

Abstract

Development of the YY-male technology for the production of genetically male tilapia (GMT) has concentrated on the generation of YY-males in a single strain of *O. niloticus* originating from L. Manzala, Egypt. Although this strain is known to have passed through several genetic bottlenecks, and is therefore likely to be inbred, it has exhibited superior growth rates compared to locally cultured strains in the Philippines. With a view to selection of strains for future work, this study evaluated the growth performance of eleven strains of mixed sex tilapia (five Egyptian, three Kenyan, two Ghanaian and a red tilapia). These were stocked communally in nine earthen ponds together with two Egyptian strains of GMT derived from YY-males. All strains were genetically characterized for 21 allozyme loci. Highly significant growth differences were observed among strains although rankings varied considerably between ponds. The two GMT strains had the highest overall growth rates. Egyptian strains generally grew fastest with Kenyan strains being the poorest performers. Genetic distance between the *O. niloticus* strains ranges from 0.000 to 0.053 and levels of genetic variation did not correlate with growth performance.

Genetic improvement of farmed tilapias: the growth performance of the gift strain of Nile tilapia (*Oreochromis niloticus*) in rice-fish environments

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Abstract

The objective of this study was to compare the relative growth performance of an improved strain of Nile tilapia (the GIFT strain) with the widely used commercial strain in the Philippines (Israel strain) and a recently imported strain from Senegal (Senegal strain) in rice-fish environments. The Senegal strain had performed relatively better than seven other test strains in rice-fish systems during an earlier study to estimate the magnitude of genotype x environment interaction in 11 different tilapia farming systems. The GIFT strain was developed from a genetically mixed-base population by combining the best performing genetic groups from eight diverse strains and their crosses. A combined-family selection program for growth performance using GIFT strain was initiated in 1991. The three test strains were evaluated under communal and separate rearing units with and without supplementary feeding. In separate rearing, 100 individuals of each strain were stocked per paddy (four replicated paddies) in 12 200 m rice-fish paddies. In communal rearing, each of the six 200 m paddies were stocked with 33 individuals of each strain to bring the stocking density to 100 per paddy. The fish in three randomly selected paddies were fed during the culture period with a commercial tilapia diet with 30% crude protein at 7% of fish body weight per day. The fish were reared for 90 days. Differences in growth and survival (% of fish recovered) among strains were highly significant ($P < 0.01$). The

relative growth performance of all strains were similar under separate and communal rearing. The weight at harvest in test units with feeding was about twice that recorded in units without feeding. The growth performance of Israel strain was poorest (28 g and 65 g, with and without feeding, respectively). Growth of GIFT and Senegal were similar (38 g and 80 g, respectively). Survival (%) was highest for the GIFT strain (45 and 63 in separate and communal rearing, respectively) and lowest for Senegal strain (30 and 20, respectively). The higher weight at harvest of the Senegal strain, comparable to that of GIFT may therefore be due to low survival of the latter.

Results indicate that the GIFT strain is a promising candidate strain for culture in rice-fish systems.

Evidence of genotype environment interaction observed in selected strains of tilapia (*Oreochromis niloticus* Linn.) during on farm growth comparison

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Abstract

Two selection experiments have been conducted from 1984 to 1989: (1) Size-specific mass selection, a procedure that modified mass selection as fry were matched for equal size and then selected on subsequent growth rate; (2) within-family selection, a procedure that appeared to be suitable for tilapia culture in Thailand. Each selection experiment consisted of one line selected for large size and one control line. After two and three generations of selection, the growth rate of progenies of selected and control lines were compared on private farms and government fisheries stations. Male progenies of the selected line using the size-specific mass selection technique grew 7% faster than those of the control line under the station condition. However, on three farms, the male progenies of the control line grew 7% faster than those of the selected line. Growth comparison of the within-family selection experiment illustrated similar results. Progenies of the selected line grew 6% faster than those of the control line on two farms and one fisheries station. However, progenies of the control line grew 17% faster than those of the selected line on one farm. The results suggested that both selection procedures are appropriate for improving tilapia growth rate under developing countries such as Thailand. However, the genotype-environment interaction should be taken into account in the selection programs.