



Fish Seed Production in Ricefields – Participatory Training and Extension Manual

Benoy Kumar Barman
Sattyanarayan Roy
Mahfujul Haque
Bilash Mitra
Benjamin Belton



UNIVERSITY OF
STIRLING

Broodfish Management of Nile tilapia (*Oreochromis niloticus*; GIFT strain) in Ponds

In order to carry out the activities of quality fingerling production of Nile tilapia (*Oreochromis niloticus*) of GIFT (Genetically Improved Farmed Tilapia) strain in rice fields of farmers it is very important to maintain and to get necessary supplies of good quality broodfish. In order to maintain the quality broodfish of GIFT farmers need to have understanding about the quality broodfish and to carry out the following techniques:

- To keep large size broodfish considering either original broodfish or largest fingerling from current generation produce in their ricefields
- During selection of fingerling collect from the rice fields to use for rearing of broodfish it needs to choose healthy, good shape, bright color, strong, well movement, disease free, and without any damage in body from their plots
- Fingerlings selected should be of similar in shape, collect in large numbers to rear as broodfish

The fingerlings collected then need to be stocked in perennial ponds or ditches after good preparation and to carry out regular management. The following activities are needed to be carried out for this purpose:

- Stocking pond should be free from any shorts of existing tilapia
- Before stocking broodfish, pond should be treated with lime (1kg per decimal). Before application in the pond lime should be diluted with water at least 24 hours
- If stocked in seasonal ditches which get dry, selected broodfish need to separate based on the quality criteria as mentioned earlier and then to re-stock in pond with perennial water. If such perennial pond is not available farmer can use relatives or neighbour pond or community ponds through negotiation with the pond owners to use the broodfish after rearing.
- It is suggested that farmers should stock at least 400-500 fingerlings of good quality from their ricefields to rear them as broodfish to use in the coming seasons. It may need 100 or less broodfish for their own plots to produce fingerlings (if the plot size within 30 decimal) however, the other broodfish they can sell to other farmers. The collection more numbers of broodfish is useful to get fish with more diversity useful to maintain good genetic quality.

- During management of broodfish the ponds should be fertilize with the application of inorganic (urea, TSP) an organic fertilizers as per recommended doses (like the grow-out ponds) to keep the water green and use supplementary feeds (rice bran, mustard oil cake etc) in required amounts.
- It needs to sample the fish regularly (at least one in a month) to observe the health situation of the broodfish and necessary measures need to be undertaken related to fertilization and feed management for effective rearing of broodfish to quality.
- The brood fish will be transferred into rice field in *boro* season when plot is properly prepared especially with raised dyke and good size ditches well prepared by using lime and fertilization. Special care need to be taken to transfer broodfish from the source of broodfish to the rice plots to avoid stress
- It is useful to stocking sufficient quantity of quality broodfish (i3 broodfish/ decimal) maintaining stocking ratio 2:1 for female and male fish is suggested
- Rice plot should be kept well managed in terms of water availability in the ditch, connection of ditch with whole rice field, safety from ducks by netting and supplementary feeding since after stocking of broodfish in the plot

Production of Nile tilapia (*Oreochromis niloticus*; GIFT) and Common Carp (*Cyprinus carpio*) fingerlings in Ricefields

