CULTURE OF MONOSEX MALE *TILAPIA MOSSAMBICA* AND *OPHICEPHALUS STRIATUS* IN FERTILIZED PONDS WITH SUPPLEMENTARY FEEDING[1]

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ABSTRACT

Two ponds were each stocked with male *Tilapia mossambica* postfingerlings and *Ophicephalus striatus* fry at 10,000/ha and 400/ha, respectively. Growth rate of male tilapia in monosex culture was highest during the second month of the 120-day culture period. An estimated average standing crop of 5,076 kg/ha/yr for harvestable-sized tilapia with 93% recovery was calculated. Average yield and recovery for *O. striatus* were 20 kg/ha, and 33%. Fifteen females were recovered from each pond. The small number of tilapia reproduction was attributed to *O. striatus* predation.

INTRODUCTION

The cichlid, *Tilapia mossambica,* is the most extensively cultured fish in eastern Asia (Coche, 1967). The fish was introduced in the Philippines in May 1950 (Villadolid and Acosta, 1954).

Tilapias easily overpopulate ponds because of its frequent spawning. Population control measures that have been applied to minimize tilapia reproduction and produce harvestable-size fish include monosex culture (Hickling, 1968; Semakula and Makaro, 1968; Shell, 1968), use of predator (Swingle, 1960), hybridization (Hickling, 1960; Avault and Shell, 1968; Lovshin, 1975) and sex reversal (Clemens and Inslee, 1968; Guerrero, 1975).

[1] Funded by the National Science Development Board (sub-project 7103.2Ag under implementation by the University of the Philippine College of Fisheries).

In the monosex culture of tilapia, the faster-growing males are preferred over females. Guerrero and Guerrero (1975) obtained higher yields of male *T. mossambica* cultured at stocking densities of 2,000/ha, 7,000/ha and 10,000/ha compared to female *T. mossambica* cultured at similar densities.

One drawback in monosex male culture of tilapia is the human error in the manual sorting of sexes. Females become inadvertently stocked with males when sexing large numbers of fish. Hickling (1962) suggested the use of predators to eliminate reproduction resulting from females in ponds intended for monosex male tilapia culture.

Piscivorous fishes used as predators of tilapia in Africa and Southeast Asia include *Clarias* spp., *Anguilla japonica, Micropterus salmoides, Serranochromis robustus, Hemichromis* spp. (Bardach, et al., 1972), *Lateolabrax japonicus* (Rabanal, 1967), *Lates calcifer, Ophicephalus striatus* (Swingle, 1972) and *Plagioscion squamosissimus* (Lovshin, 1975).

This paper presents the results of an experiment conducted to determine the growth rate and yield of monosex male *T. mossambica* in fertilized ponds with supplementary feeding; and to determine the effectiveness of *O. striatus* as predator of tilapia reproduction resulting from inadvertent stocking of females.

MATERIALS AND METHODS

Two earthen ponds, approximately 431 m^2 and 401 m^2 and with an average water depth of 70 cm, were used. Pond inlet pipes supplying water from an irrigation source were screened to prevent entry of wild fishes. The ponds were fertilized with ammonium phosphate (16-20-0) on platforms at the rate of 50 kg/ha two weeks before fish stocking.

Postfingerlings of tilapia were taken from a holding pond and sexed by examination of the genital papilla (Vaas and Hofstede, 1952). Male tilapia averaging 9.6 cm in total length and 14 g in body weight were stocked in the ponds at a density of 1/m^2 (10,000/ha).

To ensure favorable tilapia growth, supplemental feeding with finely ground bulgur wheat enriched with soy bean (13% protein) was done in each pond at the rate of 2.5% of tilapia body weight twice daily, morning and afternoon, six days a week. The feeding rate was adjusted once a month based on sampling approximately 10% of the fish. Fertilization with ammonium phosphate at 50 kg/ha was done bi-weekly throughout the 120-day culture period, October 1974 — January 1975. Fry of *O. striatus* averaging 25 mm total length and 0.2 g body weight were stocked in each pond at the rate of 400/ha.

Growth rate of tilapia males was determined at intervals of 30 days from time of stocking by measuring individual weights of sampled fish representing approximately 10% of the population in each pond. Yields, reproduction and recovery rates of tilapia and *O. striatus* were determined.

