

Aquaculture in Miami-Dade County Florida

By

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INTRODUCTION

This section discusses the history, current status and anticipated prospects of the aquaculture subsector in Miami-Dade County Florida as of the fall of 2000. It represents a synthesis of work by Mr. Don Pybas, Director, and Mr. Christopher Brooks, Aquacultural Agent, both with the Miami-Dade County Cooperative Extension Service in Homestead, Florida, and Robert Degner and Tom Stevens with the Food Marketing Research Center at IFAS/University of Florida. Most of the data on sales are acquired from published reports by the USDA National Agricultural Statistics Service, the USDA Economic Research Service, the Food and Agriculture Organization of the United Nations, the National Marine Fishers Service of NOAA, and through direct contact with producers in the County.

A brief history of aquaculture in the region is presented first. This is followed by an assessment of the current situation in Miami-Dade County. Next, the economic trends for fish and aquacultural production and consumption are reviewed at the international, national, state and local level.

History

Aquaculture, in Miami-Dade County got started in the mid-1940s when several freshwater ornamental or “tropical” fish operations began producing “live bearers” (Swordtails, Mollies, etc.). The industry grew quickly, so that by the late 1950s there were 25 to 30 tropical fish farms in the area. Within 20 years, local population and urban development grew rapidly and a substantial number of these farms relocated to the Tampa area. In the 1970s, land was cheaper and urban development pressures were less intense in the central west-coast of the state. By 1997 there were only 12 ornamental fish operations remaining in the County (personal communication with Christopher Brooks, Miami-Dade County Agricultural Extension Service).

A variety of different aquacultural enterprises and technologies have been attempted in the South Dade area since the 1950s (personal communication with Don Pybas, Miami-Dade County Agricultural Extension Service). In the food-fish side of the industry, efforts have included, rearing channel catfish, tilapia, freshwater prawns, and redfish. In the late 1960s, a raceway system was constructed on what was then known as the Aerojet property, consisting of about 4,000 acres just outside Everglades National Park. This facility consisted of twenty 100-foot long, raceways, several concrete and asphalt lined ponds, and support facilities on about 50 acres. There have been a number of attempts to grow catfish, tilapia, goldfish and most recently, hybrid striped bass at this facility. The higher valued hybrid striped bass has continued to be a viable selection, although virtually all this product is shipped to Mid-Atlantic and New England markets. This property is currently owned by the South Florida Water Management District and leased to a private company. Also in the late 1960s, a freshwater Malaysian prawn hatchery and grow-out facility was established in south

Miami-Dade County. This facility was able to produce post-larval animals for stocking in a number of ponds. Prior to expanding to full-scale grow-out production, the facility was sold to the Weyerhaeuser Corporation. Weyerhaeuser continued operating it until the early 1980s. This company subsequently explored developing grow-out facilities in offshore countries and eventually sold its facility in South Dade.

Recent Events

In addition to the hybrid striped bass production, a number of more recent ventures have attempted to grow tilapia as a food fish. While tilapia are relatively easy to grow in the South Florida climate, these operations have never achieved sufficient size and profitability to become commercially viable. Competition from lower-cost imports grown in Latin America and Southeast Asia is formidable. Off-shore production has economic advantages of lower real estate and labor costs, as well as fewer government regulations compared to South Florida. A few individuals in the area continue to produce tilapia, but these are considered "hobby" operations.

The most recent food-fish venture in the area is the development of a hybrid sturgeon farm and renewed exploratory efforts to produce freshwater prawns. The sturgeon caviar production facility is currently operating on about 14 acres of land using re-circulating water tanks. This facility has only been in operation for a short period and caviar has yet to be harvested. Attempts to develop the freshwater prawn production have recently been undertaken in the County, but like tilapia, none has attained commercial status. One or two growers are attempting to establish grow-out and market channels.

