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Sustainable Aquaculture for a Secure Future

Title: **Tilapia–Shrimp Polyculture in Negros Island, Philippines: A Review**

Author(s): Philip S. Cruz
Cruz Aquaculture Corporation, 158-C, Philsugin Road, Singcang, Bacolod City 6100 Philippines

Merlina N. Andalecio
Institute of Fisheries Policy & Development Studies, University of the Philippines Visayas, Miagao, Iloilo 5023 Philippines

Remedios B. Bolivar
Freshwater Aquaculture Center/College of Fisheries, Central Luzon State University, Science City of Muñoz, Nueva Ecija 3120 Philippines

Kevin Fitzsimmons
Environmental Research Laboratory, Department of Soil, Water & Environmental Science, University of Arizona, 2601 E. Airport Drive, Tucson, Arizona 85706 USA

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Abstract: Tilapia–shrimp polyculture has played an important role in current efforts to control luminous bacterial disease caused by *Vibrio harveyi*. At present, green water technology is most extensively used by shrimp farmers in Negros Island in the central Philippines. While the contribution of tilapia as a biomanipulator is highlighted in the literature, the mechanism of action is not well understood. Data were gathered from shrimp ponds practicing two production systems: (a) green water system (probiotics + tilapia) and (b) closed/semiclosed system (probiotics alone). There was no difference between luminous Vibrio count ($P < 0.05$) in both systems, and water quality was found to be similar ($P < 0.05$). Because the green water system uses a bigger reservoir to raise the tilapia biomass, the net shrimp production was lower. In terms of direct cost of production, however, the green water system was 10–15% lower than the closed/semiclosed system because of significantly less aeration required. The polyculture maintained a more stable plankton environment during the early months of culture, which increased survival of shrimps. Various pathways are presented for the control

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of luminous bacterial growth in polyculture ponds: (a) fish feeding on organic wastes and conversion to feces; (b) selective fish foraging to increase the dominance of beneficial phytoplankton; (c) bioturbation of pond sediments; and (d) release in the water column of antimicrobials, fungi, or competing bacteria from the skin and gut mucus of tilapia.

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