

White Shrimp Boom Continues

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The giant tiger prawn, *Penaeus monodon*, is the principal species farmed in southeast Asia, the leading shrimp-farming region of the world. In recent years, however, the pacific white shrimp, *P. vannamei*, has gained popularity and market share in this area. Disease and other problems helped to effect the change.

Disease Sparks Change

In the late 1980s and early 1990s, a variety of shrimp viral diseases infected *P. monodon* culture populations throughout Asia. White Spot Syndrome Virus (WSSV) destroyed many crops, while less lethal diseases like Yellow Head Virus slowed shrimp growth and reduced harvests.

P. vannamei in Taiwan

In 1996, a hatchery near Kaohsiung, Taiwan read about the success of specific pathogen-free (SPF) white shrimp in the United States and contacted High Health Aquaculture to purchase broodstock. "Specific pathogen-free" is a description of health status that means the designated shrimp passed a rigorous quarantine and disease-screening process that determined they are free of known pathogens.

Based in Hawaii, USA, High Health shipped SPF *P. vannamei* and worked closely with the hatchery to establish nauplii and postlarvae production. More broodstock were shipped in the spring of 1997, and by April the hatchery was producing substantial quantities of PL and distributing them throughout Taiwan.

White Shrimp Jackpot

By August, farmers who stocked *P. vannamei* PL had great harvests – they made lots of money and news of the white shrimp "jackpot" reached the front page of the national newspaper.

High Health and other shrimp farms in Hawaii were deluged with requests for white shrimp broodstock.

Taiwan's insatiable search for white shrimp broodstock spread worldwide, and wild *P. vannamei* broodstock were imported from Latin America. The use of wild animals inevitably introduced diseases, but the white shrimp craze continued at a fevered pitch into the spring of 1998.

Breeding, Growout Performance

Hatchery operators using High Health broodstock were producing 3-4 million nauplii/day from 200 pairs and getting 60-70% survival to PL₅. Some hatcheries developed an interesting alternative maturation system that used an all-male mating tank and multiple all-female maturing tanks. Successful growout farmers were averaging 1.2 mt production in 0.1-ha ponds (12 mt/ha) of 12- to 15-g shrimp in 75 days. Nearly all the *P. vannamei* were marketed live in local markets.

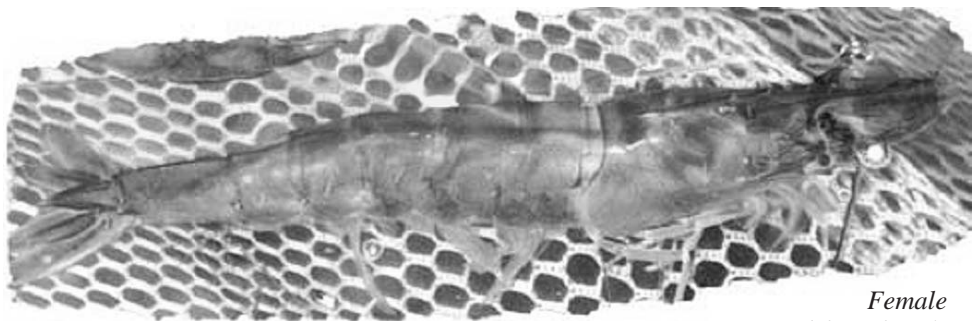
Spot Syndrome Virus (WSSV) was endemic and also causing mass mortalities. Runt Deformity Syndrome and slow growth were common. To reduce costs, most hatcheries began using cheap homegrown broodstock.

Because there was no consideration of genetic makeup or biosecurity in producing homegrown broodstock, their use introduced viral diseases and inbreeding disorders into the seed supply system. Growout systems stocked with homegrown offspring were much less reliable than the original crops stocked with PL from SPF broodstock.

Despite these problems, *P. vannamei* is now the leading cultured shrimp in Taiwan, with 15,000 mt annual production compared to 10,000 mt for *P. monodon*.

P. vannamei in China

High Health started exporting SPF *P. vannamei* broodstock to Zhanjiang and Hainan, China in 1998. PL from



Female
P. vannamei broodstock.

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Homegrown Problems

P. vannamei broodstock grown in Taiwan became available in the summer of 1998. Large quantities of nauplii and PL were produced, and PL prices shrank to U.S. \$1/1,000. By summertime, reports of problems in *P. vannamei* growout were common.

Taura Syndrome Virus, which had been imported with wild *P. vannamei* broodstock from Latin America, caused significant growout mortalities. White

these broodstock again produced impressive growout success, creating a second surge in broodstock demand in China in 1999. The massive imports of homegrown broodstock and their seed in Taiwan led to similar problems in China in 2000.

Shrimp Markets

An interesting innovation in *P. vannamei* marketing developed in Hainan. Ponds are seine-harvested with elec-

tric nets and shrimp are live-hauled to a processing facility near Haikou Airport. Shrimp are chilled and packed in oxygen-inflated bags in styrofoam boxes, then air-freighted to the markets in Shanghai and Beijing. Up to 100 mt of live *P. vannamei* are shipped out of Hainan daily.

Leading Shrimp Species

As in Taiwan, *P. vannamei* has emerged as the leading farmed shrimp in China. Exports to the U.S. reached 60,000 mt in 2001 and may rise to 100,000 mt in 2002, according to the U.S. National Marine Fisheries Service. While the use of homegrown, virus-contaminated stocks is inefficient, the immense human and physical resources devoted to shrimp farming in China result in huge production. Including domestic consumption, China's *P. vannamei* production in 2002 is probably around 200,000 mt.

Improved Stocks Needed

Because flying insects can easily transfer Taura Syndrome Virus from pond to pond, shrimp stocks resistant to the disease are urgently needed in parts of Asia. Combining SPF stocks that are also TSV-resistant with biosecurity to prevent WSSV, a truly sustainable shrimp-farming system could emerge in Asia. *P. vannamei* production there could reach new records. Following this formula, U.S. shrimp-farming production has grown significantly over the last three years.