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Intelligence

Thailand's white shrimp revolution

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Switch leads to well-organized, fully integrated industry

The kingdom of Thailand is the world's leading shrimp-farming nation. It exports the most shrimp in volume and value, and is the top supplier of farmed shrimp to the United States and Japan. Traditionally, the Thai shrimp industry farmed black tiger shrimp (*Penaeus monodon*) but since 2001, it has undergone a dramatic transformation and switched to Pacific white shrimp, *P. vannamei*.



Thailand's move to *P. vannamei* resulted from the species' higher profit potential and production reliability through the avoidance of disease.

Industry development

Thailand starting farming shrimp in the 1970s using locally available *P. monodon* broodstock captured from the sea to produce postlarvae in land-based hatcheries for pond stocking. By the early 1990s, Thailand emerged as the world's leading farmed shrimp producer and exporter based on *P. monodon* production.

A combination of factors allowed Thai shrimp farming to develop into a well-organized, fully integrated industry. Technology is effectively applied at all levels in shrimp hatcheries, farms, feed companies, and processing plants, as well as international marketing companies. A diverse collection of entrepreneurial businesses and several multinational public companies create a competitive business climate that leads to innovation and increasing productivity.

Financing for the industry is substantial through several large publicly traded companies, as well as bank financing. Government support through the Department of Fisheries and university research programs support the industry through research and extension services.

Thai shrimp industry has a strong market focus with many processing and exporting companies to distribute Thai product worldwide. Thailand's Mahachai shrimp auction provides an excellent outlet for independent farmers, who receive competitive auction prices for their shrimp. Daily auction prices are text-messaged industrywide. Several Thai companies have well-established marketing companies in the major import markets in the U.S., Japan, and Europe.

Disease issues

In the 1990s, disease problems increased risks and slowed industry expansion. Yellow Head and White Spot Syndrome Viruses severely impacted production, but government-sponsored research and extension helped the industry adjust and manage around the diseases. Despite such problems, the Thai industry maintained its position as top shrimp producer. In 2001, Thailand's *P. monodon* production peaked at 280,000 metric tons (MT).

Since 2001, *P. monodon* farmers have faced a new disease called Monodon Slow Growth Syndrome (MSGs), which is characterized by slow growth that leads to small harvest sizes and lower prices. The cause of MSGS is still unknown. This slow growth problem with *P. monodon* set the stage for the introduction of specific pathogen-free (SPF) *P. vannamei*. Farmers were looking for a lower-risk, reliable way to make money farming shrimp.

SPF *p. vannamei*

Limited SPF *P. vannamei* broodstock imports were first tested in 2001. The impressive results showed high survival and fast growth to 20 g in 100 days with uniform distribution in two to three size classes at harvest. The SPF shrimp were tolerant of higher densities than *P. monodon* – up to 2.5 kg per square meter – and there were lower incidences of mass mortality. The industry lobbied to allow more broodstock imports in 2002. More farm trials followed, and 2002 also saw tests of “home-grown” F1 broodstock.

Farmers soon found that most of the growth and production advantages of true SPF *P. vannamei* were lost using postlarvae from the “home-grown” broodstock. Slower growth, large size variations, and more disease events were typically experienced with F1 stocks.

White shrimp production in 2002 jumped to nearly 20,000 MT. Fig. 1 illustrates the rapid 2002-2006 increase in *P. vannamei* production, while *P. monodon* production rapidly declined. In 2006, *P. vannamei* represented over 98 percent of Thailand's total production entering the shrimp auction, and production is approaching 400,000 MT.

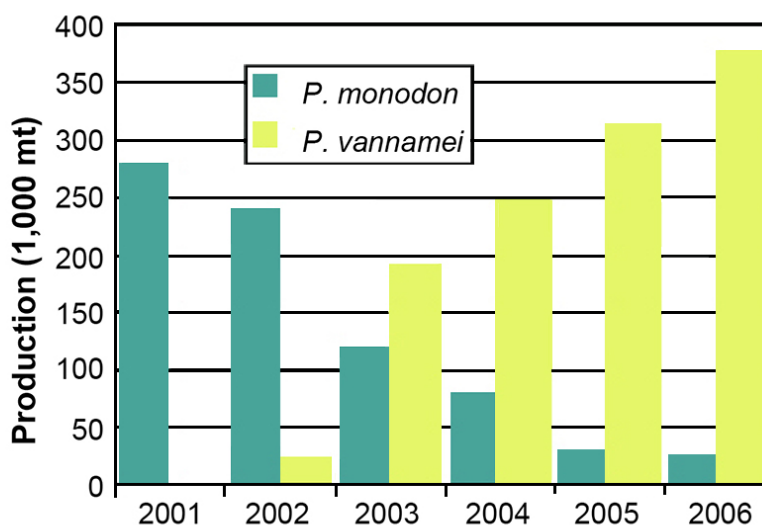


Fig. 1: Annual shrimp-farming production in Thailand.

Current production

Progressive Thai farmers now produce 20 to 30 MT/ha/crop using SPF *P. vannamei* that are also resistant to Taura Syndrome Virus. Table 1 compares the relative production numbers and profits between species in Thai shrimp farms. These data clearly show the driving force of Thailand's change from farming *P. monodon* to farming *P. vannamei* was the superior production economics with *P. vannamei*. Profits with *P. vannamei* are two to three times greater than with *P. monodon*. Production reliability through the avoidance of disease is also higher with SPF *P. vannamei*.

Wyban, Production parameters and profits, Table 1

| Parameter | <i>P. monodon</i> | <i>P. vannamei</i> |
|--------------------------------------|-------------------|--------------------|
| Density (postlarvae/m ²) | 40-50 | 120-200 |
| Crop duration (days) | 110-140 | 105-120 |
| Harvest size (g) | 22-28 | 21-25 |
| Yield (mt/ha/crop) | 8 | 24 |
| Crop value (U.S. \$/ha) | \$45,000 | \$96,000 |
| Crop costs (U.S. \$/ha) | \$32,000 | \$60,000 |
| Production profit (U.S. \$/ha) | \$13,000 | \$36,000 |

Table 1. Production parameters and profits between typical *P. monodon* and *P. vannamei* production systems in Thailand.

Controlled broodstock imports

A key factor in Thailand's success with *P. vannamei* is the country's control of broodstock imports to ensure sufficient supplies of true SPF brood animals. A permit to supply broodstock is required from the Thai Department of Fisheries (DOF). Thai law requires that broodstock suppliers are certified SPF producers with a two-year history of SPF production and U.S. government certification. DOF Code of Conduct certification is required for Thai hatcheries to import SPF broodstock.

Ongoing trends

A recent trend in Thai *P. vannamei* farming is multicropping from high stocking densities of 200 per square meter that lead to a local supply of small (100 animals/kg) farmed shrimp. Industry consolidation is another trend, with large integrators testing a contract-farming business model.

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