

Positive impacts of inclusion of Nile tilapia on Carp Polyculture

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Introduction

Fish farming is currently one of the popular agriculture enterprises among Nepalese farmers.

The growth rate of fisheries and aquaculture sector is more than 9% in the last decade (CFPCC, 2019).

Carp polyculture is the most common, popular, and successful aquaculture system in South Asia, including Nepal. In 2018/19, total fish production was 91,832 t (CFPCC, 2019), which is insufficient to fulfill the growing demand for fish in Nepal.

Therefore, it is essential to increase production and productivity. Including mono-sex Nile tilapia in carp polyculture could enhance fish productivity (Bhujel, 2014) because tilapia grows faster. Moreover, Nile tilapia is an omnivore (Wang & Lu, 2015) and is compatible with carps.



Objectives:

1. To compare between the two different system carp polyculture and carp polyculture- Nile tilapia system.

Research questions

1. How the inclusion of Nile tilapia affects the existing the carp polyculture?
2. Does the addition of Nile tilapia increase the productivity?

Methodology

Culture was done in two cemented tanks of 25 m² at Fisheries program of Agriculture and Forestry University, with the culture period of 26 days.



Fig: Site Tank

The treatments were: a) Carp polyculture (15,000/ha) b) carp polyculture + mono sex Nile tilapia (20,000/ha) with fertilization and feeding.

Hypophthalmichthys molitrix, *Hypophthalmichthys nobilis*, *Ctenopharyngodon idella*, *Labeo rohita*, *Cyprinus carpio*, were stocked in all ponds at the ratio of a) 5:2:4:4:5 and b) 4: 2: 4: 3: 4 with *Oreochromis niloticus* :3 respectively.



Fig: Tank Preparation



Fig: Duckweed Collection

The pond was fertilized using urea and DAP at the rate of 4.7 g/m²/week and 3.5 g/m²/week respectively. Fishes except Grass carp were fed twice daily with the pellet made from mustard oil cake and rice bran mixed at a 1:1 ratio at the rate of 5% BW. Grass carp were fed with duckweed at a rate of 50% BW twice a day from 7:30 am to 8 am and 1:30 pm to 2 pm.

Water quality parameters i.e., water temperature, transparency, water depth, dissolved oxygen, and pH and were monitored daily while total alkalinity was monitored weekly. A sampling of fish was done fortnightly to check fish growth and adjust feed quantity