RESULTS AND DISCUSSION

Growth rate of male tilapia was found to be highest during the second month of culture. Mean net weight gain of the fish was greatest after the second month and lowest after the fourth (Table 1). The fish attained harvestable size (50 g) after approximately 37 days of culture and averaged 125 g after 120 days.

The results indicate that growth of male tilapia stocked at 10,000/ha in monosex culture was favorable during the second and third months with pond fertilization and supplementary feeding. The data showed that the highest yield/ha/yr can be obtained by harvesting monosex male tilapia 60 days after stocking.

Of 832 tilapia stocked in both ponds, 773 were recovered at harvest for a recovery rate of 93%. Fifteen tilapia females were recovered from each pond. All the females were of spawning size. Presence of these females was attributed to error in manual sexing. Average number of tilapia reproduction recovered from the two ponds was 145.

Thirteen *O. striatus* were recovered from the 40 stocked in both ponds for a recovery rate of 33%. The fish ranged from 16.0 — 32.2 cm total length and 35.0 — 297.6 g body weight and had an average yield of 20 kg/ha. No reproduction of *O. striatus* was found.

Growth of *O. striatus* varied greatly and high mortality and/or escape of the fish apparently occurred. Although reproduction of tilapia was not totally eliminated, it is felt that presence of *O. striatus* was somewhat effective. Use of *O. striatus* fingerlings with higher survival rate is recommended for similar experiments in the future.

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Table 1. Growth rate and yields[a] of male *Tilapia mossambica* cultured in fertilized ponds with *Ophicephalus striatus* and supplementary feeding.

Culture day	Mean wt. (g)	Net gain/fish/30 days (g)	Net gain/fish /day (g)	Estimated standing crop (kg/ha)	Estimated yield (kg/ha/yr)
0	14	-	-	140	-
30	30	16	0.5	285	3,420
60	89	59	1.9	846	5,076
90	120	31	1.0	1,140	4,560
120	126	6	0.2	1,197	3,591

[a] Data are averages of two replicates

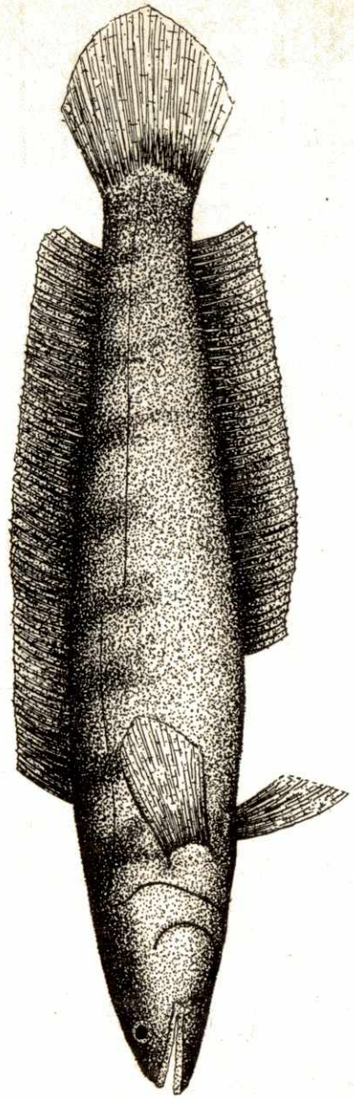

Fig. 1. STRIATED MURREL — DALAG
Ophicephalus striatus (BLOCH)
AVERAGE LENGTH 30 to 40 CENTIMETERS

