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EFFECT OF STUNTING ON THE GROWTH OF BLUE TILAPIA (*TILAPIA AUREA*, CICHLIDAE)

Aquaculture is gaining widespread importance in Africa as a means of providing high quality protein in the rural areas. Several *Tilapia* species (Family Cichlidae) are cultured in Africa because of their prolific reproduction, rapid growth, omnivorous food habits and relative hardiness. Fingerlings for stocking new or recently harvested ponds are obtained from older, established ponds. Often these fingerlings are stunted, having had their growth suppressed for several months due to over-crowding and competition for food in the older pond (Torrans, Proc. Peace Corps Pan-African Aquaculture Conf., Libreville, Gabon, 1983, in press).

The effect of previous stunting on the growth potential of fish stocked in new ponds is not clear. Stunted bluegill, *Lepomis macrochirus*, have been shown to exhibit slower growth rates than non-stunted individuals when reared under similar conditions (Murnyak, Murnyak and Wolgast, Prog. Fish-Cult., 46(2):133-138). However, researchers at the Lajas Aquaculture Center in Puerto Rico have shown that stunting has no effect on the growth potential of Nile tilapia, *Tilapia nilotica* (Anon., Southern Region Cooperative Research Project S-168 Annual Report 1983: Warm-water Aquaculture, May, 1985). We report here the results of a study conducted at the University of Arkansas at Pine Bluff Agricultural Experiment Station to determine the effects of stunting on the growth potential of blue tilapia *Tilapia aurea*.

One-year-old fish were produced in ponds during the summer of 1984 and over-wintered in indoor heated tanks until the spring of 1985. Two-year-old fish were produced in ponds during the summer of 1983 and held in indoor heated tanks for approximately 18 months. Both age classes of fish were produced from the same genetic stock, and fed maintenance diets while held indoors.

Twenty males were selected from each of the two age classes. Each fish was weighed to the nearest gram and individually marked by scarring different dorsal fin rays (Welch and Mills, Can. J. Fish. Aquat. Sci., 38:1168-1170, 1981). Both groups were stocked on May 1, 1985 in the same 0.05 ha earthen pond. The pond was previously fertilized with manure to produce a plankton bloom, and the fish were fed to satiation once daily for a 90-day period with a 32% protein floating pelleted feed.

The pond was harvested on July 30, and 17 males that were identifiable by their marks were recovered from each age class. The remaining six fish stocked in the pond were mortalities, unidentifiable individuals, and one female that was misidentified at stocking. All analyses were based on the initial and final weights of the 17 males from each age class whose identity at both stocking and harvest was certain.

The one-year-old group grew from an initial average weight ( $\pm$  S.D.) of  $76.1 \pm 11.8$  g to  $237.6 \pm 17.9$  g over the 90-day period, for an average growth rate of  $1.79 \pm 0.25$  g/day. The two-year-old group grew from an initial average weight of  $76.2 \pm 8.5$  g to  $231.9 \pm 13.6$  g, for an average growth rate of  $1.73 \pm 0.21$  g/day. There were no significant differences in initial weight, final weight, or growth rate between the two groups (T-Test,  $n = 17$ ,  $P = 0.05$ ).

The results of this study indicate that stunting has no significant effect on the growth of male blue tilapia when they are subsequently reared under conditions conducive to growth. The contradictory results previously reported for bluegill may be due to the fact that the two age groups used in that study came from two different populations, not the same population as in our study, and may have had different genetic potentials for growth.

Therefore, if tilapia are to be reared in monosex (all-male) production ponds, growth rates should not be significantly affected by prior stunting of the fish. However, if male and female tilapia are to be reared together in mixed-sex culture, as is typically the case in Africa, the stocking of fingerlings over two months old, whether stunted or not, is not recommended. Female blue tilapia reach sexual maturity at four to five months of age, and will spawn at approximately monthly intervals thereafter. If females that are approaching sexual maturity are stocked in a pond with males, the resulting recruitment can severely reduce the growth of the original stock through competition for food (Torrans, Proc. Peace Corps Pan-African Aquaculture Conf., Libreville, Gabon, 1983, in press), resulting in a harvest of fish that may be too small to market.

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