

Hatchery Techniques: Feed Training Juvenile Largemouth Bass,
Micropterus salmoides floridanus

Florida Bass Conservation Center at the Richloam Fish Hatchery

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Florida is the Fishing Capital of the World. The black basses are the most sought after freshwater recreational fish in North America, and the subspecies known as the Florida largemouth bass is world-renowned for its trophy potential. As the human population increases, there is increasing demand for the Florida Fish and Wildlife Conservation Commission (FWC) to stock more largemouth bass in state waters.

Traditionally, largemouth bass hatchery programs in North America stocked fingerling largemouth bass (1" to 2" in length) directly from hatchery ponds. These are known as phase-I fish, and the reason for using the small fish was that bass fingerlings were finicky bullies. They wouldn't eat artificial food, and attacked any fish smaller than themselves—including other bass.

The historic hatchery process involves placing mature male and female bass in a prepared pond, with all the potential predators and aquatic plants removed. Once the fry (baby fish) absorb their yolk-sacs and swim up, they begin schooling. At which time, the fry (about 80,000/acre) are often moved to fertilized nursery ponds with abundant zooplankton. Zooplankton are nearly microscopic floating animals that tiny bass and other fish eat before they are large enough to catch other fish. Typically, 30-40 days later, ponds are drained to harvest the bass that are then transported to lakes for release. Survival of fingerlings was historically very low, except when bass were stocked in lakes that had been totally renovated by removing all predators.

In the late 1970's, fisheries biologists throughout the south began to experiment with raising and stocking larger (4 inch) largemouth bass. This process required an additional step and consequently bigger bass are referred to as phase-II fish. Stocking larger bass was believed to be more successful because they are less vulnerable to predation, and their size allows them to eat bigger, more varied prey items. This led to a tremendous amount of research on techniques to produce bigger largemouth bass cost effectively, without them cannibalizing each other, or the expense of providing them with other fish species to consume.

FWC biologists at Blackwater and Richloam hatcheries developed some of the first effective techniques to train largemouth bass to eat artificial food. However, the bass' growth and health using this technique was originally not comparable to bass fed live fish. Subsequently, work completed at the Florida Bass Conservation Center (FBCC) from 2001 to 2009 centered on developing a diet that met specific nutritional requirements for largemouth bass. In the early years, culturists used available diets developed for cold water fish (trout and salmon), because of their high protein content. Unfortunately, when fed to warmwater largemouth bass, salmon diets were not fully digested and caused serious liver disease problems (Pale Liver Syndrome). Now that nutritional research is complete, all largemouth bass raised in Florida to larger sizes utilize the Richloam Bass Diets, which were developed in conjunction with nutritional husbandry experts at the University of Florida.

Largemouth bass must be trained to accept the artificial diet. Early researchers wrote "how-to" papers on feed training bass utilizing a variety of techniques that included the use of carp eggs, krill meal, shrimp meal, and sprayed-on feed additives to achieve that crucial first

step—getting the fish to recognize and accept non-swimming food items. Having tried several different strategies over the years, staff at the FBCC developed a feed training protocol which has been used successfully to raise largemouth bass fingerlings to more than 4 inches in 90 days on artificial diets.

The Current Production Process for Phase-II Bass

Spawning:

At the FBCC, largemouth bass brood fish are allowed to spawn naturally in ponds, or sometimes they do so in concrete raceways on spawning mats. In the latter case, the eggs are removed from the mats and incubated in standard hatchery MacDonald jars that keep the eggs suspended in fresh flowing water until they hatch. When the eggs hatch, the yolk-sac fry are collected in aquaria. Artificial aeration and flowing fresh water take the place of the male bass that normally stays in the bed and fans the eggs to keep dirt from settling on them, to give them fresh oxygenated water and to keep predators away. When the yolk-sac is absorbed, the swim-up fry are transferred to prepared hatchery ponds for grow out on zooplankton through phase-1. They are then harvest as fingerling bass (1-2” long).

Before Fingerling Bass are Pond Harvested:

At the FBCC, fingerling bass are harvested from nursery ponds and restocked in a 30-foot raceway equipped with automatic feeders. One day before fingerling bass are harvested and transported to the indoor tanks, staff prepare *Artemia* (brine shrimp, a freshwater invertebrate similar to the zooplankton they ate in the ponds) to assist in transitioning bass feeding on microscopic invertebrates to artificial diets. Once fingerling bass are moved to indoor tanks, they are fed every 30 minutes for 2-3 days. Bass are fed 24-hours a day, and uneaten feed must be cleaned regularly to ensure water quality remains adequate for developing juveniles.

Stocking the Receiving Tanks:

Successful feed training starts with the correct stocking density, ranging from 44 to 60 fingerling bass per gallon of water. By nature, bass are very aggressive and survival depends of how successful they are at capturing prey. By stocking training tanks at high densities, competition helps stimulate bass to take prepared diets.

Feed Training:

For the first day, largemouth bass fingerlings are offered brine shrimp as soon as they are stocked in a tank and every two hours thereafter for three days. On successive days, staff offer fingerlings a high protein starter feed (Otohime C-1) that is similar in size and color to live brine shrimp. The starter feed contains krill meal, which is a key attractant, and is essential during initial feed training. By the third day, Richloam Bass Diet (1-mm pellet) is mixed with the starter feed. Starting with 75% starter diet to 25% Richloam Diet, the amount of starter is slowly decreased until 100% Richloam Diet is being fed. Depending on fish size and water temperature, conversion to pure Richloam diet takes 4-10 days, with smaller fish and colder temperatures requiring more time.

Feeding can then be reduced to every 1-2 hours. Automatic overhead (Loudon type) feeders reduce manual labor. It is important when feeding to spread feed evenly “in front of the fish’s nose.” This ensures all bass have an opportunity to train on feed. Once trained, feeding frequency can be reduced to every 2-4 hours to achieve fast growth.

Return/Survival:

There are many variables that affect training success. Typical survival of bass subjected to feed training at the FBCC is about 70%. Although larger fish are easier to feed train than smaller fish, but fish as small as one inch can be successfully trained.

Research continues at the FWC hatcheries and in the field in ongoing efforts to make stocking as cost efficient and effective as possible. However stocking alone will never succeed, having quality habitat and anglers that respect the law and help promote conservation are essential to bass fishing success throughout Florida for now and the future.



Figure 1. Typical 4-inch, feed-trained Florida largemouth bass.



Figure 2. Photo of feed training tanks, showing Loudon style automatic feeders which assist in dispensing feed once largemouth bass are trained.