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Low-volume, high-density culture system effective with pompano in Philippines

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Extruded floating feeds improved feed use limited pollution

ASA-IM Aquaculture Technical Manager Levy Manalac (right) teaches the demonstration feed manager proper satiation feeding techniques.

Through the efforts of Dr. Michael Cremer, the American Soybean Association International Marketing (ASA-IM) program's Soy-In-Aquaculture project in China developed a low-volume, high-density cage culture production methodology with the aim of maximizing farmer profits, improving productivity, reducing feed conversion and limiting environmental degradation.

The system maximizes cage production through the use of good site selection, proper cage positioning, limited cage volumes and maximized fish densities. It also incorporates proper feed management using high-quality, extruded floating feeds with feed enclosures that prevent floating feed from exiting the cages.

To illustrate the effectiveness of the ASA-IM cage production technology for high-value marine species in the Philippines, a demonstration project was recently begun.

Cage demonstration

The marine farm in the demonstration project normally used 5- x 5- x 5-meter or 125-cubic-meter floating cages that produced an average final harvest biomass of 8 kg per cubic meter. Six cages were attached to each other in a rectangular module that limited water exchange, particularly for cages in the middle of the module. Sinking pellet feeds were typically used with ad libitum feeding management.

Fish were fed using a "trickle method" with small amounts of feed broadcast into the cage over a long period of time. Feed managers fed the fish once in the morning and once in the afternoon, taking two to three hours per feeding session.

The ASA-IM project used three 125-cubic-meter floating cages that targeted a final biomass of 20 kg per cubic meter of pompano (*Trachinotus blochii*) using a 43 percent-protein, 12 percent-fat floating aquafeed. Fingerlings in cages A1 and A3 were stocked at a size of about 73 grams, while those stocked in cage A5 weighed 105 grams.

During the demonstration, only three of the six cages in the standard module configuration were used in a staggered formation, leaving the three cages in between vacant to allow water exchange to all four sides of each cage. Past research by ASA-IM also showed that the greatest production efficiencies were obtained by placing floating feed in the center of the cage within a feed enclosure reflecting 50 to 70 percent of the cage surface area to contain feed during feeding.

At the start of the demonstration, the farm manager and staff were hesitant about using extruded floating feeds. Their concerns regarding how to prevent the feed from exiting the cage when there were strong water currents were answered by the feed enclosure approach. In addition to the floating feed and feed enclosure, the ASA-IM 90 percent-satiation feeding technique was used to help limit waste.

The ASA-IM demonstration project positioned cage modules with better orientation and positioning between cages. Central feed enclosures

inside the cages prevented floating feed from exiting the cages during the culture of pompano.

Results

At the end of the demonstration, cage A5 had a total biomass of 2,754.6 kg or 22.04 kg per cubic meter with average body weight of 507 grams, feed-conversion ratio (FCR) of 1:2.49 and survival rate of 99.8 percent at 134 days of culture. Cages A1 and A3 yielded an average of 2,453.6 kg per cage or 19.6 kg per cubic meter of 464-g fish, FCR of 1:3.20 and 98.0 percent survival at 169 days of culture (Table 1).

Manalac, Performance of pompano stocked in cage, Table 1

	Cage A1	Cage A3	age A5
Initial average body weight (kg	0.073	0.073	0.105
Average body weight (kg)	0.473	0.454	0.507
Total biomass (kg)	2,555	2,352	2,754
Production (kg fish/m³)	20.44	18.82	22.04
Survival rate (%)	99.4	96.0	99.9
Feed-conversion ratio	3.06	3.34	2.49
Culture period (days)	169	169	134

Table 1. Performance of pompano stocked in cage demonstration.

The demonstration was a learning experience for the farmer. Even with high feed conversion, the production showed great improvement compared to the previous year's harvest. The farm now uses only extruded floating feed, and the cooperating feed mill now promotes the use of floating feeds to its fish cage customers.

Using extruded floating feeds improved feed use and helped in limiting environmental pollution. The satiation feed management increased savings due to lower FCRs and the decrease in labor required to grow fish faster than before.

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