Fig: Feed Preparation



Fig: Harvesting

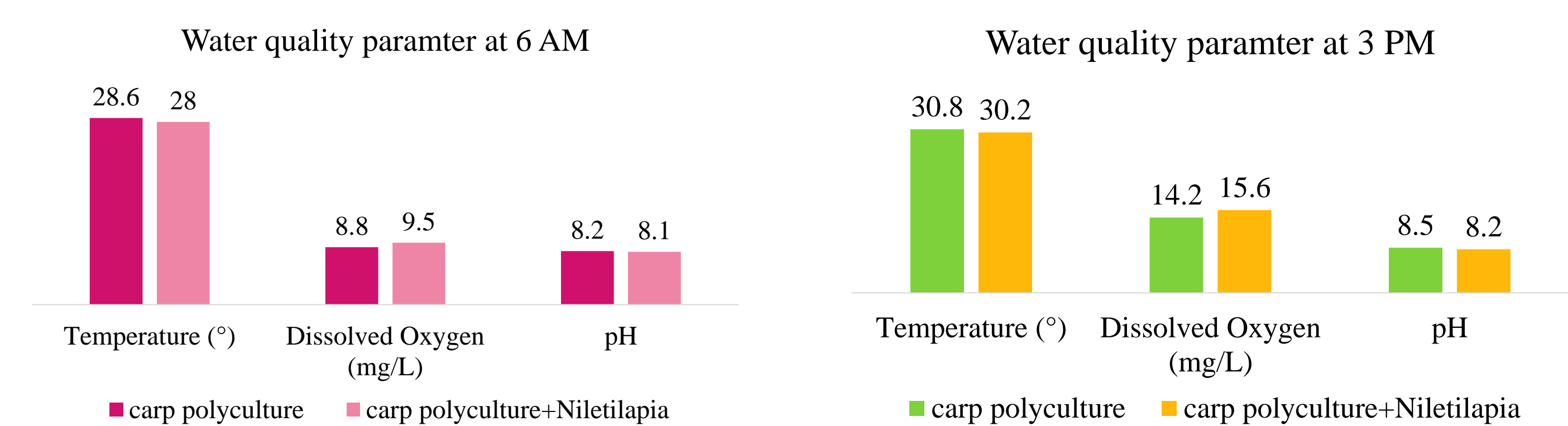
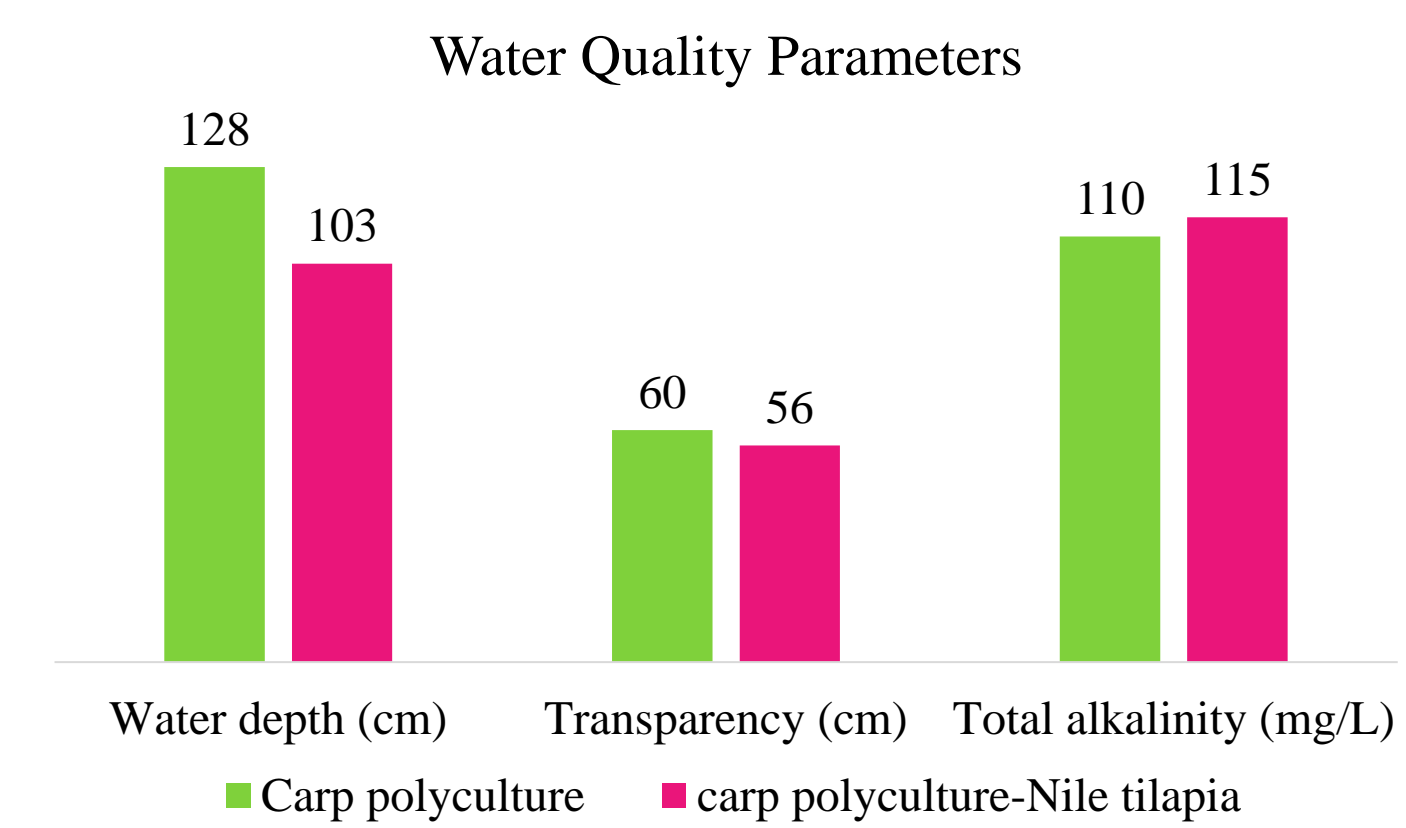


