

**Aqua-Internship Program**

**Asia Link project**

**Faculty of Fisheries**

**Bangladesh Agricultural University, Mymensingh**

**A REPORT ON CURRENT BREEDING PRACTICES OF SIX FISH SPECIES (SHING, MAGUR, KOI, RUI, PANGUS, SILVERCARP) AND OVERALL OPERATIONAL SYSTEM OF A HATCHERY.**



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# **A REPORT ON CURRENT BREEDING PRACTICES OF SIX FISH SPECIES (SHING, MAGUR, KOI, RUI, PANGUS, SILVERCARP) AND OVERALL OPERATIONAL SYSTEM OF A HATCHERY.**

## **Introduction:**

Bangladesh is endowed with many rivers. Once upon a time fish was abundant in the open water of our country. But with the increasing rate of population, pollution, environmental change and due to the overall degradation and reduction of water quality parameters and fish spawning and breeding ground many of the fish species is becoming extinct day by day in the nature. So hatcheries of our country are coming forward to meet up the increasing demand of fish of our population. But most of the hatchery owners do not know about the breeding practices in a proper scientific way. As a result genetic drift, rate of inbreeding is increasing day by day in these hatcheries; hence production rate and production quality is declining in the hatcheries. Sometimes it differs a lot between the knowledge found in book and current field practices. So it is important to sharing the knowledge with the farmers in the field level. That is why it is important for all the Fisheries graduates to know about the current breeding practices and overall operational systems of hatcheries.

## **Objectives:**

1. To acquire knowledge that is currently practicing in the field.
2. To practice the induced breeding in the field level.
3. It makes possible to share knowledge with the farmers which will be helpful for both the students and the farmers.
4. To pick up new ideas from the field level.
5. To conduct research in the field level.
6. To gain knowledge about the disease problems and the way to solve it.
7. To gain knowledge about proper hatchery management.
8. To share knowledge about application of drugs and hormones.

## **Materials and methods:**

### **Brood fish:**

Most of the time broods are collected from BFRI (Bangladesh Fisheries Research Institution) and BFRI collects their broods from the nature. In most of the cases the quality of broods are good, so the possibility of inbreeding is reduced.

### **Farm facilities:**

### **Pond facilities:**

Sharnalata Agro Fisheries Ltd occupies 17 ponds, a tilapia unit, a hatching unit, a power and feed manufacturing unit. There are 4 ponds required for brood rearing of tilapia, 9 for carps, perches, catfishes and 3 for nursing tilapia fry.



**Overhead tank:** A large overhead tank is there in the hatchery, to supply the water all over the hatchery. Water of the pond is reused for the overall management of the hatchery.

**Hatching unit:** Hatching area contains 19 jars, 3 circular tanks, 4 rectangular tanks.



**Others:** Alternative power supply system, shallow machine etc.

**Breeding procedure:**

**Instruments:**

Simple weighing machine for weighing PG (Pituitary Gland), Large weighing machine for weighing brood fish, syringe.

### **Breeding process:**

In all cases breeding procedure involves the following steps:

- 1. Brood selection:** Healthy, good looking and mature broods are selected for breeding purpose.
- 2. Conditioning:** Then fish are kept in large circular tanks (rui, silver carp, pangus) and in comparatively small rectangular tanks (koi, shing, magur) for 6 to 12 hours for conditioning purpose.
- 3. Preparation of inducing agents:** PG is weighed by Archimedes weighing machine according to the necessity and grinded by a grinder. Then required amount of water is added with it by a syringe. HCG that is used in the hatchery is commercially available in 5000IU vials.



- 4. Injecting inducing agents:** Inducing agent is injected either in the muscle below the dorsal fin on the lateral line or below the pectoral fin in the soft muscle near the heart.



| Serial no. | Name of the fishes | Doses  |
|------------|--------------------|--|
| 1.         | Shing              | 70mg PG/kg of fish(for female)   |
| 2.         | Magur              | 80-100 mg PG/kg of fish (for female)   |
| 3.         | Koi                | 6 mg PG/kg of female fish and 2 mg PG/kg of male fish.   |
| 4.         | Rui                | For female: 2 doses are applicable.<br>1 <sup>st</sup> dose: 2mg PG/kg of fish<br>↓ 6h after<br>2 <sup>nd</sup> dose: 4mg PG/kg of fish<br>For male: 1 dose 2mg PG/kg of fish                                      |
| 5.         | Pangus             | For female: 2 doses are applicable.<br>1 <sup>st</sup> dose: 2-3 mg PG/kg of fish<br>↓ 10-12h after(If ovulation doesn't occur)<br>2 <sup>nd</sup> dose: 4-5mg PG/kg of fish<br>For male: 1 dose 2mg PG/kg of fish |
| 6.         | Silver carp        | 200 IU HCG/kg of fish (both male and female) and for female after 12h if ovulation doesn't occur again 200 IU HCG/kg of fish.  |

### 5. Ovulation:

In case of shing , magur and koi generally ovulation occurs 6-10h after injecting inducing agent. For rui, pangus, and silver carp the time varies

4-8h after injecting the 2<sup>nd</sup> dose of inducing agent.

