

Fish Culture in Cages in Lake Danao, Cebu

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Abstract

Lake Danao is a picturesque inland body of water having an area of 685 ha located in the municipality of San Francisco in Pacijan Island, Camotes, Cebu. At the middle of the lake is a circular islet with an area of one acre. This lake is a potential area for cultivation of fishes in pens and cages. To date there are only two agencies which use the lake for fish production, namely; the Department of Agriculture Regional Office No 7 Carmen-Lake Danao Fishery Complex Research Outreach Station and the CSCST-Fishery and Industrial College, San Francisco, Cebu. The following are the ranges of selected water quality parameters: salinity, 0-0.5 ppt; water temperature, 27-29 °C; pH, 8.5-9. The lake has no definite inlet and outlet of water and is free from pollutants. The water is clear with assorted vegetation. The soil is coarse, silty and sandy. The present study has shown the feasibility of growing tilapia in cages in Lake Danao.

Introduction

Situated north of mainland Cebu, San Francisco was established as a municipality in 1963 (Socio-economic Profile of San Francisco, Cebu, 1996) with 15 barangays. It is located in the Pacijan Island, one of the three islands comprising the Camotes group (Fig. 1). San Francisco is 38 nautical miles from Cebu City and has a total land area of 9,982 ha.

Lake Danao is the largest and longest lake in the Visayas, shaped like a number 8 (Fig. 2). Lake Danao is about 649 ha with a 1-acre (4,047 sq m) islet at the middle. It is surrounded by six out of 15 barangays in the town of San Francisco. The lake supplies water to the rice fields in Sitio Danao and Patabog. Its shoreline ranges from rocky to soft mud. The type of soil is coarse, silty and sandy. The depth of the water ranges from 0.5-30 fathoms. The water is generally clear. Water temperature ranges from 27-29°C. Water has a pH of 8.5-9.0. Salinity ranges from 0-0.5 ppt. The lake water is free from pollutants, except for some allochthonous materials (Station Profile of Carmen-Lake Danao Fishery Complex/Research Station for Freshwater Fisheries Development Zone, Union, San Francisco, Cebu. 1995). It has no definite inlet and outlet, but it is presumed that a subterranean spring supplies water to the lake. Assorted vegetation such as hydrilla, water lily, water hyacinth, and 'kangkong' *Ipomaea aquatica* are found in the lake. 'Suli-suli', 'palawan nipa' and coconuts grow

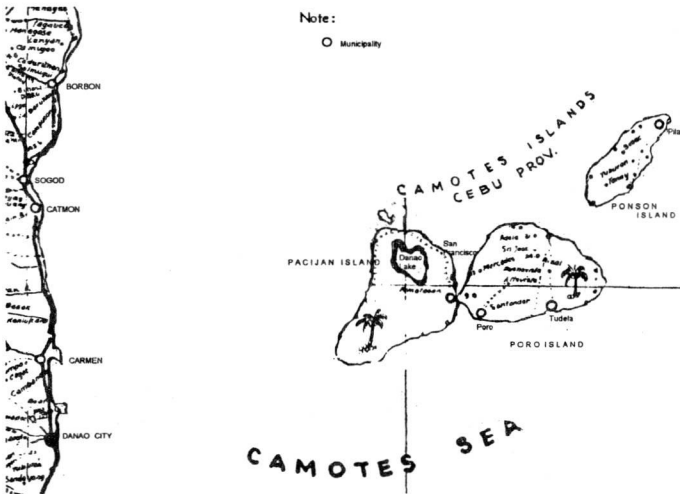


Fig. 1. Map showing the Camotes Islands. San Francisco is in the Island of Pacijan. The two other islands are Poro and Ponson.

along the periphery of the lake. The 'suli-suli' plants present in the lake are made into different articles like mat, hat, centerpiece, bags of different styles, wall decor and doormats to enhance the cottage industry of the inhabitants. The lake is a tourist attraction where boat trips could be for recreation. Majority of the households living nearby catch fish in the lake for food and for the market. The lake is also used for bathing and washing of clothes. Lake Danao was adjudged as the Cleanest Inland Body of Water for CY 1996 by the Department of Interior and

Local Government on September 30, 1996. An Award of Recognition to Lake Danao as the 1996 Cleanest Lake of Region VII was given by the Committee on Presidential Awards for the Cleanest Inland Bodies of Water in the Philippines for Region 7 on December 11, 1996. An award of excellence was conferred to Lake Danao as a national finalist in the 1996 Search for the Cleanest Inland Bodies of Water.

