

# Mosquitofish

*Gambusia holbrooki*

**H**ero or villain? Is it a legendary devourer of mosquito larvae that reduces mosquito populations, or is it a predator so aggressive that it is more detrimental than helpful in controlling mosquitoes?

Mosquitofish are actually a little bit of both.

Mosquitofish are members of the 'live-bearer' family along with guppies, mollies, swordtails and other popular aquarium fish. Of the 45 species of mosquitofish, all native to the Americas, two species are relatively widespread throughout the US.

Western Mosquitofish (*Gambusia affinis*) are native from the Mississippi River drainage west to California while Eastern Mosquitofish (*Gambusia holbrooki*) are native along the Atlantic coast from New Jersey to Florida.

Eastern Mosquitofish are the second most common fish in freshwater Everglades marshes (Least Killifish are smaller, but more abundant) and are a critical food source for larger fish and many wading birds.

While males and females can be difficult to tell apart, adult males are considerably smaller (~3/4" in length vs. females ~1") and have an extended anal fin called a gonopodium that is used for internal fertilization of females.

They are extremely hardy and adaptable fish that can survive a variety of pH's and temperatures (43-95° F, and for short periods of time as high as 107° F) and very low dissolved oxygen content.

Mosquitofish reproduce rapidly; gestation is about four weeks. A female can produce three to four broods a year in her three-year lifetime, each brood having up to several hundred young.

It is because of their adaptability to changing environments that Mosquitofish are so successful in the seasonally-flooded marshes at Corkscrew and throughout South Florida. They can sur-



vive a 90% dry season die-off and be at full population levels within months of the return of favorable conditions.

In addition to being prolific breeders, they are also excellent dispersers. With the onset of the wet season, they can move tens of miles from deep-water refuges to repopulate the system. Even with the extreme dry-down at Corkscrew this year, Mosquitofish were back in the lakes, only inches deep, within a week of the return of water.

## Mosquito-eating fish, really?

Because of their reputation as mosquito control agents, mosquitofish have been routinely and indiscriminately stocked in temperate and tropical waters around the world since the turn of the century. But are they really specialized mosquito eaters?

Mosquitofish are most often found near the water's surface and are voracious predators. They have upturned mouths designed for preying upon mosquito larvae, aquatic insects, smaller fish, and zooplankton that swim at the water's surface. Mosquitofish have been seen to consume 230 mosquito larvae in one hour, but they actually prefer other food sources when available.

Other native fish like Least Killifish, Bluefin Killifish, Swamp Darters, Golden Topminnows, and juvenile Sunfish appear to be just as effective eating mosquito larva and controlling mosquito populations as Mosquitofish.

In fact, in our ecosystem, Mosquitofish primarily eat grass shrimp, dragonfly and damselfly larvae, aquatic beetles, and eggs, larvae and juveniles of various fishes, including their own. In short, these fish will eat pretty much anything they can fit in their mouths. Mosquitofish have even been found to be aggressive toward larger fish, often attacking, shredding fins, and sometimes even killing them.

## Too much of a good thing?

The adaptability and aggressive nature of Mosquitofish make them very successful invasive species outside their native range. They have been introduced nearly worldwide by well-meaning mosquito control agencies and they have had extremely detrimental effects on native fishes, invertebrates, and amphibians.

Introduced Mosquitofish are thought to be responsible for the decline of several aquatic species in the West (topminnows, pupfish, Pacific treefrogs, California newt), Southeast (gopher frogs), and as far away as Australia (threatened frogs and other fish).

Introductions may actually increase mosquito populations when Mosquitofish consume native fish which are better adapted to control mosquito larvae in their native ecosystems. They may also precipitate algal blooms by eating the native zooplankton grazers.

Mosquitofish are a good reminder of the importance of keeping fish, and all species, restricted to their native range where they can be the heroes.

Any introduced species is a villain. In South Florida, native fish are threatened by introduced fishes such as Mayan cichlids, black acara, spotted tilapia, oscars, walking catfish, and brown hoplos which have the potential to out-compete or displace native communities.

Every organism has a specific niche in its native habitat. Introducing a species to a new area, even Mosquitofish, often upsets nature's delicate balance and in the long run creates bigger problems than ever existed in the first place.