

The snakehead fish: a success in Myanmar

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Myanmar scores breakthroughs in fry breeding, commercial farming and extruded feed development for the snakehead fish.

The snakehead *Channa striata* is a popular freshwater fish in Asia due to its delicate flesh, well-accepted flavour, and its high nutritional and unique medicinal values. In the past years, some farmers in Southeast Asian countries such as Vietnam, have begun to farm the snakehead, feeding it with trash fish. However, with the development in extruded feed technology and since 2009 with technical support from China's Guangzhou Hiner Biotechnology Co Ltd (Hiner), several feed mills now produce specialised extruded feed for the snakehead in Vietnam. These feeds have shown excellent results and brought enormous economic benefits to farmers. In addition, there was the development of artificial propagation techniques for the snakehead which has reduced the dependence on wild caught fry and fingerlings for farming.

The snakehead is widely available in Myanmar. In local markets, the fish fetches a price from MMK (Burmese kyat) 3,000 to 3,500/kg (USD3.16 - USD3.69/kg). But in recent years, the natural snakehead population has declined rapidly due to over fishing. However in 2012, there was a breakthrough in fry breeding, and the farming technology of the common snakehead has drawn wide attention for its fast growth and adaptability in Myanmar.

In 2012, Hiner, which provides aqua feed premixes and integrated solutions in China, signed a strategic co-operation agreement with Htoo Thit Company (HT), an aquatic feed company. HT ranks among the top 3 in the feed industry in Myanmar and it also owns more than 200 ha of freshwater ponds for R&D and fish farming in Yangon, Myanmar.

In 2012, the artificial breeding of *C. striata* was carried out and extruded snakehead feed was used under the guidance of Hiner experts for the first time in Myanmar. Through these co-operative undertakings, HT's technical team has been able to accumulate some successful experiences and made revolutionary headway on larvae breeding and extruded snakehead feed.



Huang Shaoyu injecting HCG into a female brood stock for artificial spawning



The hatched one-day old larvae (DAH1) of *C. striata*



12-days post hatch fry



Juvenile *C. striata* (one day after weaning)

Larval rearing

In May 2012, with the local resources from HT, Hiner assigned Huang Shaoyu, its technical manager and Dong Qiufen, its vice-marketing and technical director, both experts in the breeding of the snakehead fish, to carry out some breeding trials. This was initiated at two fish farms located in Bago and Yangon provinces. The farms enabled HT to score a breakthrough in larval rearing of snakehead for the first time with excellent water quality parameters and appropriate temperatures (26-32°C) and using wild-caught broodstock of *C. striata* from south Myanmar. However, during the trial, there were



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Hand feeding extruded feed



Monitoring fish growth

some difficulties with local conditions - a harsh rainy season and high temperatures in summer. In addition, initially, local labour were not experienced enough to handle the fish and even some breeding tools required for the breeding work needed to be imported from China. Finally, the team managed to successfully produce one million juveniles.

A year later, in 2013, HT together with Huang Shaoyu and another expert, Bai Haiwen, carried out more snakehead breeding trials. Learning from the successful experiences in 2012, remarkable progress were made in larvae hatching and snakehead feeding. This time round, 20 million snakehead eggs were hatched and 6 million juvenile snakeheads were produced. During the tough two years of learning and practice, HT has achieved success in the propagation technique of snakehead, with the fertilisation rate of snakehead eggs and the survival rate of larvae before first feeding at more than 90% and 99% respectively. Within 45 days post hatching, the fingerlings body weight reached 16~20 g.

Extruded feed

The carnivorous snakehead fish require high levels of dietary protein. Hinter is a subsidiary of Guangdong Haid Group, one of the first feed companies to manufacture extruded snakehead fish feeds in China and which has considerable knowledge and experiences with this fish in China and Vietnam. In 2009, Hinter assisted a Vietnamese feed company, Con Heo Vang Company, to be the first to produce extruded snakehead feed in Vietnam. In 2012, HT successfully produced extruded feed for this fish using local raw materials with assistance from Hinter, specifically, Dr Zhang Song, vice president and Tian Pengfei, production director. The first batch of high quality extruded snakehead feed with 40% crude protein was manufactured in July. Up to the end of 2013, HT was able to produce all kinds of high quality extruded snakehead feed using local raw materials and Hinter premix A701.

