

**Progress Report**

*on*

**Genetic stock improvement of GIFT using family selection  
protocol in Bangladesh**

**Year: March – November, 2013**

**Bangladesh Fisheries Research Institute  
Mymensingh, Bangladesh**

## Progress Report on

### Genetic stock improvement of GIFT using family selection protocol in Bangladesh

The following research activities were carried out during March to November 2013 to implement the stock improvement program of GIFT using family selection protocol:

#### Objectives of the research work:

- To continue stock improvement of BFRI-GIFT strain using family selection protocol
- To evaluate the growth performance of F-7 generation of BFRI GIFT strain produced from family selection protocol

#### Achievements so far

##### Study I. stock improvement of BFRI-GIFT strain using family selection protocol

The following protocols were maintained for the production of F-7 generation:

##### Setting of Breeding Hapa

Breeding hapas (60 nos.) were installed in a breeding pond (1000 m<sup>2</sup>) for producing F-7 generation. Prior to install the breeding hapas, pond was dried and exposed to sun light for five days. Lime was applied at the rate of 250kg/ha in the pond bottom after hapa installation. After three days of liming, pond was filled up with deep tube well water at the depth of 1.0 meter

##### Breeding in hapa

A total of 2212 fish of the F-6 generation were harvested. The weight of male and female were 199.31±35.23 and 156.78±22.63g, respectively. General linear model analysis indicated that there was significant difference ( $P < 0.001$ ) in body weight between the two sexes, where the males were substantially heavier than the females (Table 1).

Table 1: Harvesting body weight of male and female during communal rearing

Sex	Number of records	Weight (g)	Co-efficient of variation (%)
Male	1103	199.31±35.23	17.67
Female	1109	156.78±22.63	14.43

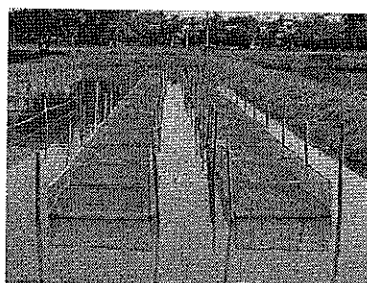
The best 60 males and 60 females were selected on the basis of breeding values of F-6 generation for the production of F-7 generation. The range of breeding values of selected males were 31.32 to 54.56, while in case of females, the values were 25.34 to 54.01 (Table 2). A pair of selected female and male breeders (1:1) was stocked in each breeding hapa on 15, May 2013.

**Table 2: Breeding values of selected male and female breeders**

Sex	Number of animals	Breeding Values
Male	60	31.32 to 54.56
Female	60	25.34 to 54.01

### **Nursing in Hapa**

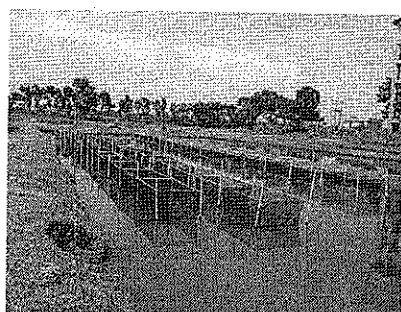
Three hundred tiny fry from each progeny group were shifted to a series of nursery hapas after 40 days of stocking (25 June 2013). Supplementary feed were supplied to the fry at the rate of 25% of estimated body weight. After one month nursing, progeny of each family were shifted to secondary nursery hapas.



**Plate 1: Figure showing the nursing hapa in pond**

### **Rearing in Hapa**

Again each progeny group (200 fry) will be shifted to 60 rearing hapa in 8 August 2013 (plate 2). Supplementary feed (Nursery feed) will be applied in all the hapas at the rate of 15% of estimated biomass.



**Plate 2: Figure showing the rearing hapa in pond**

### **Pond preparation for communal rearing**

For rearing of tagged fish, a pond having an area of 1000 m<sup>2</sup> was selected. The selected pond was dried and treated with lime at the rate of 250 kg/ha. Then lime treated pond was filled up with underground water. After three days, pond was fertilized with Urea and TSP at the rate of 25 and 12.5 kg/ha, respectively.

