

NOTICE OF PUBLICATION



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Title: Development of Production Technologies for Semi-Intensive Fishfarming During the Past Decade in Central America

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Abstract: This paper reports on techniques that have been developed by the Pond Dynamics/Aquaculture Collaborative Research Program in Central America to increase Tilapia production by optimizing resource use in systems based predominately on natural pond productivity.

Tilapia yields in ponds fertilized only with phosphorus averaged 409 kg/ha and were unprofitable. Additions of 24 kg/ha nitrogen and enough phosphorus to maintain N:P ratios of 4:1 increased yields to 2079 kg/ha. Tilapia yield responded curvilinearly to chicken litter fertilization at weekly rates ranging from 125 to 1000 kg dry matter/ha; tilapia yields ranged from 1095 to 2593 kg/ha. Profitability was greatest at the highest litter application rate. Culture systems based solely on organic fertilization were nitrogen limited because of the low N:P ratio in chicken litter. Yields could be increased to 3600 kg/ha when weekly chicken litter applications at 750 kg/ha were supplemented with inorganic nitrogen to raise total available nitrogen to 25 kg/ha. Higher additions of nitrogen resulted in heavy blue-green algal blooms and decreased fish yields. Blue-green algae are thought to have out-competed other algae in the high pH and low CO₂ conditions that predominated during high nitrogen fertilization.

Weekly chicken litter inputs could be reduced to 500 kg/ha by substitution with equivalent inputs in inorganic N and P, but greater reductions resulted in lower primary production and fish yields. Primary production is believed to have been limited by CO₂ in ponds receiving low quantities of organic matter. Tilapia yields could be increased by use of prepared diets (20-25% protein), but profitability increased only when the Tilapia stocking rate was at least 2 fish/m², and feed was substituted with chicken litter for the first 2 to 3 months of a 5 month growing cycle.

Ponds were stocked with male tilapia that had been either manually separated from mixed sex populations, or hormonally sex reversed. Neither technique of acquiring male Tilapia was 100% effective, so there was always reproduction in grow-out ponds. Reproduction could be practically eliminated, however if 500 *Cichlasoma managuense* (guapote tigre) fry or fingerlings were stocked per ha of pond. Efficient predation of reproduction was related to number of guapote stocked per area rather than per tilapia.

Colossoma macropomun (tambaquí), a characid native to the Amazon and Orinoco River basins, was found to grow well with prepared diets, but performed poorly in ponds receiving only organic fertilization.

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