NOTICE OF PUBLICATION

RESEARCH REPORTS
TITLE XII POND DYNAMICS/AQUACULTURE COLLABORATIVE RESEARCH SUPPORT PROGRAM

Title: Phosphorus fertilization strategy in fish ponds based on sediment phosphorus saturation level

Author(s): Madhav K. Shrestha
C. Kwei Lin*
Asian Institute of Technology
Agriculture and Aquatic Systems Program
P.O. Box 4
Klong Luang, Pathumthani 12120, Thailand

Date: 14 August 1997 **Publication Number:** CRSP Research Report 97-114

Price: The CRSP will not be distributing this publication. Copies may be obtained by writing to the authors.

Abstract: Two experiments were conducted to determine effective P fertilization strategy in fish ponds in relation to sediment P saturation level. Experiment 1 was conducted in cement tanks with five levels of P saturation in the sediments (5, 24, 44, 60 and 79%) and with three P fertilization rates (0.2, 0.1 and 0.05 g m^{-3} day^{-1}, N:P ratios of 2:1, 4:1 and 8:1, respectively). Nile tilapia (*Oreochromis niloticus*) were cultured in tanks for 57 days. Results showed that the mean concentration of soluble reactive phosphorus (SRP) in the water column increased with increasing sediment P saturation and P fertilization rate. The maximum net fish yield (NFY), 4.2 ± 0.3 g m^{-3} day^{-1}, was obtained at an SRP concentration of 0.3 mg l^{-1}; higher concentrations did not increase fish yield. These levels of SRP and NFY were attainable with P fertilization rates of 0.2 g m^{-3} day^{-1}, 0.1 g m^{-3} day^{-1} and 0.05 g m^{-3} day^{-1} and N:P ratios of 2:1, 4:1 and 8:1 in ponds where level of sediment P saturation was below 10%, above 45% and above 60%, respectively. Experiment 2 was conducted in earthen ponds to test and verify the P fertilization rate based on the cement tank results. Three new and three old ponds with 8 ± 1.7% and 88 ± 7.3% sediment P saturated in the top 5 cm of mud were fertilized at a rate of 0.2 g m^{-3} day^{-1} and 0.05 g m^{-3} day^{-1} and N:P ratio of 2:1 and 8:1, respectively. Nile tilapia were cultured at a density of two fish m^{-3} for 85 days. The mean NFY obtained in new and old ponds were 1.73 ± 0.08 g m^{-3} day^{-1} and 2.24 ± 0.32 g m^{-3} day^{-1}, respectively, which were not significanty different (P>0.05). We conclude that P fertilization rate should be based on P saturation level in mud to overcome the problem of under or over supply of P in fish ponds.

*Corresponding author.

This abstract was excerpted from the original paper, which was published in Aquaculture, 142(1996):207-219.

CRSP RESEARCH REPORTS are published as occasional papers by the Program Management Office, Pond Dynamics/Aquaculture Collaborative Research Support Program, Oregon State University, Snell Hall 400, Corvallis, Oregon 97331-1641 USA. The Pond Dynamics/Aquaculture CRSP is supported by the U.S. Agency for International Development under CRSP Grant No.: LAG-00-96-900015-00.