Efficiency of Pacific White Shrimp Culture, Current Issues in Indonesia

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The Pacific white shrimp, *Litopenaeus vannamei*, was introduced to Indonesia in 2000 and initially cultured in East Java. At first, successful pond growout produced yields of 7-10 mt/ha, with animals reaching 15 g in 90 days. Survival rates of 75-90% and 1.1-1.4:1 feed-conversion ratios were reported.

However, major losses in ponds stocked in mid-2002 were confirmed as the result of White Spot Syndrome Virus. Most of the affected farms were stocked with postlarvae produced from pond-reared broodstock that were not specific pathogen-free. At present, with better understanding of the species, *L. vannamei* are once again widely farmed in Indonesia.

CPB Integrated Farm

Research trials at facilities like the P. T. Central Pertiwi Bahari (CPB) shrimp farm on the northern coast of South Sumatra, Indonesia, helped re-establish the species. The farm’s integrated complex – with a laboratory, hatchery, feed mill, power plant, and processing and cold storage facilities – supports both commercial ponds and a number of trial ponds. CPB is one of the largest producers in Asia, with over 3,600 0.5-ha intensive culture production ponds.

Culture Trials

Promising results in trials with Pacific white shrimp from late 2001 to mid-2002 led to further trials using various production systems. CPB tested ponds lined with high-density polyethylene plastic, semilined ponds, and earthen ponds with different stocking densities. An adapted version of the Belize Aquaculture, Ltd., zero-exchange bacterial floc system was also tried. Successful results were transferred for commercial operation.

Efficiency of Commercial Ponds

CPB’s commercial production standard for culture of Pacific white shrimp is set at 5.0 mt/0.5-ha pond with a mean animal size of 14-15 g. The ponds are stocked at a density of 70-80 PL/m². Energy inputs include mechanical aeration of 10 HP/0.5 ha.

Many ponds are now managed based on technology transferred from research and trials with high-density and bacterial floc culture systems. The results from the commercial-scale culture are excellent (Figure 1), with average production as high as 22 mt/ha.
in semi-lined ponds with bacterial floc systems and mean animal size of 17-18 g. In high-density (100 PL/m²) culture, yields of over 13.0 mt/ha with mean animal size of 13-14 g have been achieved.

According to McNeil (2003), 70% of all new pond construction in China is lined, and farmers who use liners are doubling their production over that of unlined ponds. As this author reported, nearly all production systems yielding over 8 mt/ha anywhere in the world are now lined.

Recently in China, a modified version of the Belize Aquaculture, Ltd., zero-exchange technology system with stocking density of 70 PL/m² achieved a production of 14.6 mt/ha. The system used nurseries and artificial substrates in growout ponds, and substituted pressure differential piping and diffused air injection for aeration paddlewheels.

**Carrying Capacity**

In CPB’s commercial production ponds, carrying capacity was highest at 680 kg shrimp/HP of energy input in the bacterial floc system in semi-lined ponds (Figure 2). McIntosh (2002) reported 550 kg shrimp/HP of paddlewheel aeration at Belize Aquaculture, Ltd. in Belize.

The carrying capacity was just over 430 kg shrimp/HP in CPB’s earthen ponds with both normal and high-density culture, whereas a carrying capacity of over 560 kg shrimp/HP resulted in semi-lined ponds without floc. However, during trials in fully lined ponds at high stocking density, a maximum carrying capacity of 631 kg shrimp/HP – almost that of the bacterial floc system – was achieved.

**Current Issues**

During the last few years, the shrimp industry has been hit hard by a number of issues. The most serious ones are antibiotic residues and the U.S. antidumping measure. As the antibiotic issue relates to human health, it was attended to quickly with support from governments and the private sector. The shrimp industry has now returned to normal with appropriate changes.

Countries that escaped being named in the antidumping suit hold vast potential for further development. If these countries escape tariffs, shrimp farming could explode there. Is the situation fair for the established industries in named countries? The antidumping issue is indeed complex, as social, political, legal, and economic elements are involved.

The industry also has to deal with environmental issues, traceability, and currently, bioterrorism. Since these issues are basically technical and managerial in nature, the industry has managed to adjust without serious impacts on producers.

**Marketing Challenge**

The real affect of these various issues is on marketing. Increased production of shrimp from Asia and Latin America and the issues above have made the market unstable and the price of shrimp has plunged.

Basically, since shrimp is a commodity, the issues are about producers, buyers, and consumers. The hard work to increase productivity by producers should not only benefit buyers but also the producers and consumers.

Programs like GAA’s Alliance Global Shrimp Outlook conference, which addresses marketing issues, need to help find ways to stimulate shrimp consumption and balance it with increasing supply. Without this balance, the supply chain could eventually collapse and every link in the chain would suffer. From governments to the private sector, all parties involved should work together to find solutions.

*Editor’s Note: Cited references are available from the second author.*