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RESEARCH REPORTS

Sustainable Aquaculture for a Secure Future

Title: Management of Organic Matter and Nutrient Regeneration in Pond Bottoms Through Polyculture

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Abstract: An experiment was conducted in twelve 200-m² earthen ponds at the Asian Institute of Technology, Thailand, during November 1997 through April 1998. The experiment was conducted for 149 days to assess effects of aerobic and anaerobic conditions at pond bottom on organic matter decomposition and nutrient release, as well as the effectiveness of common carp (*Cyprinus carpio*) in removing organic matter from pond sediments and recycling nutrients in Nile tilapia (*Oreochromis niloticus*) ponds. The experiment consisted of four treatments: (A) tilapia monoculture with water mixing; (B) tilapia monoculture without water mixing; (C) tilapia/carp polyculture with water mixing; and (D) tilapia/carp polyculture without water mixing. Sex-reversed all-male Nile tilapia were stocked at 2 fish m⁻² at a size of 8-12 g in all ponds, while common carp fingerlings at 0.3 fish m⁻² at a size of 13-17 g. All ponds were fertilized with chicken manure at the rate 1,000 kg ha⁻¹ week⁻¹ (dry matter basis) to create anaerobic bottoms. Aerobic pond bottoms in water mixing treatments (A and C) were created by fixing a submersible pump (0.5 kW) 30 cm above the bottom of each pond to mix surface and bottom water.

Results of the experiments indicate that inclusion of common carp into Nile tilapia ponds was effective in recycling nutrients, and might be effective in removal of organic matter, if more common carp are added. Water mixing in the experiments largely reduced phytoplankton growth in both mono- and polyculture ponds. Water mixing did not affect the

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growth of Nile tilapia in monoculture ponds, but significantly ($P < 0.05$) reduced the growth of both Nile tilapia and common carp in polyculture ponds.

This abstract was excerpted from the original paper, which was in the Proceedings for the 6th International Symposium on Tilapia in Aquaculture, 12-16 September 2004, vol 2 pp.763-772.

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