## **Tagging and communal rearing**

In the first week of October 2013, 20 male and 20 female of each progeny group fish have been selected and tagged them by using Passive Integrated Transponder (PIT). Tagged fishes stocked in a pond (1000m<sup>2</sup>) for communal rearing. During tagging, tag number, body weight and total length have been recorded. Supplementary feed (Floating feed) containing 28% crude protein are being applied 6 days in a week for the tagged fishes at the rate of 8% of estimated body weight. Fish are being sampled at monthly interval to know the growth as well as feed ration adjustment. After five months of rearing (i.e. end of February, 2011), fish will be harvested. After harvesting, breeding values will be estimated through SAS programme.

## **II. Evaluation of F-7 Generation with founder population of GIFT strain in pond ecology**

For evaluating the growth performances of upgraded GIFT (T-7) and non selected GIFT population (offspring of fonder population) of GIFT (T-2) were carried out during July to October 2013 in a pond having an area of 400 m<sup>2</sup>.

### **Stocking of fingerling**

A pond was prepared with lime and inorganic fertilizer at the rate of 250 and 37.50 kg/ha, respectively for this experiment. There were two treatments: treatment-1 was designed with upgraded BFRI-GIFT (F-7) while treatment-2 with founder population (offspring of fonder population). In each treatment 500 fry were stocked for growth evaluation. Progeny of the selected fish were produced from 60 single pair matings in separate hapas. Fry of upgraded BFRI-GIFT (F7) were stocked together with the progeny of the founder population (offspring of fonder population) in a pond for communal rearing. The Fry of treatment-2 (T-2) were marked through cauterization of pelvic fin.

### **Post stocking management**

Fish were fed with supplementary feed containing 30% crude protein ration 2.0 times/day. Feeding rate was initially 15% of total body weight per day and was subsequently reduced to 13, 11, 9 and 7% on days 01, 30, 60, 90 and 120, respectively. At fortnightly interval, lime was applied in the pond at the rate of 5.0 kg ha<sup>-1</sup> during the culture period.

### **Environmental monitoring**

Environmental parameters were measured at weekly intervals at 9.00-10.00am. The water quality parameters measured were temperature, transparency, pH, dissolved oxygen, total alkalinity and total ammonia.

### **Fish sampling**

Fish were sampled at fortnightly intervals by seine net and weighing 50 fish to measure the growth, assesses the health status and feed adjustment.

### **Results:**

Month wise sampling data of two treatments are shown in Table 1. The month wise sampling data of Treatment-1 (F-7 generation) was always higher than treatment-2. After four months rearing, the final

cumulative mean weights were recorded at  $198.23 \pm 36.99$  and  $138.44 \pm 20.29$ g in Treatments- 1 and 2, respectively (table 3). The harvesting weight of treatment-1 was significantly ( $P < 0.05$ ) higher than that treatment-2. The harvesting weight of the selected GIFT (F-7 generation) was 43.19% higher than that of treatment-2 (Figure 1). In regard to survival rate, 87% was observed in treatment-2, while 91.8% in treatment-2. The F7 generation of GIFT showed higher survival than the offspring of founder stock of GIFT.

**Table 3: Sampling weight of fish in two treatments**

Sampling month	Treatment-1 (g)	Treatment-2 (g)
Initial	$4.16 \pm 0.79$	$4.28 \pm 0.61$
30-July, 2013	$41.04 \pm 4.53$	$36.12 \pm 4.36$
30-August, 2013	$82.28 \pm 7.47$	$65.76 \pm 7.83$
30-September, 2013	$134.72 \pm 13.33$	$102.84 \pm 9.24$
30-October, 2013 (harvesting weight)	$198.23 \pm 36.99$	$138.44 \pm 20.29$

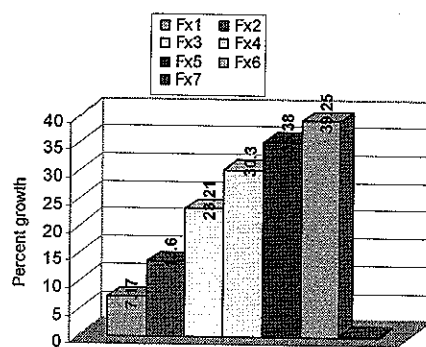


Fig. 1: generation wise percent weight gain of BFRI-GIFT strain