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RESEARCH REPORTS

Sustainable Aquaculture for a Secure Future

Title: Effects of silver carp and the small indigenous fish mola *Amblypharyngodon mola* and punti *Puntius sophore* on fish polyculture production

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Abstract: A sustainable semi-intensive pond aquaculture technology including major carp species as cash-crop and small indigenous fish species (SIS) as food for the farmers' families is being optimized in Bangladesh. The inclusion of silver carp (*Hypophthalmichthys molitrix*), a cheap large species affordable by poor farmers, is now being considered. As part of a study on the effects of this filter feeder on polycultures including the large carps rohu (*Labeo rohita*), catla (*Catla catla*) and common carp (*Cyprinus carpio*) and the SIS punti (*Puntius sophore*) and mola (*Amblypharyngodon mola*), an experiment was carried out under farm conditions to test the effects of silver carp and of each SIS species on the growth, survival and yield of the large and small species and on pond ecology.

The experiment was performed in 38 farmers' fishponds of different sizes, from 220 m² to 1200 m². The results show that the larger the fish pond the better rohu performance, the larger punti fry weight and the lower punti fry harvested biomass. Pond size did not affect other fish species. The addition of 250 mola and/or punti per 100 m² fishponds affected rohu and catla and did not affect common and silver carps. The addition of mola alone reduced rohu's parameters by 15%. The addition of SIS in the three combinations tested (250 mola, 250 punti, 125 of each species) reduced catla's parameters by 20–24%. Punti fry were larger when both SIS were stocked and punti fry biomass was larger when only punti were present.

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Total mola harvested biomass and yield were larger when the entire SIS stocked were only mola.

The addition of 10 silver carp over the 99 large carps stocked per 100 m² fishponds negatively affected rohu and catla growth and yield by about 15–21% and 45–50% respectively but not their survival, did not affect common carp performance, did not affect punti and mola reproduction in the ponds, reduced punti yields by 25%, reduced mola performance by about 35%, and silver carp own biomass increased total yield and total income in about 12% each. These effects are explained and discussed considering fish interactions through the food web. The decreased income from selling the more expensive large carps is more than compensated by that obtained from silver carp, which allows the option to the farmer to sell part of the silver carp to complete the cash income that would have been obtained from large carps only if silver carp would not be stocked, and consume the rest with the family.

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