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GROWTH AND REPRODUCTIVE PERFORMANCE OF IMPROVED TILAPIA (*OREOCHROMIS NILOTICUS*)

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Final Abstract*

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ABSTRACT

Currently, there are four lines (GIFT, IDRC, Fishgen, and Chitralada) of established and productive stocks of Nile tilapia in Asia, and three of them have been selected for improved growth. Although the selected lines are thought to have higher growth rates under extensive culture systems, there may have been a number of correlated responses to selection that could impact other traits such as reproduction. Such traits have not been subjected to comparative evaluation. Therefore, this study examined reproduction as well as growth, under an intensive culture system, for these four strains of tilapia.

The study has two components with the following objectives:

- 1) Compare reproductive performance (fecundity, spawning frequency, fertilization, hatch and larval survival) of three improved (GIFT, IDRC, Fishgen) and the Thai Chitralada strain of Nile tilapia; and
- 2) Compare growth, as well as age and size at sexual maturation, of the four strains in earthen ponds and in an intensive recirculation system.

Significant progress has been made on the first of these objectives, but experiments relating to the second objective are in progress.

Our study compared growth, survival, sexual maturation, and various reproductive parameters in four tilapia strains, three of which have been improved through various selective breeding approaches (GIFT, IDRC, and Fishgen-selected), and a local stock (Chitralada) was included as a non-improved control. The four strains were originally reared in extensive culture systems with fertilization only. Growth (weight and length) and reproductive parameters (gonadosomatic index, hepatosomatic index, and stages of sexual maturation) were measured on fish sampled every 21 days. Based on staging of gonad development, GIFT were found to become sexually mature somewhat later than the other two strains. At nine months, broodstock from each strain were stocked in 5-m² breeding hapas, with 5 males and 15 females per hapa and four replicate hapas per strain. Broodstock were sampled for eggs every week, and data on fecundity and inter-spawning interval for the four strains were assessed. Seasonal and environmental variances appear to be major determinants of egg/fry production, with the only strain difference observed being a lower relative fecundity in GIFT. Across all strains, fecundity per female increased over time, while fecundity per unit weight of female remained constant. Spawning frequency and interval of spawning fluctuated widely between individual fish. Spawning interval was highly variable within individual females making it difficult to identify trends. Many females spawned very infrequently, and the means to identify fecund females could have huge impacts upon hatchery efficiency.