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AQUACULTURE COLLABORATIVE RESEARCH SUPPORT PROGRAM



## RESEARCH REPORTS

Sustainable Aquaculture for a Secure Future

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**Title:** Polyculture of Grass Carp and Nile Tilapia with Napier Grass as the Sole Nutrient Input in the Subtropical Climate of Nepal

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**Abstract:** An experiment was conducted in outdoor concrete tanks (4.9 m x 4.8 m x 1.75 m) at the Institute of Agriculture and Animal Science (IAAS) of Nepal to evaluate the growth of grass carp and Nile tilapia fed with napier grass in polyculture, to evaluate water quality regimes of pond water, to determine the compositions of foods consumed by Nile tilapia, and to determine the optimal ratio of grass carp to Nile tilapia in polyculture.

The experiment was laid out in a completely randomized design with five treatments replicated thrice. Five stocking ratios of grass carp to Nile tilapia were tested: (1) grass carp only at 0.5 fish/m<sup>2</sup>(control); (2) grass carp at 0.5 fish/m<sup>2</sup>plus tilapia at 0.25 fish/m<sup>2</sup>;(3) grass carp at 0.5 fish/m<sup>2</sup> plus tilapia at 0.5 fish/m<sup>2</sup>; (4) grass carp at 0.5 fish/m<sup>2</sup> plus tilapia at 1 fish/m<sup>2</sup>; and (5) grass carp at 0.5 fish/m<sup>2</sup> plus tilapia at 2 fish/m<sup>2</sup>. Grass carp fingerlings (39.3±2.3 – 46.6±0.2 g) were stocked on 26 May 2002, while mixed-sex Nile tilapia fingerlings (9.0±0.1 – 10.0±0.2 g) were stocked 6 days later. Chopped fresh napier grass leaf was the sole nutrient input and provided ad libitum daily in the morning.

Mass mortality of grass carp (100%) occurred in all three replications of the monoculture (treatment 1) during the twelfth week (81 days) of the experimental period, was 100% in all polyculture treatments. Mean weights of Nile tilapia at harvest decreased linearly with increased stocking densities of Nile tilapia, while net fish yields of Nile tilapia increased linearly ( $P <$

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0.05). The combined net and gross fish yields of grass carp plus both adult and recruited Nile tilapia were not significantly different among all polyculture treatments ( $P > 0.05$ ). There were no significant differences in all measured water quality parameters. Gut analyses showed that grass carp consumed grass only while Nile tilapia consumed diversified food items including feces of grass carp.

The present study has showed that the optimal ratio of grass carp to Nile tilapia in polyculture fed napier grass is 1:1, i.e., grass carp at 0.5 fish/m<sup>2</sup> plus Nile tilapia at 0.5 fish/m<sup>2</sup>. The present study has indicated that the addition of Nile tilapia to the grass carp tanks fed napier grass as the sole nutrient input is a low-cost culture system, which can efficiently utilize available resources, reuse wastes derived from grass carp, augment total fish production.

This abstract is excerpted from the original paper, which was a proceeding of the Sixth International Symposium on Tilapia in Aquaculture.

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