Perspectives on the application of closed shrimp culture systems

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PERSPECTIVES ON THE APPLICATION OF CLOSED SHRIMP CULTURE SYSTEMS

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The environmental sustainability of aquaculture in general - and shrimp culture in particular - has received increasing attention in recent years. Discharge of nutrient-rich effluent from intensive culture systems can contribute to eutrophication of receiving waters, potentially impacting both natural biota and local culture operations. With the proliferation of catastrophic viral epidemics, implementation of techniques for minimizing water exchange has increased. A growing volume of scientific research and industry experience confirms that water exchange may be reduced or eliminated. Supplemental aeration plays a key role in the successful operation of semi-intensive and intensive closed systems. To maintain appropriate dissolved oxygen levels it has been estimated that paddlewheel aeration, used in many closed systems, must be increased by 10% or more over levels traditionally applied in intensive culture. As aeration rates are increased, aerator placement and use of backup aeration and alarm systems becomes a necessity. The pond microbial community plays a major role in pond dissolved oxygen dynamics, natural food availability and mineral recycling rates. A growing volume of research and hands-on experience suggests that manipulation of microbial communities through supplementation of limiting nutrients, selective habitat expansion, or culture additions can have positive impacts. In some cases, however, these same techniques can have unexpected consequences requiring more basic research on pond microbial community ecology and an improved understanding of mechanisms of action. Feed is the major source of nutrient input into pond systems. Without water exchange, control of feed formulations and feed inputs becomes one of the most critical factors for success as levels of intensification are increased. Preliminary studies are now under way aimed at increasing stocking densities in enclosed biosecure raceway systems using static water culture technologies. Preliminary results are presented and avenues for future research are discussed. Sedimentation may represent an effective strategy for removal of organic material from culture systems and harvest water. Additional research will be needed to explore waste treatment and related disposal issues. An extended review of recent publications on the development and application of zero exchange systems at Belize Aquaculture, Ltd., is included. Application of recent technological advances and experience gained in research, pilot and commercial scale systems can improve the outlook for optimization of the design of new systems, the retrofitting of existing systems and the application of management protocols for shrimp culture with minimal water exchange. The design and management of production facilities to reuse water, minimize exchange and eliminate discharge will improve the outlook for more profitable and sustainable production technologies.
A GLOBAL REVIEW OF SHRIMP FEED MANAGEMENT: STATUS AND PERSPECTIVES

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4 National Resource Center for Cephalopods, University of Texas Medicattle is known about their biology and physical demands within their natural habitat. As a consequence, there exists the lack of a viable culture technique. Yet, there is great potential in the P. schmitti species which has a similar cultivating system to that of P. vannamei. Because the technology for P. schmitti is believed to be in the experimental stage, culturing of this species has not been fully developed.

Freshwater aquaculture in Belize is currently focused on ornamental fish. However, there was one farm, the Cherux Farm, involved in the farming and exportation of the Australian fresh water lobster and the Red Drum fish. Additionally, this farm was previously involved in the farming of Tilapia but this practice has now ceased. Farming of the Australian fresh water lobster has also temporarily ceased because of marketing problems and environmental issues. Presently, Cherux Farm has merged with Nova Companies Belize Ltd. who is the majority shareholder. Currently, there are six farms operating in Belize located in the Belize, Stann Creek and Toledo Districts.

The current Fisheries legislation does not include specific regulations for aquaculture activities. All farm operations must conform to guidelines governing importance of juveniles, broodstock and infrastructure. For example, all broodstock and fingerlings brought into the country for culturing must be accompanied by a phytosanitary certificate. Processing must be conducted in accordance with the quality assurance regulations of the Fisheries Act. Also, the development of aquaculture projects must minimize critical habitat destruction (mangroves etc.) and conform to the environmental guidelines set out by the Department of Environment and the Fisheries department. The Fisheries Department encourages the culture of indigenous species to reduce or minimize the introduction of exotics into the wild.

Belize has good potentials for aquaculture because of the following:

1) It has a politically stable Government engendered by long democratic traditions.
2) Tropical conditions allow for year-round culture activities.
3) Water (both fresh and marine) is abundant and of good quality.
4) Logistical advantages by virtue of geography, international status and language.
5) Available labor at virtually all levels of aquaculture enterprises
6) Lucrative and competitive development incentives.

In 2001, estimated export earnings from farmed shrimp was BZ $46 million. This industry can be classified as being moderate scale yet expanding rapidly, and generating a significant amount of foreign exchange for the country. The productive sector of Belize invests its energy in export oriented enterprises; therefore, the Government of Belize retains a pro-investment policy concerning aquaculture in Belize.

Also existing is artisanal shrimp fishing, which is mostly limited to the southern coastal regions. The most commonly caught species from this fishery are the Panæus duorarum and Panæus schmitti. The small amount of data gathered on this fishery indicates that it is under-exploited. However, it is believed that the trawl shrimp fishery, which over the past 10 years has fluctuated between 10-14 trawlers, is most likely over-exploited. The Industrial Trawl fishery consists of industrial fleet design as those as the Gulf of Mexico type trawlers.

Currently, the shrimp companies of Nova Companies Belize Ltd. and Belize Aquaculture Ltd. are seeking to increase the production of larvae for shrimp. The urgency for this venture has developed because of the widespread infestation of the white spot virus affecting larvae imports along the Pacific Coast of Central America. They hope to become self-sufficient in the production of larvae by the end of this year, supplying larvae for all shrimp farms in Belize.

Note: EVVEN does not share the opinion of those articles.
The resettlement ponds the Belize Aquaculture Ltd uses have to be emptied eventually. En regards to the Species of P.schmittii, the fundacion La Salle / EDIMAR has archived all goals necessary to commence a venture based on P.schmittii.