbed to diseases.

A greenhouse system for vannamei shrimp ponds

Farming technology: the fifth challenge

In some older shrimp farming areas in South China, poor water quality and environmental conditions have complicated the disease situation. Most shrimp farmers are smallholders and some of them do not have adequate technical knowledge. They carry out farming based only on their experience. Some feed additive and farm suppliers and large feed companies, such as Guangdong Haid Group, have built up technical service teams to help these farmers. However, some farmers not only select feed and pond treatment products from small companies, but also do not get any technical support or any information on how the products function.

Improving production

With the above challenges and problems in China's shrimp industry, how can we overcome these? Here are some useful suggestions.

Postlarvae bottleneck

Selective breeding is key to overcoming the postlarvae bottleneck. It is important to have a balance between imported broodstock and locally selected broodstock. As imported broodstock quality is not considered stable in recent years, the government and large companies are already focusing research on selective breeding. Considerable work is still required before we can see progress. There should be a national standard on broodstock imports as well as setting a blacklist for suppliers with poor records on low survival rates and disease broodstock. A strict management of the domestic shrimp seed production is the way forward for a healthy shrimp hatchery industry in China.

Farming technology

Among Chinese shrimp farmers, there is a common saying that there are no secrets in shrimp farming technology; good postlarvae, controlling water quality and high DO are the three most important basic requirements in shrimp farming. Choosing good quality shrimp seed is key to good harvests; thus knowing how to choose quality postlarvae is the most important factor. The farmer must also know how to control water quality; ensuring a balance between algae and bacteria is a crucial factor to keep pond water in a stable condition. Finally, DO is the life-line in shrimp farming and is related to feeding, shrimp immune system, growth and many others.

Even though some experienced farmers may take all these for granted, there is still an element of scientific management. Some may have more experience and knowledge in shrimp farming than others and so we need more trained technicians and R&D units to collect and disseminate such information for others to follow. Polyculture of shrimp with various fish species has a history of more than 20 years. It has been shown as a profitable way to farm shrimp. It can be improved and tried in the high density farming areas.

A better service system for the farmers

In China, most of the small farmers still do not know how to manage the farm in a scientific way, so they need advice and help. Most aquaculture technicians are from feed and pond health/ additive product companies. But different companies have varying levels of service systems and quality of services. The suggested technology may also be different. In shrimp farming, the right environment and good pond condition is critical to avoid health problems and ensure successful crops. It is time that the support industry make improvements in their services. The companies should be seen as not only selling feed or other products, but also providing the right advice and services.

Better communications

In China, from the North to South, there are so many different shrimp farming models, some with a history of success. As successful experiences can be applied in other places, it is important to share these to improve shrimp production. In addition, many basic research results can be transferred into practical production practices in the shrimp industry. Some new technology and knowledge from other countries also can be adapted for shrimp farming in China.

Outlook in 2014

With high prices and a higher level of risks, mainly from diseases, there are both opportunities and challenges in 2014. Shrimp farming is very profitable when prices are very high as seen in 2013. It is common that high prices will encourage more farmers to start shrimp farming and even convert their fish ponds into shrimp farms. The challenges in 2013 will prepare farmers who will now pay more attention to postlarvae quality and on proper use of pond health additives and be more discerning on services provided by suppliers. A higher level of requirements from farmers will improve the standard of services and direct R&D to the needs of industry.

We expect that the 2014 shrimp production will recover to more than 1.2 million tonnes as the effective actions outlined above, such as the use of 'healthy' farming models with low farming density, good quality postlarvae, use of probiotics for water quality control and reduced usage of antibiotics become more popular. Polyculture and green house farming technology will be more accepted and in more areas. Although there are interests in biofloc technology, it still needs further research, in particular on the specifications for the various geographical conditions and culture.

Zhong Yumin

Dong Qiufen

Zhang Song

Yang Yong

From left, Zhong Yumin, Dong Qiufen, Dr Zhang Song and Dr Yang Yong are experts in aquaculture nutrition and health from Guangzhou Hinter Biotechnology Co., Ltd. As the biggest aquafeed premix supplier in China, Hinter delivers a whole range of practical solutions for aquafeed mills to help them produce high quality aquafeed. Email: qiufendong@gmail.com (Dong Qiufen).

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Guangzhou Hinter Biotechnology Co.,Ltd E-mail: echowavechina@hotmail.com

Add: No.56, the 2nd Xingui Road, Guangzhou High-tech Industrial Development Zone, Guangdong Province, P.R. China