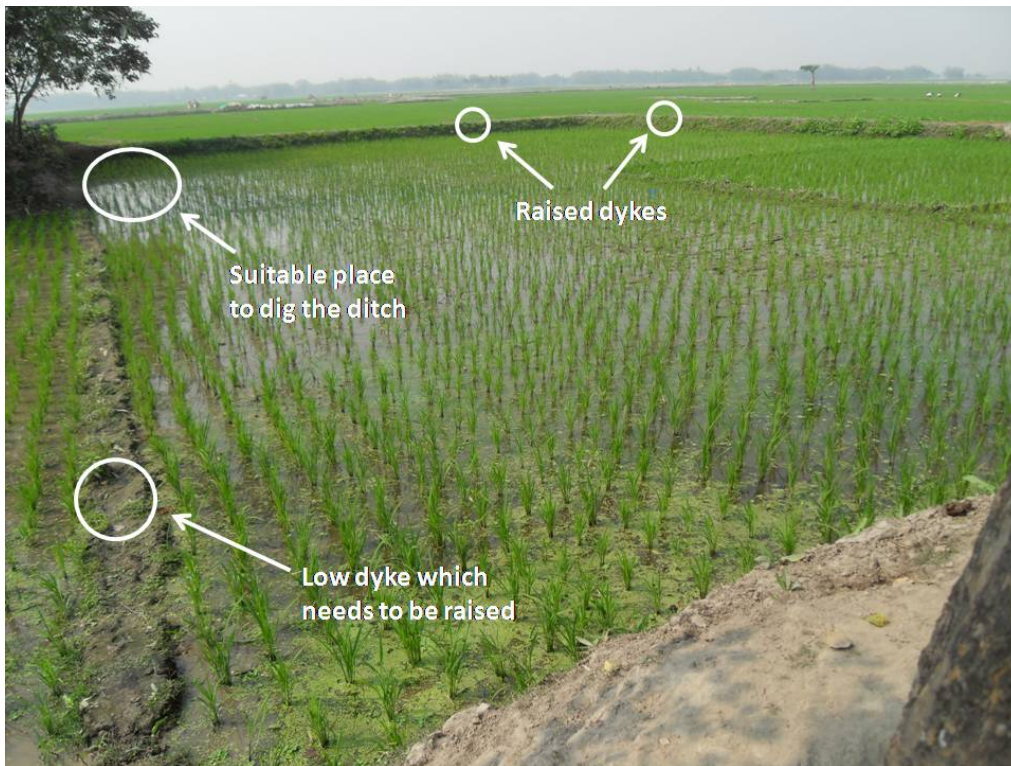
Introduction

By stocking broodfish of Nile tilapia (*Oreochromis niloticus*) GIFT strain and fertilized eggs of common carp (*Cyprinus carpio*) in ricefield during *boro* season farmer can produce a large numbers of large size quality fingerlings. They can sell these fingerings to traders and neighbours and/or use for early stocking in own ponds and rice fields for grow-out to get higher foodfish production. The farmer can produce enough fish to eat regularly for household consumption. In order to produce quality fingerlings of Nile tilapia (GIFT) and common carp successfully it needs to follow some basic steps as explained below:

Ricefield preparation

- Once it has been chosen which ricefield to use it is very important to repair any low dykes so that fish cannot escape from the plot when the water level raises. Raise the plot dykes to about 1 hand's (1.5 feet) height above the surface level of the plot. If the dykes are already high it may need only to do repairing (checking for any holes or breakage in the dikes)
- Before stock fish in the plot it needs to make a small ditch where the fish can shelter from predators. The ditch should be at least 5 X 5 hands (7.5x7.5 feet) in area, with a depth of 2.0 hands (3 feet). It is best to make the ditch in a suitable corner of the plot where rice productivity is low.

The picture below shows a suitable ricefield. Three of the dykes are high. One of the dykes is low and needs to be raised to stop fish escaping when the water level is high. The shady corner where the tree is would be a good place to dig the ditch



Stocking and feeding of Nile tilapia broodfish

- Need to stock Nile tilapia broodfish at a density of 3 fish/decimal from own source or from neighbours who reared quality broodfish following good management practices (as mentioned above) or from the satellite broodfish rearer who reared broodfish in cages. Field trainer should tell farmers when the broodfish are ready to collect and where to collect them from. For collection of broodfish from the source and to transport to the ricefield plot site for stocking it is better to do using large aluminum patil filled with sufficient water early in the morning.
- Place the pot gently into the ditch in rice plot. The fish will swim out into the ditch when they are ready.
- The best period for stocking Nile tilapia in *boro* rice plot is between mid February to end of March
- If possible should feed the fish in the ditch every morning and every afternoon so that they can grow quickly. Need to feed about one handful of rice bran each time. Observe the fish carefully to see whether they eat it all. Other feeds like mustard oil cake also use along with rice bran as feed