Pond production techniques

For two consecutive years, HT carried out breeding trials and experimented with production techniques. Gradually it succeeded in snakehead fish breeding and farming in earthen ponds. It has also learnt to overcome difficulties; Myanmar's changing climate, poor hardware and other farming conditions. Furthermore it could testify that extruded feeds resulted in rapid growth, lower feed conversion ratio (FCR) and lower incidences of diseases.

In 2012, HT stocked 540,000 snakehead fingerlings (size 160/kg) in their 18 ponds with an area of 2 MMR-mu each (1 Myanmar mu equals 0.8 ha). After a successful acclimatisation, the fish were fed

with 62.5 tonnes of extruded feed with 39~43% crude protein for a year. In July 2013, the first batch of farmed snakehead was sold to the local market. Besides a FCR of 1.30, survival rate of 85.3%, minimum fish weight of 500g/fish and a harvest of 48.03 tonnes, HT was able to record an impressive gross and net profit.

Motivated by these favourable farming results in 2012, the company has expanded its snakehead farming area since 2013. Thus far, 1.2 million juvenile snakehead fish have been stocked in 40 earthen ponds with an area of 2 MMR-mu each. Workers from the company fed fish with 119.01 tonnes extruded feed for six months in these ponds. With FCR of 1.11, survival rate of 91.5%, fish weight of 500-800 g/fish, and a harvest of 107.02 tonnes, HT again achieved good farming results.

Table 1. HT: Results of two years of snakehead farming with extruded feed

Parameters	2012	2013
Culture area (ha)	14.4	36
Pond depth (m)	1.0	1.0
Size of juvenile fish (pcs/kg)	160	160
Stocking density (pcs/m ²)	3.75	3.75
FCR	1.30	1.11
Feed frequency (times/day)	2~3	2~3
Feed rate (% body weight)	3~5	3~5
Culture duration (days)	342	182
Body weight at harvest (g/fish)	500-1,000	500-800
Survival rate (%)	85.3	91.5
Yield (kg)	48,032	107,020
Price (USD/kg)	3.51*	4.24**
Unit production (kg/ha)	3,335.56	2,972.78
Benefit/Cost (B/C) (%)	123.34	153.81
<i>*Prices were on 13 July 2013* and 5 December 2013**</i>		

Table 1 verifies the positive benefits of snakehead farming for the company. Results showed improvements in the benefit and cost ratios of 123.34% in 2012 and 153.81% in 2013. There was also increases in net incomes, as well as FCRs of 1.30 in 2012 and 1.11 in 2013. As



Checking health status of fish

a result, HT has earned accolades such as government recognition, awards and authorised patents.

All these successes have not only established a solid theoretical and practical foundation for the commercialisation and large-scale production of *C. striata*, but also laid a firm foundation for the subsequent application and promotion of extruded snakehead feed.

Outlook for snakehead culture

Myanmar is blessed with abundant water resources with excellent water quality. It also has moderate aquaculture and developed river systems which enable a natural water exchange for most ponds. Adding to these favourable factors, are the low labour costs and pond rentals. With the development of technology and excellent wild broodstock, the breeding density and unit production of snakehead will be greatly enhanced.

HT's pursuit of snakehead farming in 2012 has become the precedent and milestone of *C. striata* farming in Myanmar.

However, at present there is a limited supply of both farmed and wild-caught snakehead despite an insatiable appetite of the Burmese people for this fish. The demand is expected to remain for quite a long time into the future and this will ensure attractive price prospects for the fish in Myanmar. These breakthroughs achieved by HT in the breeding, farming and development of extruded snakehead feed have broken new barriers in the aquaculture industry in Myanmar. We expect that the high profit margins will continue to drive the growth in snakehead farming and with this, the demand for extruded feed. It is reasonable to believe that the snakehead will be a promising farmed freshwater fish in Myanmar.



Bai Haiwen



Huang Shaoyu



U Than Lwin



U Tint Swe



Dong Qiufen



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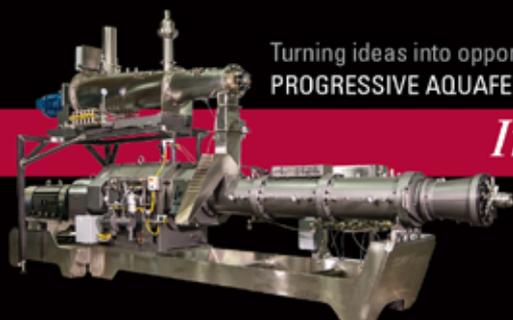
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