

A STATUS REPORT ON TILAPIA IN FLORIDA¹

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Tilapia are members of the family Cichlidae and occur naturally in Africa and the Near East. There are now four species of Tilapia which are well-established in Florida. These are the blue tilapia (Tilapia aurea), spotted tilapia (T. mariae), blackchin tilapia (T. melanocheilus) and the Mozambique mouth-brooder (T. mossambica).

The blue tilapia came from stocks brought to the United States in 1957 by Auburn University. The Florida Game and Fresh Water Fish Commission acquired 3,000 juvenile blue tilapia for research purposes from Auburn in 1961. Before the Commission's research was completed on this fish, they had been illegally removed and stocked into our natural lakes and streams. Since their introduction only 17 years ago, blue tilapia have spread throughout central Florida and are now found in at least 22 counties. Unfortunately, the anticipated beneficial qualities of this species never materialized.

The other species of Tilapia established in Florida are believed to have been introduced by tropical fish farmers. The

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blackchin tilapia was first reported as being established in the Tampa area in 1963. The spotted and Mozambique tilapias were first reported established in canal systems of Dade County in 1974. Both of these latter species are rapidly expanding their known range. A fifth and presently unidentified Tilapia sp. has been collected from the St. Petersburg area (Dr. Walter R. Courtenay, Jr., Florida Atlantic University, personal communication).

Little is known about the effects these and other established non-native fishes are having in Florida. This is not to say that there has not been a considerable amount of work done on these species, but serves to demonstrate the complexity of the interspecific interactions non-native fishes pose. Originally most studies involving tilapias were aimed at identifying the possible beneficial aspects of these fish, such as their use as a biological control for aquatic weeds and as a sport or food fish. More recently, particularly in Florida, Texas and California, an emphasis has been placed on determining just what effect established tilapias are having on the aquatic ecosystems and developing methods for their management.

✓ Current tilapia research being conducted at the Non-Native Fish Research Laboratory is aimed at identifying their lower lethal temperature limits; interspecific interactions in a small central Florida lake; effect of a largemouth bass spawning activities and success; predator-prey relationships with largemouth bass; and an evaluation of a hybrid tilapia now being proposed as a superior sport and food fish.

To date, lower lethal acclimation temperatures have been identified under controlled conditions for blue tilapia, spotted tilapia and the Mozambique mouthbrooder. All tilapia tested died between 6 and 12°C (42.8 to 53.6°F). Of these three tilapia, blue tilapia is the most tolerant of cold water while spotted tilapia is the least tolerant. The lower lethal acclimation temperatures for the Mozambique mouthbrooder were intermediate to those for the blue and spotted tilapias.

The interspecific interactions of blue tilapia and largemouth bass were evaluated in a preliminary study this spring. Since only the male tilapia build and guard nests, it was postulated that if there were competition for spawning sites between the bass and tilapia it would be between the male fishes. Eight small ponds were stocked with bass and tilapia. Data from this preliminary study suggest that (1) blue tilapia prefer a spawning substrate of fine sand whereas bass prefer coarse gravel; (2) the mean depths of bass nests in treatments containing male tilapia were less than in the ponds without male tilapia; and (3) the average number of bass fingerlings^s recovered decreased, respectively, in ponds with bass only, bass and both sexes of tilapia, bass and female tilapia only, bass and male tilapia only.

A comprehensive long-term field study is underway in a central Florida lake where blue tilapia have recently become established. This lake has previously supported healthy populations of largemouth bass and bream. In this lake, we are attempting to identify the interspecific interactions between the blue tilapia

and native species at the community level. After a year of intensive sampling to establish a reliable baseline, this lake will be periodically sampled to determine if there are any shifts in the community structure which can be attributed to the blue tilapia.

One of the reasons tilapia have been repeatedly introduced outside their natural range is that they are a potentially valuable food resource. Most recently, the monosex tilapia hybrids have become popular and widely acclaimed as a superior food fish in addition to possessing sportfish qualities. Therefore a study was initiated this spring to evaluate the growth, food conversion, temperature tolerances and sportfish qualities of a tilapia hybrid.

Finally, a study is planned for this fall in which we will evaluate the predator-prey relationship between largemouth bass and blue tilapia. In this study we plan to identify the minimum, maximum and preferred sizes of blue tilapia that largemouth bass will eat, in addition to considering the blue tilapia's overall value as food for bass. Such studies are necessary if we are to adjust our fish management practices to incorporate these new species.

CONCLUSIONS

There are at least four well-established Tilapia spp. in Florida. All, except the blackchin tilapia, are rapidly expanding their known range in Florida. What appear to be simple questions like, "What effect are these tilapia having on our native fishes?" are, in fact, not nearly so simple as they may seem. The direct

and indirect interactions of these fishes are so complex that it will require years of extensive research before we can begin to understand the impact of these species in our lakes, streams and canals. Since there is no known way of ridding ourselves of these unwanted species, the Commission continues the long and tedious chore of learning how we can live with them.

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