

# NOTICE OF PUBLICATION

---

POND DYNAMICS/ AQUACULTURE COLLABORATIVE RESEARCH SUPPORT PROGRAM

## RESEARCH REPORTS

Sustainable Aquaculture for a Secure Future

---

**Title:** Effects of pond depth & mechanical mixing on production of *Oreochromis niloticus* in manured earthen ponds

**Author(s):** J.P. Szyper<sup>1</sup> and K.D. Hopkins<sup>2</sup>

1. University of Hawaii at Manoa, Hawaii Institute of Marine Biology, P.O. Box 1346, Kaneohe, Hawaii 96744, USA

2. University of Hawaii at Hilo, College of Agriculture, Hilo, Hawaii 96720, USA

**Date:** 4 December 2018 Publication Number: CRSP Research Report **96-A04**

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

**Abstract:** An experiment to assess the effects of water mixing on production of Nile tilapia (*Oreochromis niloticus*) in fertilized earthen ponds was performed at the Asian Institute of Technology in Thailand. Male fingerlings stocked at 3 fish · m<sup>-3</sup> grew to final weights of 106-233 g in 173 days in nine ponds of approximately 370- m<sup>2</sup> individual surface area. Yields were statistically indistinguishable among treatments, averaging 5.4 t · ha<sup>-1</sup> · year<sup>-1</sup> in three ponds of 1.5 m depth whose water was mixed for two hours each day; 6.7 t · ha<sup>-1</sup> · year<sup>-1</sup> in three similar but unmixed ponds; and 6.9 t · ha<sup>-1</sup> · year<sup>-1</sup> in three unmixed ponds of 0.9 m depth. Survival was significantly lower in the deep mixed ponds (72% compared with 91-93%). Fish grew more rapidly and had larger final weights in the shallow unmixed ponds, which had larger standing stocks of phytoplankton, as measured by chlorophyll a, and greater rates of gross dissolved oxygen (DO) production per unit volume during most of the growth period. Treatments did not differ in gross DO production per unit area. Daily mixing produced higher nighttime bottom oxygen concentrations up until 2300 hours, but did not change overnight DO minima. No treatment-related differences in ammonia concentrations or other water quality parameters were found. The oxygen-conserving effect of mixing was not effective in enhancing production of this species, which grows and survives well in unmixed ponds, tolerating or avoiding waters of low oxygen content. Mixing and aeration strategies must be examined carefully for both detrimental and beneficial effects.

---

**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 USA. The Pond Dynamics/Aquaculture CRSP is supported by the US Agency for International Development under CRSP Grant No. DAN-4023-G-00-0031-00.

This abstract was excerpted from the original paper, which was in R.S.V. Pullin, J. Lazard, M. Legendre, J.B. Amon Kothias, and D. Pauly (editors), The Third International Symposium on Tilapia in Aquaculture. ICLARM Conference Proceedings 41, 575 pp., pgs. 152-158.