Stocking Fertilized Eggs of Common Carp

If there is a pond in the community of farmers which has common carp in it they can also stock its fertilized eggs to grow fingerlings in the same rice field with Nile tilapia together. In order to do this the following points need to be considered:

- Common carp produce eggs mainly between mid February and the end of March
- Put a water hyacinth in a pond where there are common carp broodfish.
- Observe whether common carp broodfish has exerted their eggs by checking the roots of water hyacinth every few days
- Once see eggs collect the hyacinth in a aluminum bowl and need to place it into the ditch of the rice plot
- The eggs will hatched out naturally and spawn of common carp will produce in the ditches
- It needs to apply fine rice bran on regular basis to feed the spawn on regular basis (2-3 times per day) initially until it become fry, later like Nile tilapia similar sorts of feeds and can be done together in the same plot.

Observation of the Ricefield

In order to get success in quality fingerling production of Nile tilapia (*Oreochromis niloticus*; GIFT strain) and common carp (*Cyprinus carpio*) it needs for the farming households to do regular observation or monitoring of their ricefield. During observation of the rice plots the following things need to be considered:

- Check the ditch in the ricefield regularly to see whether any fry have appeared. Any member of household (husband, housewife or children) can do this
- Check the water level in the ricefield while observing the fry and try to make sure the water level doesn't fall below 5-6 inches. Once fry have appeared they should be able to move freely out of the ditch into the rice plot to feed and return to the ditch again to take shelter
- Normally when a ricefield has fish stocked in it they will eat all of the insects and other pests so it is normally not need to use any pesticides. Farmer should always avoid using any pesticide in plot after fish have been stocked in it. However, if there is a severe pest infestation in the plot farmer can use pesticides bringing all the fish to the ditch and

keeping them there for few days until the reaction of pesticides resolved. In order to do these farmers must make a strong dyke around the ditch of about 1 foot high. Leave an opening about 1.5 feet wide in the dyke so that the fish can swim into it. Drain the plot so that all the fish move back to the ditch. Then close the dyke so that they cannot swim back into the field. Use the pesticide. Wait at least 3 -5 days after using the pesticide. Then make an opening in the ditch so that the fish can return to the field. The picture below shows a ditch with a dyke like this



Harvesting Fingerlings

- When the fingerlings in your plot are large size (at least 1.5-2 inch) long they are ready to be sold or stocked into your own pond.
- Farmers need to talk to fingerling traders and grow-out farmers and inform them that fingerlings ready for sale.
- Arrange a time with the customers when harvest the fingerlings
- Drain the rice plot. As the water level goes down the fish will swim to the ditch
- Harvest fingerlings from the ditch by gently using a mosquito net to catch them. Sell the larger fingerlings but return any fish less than 1inch long to the ditch so that they can grow bigger

- Leave the adult fish in the ditch.
- Gradually increase the water level in the rice plot and keep checking the plot and feeding the brood fish as you did before
- The brood fish will produce more fingerlings which you can also harvest and sell
- Fingerings can be harvested about once every three weeks.
- Try to keep a record of how many fingerlings you sell, the dates when you sold them and how much money you made.
- Production of fingerlings is usually highest during the months of May, June and July

Fingerling Production, Income and Household Consumption

- By stocking of 90 broodfish in 30 decimal (1200m²) rice plots and by stocking fertilized eggs of common carp with water hyacinth in the plot a farmer can able to produce >10,000 large size fingerling and can earn at least a net profit of Taka 10000 from the plot in addition to the usual production of rice and income from rice.
- Farmers able to use good quantity of large size Nile tilapia fingerlings (50-100g) produce in their rice plots directly for household consumption of importance to meet up the nutrition of the household members especially for minor children and pregnant and lactating women as the fish of such small size and delicate age are normally eaten as whole fish.

Re-stocking

- Farmer can keep some of the fingerlings of good quality as broodfish in the ditch or perennial ponds (as mentioned in the beginning) after July so that they can produce more fingerlings during next *boro* season using sufficient quantity of broodfish.
- If it is not possible to keep own broodfish farmer can purchase such fish from the neighbours who maintain the broodfish in their ponds or in cages in ponds for sale.