



Cooperative Extension Service
Institute of Food and Agricultural Sciences

Alternative Opportunities for Small Farms: Bait Minnow Production Review¹

Michael McGee and Andrew Lazur²

Bait minnows are an important aquacultural commodity in many established, southern fish farming areas. The most economically important bait minnow species are the golden shiner, *Notemigonus crysoleucas* and the fathead minnow, *Pimephales promelas*. Arkansas leads the country in baitfish production with 25,000 acres in 1992 valued at over 40 million dollars.

Commercial production of bait minnows in Florida is limited. Approximately 99% of the farm-raised shiners sold in Florida are imported from the Mississippi Delta area. In some lakes in Florida, large wild golden shiners (6 to 10 inches) are harvested commercially and sold to retail bait shops. These large fish are preferred by trophy largemouth bass fishermen and can retail for as much as \$1.00 each. Unfortunately, supply of wild shiners is inconsistent and being a specialty type product, demand is relatively limited. The potential production of brackish water or marine baitfish is promising with strong demand, but limited and inconsistent wild supply. Recent studies at the University of Florida have shown that the culture of the gulf killifish, *Fundulus grandis*, or bull minnow is possible in small ponds with very low salinity water. Preliminary yields have averaged 900 pound per acre.

Recently, to supplement farm income, catfish producers in north Florida have diversified into baitfish production. The primary bait fish raised is the golden shiner with small and intermediate size shiners produced for the crappie and largemouth bass markets being the

most economically feasible for farmers. Because of the lower transportation costs and reduced handling stress to fish, golden shiners produced in Florida have sold to local wholesalers for approximately 10 - 15 % higher compared to pondbank prices in the leading bait producing states. 1997 pondbank prices for Florida farm-raised shiners range from \$3.00 - 3.75 per pound depending on quantity and location.

Marketing Situation

Established marketing systems of bait minnows present many challenges to newcomers into the industry. The large interstate markets are dominated by large producers with experience and an established distribution network. Isolated fishing areas or those not presently supplied by large producers present the best opportunities for new and smaller producers. Consideration of market type--retail or wholesale with price structure and product demand associated with each will assist the farmer in determining the scale of the farming operation. The baitminnow market is complex and numerous factors exist that must be adequately considered to determine the business opportunities.

Fishermen can be demanding as to the type, size, color and quality of the bait they buy. Wild minnows often compete with cultured bait products for local sales near fish camps. Emphasis on consistency of supply as

1. This document is Fact Sheet RS-AC004, one of a series of the Fisheries and Aquatic Sciences, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. First printed June 1987. Please visit the FAIRS Web site at <http://hammock.ifas.ufl.edu>.
2. Michael McGee, former assistant professor, Fisheries and Aquatic Sciences and Andrew Lazur, associate professor, Fisheries and Aquatic Sciences, Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, 32611.

The Institute of Food and Agricultural Sciences is an equal opportunity/affirmative action employer authorized to provide research, educational information and other services only to individuals and institutions that function without regard to race, color, sex, age, handicap, or national origin. For information on obtaining other extension publications, contact your county Cooperative Extension Service office. Florida Cooperative Extension Service / Institute of Food and Agricultural Sciences / University of Florida / Christine Taylor Waddill, Dean

well as product quality cannot be overlooked. To keep clientele, the producer must be able to supply the quantity and quality of minnows at the times required by the customer. Sales may be seasonal or affected by climatic variations, and not necessarily in season with the growers' minnow production. Oversupply and price variation may occur as dictated by the production of the large established growers.

Time spent to research and understand marketing potential is essential prior to getting started in the baitminnow business.

Labor and Capital

Like other types of aquaculture, baitminnow production requires a great deal of resources including money and time. Whether considered as a supplemental or full-time business investment, costs for pond construction and equipment will average \$5,000 to \$8,000 per acre depending on farm and pond size and facility location. A full-time operation would require a minimum of 30 to 40 acres of ponds with an average fish production of 800 to 1000 lbs/acre and selling direct to retail outlets. In this example an investment of \$200,000 to \$300,000, not including land costs, would be required.

Regardless of farm size the major development costs are land acquisition, pond construction, well drilling, equipment and holding facilities. Major operating costs are labor, feed, fertilizers, chemical treatments, electricity, harvesting and transportation. Careful attention to farm design and pond construction can reduce investment and operating costs and help ensure a successful business.

Suitability

The warm climate and long growing season in Florida are suitable for bait minnow production. In the Mississippi Delta region, bait minnows are normally grown in ponds of 5 to 20 acres in size and with an average depth of 3 to 4 feet. In Florida, smaller ponds ranging from 0.5 to 3 acres are used and have achieved good fish production. A greater number of smaller ponds can provide farmers with better management and marketing control.

Relatively flat land with clay soil is required for proper levee pond construction. However, excavated

ponds can be built in sandy soils where the water table is high and does not fluctuate during dry seasons. Check local and state regulations before constructing ponds.

A suitable water source is required with either type of pond construction. Florida has abundant ground water which is preferred for aquaculture because of its purity. Good quality water is for filling ponds, as well as replenishing water losses due to seepage and evaporation. Normally, 1 to 3 times the pond volume is replaced during the growing season for water quality management and losses from evaporation and seepage. It is recommended that 20 to 40 gals/min/acre of well water be available.

Production and Management

Although bait species have different spawning habits, all minnows are egglayers and easily bred by combining males and females in ponds. Spawning occurs during the spring when water temperatures are rising. Egg production averages several thousand per female. In commercial production, eggs are usually collected on spawning mats, such as washable air conditioning filters, and moved to nursery ponds for hatching. Nursery ponds are specially prepared to eliminate predacious insects and fish prior to stocking eggs. Eggs hatch in 4 to 6 days and the fry initially feed on natural food produced in the pond. Natural productivity of the pond can be enhanced by fertilization. Commercial growers usually feed a prepared diet to the fish to maximize production during growout. Depending on the desired size, marketable fish can be produced in 3 to 6 months. Producing six inch or larger fish may take up to two years and would increase the cost of production.

Production in well stocked, fed and managed ponds can range between 700 and 1,200 lbs/acre of varied size fish. Studies at the Sam Mitchell Aquaculture Farm in north Florida have demonstrated yields averaging 1,700 lbs/acre in small 0.4 acre ponds. A significant fish size differential is common at harvest necessitating grading fish into marketable sizes. Fish that are not of marketable size can be restocked into ponds and grown out for future sales. Special attention is required when harvesting and size grading shiners because of the relative low tolerance of shiners to handling stress. Adequate fish holding, grading tanks and transport methods are essential for successful bait marketing. Additional production information on each species

should be obtained and carefully reviewed prior to attempting spawning and rearing.

In addition to fish production, the minnow farmer must also be concerned with maintaining suitable water quality, recognizing and treating fish diseases, and controlling predation by birds, snakes and other animals. Losses can be significant if these factors are not properly addressed.

Summary

The long growing season, good soil and water quality and strong market demand for bait minnow provides opportunities for Florida farmers to diversify and supplement farm income. Investigating the market conditions and finding a niche in the bait market is an important first step in planning and developing a baitfish operation. Once a successful crop is produced, additional skill and effort is required to harvest the fish, process them, and deliver a high quality, live product to market.