

NOTICE OF PUBLICATION



RESEARCH REPORTS

TITLE XII POND DYNAMICS/AQUACULTURE COLLABORATIVE RESEARCH SUPPORT PROGRAM

Title: Relationships Between Primary Production and Yield of Tilapia in Ponds

Author(s): James S. Diana and P. J. Schneeberger, Great Lakes Research Division and School of Natural Resources, University of Michigan, Ann Arbor, Michigan 48109, USA
C. Kwei Lin, Division of Agricultural and Food Engineering, Asian Institute of Technology, G.P.O. Box 2754, Bangkok 10501, Thailand

Date: 28 September 1989 **Publication Number:** CRSP Research Reports 89-19

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

Abstract: The purpose of this study was to determine relations between physicochemical variables and primary productivity or fish yield using multiple regression analysis. In Thailand, 8-12 ponds (250 m²) were stocked with male *Oreochromis niloticus* (25-35 g) at a density of 1 fish/m³. Experiments were run for approximately 5 months during the wet season of 1984 and the wet and dry seasons of 1985. Ponds received nutrient inputs according to three different management schemes: (1) low input inorganic fertilizer (8 kg/ha/month P₂O₅); (2) high input organic fertilizer (500 kg/ha/week chicken manure); and (3) high input inorganic fertilizer (100 kg/ha/week P₂O₅ and 30 kg/ha/week urea). Air and water temperature, solar radiation, rainfall, dissolved oxygen (DO), total phosphorus, nitrate-nitrite, ammonia, turbidity, chlorophyll *a*, primary productivity, fish weight, and fish survival were measured regularly throughout each experiment. Data were examined by regression analyses.

Ponds receiving high fertilizer inputs exhibited higher nutrient levels in water, higher primary productivity, and higher fish production than ponds treated with low inputs of fertilizer. Nitrogen and phosphorus appeared to be limiting factors for primary productivity, although multiple regression between these two factors and primary production indicated no significant relationship. The availability of nutrients may have been related more closely to regeneration rate than absolute concentration. Fish yield was strongly correlated to rainfall, fish biomass, DO, water temperature and solar radiation. The correlation between net yield and fish biomass was a positive one, indicating that carrying capacity was not reached in the ponds.

This paper was published in *ICLARM Conference Proceedings 15, The Second International Symposium on Tilapia in Aquaculture*. 1988.

CRSP RESEARCH REPORTS are published as occasional papers by the Program Management Office, Pond Dynamics/Aquaculture Collaborative Research Support Program, Office of International Research and Development, 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.: DAN-4023-G-SS-7066-00.