6. **Stripping:** After ovulation eggs are collected in bowl by stripping method. Milt is collected in case of rui, silver carp, pangus and koi. Sperms are mixed with eggs with the help of feather. In case of shing and magur males are needed to be sacrificed to collect milt. This is due to their curved structure of testis.
7. **Fertilization:** After mixing of eggs and milt, fertilization occurs within a few minutes .The fertilized eggs become swollen and turn into slight whitish colour rapidly.
8. **Incubation:** Then the fertilized eggs are kept in incubators where they took 24-48h for hatching after fertilization.
9. **Hatching:** Hatching takes place 24-48h after fertilization depending on the species and the level of egg maturation. Generally large fish require more time for hatching of eggs in compare with small fishes.
10. **First feeding:** First feeding is very important for the survival of the hatchlings. In case of all shing, magur and koi first feeding is done within 50-60h after hatching and in case of rui, pangus, silver carp first feeding is done within 70-72h when the yolk sac is about 70% absorbed. In case of all fishes hard boiled chicken egg yolk is used.

### **Hatchery operation:**

The overall hatchery operation can be divided into two stages.

1. Breeding unit
2. Culture unit

### **Breeding unit:**

Time duration: For rui, mrigal, pangus, silver carp, koi, shing, magur, tilapia, etc. time ranges are given below:

| <b>SL no.</b> | <b>Name of the fishes</b>                           | <b>Month ranges</b>   |
|---------------|---|---|
| 1.            | Rui, mrigal, pangus, silver carp, koi, tilapia etc. | March-April to June-July                                      |
| 2.            | Shing, magur  | March-April to August-September, sometimes twice in a season. |
| 3.            | Common carp   | August-September to February-April                            |

### **Marketing system:**

- In case of shing, magur, koi, rui and tilapia (monosex tilapia and GIFT tilapia) fry and fingerlings are sold.

- In case of other fish species spawn are sold.
- Polythene bags are filled with O<sub>2</sub> and packed properly.
- Fry and fingerlings are weighed and packed properly.



- Small to large scale farmers are the buyer of these fry and spawn. They buy according to their previous pact.
- Purchase rate is given below:
  - For pangus and silver carp the rate is 2000-2200 Tk/jar (300000-400000 spawn) .
  - For rui the rate is 1.5tk/1.5-2.0 inch fry.
  - Tilapia is rated .75tk/fry.
  - Shing and magur rated 1.5tk/1.5 inch fry

Fry and fingerlings are sorted according to their size and species.



**Culture unit:**

The months range from August-September to February-March they consider as culture period. They are very busy with the fish rearing by managing the water quality parameters, by feeding them properly, by pond preparation for the next season etc.

**Data collection:**

Data were collected from farm authority. Various types of data were found which include:

- **Feed:** Ingredients are collected from the local market.
- **Hormones and drugs:** Hormones and drugs are brought from Mymensingh.
- **Water quality:** Water of different ponds is reused for
- **Marketing facilities:** As the farm is situated near the Dhaka- Mymensingh highway then the transportation systems are good and facilitates the marketing systems.
- **Extension technique:** The hatchery provides job opportunities to many of the unemployed young people. As the owner of the hatchery is one of the fisheries graduates it becomes an institution to train the village people about proper fish farm management.
- **Future prospect of the farm:** In the current year the area of the farm increases by excavating new ponds.

Other important chemicals and drugs required for the culture purposes:

| SL no. | Name      | Purpose       |
|--------|-----------|---------------|
| 1.     | Renamycin | As antibiotic |