According to the 1997 USDA Census of Agriculture and personal communication with agents with the Agricultural Extension Service, there were 12 ornamental fish producers in Miami-Dade County. Ten of these raise egg-laying fish (cichlids), and six produce live-bearers (Swordtails, Mollies, etc). Miami-Dade County also has one alligator farm.

Natural Resources

South-eastern Florida, including Miami-Dade County, has a near subtropical climate, with hot and wet weather conditions in the summer season (May to November) and cool and dry conditions through the winter season (December to April). Monthly average temperatures in the county range from 65.3° F in January, steadily increasing to an average of 81.4° F in August, then decreasing to the mid to low 70s during the fall. Many tropical aquatic species are sensitive to freezing temperatures, but temperatures this cold do not regularly occur in the area. The warm subtropical climate of Miami-Dade County allows for long growing seasons for both tropical and temperate aquaculture species alike.

With its unique soil type of calcium carbonate rock underlying a thin layer of organic matter, it is relatively easy to excavate ponds for aquacultural production in the county. The lime-rock is porous, allowing the extremely shallow water-table to quickly fill excavated ponds through seepage. Many ornamental fish farmers continue to use this type of system to raise fish or other aquaculture species in the County. Other types of ponds or water holding facilities that have been used in the area include levy type ponds, recirculating above-ground lined pools or tanks, deep borrow-pit cage culture, and more recently, concrete

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vats. Many ornamental fish producers have adopted above ground growing systems that utilize rectangular concrete tanks or vats. This system reduces surface runoff problems, variability in water levels, and pest problems. Concrete tanks or vats also make harvesting somewhat easier.

Economics

The production and consumption markets of fishery and aquaculture products occurs at local, regional, national and international levels. For this reason it is important to consider the supply and demand situation for these foods across all geo-political boundaries.

International

World capture fisheries production (inland and marine) has leveled off since the late 1980s at around 90 million metric tons per year (United Nations FAO, 2000). Capture fishery production actually declined by over 7 percent in 1998 to 86 million metric tons. It is generally believed that the world's fishing areas have become fully exploited and no future increases in marine and inland capture production should be expected. In response to this constraint, aquaculture production has grown significantly in the last 30 years, from a rate of 8 percent per year in the 1970's and 1980s, to 10 percent per year in the 1990s (United Nations FAO, 2000). In 1998 world aquaculture production increased to 30.9 million metric tons, up 7.3 percent from 1997 production, and up almost 49 percent from 1994 levels. The majority of world aquaculture production occurs in freshwater environments and is dominated by finfish such as silver and grass carp. Aquaculture in brackish or salt water is dominated by shrimp, milkfish and salmon production. In 1998 south-east Asia and particularly China dominated world aquaculture production.

Total world exports of fish and fishery products were \$51.3 billion in 1998, with total imports valued at \$55.0 billion (United Nations FAO, 1999). Japan is the largest importer of fish in the world. The U.S. is both a major importer and exporter seafood products. In the year 2000, U.S. imports of fishery products were valued at \$10.1 billion, while its exports were valued at \$2.8 billion. Shrimp is the most valuable traded seafood product in the world and comprised \$3.8 billion of U.S. imports in 2000. Although the U.S. has substantial fishery product exports, it exports relatively little aquacultural products. These consist mostly of farm-raised trout and salmon that are shipped to Canada and Mexico, and oysters and clams that are shipped to Canada. The world ornamental fish industry exports its products to a number of countries, but the United States is also a net importer of these products. The total value of U.S. aquaculture exports was approximately \$30-35 million in 1999. The estimated total value of aquaculture imports to the U.S. was \$2.4 billion in 1999 (United Nations FAO, 2000).