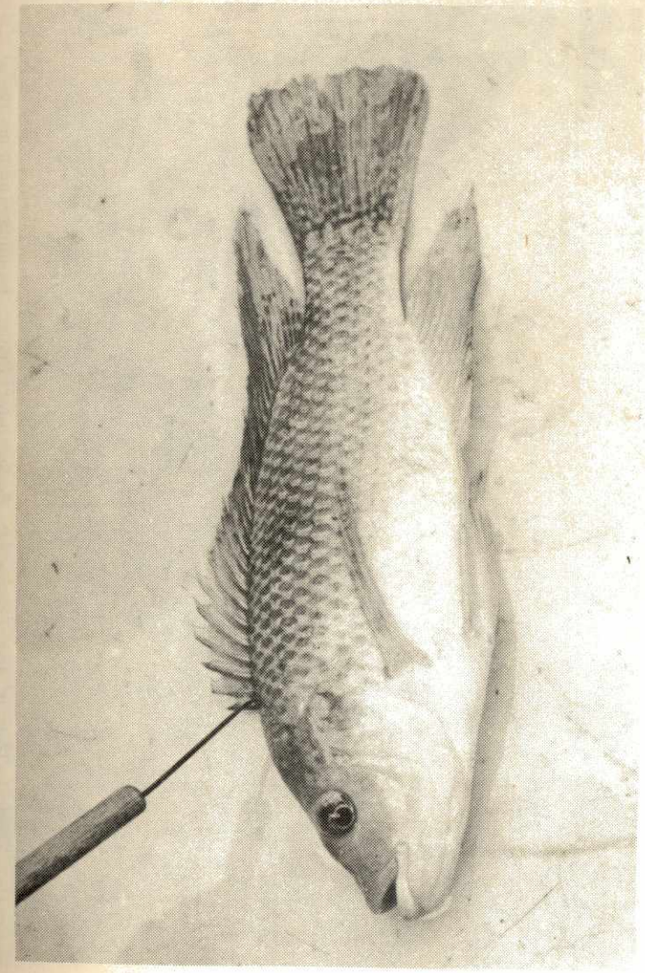

Fig. 2. Tilapia mossambica

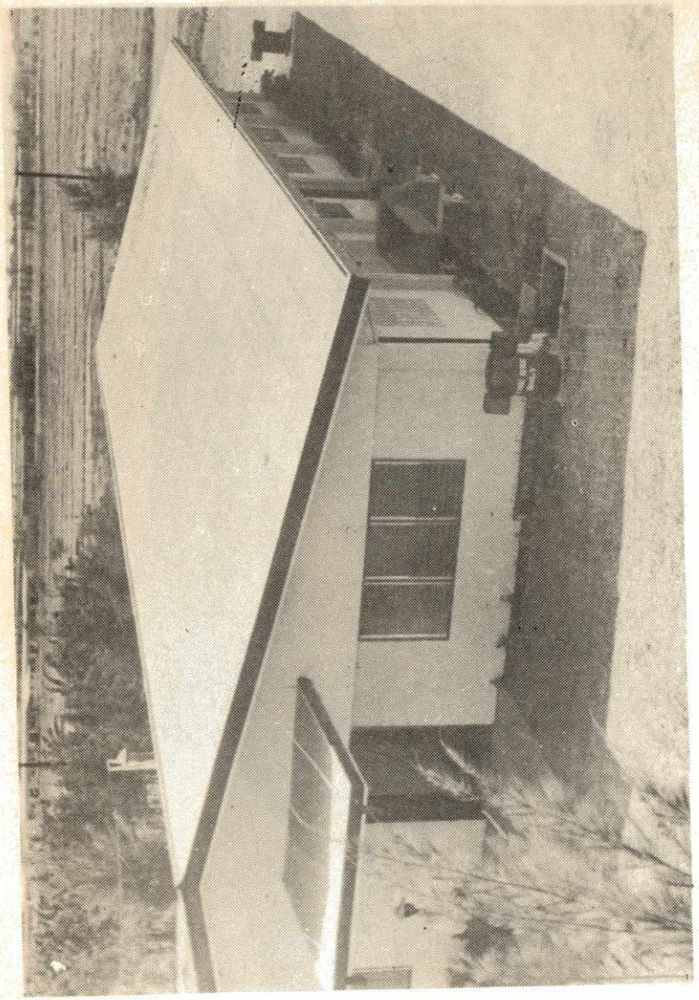

Fig. 3. This is the Freshwater Aquaculture Center building (administration-research) located at the Central Luzon State University in Muñoz, Nueva Ecija.