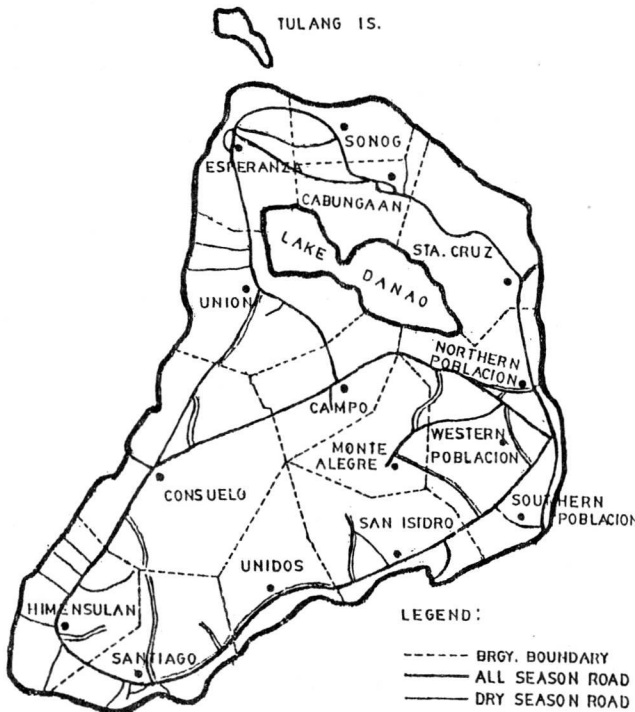


Fig. 2. Map of the municipality of San Francisco including road network and the six barangays surrounding Lake Danao

The CSCST-Fishery and Industrial College is one of the satellite schools under the Cebu State College of Science and Technology and is the only college located at the Camotes Islands, particularly in the municipality of San Francisco. The school site is 10 ha with a 1.4 ha lot near the shore of Lake Danao (CSCST-Fishery and Industrial College. Annual Report '96, San Francisco, Cebu). The present study was conducted by the College to determine the growth and survival of tilapia with or without feeding in cages in Lake Danao.

Materials and Methods

Experimental fish

The fish stock is a strain of Nile Tilapia called GIFT (Genetically Improved Farmed Tilapia). It came from the Carmen-Lake Danao Fishery Complex Research Outreach Station in Union, San Francisco (Cebu), an agency tasked to acquire and develop good broodstock and propagate quality fingerlings to cater to the requirements of the tilapia aquaculture industry in Central Visayas. The fingerlings were about 2 g each at stocking.

Cages and stocking density

There were nine cages for three treatments. Each polyethylene cage (2.5 x 2.5 x 1.5m) was stocked with 125 tilapia fingerlings (20/sq m). The tilapia were placed in fine-meshed net cages for 2 months before they were transferred to net cages with bigger mesh size for the rest of the 4-month culture period.

Feeding treatments

There were three feeding treatments with three replicates each. The tilapia were given chopped 'kangkong' *Ipomaea aquatica* or broiler starter crumbles, a commercial chicken feed. The fish were fed daily at 20% of total biomass divided into two rations given in the morning (0900 h) and in the afternoon (1600 h) (Anon. no date; Orcullo unpubl.). Feeds were given little by little to avoid wastage. Fish in cages without feeding served as control.

Maintenance, guarding and sharing of harvest

A fish farm worker was assigned to guard the cages, feed the fish stock, and repair the cages, if necessary. At night, a member of the Lake Danao Fish Farmers Association (LDFFA), an organization of the nearby inhabitants, guarded the set up. The school provided the guard on duty at night with a gill net (1.5 m wide and 500 m long) and a small banca to facilitate catching marketable fishes such as wild tilapia and other fish in the lake. This ensured that the guard was always awake.

For the use of gill net, the school charged ten pesos (P10.00) per night as rental until such time that the actual cost was recovered. Then the ownership of the gill net and other paraphernalia was automatically transferred to the Association without additional cost. As to the tilapia in cages, the association got 75% of the harvest while the remaining 25% went to the College.

Results and Discussion

The growth and survival of the tilapia in cages are shown in Table 1. The tilapia responded positively to the feeds. Tilapia given commercial chicken feed had the highest growth followed by fish given 'kangkong'. For fish given the commercial feed, there were about 10 pieces to a kilo. The fish that were dependent solely on the natural food present in the lake showed the poorest growth. Survival rates in all treatments were high (>90%).

Table 1. Summary of the mean body weight and survival of tilapia fed 'kangkong' and commercial feed for 120 days (July 2-Nov. 2, 1996)

Feeding treatment	Body weight (g)		Increment (g)	Survival rate (%)
	Initial	Final		
'kangkong'	1.8	66.9	65.2	95.5
commercial feed	2.1	100.8	98.7	97.0
no feed given	1.9	53.2	41.3	91.5

Harvesting was easy since the tilapia were confined in small areas. Most of the harvested tilapia were processed into dried and canned products. The others were sold fresh. It was observed that the tilapia cultured in cages were more palatable and had less offensive odor than the wild tilapia caught from the lake.

The present study demonstrated the feasibility of culturing tilapia in cages in Lake Danao. Further studies will be conducted using other formulated feeds with inexpensive ingredients like 'kangkong'.

References

- Anon. (no date). Carmen-Lake Danao Fishery Complex: How to Raise *Tilapia nilotica* in Cages. Pier, Carmen, Cebu (mimeo.).
- Orcullo RP. (no date). Propagation of GIFT Fish DA-CC DFC/ROS, Camotes Is. Cebu (mimeo.).