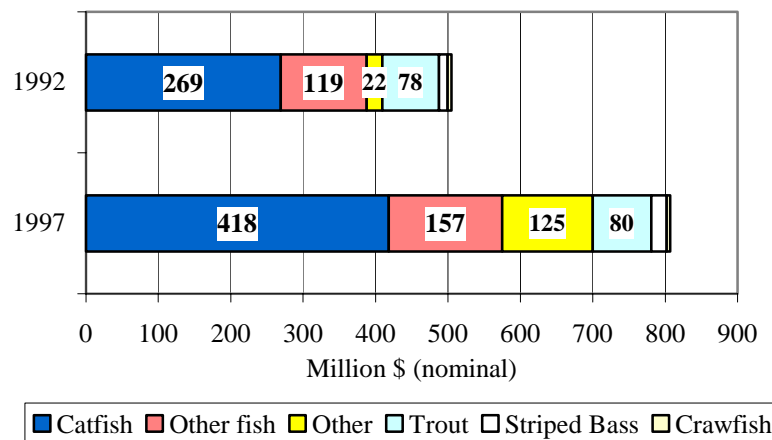
National

Domestic production and imports of fish in the United States more than doubled between 1970 and 1997. At the same time, exports from the U.S. to other countries increased by more than 10 fold. Despite the tremendous growth in U.S. exports, the quantity of imports exceeded exports by approximately 800 million pounds in 1997 (Bureau of Labor Statistics, U.S. Dept. of Labor). Per capita consumption of fish and related products grew by

approximately 24 percent between 1970 and 1997, but most of this growth occurred prior to 1987, when consumption peaked at 16.1 lbs per person per year (USDA-ERS, 2000). Since 1987, per capita consumption has declined by nearly 10 percent, to 14.5 lbs per year in 1997. (During this same 10 year period, per capita consumption of poultry increased by 27 percent to 64.8 lbs per year.) This decline in per-capita consumption is primarily due to relatively higher consumer prices for fish. From 1970 to 1997, the consumer price index for fish increased on average about 6.4 percent per year. This compares to an average annual increase of 4.3 and 5.1 percent for all meat and all food prices respectively (BLS). Consequently, most of the growth in total consumption of fish since 1987 has been due to increasing population.

Aquaculture in the U.S. is dominated by the catfish industry (Figure 1) (USDA-ERS Outlook 2000 and Census of Agriculture, 1997). Over 500 million pounds of catfish were produced and marketed in the U.S. in 1997. At this volume, the industry has captured significant economies of scale in production, processing and marketing. The fresh water trout industry has also been able to capture such economies because production is highly concentrated in the state of Idaho. Other species produced by the industry include tilapia, salmon, marine shrimp, crawfish, mussels, and oysters. With the exception of catfish, the aquaculture industry has generally not been very successful in producing products that are relatively inexpensive and have wide market appeal.

Figure 1. Composition of Production in U.S. Aquaculture, 1992 and 1997, Census of Agriculture, 1997.



State

In the 1998 Census of Aquaculture, Florida ranked third in the nation for sales of aquacultural products, behind Mississippi and Arkansas. Florida's aquaculture industry is dominated by ornamental fish production, while Mississippi and Arkansas primarily produce food fish (catfish). Florida is the largest dollar value producer of tropical ornamental fish in the United States, with approximately 95 percent of the nations' production (UF/IFAS Aquaculture Base Paper). Reported sales of aquacultural products from Florida vary

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somewhat by source and over time. The Census of Agriculture (USDA-NASS) reported that 1997 sales of Florida aquaculture products reached \$52.3 million. This is a 70.9 percent increase over the \$30.62 million of sales reported by the Census in 1992 (in nominal dollars). The 1998 Census of Aquaculture (USDA-NASS) reported the total value of aquacultural products sold from Florida at \$76.7 million. The Florida Agricultural Statistics Service (FASS) periodically conducts a survey of aquaculture in the state. This agency reported that sales of aquacultural products totaled \$86 million for 1999. This number represents a 16 percent decline from their 1997 estimate of \$102 million. The 1999 FASS report states that most of this reduction from 1997 was due to decreased sales of live-bearing tropical fish.

