# CULTURE OF *Tilapia nilotica* and *Macrobrachium* SPECIES SEPARATELY AND IN COMBINATION IN FERTILIZED FRESHWATER FISHPONDS

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## ABSTRACT

*Tilapia nilotica* and shrimps of the *Macrobrachium* species, separately and in combination, were stocked in 15 0.1 ha fertilized earth ponds. Yield of *T. nilotica* in ponds stocked with 5 kg/ha adult shrimps increased by 21% over that of ponds with *T. nilotica* only. Presence of the shrimps also increased the total yield of polyculture ponds by 22% compared to that of monoculture ponds with *T. nilotica* alone. The shrimps apparently contributed substantially to the natural diet of *T. nilotica*. Adult shrimps stocked at 5 kg/ha yielded more than juveniles stocked at 10 kg/ha in monoculture and polyculture ponds.

Culture of *Tilapia nilotica* in freshwater ponds is gaining wide acceptance in the Philippines. Experimentally, the monoculture of the species in fertilized fishponds at 10,000 to 20,000/ha has given yields of 612 to 1,100 kg/ha respectively (Guerrero, 1976).

Two freshwater shrimp species, *Macrobrachium lanchesteri* and *M. lanceifrons montalbanense,* were found to be capable of reproducing in fishponds (Guerrero, Guerrero and Grover, 1975). Preliminary studies on the monoculture of shrimps and in combination with *Tilapia mossambica* and *T. nilotica* had encouraging results (Guerrero and Guerrero, 1976).

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The objective of this study was to compare the monoculture and polyculture production of *Tilapia nilotica* and the freshwater shrimps (*Macrobrachium lanchesteri* and *M. lanceifrons montalbanense*) with two stocking densities of the shrimps in fertilized fishponds. The study was done at the Freshwater Aquaculture Center from April to August, 1976.

## MATERIALS AND METHODS

Fifteen 0.1 ha earth ponds were used in the study. The ponds were totally drained and refilled with deep well water. Mean water depth in the ponds was maintained at 70 cm. All ponds were fertilized with commercial ammonium phosphate (16-20-0) on platforms at the rate of 50 kg/ha every two weeks.

Five treatments each replicated thrice were tested. The treatments were: 1. *T. nilotica* stocked at 1,000/pond (10,000/ha); 2. *Macrobrachium* spp. stocked at 0.5 kg/pond (5 kg/ha); 3. *Macrobrachium* spp. stocked at 1 kg/pond (10 kg/ha); 4. *T. nilotica* and *Macrobrachium* spp. stocked at 1,000/pond (10,000/ha), and 0.5 kg/pond (5 kg/ha), respectively and 5. *T. nilotica* and *Macrobrachium* spp. stocked at 1,000/pond (10,000/ha), and 1 kg/pond (10 kg/ha), respectively.

Fingerlings of *T. nilotica* stocked had individual mean weights ranging from 0.4 to 4.9 g. The shrimps stocked at 5 kg/ha were predominantly adults with individual mean weight of 1.2 g. Because of the inadequate supply of adults, the shrimps stocked at 10 kg/ha consisted mostly of juveniles with individual mean weight of 0.2 g. To minimize predation of the shrimps by the fish, 20 shrimp shelters made of *Tamarindus indica* brush were placed in each pond with the shrimps.

The culture period for all treatments was 120 days from stocking. At harvest, the yields of *T. nilotica* and the shrimps were evaluated.

## RESULTS AND DISCUSSIONS

The results showed that *T. nilotica* production was increased by 21% when cultured in fertilized fishponds with *Macrobrachium* spp. at stocking densities of 10,000/ha for the tilapia and 5 kg/ha for the shrimps (Table 1). Higher production of the fish in com-

Table 1. Mean recovery rates, individual weights and yields of *Tilapia nilotica* after 120 days of culture.

| Treatment | % Recovery | Individual Wt. (g) | Yield (kg/ha) |
|---|---|---|---|
| I | 84 | 74.7 | 578.6 |
| IV | 83 | 82.8 | 701.2 |
| V | 86 | 80.5 | 699.3 |

Note: Figures represent means of three replicates.

bination with the shrimps compared with monoculture indicated that the presence of the shrimps benefitted the fish. *T. nilotica* is known to feed on the shrimps in ponds as shown by stomach contents analysis (Gonzales, 1976).

Total pond yield was increased by 28% and 25%, respectively, with *T. nilotica* and 5 kg/ha shrimps, and *T. nilotica* with 10 kg/ha shrimps compared with that of *T. nilotica* only (Table 2). This indicated that the shrimps reproduced heavily and contributed appreciably to total yield despite predation by the fish. The yield of

Table 2. Partial and total yields of *Tilapia nilotica* and *Macrobrachium* species cultured for 120 days.

| Treatment | Partial Yield (kg/ha) *T. nilotica* | *Macrobrachium* spp. | Total Yield (kg/ha) |
|---|---|---|---|
| I | 578.6 | — | 578.6 |
| IV | 701.2 | 40.5 | 741.7 |
| V | 699.3 | 26.0 | 725.3 |

Note: Figures represent means of three replicates.

the shrimps was higher in ponds stocked with 5 kg adults/ha than those in ponds with 10 kg juveniles/ha. The possible reasons for this were the ability of the adult shrimps to breed earlier and escape fish predation more readily than juveniles.

Yields of the shrimps were higher when stocked alone than in the polyculture ponds (Table 3). Stocking of adult shrimps at 5 kg/ha gave better yields than juvenile shrimps stocked at 10 kg/ha whether in monoculture or polyculture ponds.



Table 3. Yields of *Macrobrachium* species cultured separately and in combination with *Tilapia nilotica* for 120 days.

| Treatment | Species | Wt. Stocked (kg/ha) | Yield (kg/ha) |
|---|---|---|---|
| II | *Macrobrachium* spp. | 5 | 119.5 |
| IV | *Macrobrachium* spp. (with *T. nilotica*) | 5 | 40.5 |
| III | *Macrobrachium* spp. | 10 | 71.9 |
| V | *Macrobrachium* spp. (with *T. nilotica*) | 10 | 26.0 |

On the whole, the results of this study strongly indicate the value of the *Macrobrachium* species as a source of natural food for *T. nilotica* and as a substantial secondary crop in freshwater polyculture fishponds. The data also suggest that stocking of adult shrimps yield more than juvenile shrimps.

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