Fig: Water quality devices

Results

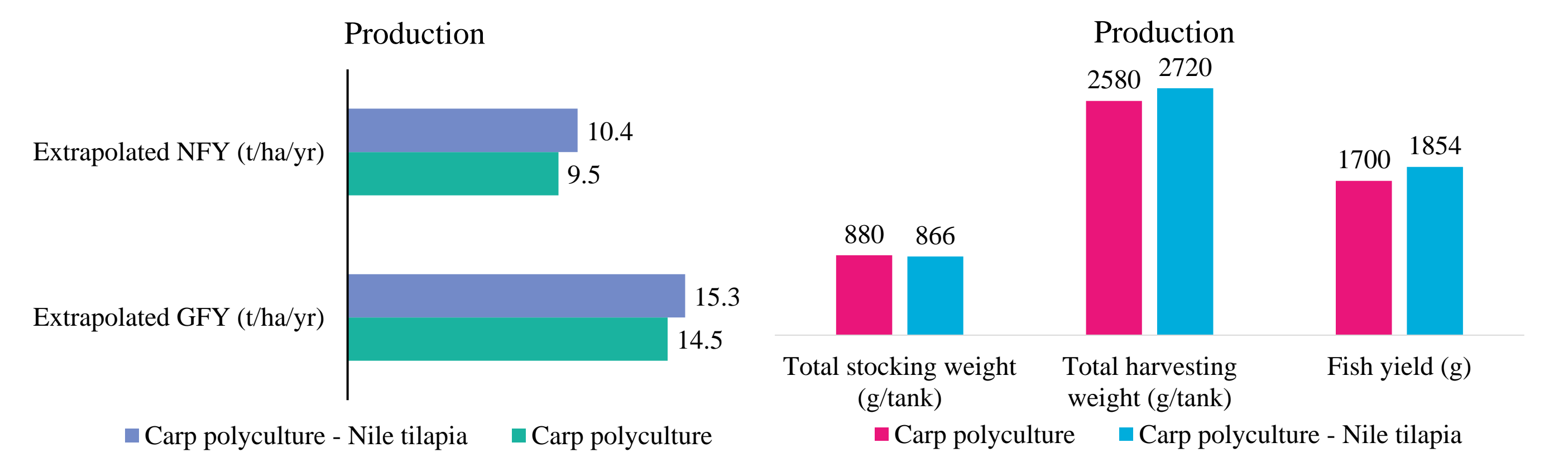
It is seen that water quality is quite good in carp alone rather than carps + Nile tilapia. However, there is not much difference among these both tanks.

Water depth, transparency was higher in carp alone while total alkalinity was higher in carp+tilapia tank.



While the temperature, DO and pH were quite similar between both tanks.

While the water quality seems equal, the production of carps+Nile tilapia is better than carp polyculture alone. The overall survival rate was higher in carp+Nile tilapia (87%) than the carp polyculture (81%). While the apparent FCR was similar among with 1.13 and 1.14 in carp alone and carp+ Nile tilapia .



While the stocking weight were quite equal. The total harvesting and fish yield was much higher in carp+tilapia then carp alone.

The extrapolated NFY was 10.4 in cap+tilapia which was higher than carp (9.5). The extrapolated GFY was also higher in carp+tilapia which is 15.3 than carp alone (14.5).

Fishes were transferred to the Aquaculture farm and sold at NRs.300/kg (2.6 \$ USD). The B: C ratio was 1.9 and 1.59 respectively.

Conclusion

Carp polyculture is the most common, popular, and successful aquaculture system in South Asia, including Nepal. It accounts for most of the aquaculture production. It is the most viable, common, easily adopted, and economically feasible system in Nepal.

Including mono-sex Nile tilapia in carp polyculture could enhance productivity. Environmentalist shows a negative response to the inclusion of mixed-sex. So, the culture of mono-sex Nile tilapia can help the increasing national production and could meet the increasing demand for animal protein. Carp and mono-sex Nile tilapia polyculture can become a tool for the poor rural farmers to overcome the nutrition and food security problems as well as their income.

From this study, it can be concluded that the carp and mono-sex Nile tilapia polyculture is a profitable venture to carry out. It has great potential and scope in Nepal.

Bibliography and Acknowledgements

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