ABSTRACT

Tilapia production began in 1951 with the culture of the Mozambique tilapia, Oreochromis mossambicus. No commercial development took place due to the subsistence nature of production in small ponds. The red tilapia strains were introduced in 1983 and production increased significantly from 1994 to 1998, reaching a maximum of 26 tonnes, due mainly to the operation of the aquaculture project of state-owned Caroni (1975) Limited. This project was leased to a private farmer in mid-1999. Tilapia production has declined but this is believed to be temporary. The Jamaica red tilapia and the Nile tilapia are the preferred species.

INTRODUCTION

The Republic of Trinidad and Tobago is located between 10°2' and 11°2' North Latitude and 60°30' and 61°50' West Longitude, just off the north-east coast of Venezuela, South America. Its climate is tropical, with an average temperature ranging from 21°C to 34°C. In general nighttime temperatures are usually 10°C to 15°C lower than during the day. There is a major dry season from late December to early May followed by a rainy season extending from late May to early December. The rainy season is interrupted by a short dry spell of mean duration two weeks and termed the petit careme. The average rainfall in NE Trinidad is around 3000 mm per annum while in NW and SW Trinidad, the rainfall is about 1500 mm per annum. The island of Trinidad is roughly rectangular in shape and has an area of 4760 square kilometers. There are three mountain ranges, the Northern Range (which is a continuation of the Andes), Central Range and Southern Range. The area between the Northern Range and Central Range is relatively flay and clayey in nature while the area between the Central Range and the Southern Range is gently rolling. Tobago occupies an area of 308 square kilometers and there is a single mountain range called the Main Ridge.
There are several major drainages in both islands. In Trinidad, the major drainages are the Caroni, North Oropouche, Ortoire and South Oropouche whereas in Tobago, the major drainages are the Courland, Hillsborough and Goldsborough. There is therefore an ideal climate, abundant water and land resources for the development of an aquaculture industry, in particular tilapia aquaculture.

HISTORY OF TILAPIA CULTURE

The Mozambique tilapia, Oreochromis mossambicus, was first introduced to Trinidad and Tobago in 1951 via St Lucia by Hickling (Kenny 1959). Production began in 1951 with the establishment of the Bamboo Grove Fish Farm at Valsayn as a research and demonstration unit (Ramnarine 1996). Research was conducted on the species during the 1950s and 1960s. Although a method was developed to restrict reproduction under pond culture (Kenny 1960), no significant commercial development took place. This was primarily the result of poor consumer acceptance of the fish due to its acquired muddy taste and dark colour. Also, most of the private farms that were established were small and subsistence culture was practiced. There was very little understanding of pond management such as water quality management, predator control and feeding. In addition, monosex culture was not practiced and this led to the production of numerous stunted and unmarketable fish. A red tilapia strain was imported from Jamaica in 1983 and the Nile tilapia was introduced into the country in 1986, also from Jamaica (Ramnarine 1996).

STATUS OF TILAPIA CULTURE

There are currently 1105 food-fish farmers registered with the Ministry of Agriculture but Manwaring and Romano (1990) identified only 562 active farmers. These farmers operate small holdings with an average surface area of 0.07 ha and initially cultured the Mozambique tilapia. Since the mid-1980s they have shifted to culturing mainly the Jamaica red tilapia, but operate, however, at a subsistence level. Today, the number of active food-fish farmers is thought to be even less than 100.

The major commercial aquaculture project in the country is that operated by the state-owned Caroni (1975) Limited, a sugar producing company. Their aquaculture project consists of a hatchery, outdoor concrete tanks and 9.5 ha of earthen ponds, ranging in size from 0.25 ha to 1 ha (Rammarine and Batchasingh 1994). This farm, however, was leased in mid 1999 to a private farmer, although Caroni (1975) Limited has retained control of the hatchery. Another government-owned facility, the Bamboo Grove Fish Farm consists of a small hatchery and 2.4 ha of ponds but is no longer in operation and is to be leased shortly. There are two other government institutions involved in aquaculture. The Institute of Marine Affairs has an aquaculture unit that consists of a hatchery/wet laboratory and nine small earthen ponds with a of total area 0.18 ha. The Sugarcane Feeds Centre has 13 ponds with a total area of 0.88 ha and a small hatchery. There is a privately owned project at Plum Mitan consisting of about 3 ha of ponds and another farm at Penal with 1 ha of ponds.

