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MOZAMBIQUE TILAPIA FOR BIOLOGICAL CONTROL OF AQUATIC VEGETATION IN TEXAS

Brittany Chesser[1] and Todd Sink[2]

INTRODUCTION

Mozambique tilapia (*Oreochromis mossambicus*) are native to Africa and have been introduced and used as a biological control for aquatic vegetation management in much of the United States, including Texas. Other biological control options for aquatic vegetation in Texas also include another non-native fish species, triploid grass carp. A common misconception is that tilapia and triploid grass carp are interchangeable when used as a management strategy for aquatic vegetation. While both tilapia and triploid grass carp consume aquatic vegetation in freshwater ponds, each has different life cycles and feeding habits, which are important to consider before stocking. Furthermore, they each have their own regulations or permit requirements in response to potential environmental and ecological impacts if they escape. This publication will explore the biology, regulations, and other considerations related to Mozambique tilapia. For more information on using triploid grass carp for biological control, please see publication No. RWFM-PU-392, *Triploid Grass Carp for Biological Control of Aquatic Vegetation in Texas*.

Mozambique tilapia are sometimes confused with native sunfishes due to their laterally compressed, deep bodies with heavily spined dorsal fins, but they can be easily distinguished by the interrupted lateral line, which is characteristic of fishes found in the Cichlid family. Identification between tilapia species is much more difficult due to the resemblance of closely related species like Blue (*Oreochromis aureus*), Nile (*Oreochromis niloticus*), and Wami (*Oreochromis urolepis*) tilapia—all having similar characteristics and the ability to interbreed, creating hybrids. They are relatively cold intolerant, becoming lethargic when water temperatures approach 55 degrees Fahrenheit (F), and they die off when temperatures dip below 50 degrees F. However, they are still considered hardy and very tolerant of poor water quality, including low-dissolved oxygen. Under optimal conditions or within their native range, Mozambique tilapia can reach 10 pounds and live up to 10 years. These sizes and ages are extremely rare and difficult, if not impossible, to obtain in Texas.

Figure 1. Mozambique tilapia

REGULATIONS

All tilapia species are considered exotic, prohibited species in Texas and are regulated, meaning they cannot be imported, exported, transported, or sold without either a permit or under regulatory exemption. Mozambique tilapia can be legally stocked in outdoor ponds, following guidance from Texas Parks and Wildlife Department (TPWD). TPWD has identified two management zones regarding stocking Mozambique tilapia species in Texas—a conservation zone and a stocking zone (Fig. 2). These zones are largely split by Interstate Highway 35 (I-35) and were created in response to a conservation assessment weighing both economic and environmental impacts from potential escapement, including competition and predation affecting native species, and habitat degradation due to their eating habits.

For tilapia to be stocked in outdoor ponds in the conservation zone (approximately west of I-35), a departmental review by TPWD will be required, at

[1]Aquatic Vegetation Management Program Specialist, Texas A&M AgriLife Extension Service

[2]Associate Professor and Aquaculture Extension Specialist, Texas A&M AgriLife Extension Service

CONTROL OF FILAMENTOUS ALGAE

There is a general misconception that tilapia are excellent at controlling filamentous algae. While it is true that all species of tilapia utilize algae to some extent as part of their diet, the biology of each species determines how much and what type of algae they will consume. Some species have closely spaced gill rakers and are better at filtering phytoplankton (single-celled algae) from the water, while other species will consume more filamentous algae species.

However, stocking a few dozen or even hundreds of tilapia into a pond choked with filamentous algae mats will not resolve the issue. For example, the species that is likely the best at consuming filamentous algae is the Mozambique tilapia. Yet, in dietary studies, it normally only consumes up to 10 percent of filamentous algae as part of its diet when other food sources are present. The remaining portion of the diet is comprised of zooplankton and phytoplankton, detritus (decaying organic matter), small fish including other tilapia (cannibalism), vascular vegetation, insects, insect larvae and other benthic invertebrates, and even bacterial films. In some studies, detritus makes up as much as 55 percent of their diet. When other foods are not present, as much as 45 percent of their diet can be comprised of filamentous algae, with the remaining portion made up of detritus and other small tilapia, but it is rare in a pond environment for any other food source to be absent.

Therefore, tilapia work best as part of an integrated management strategy. In this strategy, it is best to kill off the majority of filamentous algae mats with an appropriate chemical treatment (algaecide), and then stock tilapia to graze off any new growth of filamentous algae. This method will prolong the period between chemical treatments and greatly reduce their need. However, tilapia stocked on their own can rarely manage filamentous algae alone, especially if predatory fish such as largemouth bass are present to keep their populations low.

CONCLUSION

To determine if stocking Mozambique tilapia is the right choice, one must consider management goals and weigh advantages and disadvantages, such as cost of stocking and winter die-offs. When used correctly, herbivorous fishes such as Mozambique tilapia or triploid grass carp may offer more effective control over a longer period, making them the more economical choice compared to chemicals. Control effectiveness and longevity are increased significantly when combined with other management practices like mechanical or chemical control, as an integrated pest management strategy.

Remember, plant identification is first step when determining effective control options: *https://aquaplant.tamu.edu/*

OTHER RESOURCE

https://edis.ifas.ufl.edu/pdf%5CFA%5CFA04300.pdf

Photos by: Jeremy Jordan, Brittany Chesser, Todd Sink