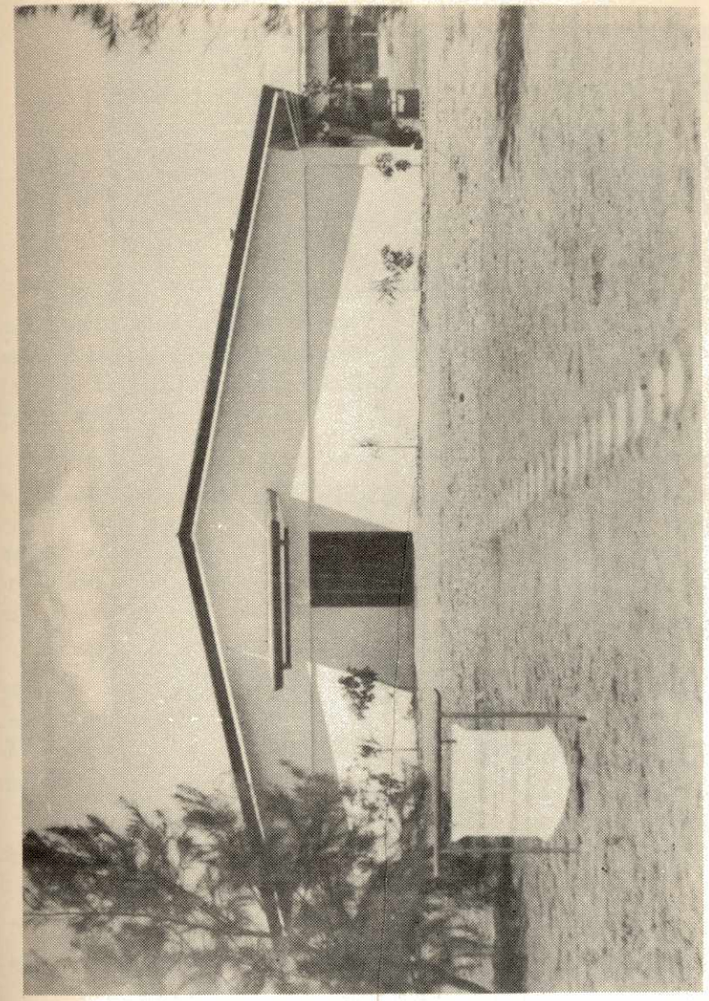

Fig. 4. Another facade of the research laboratory of CLSU, Nueva Ecija.

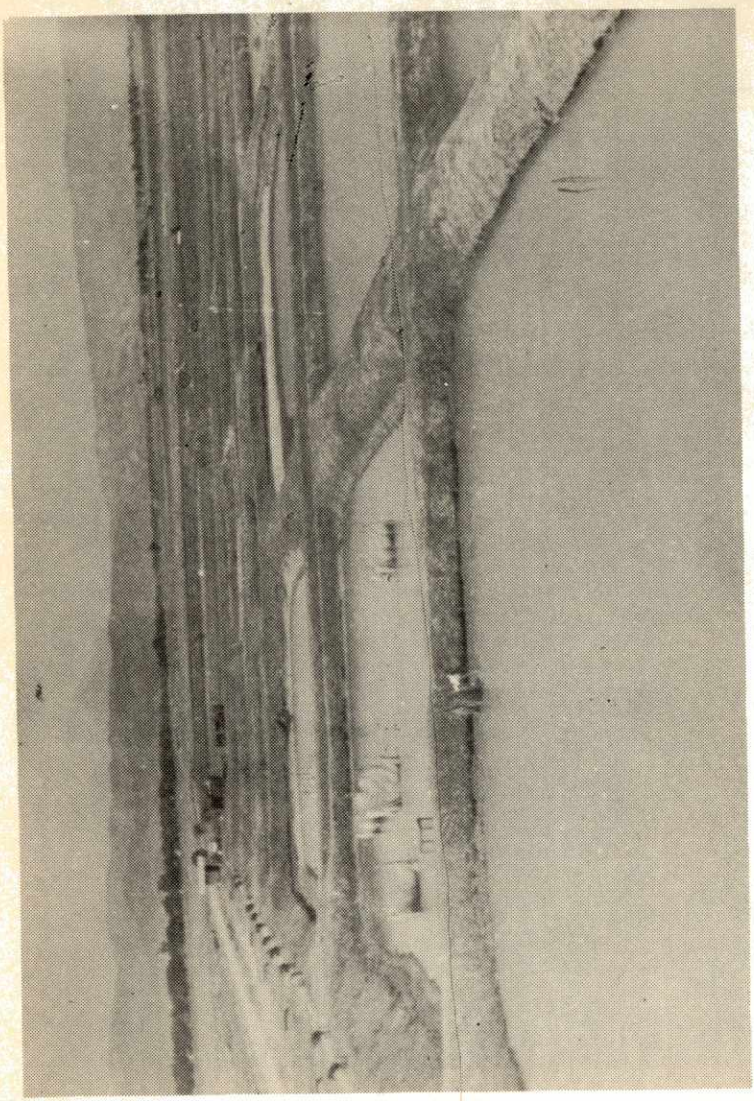

Fig. 5. There are 60 ponds in operation in the Freshwater Aquaculture Center at CLSU, Nueva Ecija, with a total area of 20 hectares.