Most projects in the country use earthen ponds but there is a tank culture operation in central Trinidad that utilizes injected oxygen in their system. The status of this project is unknown.
Caroni (1975) Limited and the Sugar Cane Feeds Centre also use concrete and metal tanks, but production from tank culture is limited.

The subsistence farmers practice mixed-sex culture while the Institute of Marine Affairs, the Sugarcane Feeds Centre and Caroni (1975) Limited practice monosex culture. Manual sexing is done by the Institute of Marine Affairs and the Sugarcane Feeds Centre while Caroni (1975) Limited uses hormonal sex reversal.

Caroni (1975) Limited uses a 24-week grow-out period and the average yield per crop ranges between 2,000 to 4,000 kg per ha. A locally manufactured tilapia feed (sinking pellets, 25% crude protein) is used and costs $US0.38 per kg. A floating pellet is also available and costs $US0.60 per kg. The average size at harvest is 250 to 450 g and the average feed conversion ratio ranges between 2:1 to 4:1. The bulk of the fish is marketed fresh, chilled on ice, while some processing is also done by Caroni (1975) Limited. Whole fish is sold at approximately $US2.00 per kg while fillets are sold at $US3.00 per 450 g package.

Production of tilapia in the country increased yearly up to 1998 and this trend is shown in Figure 1. The bulk of production (about 70%) came from the state-owned Caroni (1975) Limited. However, since the production ponds of Caroni (1975) Limited were leased to private enterprise, no fish have been harvested. Production has declined in 1999 but this is believed to be temporary since new projects are being planned and a tank culture project is expected to come on stream in 2000.

![Fig. 1 Tilapia production](image_url)

The Government, through the Fisheries Division of the Ministry of Agriculture, Land and Marine Resources, has established three community-based tilapia farming projects at Point Coco, Barrackpore and Las Lomas, in an effort to again promote tilapia farming. Small earthen ponds are used and semi-intensive culture methods are employed. Sex-reversed Nile
tilapia are cultured. One pond (0.15 ha) was recently harvested but yield data was not yet available.

**RESEARCH, DEVELOPMENT, EXTENSION AND SUPPORT**

Several organizations and institutions in the country are involved in tilapia research. These are the University of the West Indies and the Institute of Marine Affairs. The major research and development areas are: enhancement of tilapia broodstock by selective breeding, improved technology for hormonal sex reversal, improved nutrition and feed management, improved production technology including water quality management, and use of locally available raw materials and by-products of agro-industries in formulation of practical tilapia diets (Ramnarine 1998).

The Ministry of Agriculture, Lands and Marine Resources has recently developed an aquaculture Policy for the country (Ramnarine et al. 1998), and several new incentives for the aquaculture industry have been recently announced. Various institutions provide technical advice to farmers and conduct field visits, and workshops are held occasionally. The University of the West Indies, the Institute of Marine Affairs, and the Fisheries Division have produced literature on tilapia production methods and pond construction. Seedstock is currently available through the Institute of Marine Affairs and the Sugarcane Feeds Centre. The Government provides a 50% subsidy on the construction of ponds to a maximum of $US3 175, and a 50% subsidy on the production cost of freshwater fish up to a maximum of $US0.80 per kg of fish produced to a maximum payment of $US1 587 per farmer per annum. Aquaculture equipment, feed, and broodstock may be imported duty free and no value-added tax is payable. Concessions may also be given on vehicles and tractors that are used in aquaculture projects. These various incentives came into effect in 1999, and it is the Government's attempt to develop the aquaculture industry. In addition, the state-owned Agricultural Development Bank, and commercial banks grant loans for aquaculture.

**CONCLUSIONS**

Tilapia production was increasing at a steady rate prior to the lease of the Caroni (1975) Limited aquaculture project. It is believed that production will decline or plateau over the next few years until new projects come on stream or if Caroni (1975) Limited restarts production. Although a market was developed for the red tilapia strain, the Nile tilapia is also gaining in popularity. Future tilapia production will come from either semi-intensive earthen ponds or intensively cultured tilapia in tanks. The future still looks promising.

**REFERENCES**