Local

Compared to other subsectors, aquaculture has historically represented a very small component of agriculture in Miami-Dade County. Although the County has a natural advantage for aquacultural production due to its climate, a variety of other factors tend to counter-act it. These include high land prices, occasional extreme weather events, urban development pressures and an array of regulatory hurdles. Unfortunately reliable and detailed data on aquacultural production in Miami-Dade County is generally not available due to the small number of producers in the County and the associated difficulties in maintaining confidentiality.

The USDA National Agriculture Statistics Service's latest Census of Agriculture for 1997 indicated that Miami-Dade County had \$5.8 million in aquaculture sales. No breakout of what portion was food fish or ornamental was provided. Another source at the Florida Agricultural Statistics Service's bi-annual Aquacultural Survey indicates that in 1996 Miami-Dade County had 22 producers with sales valued at \$3,279,000. There were 13 ornamental fish producers with sales of \$2,647,000. Species produced included cichlids and other egg-layers, Koi, live-bearers, and crustaceans. Five aquatic plant producers had sales of \$195,000, and all other producers reported sales of \$632,000 (FASS, 1996).

Due to the small numbers of some types of aquaculture operations, sales data are only available for them in an "All Other" category. This category included hybrid striped bass (listed as a sport species), alligator, tilapia, and hybrid sturgeon. Limited sales of freshwater prawns and other organisms may have been lumped into this category.

In 1999, FASS indicated there were between 20 and 49 aquacultural producers (food and ornamental) in the County. Unofficial estimates indicate that aquacultural sales within the County totaled between \$2 and \$3 million for 1997. Since that time, flooding from Hurricane Irene and other rain-events has disrupted aquacultural production in the area. Christopher Brooks, formerly with the Miami-Dade County Agricultural Extension Service, indicated that in 1997 there were 12 tropical ornamental fish producers, one sturgeon farm, one striped bass farm, 3 tilapia operations, one alligator farm (that is primarily a tourist attraction), a number of aquatic plant producers and one fresh water prawn grower in the County. Some of these are backyard hobby operations that do not represent viable economic enterprises. Other operations are serious commercial ventures that have yet to generate profits or even revenues. Tropical (ornamental) fish producers are the predominant form of economically feasible aquacultural enterprise within the County.

Miami serves as a valuable transshipment point for the ornamental fish trade. This gives highly specialized local producers access to international niche markets. Live ornamental fish are placed in plastic bags with a small amount of water and oxygen filling the remainder of the bag. It is then placed into a polystyrene box and, in turn, placed in a cardboard shipping box. Fish can sustain reasonable temperature fluctuations and travel times of up to more than two days. Minimal loss is experienced if timely handling and air connections are met during shipping.

Miami International Airport has the second largest volume of domestic live fish after Tampa International Airport. In 1994 values of live ornamental fish imported to and exported out of Miami International Airport were \$5.9 and \$4.46 million respectively (FL Dept of Commerce, 1996). A significant portion of imported fish are transshipped to other countries. Domestically reared ornamental fish are also exported to Canada, Asia and Europe. After importation of cut flowers, primarily from Columbia, live ornamental fish is the largest air freight commodity at Miami International Airport.

CONCLUSIONS

Aquaculture represents a minor or niche segment of the agricultural sector of Miami-Dade County. From a production-technology standpoint, the County has the potential to nurture a significantly larger aquaculture industry given its favorable location and climate. Its sub-tropical climate is conducive to longer growing seasons and higher levels of productive efficiency than are obtainable in more temperate latitudes of the United States. None the less, based on past performance and the current local and international business environments, there does not appear to be any economic indications pointing to a significant expansion or contraction of the industry in the near future. This is not to say that it would be impossible for an individual or organization, with the vision, skills and economic resources, to create a nationally or internationally viable aquacultural enterprise within the County at any time.