Tilapia Fingerlings From Varied Systems Deliver Similar Growout Performance

Although opinions vary, tilapia fingerlings raised in hatcheries, hapas or ponds all produce quality stock.

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Summary:
Results of a 120-day study showed that Nile tilapia fingerlings produced in incubation units, hapas or ponds exhibited similar growout performance. Although not statistically significant, the tilapia from artificial incubation units performed optimally. Fish from hapas also did very well. These treatments produced the greatest yield of fish, and a greater proportion of harvested animals fell in larger size categories.

Some tilapia growout operators believe that fingerlings from artificial incubation units have lower survival, smaller size and lesser quality. On the other hand, fingerlings from ponds and hapas are said to have high survival and bigger size.

A study was conducted by the authors to evaluate the growth performance of Nile tilapia, *Oreochromis niloticus*, fingerlings that were produced in three hatching systems: artificial incubation units, hapas and ponds.

Study Setup

The study was composed of four treatments in earthen ponds and replicated three times. Treatment I raised sex-reversed Nile tilapia fingerlings produced in artificial incubation units. Treatment II used sex-reversed fingerlings produced in hapas. In treatment III, the tilapia fingerlings came from ponds. Treatment IV used a mixture of sex-reversed fingerlings from the three sources. Size 20 tilapia fingerlings of the GIFT strain with a weight range of 0.26 to 0.34 g were used in the study.

Fingerlings were stocked in 12, 500-m^2 earthen ponds at 4 fish/m^2 or 2,000 fish/pond. The fingerlings were fed twice a day with commercial feeds at 20% of body weight until the second week, when the fish then received feed at 10% of body weight for two weeks. From weeks four through six, the tilapia received feed at 7% of body weight. They then were fed at 6% of body weight for two weeks, 5% for two weeks, 4% for two weeks and, finally, 3% body weight for weeks 12 through 16.

The ponds were fertilized weekly using the inorganic fertilizers ammonium phosphate and urea at the recommended rates of 28 kg nitrogen and 5.6 kg phosphorus/ha/week to enhance the growth of natural foods.

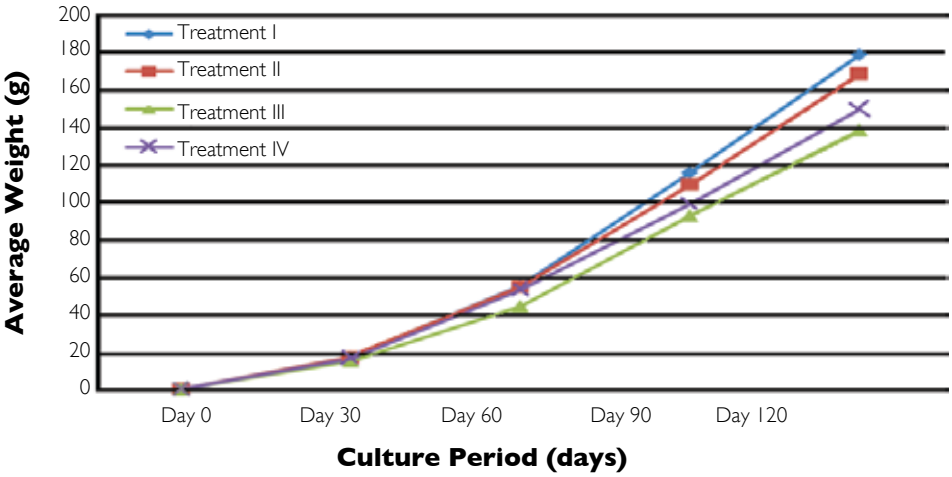

Figure 1. Average body weight of Nile tilapia stocks over 120 days of culture.

Results

Figure 1 shows the average body weight of the tilapia after 120 days of culture. At 179.26 ± 42.30 g, the average body weight at harvest was highest in treatment I, the fish produced in artificial incubation units. This mark was followed by 168.94 ± 48.60 g for the fish from hapas in treatment II; 150.04 ± 14.73 g for treatment IV, the combination of the three hatching systems; and 138.87 ± 17.30 g for the fish from ponds in treatment III.

Similar trends with specific growth rate or the daily change in body weight, gross yield, feed consumption and feed-conversion efficiency were also seen. However, these differences were not statistically significant ($P > 0.05$) among the groups. After 120 days of culture, no significant differences were found in the survival rate of fish produced from the three different hatching systems.

On the size distribution of the stocks, results showed that the highest proportion of fish harvested ranged 101 to 200 g ($P > 0.05$, Figure 2). Fish hatched in artificial incubation units and hapas had a higher proportion of fish in the 201- to 250-g and 251- to 300-g size categories, although there was no statistically significant difference among treatments in any of the size categories harvested.

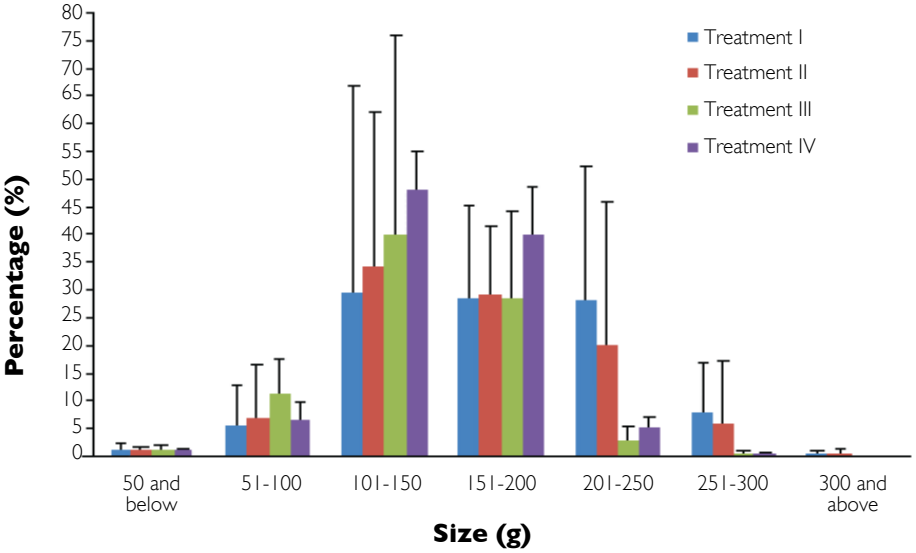

Figure 2. Size distribution of tilapia produced from different hatching systems.

Cost Analysis

A basic cost and return analysis showed that the net profit of growing hapa-produced fry was highest, as incubation units required more costs for construction and maintenance. However, as with the growth performance variables, the authors did not see statistical differences in the cost-return analyses among the different hatching systems.

Additional replication is likely required to establish whether incubation units and hapas might serve as better hatching systems for producing Nile tilapia. Nonetheless, the overall outcome of these experiments indicates that any of the hatching systems can be used for the growout production of Nile tilapia with no significant loss in production efficiency.