|     |                              |  |
|-----|------------------------------|--|
|     |                              |  |
| 2.  | <b>E-cap</b>                 | <b>Enhance reproduction</b>                  |
| 3.  | <b>Moxacil-vet</b>           | <b>Antibiotic</b>                            |
| 4.  | <b>Immugro</b>               | <b>Immune modulator , growth promoter</b>    |
| 5.  | <b>Foliar plus</b>           | <b>Live stimulator</b>                       |
| 6.  | <b>Cotrim-vet</b>            | <b>Antibiotic</b>                            |
| 7.  | <b>Acimox-vet</b>            | <b>Antibiotic</b>                            |
| 8.  | <b>Gsonex</b>                | <b>Deodorant, adsorbent and bioscavenger</b> |
| 9.  | <b>Prosap</b>                | <b>To reduce ammonia</b>                     |
| 10. | <b>Growpower poder</b>       | <b>Growth promoter</b>                       |
| 11. | <b>Methylene blue</b>        | <b>Recover injury during transportation</b>  |
| 12. | <b>Aquaspot blue</b>         | <b>Antifungal</b>                            |
| 13. | <b>MIm 100 gold</b>          | <b>Antifungal and antibacterial</b>          |
| 14. | <b>Tap water conditioner</b> | <b>Antichlorine</b>                          |
| 15. | <b>Vitamin</b>               | <b>For breeding, health, colour</b>          |

**Result discussion:**

- The private hatcheries are very busy with their works all the year round.
- Their main goal is to increase the production rate and play an important role in minimizing the problems to fulfill the increasing demands of the population.
- Although they got a good production, they also need to invest a huge amount of money to maintain the total hatchery operation.
- Their total investment in different sectors run as follows:

**1. Salary: 28%**

**2. Feed: 25%**

- 3. Hormone:19%**
- 4. Electricity:11%**
- 5. Repairing: 3%**
- 6. Drug:6%**
- 7. Fuel:8%**

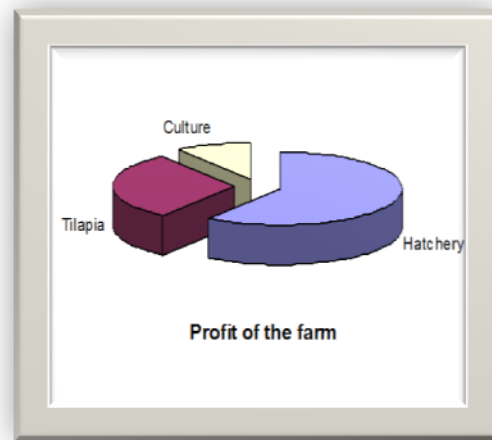
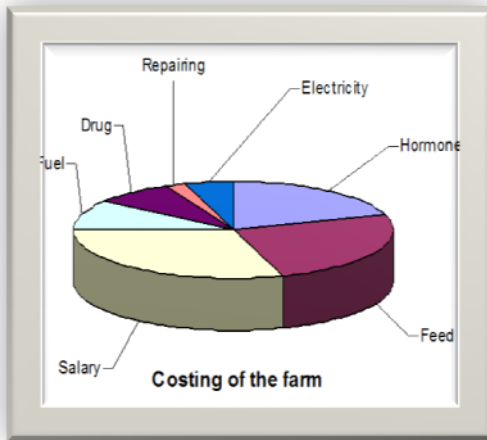
The main portion of profit of the farm comes from the hatchery unit. A major proportion comes from the tilapia sector which includes production of monosex tilapia, GIFT tilapia and fry, fingerling and marketable size tilapia production. The rest of the profit comes from the culture unit



The source of profit runs as follows:

- 1. Hatchery:58%**
- 2. Tilapia(monosex, GIFT, fry, fingerling etc):30%**
- 3. Culture:12%**

The approximate diagram of expense and profit is given below:



Pr

### blems and suggestion:

#### Problems:

1. In the current year production rate is less in compare with the previous year due to the environmental change and rough weather condition. Expected and quality eggs are not found in the broods.
2. Hatchery owners focus only on production and eager to get good profit. No research is conducted here.
3. Due to repeated operation year after year soil quality is reducing day by day.
4. Some of the technicians are not properly skilled.
5. Sometimes rough handling is done due to the lack of passion.
6. Electricity problem is one of the major problems.
7. Sometimes quality of the drugs and hormone may reduced due to the previous storage in the drug house an also in the hatchery.

#### Suggestions:

1. Besides production some research should be conducted.
2. All the employers should be properly trained.
3. Culture system should be altered at least once in two years.
4. Alternative power system should be considered. For e.g.: Bio-gas plant, solar system etc.
5. Handling of the broods should be done in proper way with utmost care.
6. Use of the drugs and hormones should be done within appropriate doses.
7. Water quality parameter should be checked regularly.

#### Conclusion:

Three months aqua internship program has provided me the actual practical knowledge about proper farm management. . Sometimes it differs a lot between the knowledge found in book and current field practices. So it is important to sharing the knowledge with the farmers in the field level. That is why it is important for all the Fisheries graduates to know about the current breeding practices and overall operational systems of hatcheries.

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