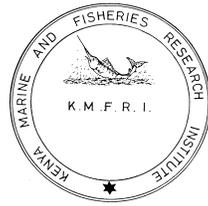


KENYA MARINE AND FISHERIES RESEARCH INSTITUTE



KAPAP PROJECT

REPORT ON UP-SCALING OF BREED IMPROVEMENT PROGRAMS FOR TILAPIA



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**UP-SCALING OF BREED IMPROVEMENT PROGRAMS FOR
TILAPIA**

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KAPAP UP-SCALING OF BREED IMPROVEMENT PROGRAMS FOR TILAPIA

1.0. Introduction

Aquaculture sector in Kenya is oftenly faced by scarcity of quality fish seed. Consequently, most Kenyan farmers do not use certified quality seed. To address this, two national fish selective breeding programs for Nile tilapia (*Oreochromis niloticus*) and African catfish (*Clarias gariepinus*) have been initiated at the Kenya Marine and Fisheries Research Institute's National Aquaculture Research Development & Training Centre – Sagana, with the aim of developing a national breeding nuclei with multiplication centers and hatcheries to distribute quality broodstock to hatcheries. A third breeding improvement program for ningu, the African carp (*Labeo victorinus*) is at formative stages at KMFRI, Sangoro Aquaculture Centre.

The breeding program is one of the KAPAP project activities aimed at up-scaling the breeding program for Catfish and Tilapia and to disseminate quality broodstock to fish hatcheries in the country. The hatcheries will in turn produce quality fingerlings for sell to fish farmers within their localities. Hatchery operators will benefit from the breeding program through being able to produce quality fish seed with faster growth, high survival and resistance to fish diseases leading to higher investment returns. The long-term objective of the breeding program is to enable fish farmers to access adequate genetically improved quality fingerlings of tilapia, catfish and Ningu at designated local hatcheries. The desirable traits obtained from the baseline survey are faster growth and improved survival and these have been incorporated into the on-going selective breeding programmes at Sagana and Sangoro to ensure that the specific requirements of the fish farmers are met. A total of 180 hatchery managers have also been trained through government assistance on methods of producing and testing for quality seed and 44 hatchery managers trained in monosex tilapia production. Hatcheries authenticated by the government are frequently monitored and hatchery skills and practices of the hatcheries have been documented to identify areas which require training.

1.1. General Objective

- i. Produce the F4 generation of tilapia in the breeding program and test the quality of the selectively bred tilapia against the non selected tilapia.

1.1.1. Specific Objectives

- i. To produce 150 full sibs of tilapia in the breeding program.
- ii. To the performance of selected tilapia with the unselected tilapia in the KAPAP focal points.

2.0. Progress of the tilapia breeding program

The tilapia breeding program started on 28th December 2011. The fish stocked in the hapas were broodstock which were obtained from the F3 generation of selection (originally conducted at Kegati Aquaculture station) and the F2 generation of Lake Kyoga strain (Dominion strain). The males and females brooders were separated for 3 months to achieve successful mating. The brooders were brought together in the hapas to breed and were checked every 7 days. The KAPAP project assisted in the procurement of the hapa net materials, fish feeds and the pond cover nets used in the program.



Installation of hapas



Tagging of brooder through fin clip



The breeding hapas with fish

2.1. Sampling

Sampling of the brooders for eggs and fry was done on a weekly basis, by checking the hapas for spawning. Spawning was observed either at egg, yolk sac or fry stage. The weekly sampling allowed for capturing the eggs immediately after spawning so as to estimate the date of spawning. When the fish have grown for 1 month the fry are removed and counted so as to determine the quantity of fry produced by each fish. Thinning was done by

randomly counting 100 fry which were left inside the hapas and the excess removed to another pond. Thinning is done to reduce overpopulation of the fry in hapas so that they can grow. The fish have been thinned and hapas with more than 100 fry are left with 100 fry only.



Checking for spawning and recording during sampling

2.2. Results on hapa breeding

Since the beginning of the breeding program for tilapia; there have been 138 full sib families at fry stage, 0 families at yolk sac fry stage and 0 families at eggs stage. There are 65 half sib families produced during the experiment while 8 half sib families have been lost through mortalities. The numbers of breeding pairs which have not responded are 4.



Weighing of the fry



Counted Tilapia fry

3.0. Tagging and stocking in ponds

The tilapia fingerlings were tagged in October 2012 and stocked in one pond. A total number of 3130 fingerlings (138 full sib families) were tagged using floy tags from USA. The pond size is 2000m² and the stocking density was at 3 fish per m². The total number of fish to be stocked was 6000 and therefore the 4000 fish were untagged fish which had remained as excesses in the breeding hapas. Record for the stocking including the dam, sire and spawn weight and tag numbers were kept. The ponds were managed in a way to

simulate the conditions maintained by local farmers by fertilizing the pond using chicken manure and supplementary feeding of the fish. The pond was covered by a predator net to control birds and other predators from eating the fish. The feeding of the fish was adjusted every month with reference to published feeding charts for tilapia in semi-intensive system. At the time of stocking poultry on top of the pond was used as a source of manure for the pond. When all the poultry were removed. Pond fertilization was done depending on transparency of the water to avoid over fertilization of the pond.

Removal of fingerlings for tagging



Tagging exercise at the hatchery

Tagging of tilapia fingerling



4.0. Challenges

- i. The growth of tilapia fry in hapas is slow.
- ii. Some of the brooders were lost through predation by snakes and alligators which entered the hapas.
- iii. Poor condition of the hatchery which makes it difficult to incubate tilapia eggs in the hatchery.



One of the alligators caught in the

5.0. Conclusion

The breeding program is on course and will produce the required quality broodstock required for quality seed production in the country. The F4 generation of tilapia is due for harvest in May to determine their performance and selection for the next generation will be carried out depending of the weight of the fish in each family. Success will, however, depend on the availability of the required resources for the requirements of fish breeding.