



GUIDELINE FOR BREEDING OF AN EXCELLENT MEDICINAL FISH *Clarias batrachus* (MAGUR) USING SYNTHETIC HORMONE

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Abstract: However, the wide spread of the species is non availability of seed both hatcheries and natural sources. The possibility to collect Magur seed from natural sources has become low. Because, the gradually increasing of pesticides use in the breeding grounds of catfish. In the natural environment, it spawns once a year and the period is July-August. Now, the way of induced breeding, by creating an artificially natural environment for hatching eggs very easily. The commercially available synthetic hormone WOVA-FH has been found most efficient inducing agent for the breeding of the *Clarias batrachus* with high success rate. In breeding, male scarification and female stripping are the major procedure. Also, high level survival rate of Magur spawn to fry, with high care. My research shows that the breeding and rearing of Magur (*Clarias batrachus*) can be achieved at the village level condition using a simple low-cost technology. Since, it is a small-scale unit; a greater number of farmers can adopt the technology for producing the seed as per requirement.

Keywords: *Clarias batrachus*, breeding, WOVA-FH, fertilization, hatchling to fingerling.

I. INTRODUCTION

The Asian catfish, *Clarias batrachus* is one of the excellent medicinal fish of India, Bangladesh, Myanmar, East Pakistan, Burma, Thailand, Colombia, Vietnam, Indonesia, Malaysia and Sri Lanka. According to fishbase *Clarias batrachus* is commonly known as Magur (India, Bangladesh), *Clarias catfish* (USA), Walking catfish (Pakistan), Panat (Philippines), lele (Indonesia), Vandermalle (Denmark), Kagga, etc.

It fetches a higher price than Indian major carps. In some parts of West Bengal, the fish is sold at 800-1500 rupees/kg (\$10.93-20.43) range (July-October, 2021). Because, its taste and high market value. In 100g of fish contains high protein (15%), iron content (710mg), Calcium (116mg), w3 (0.316g), Selenium (138mg), Vitamin-A (20.8 mg), Zink (0.91mg) and low value of fat (1%) as well as therapeutic application.

II. MATERIALS AND METHODS

Equipment's are used in *Clarias batrachus* (Magur) breeding-

- 1. Tank fabrication:** Thermocol fish tray, Paper tape, Water pump, Air pump, Air stone, soft pipe
- 2. Breeding operation:** Water tank, 1500L water, Salt, Ph paper, *Clarias batrachus*, Hard pipe, Water pipe, Black paper, Frame, Biological blade, Fork shape, Feather, Dropper, Bowl, Scale, Copy and Pen, Camera (Smart phone)

3. Tank fabrication

3.1. Materials: 2×1×1.5 ft thermocol tank- 5 pics, Air pump (for air supply in the water), Air stone (for bubble making), Soft pipe (for air pump to air stone connection), Hard pipe (for dewatering).



Fig.1. Thermocol Fish Tray

4. SCIENTIFIC IDENTIFICATION OF BROODER

The fish is heterosexual. During breeding season, the sexual dimorphism is fully prominent.

4.1. MALE IDENTIFICATION

- Color- The colour of the mature fish becomes grayish during breeding season.
- Body shape- A male *Clarias batrachus* has a slim belly than a female that is especially prominent during mating season.
- Male genital papilla- The genital opening in a male is conical and prominently long.
- Spot- A male can also be distinguished by the dorsal fin spots.



Fig.2. Male



Fig.3. Female

4.2. FEMALE IDENTIFICATION

- Colour- The female becomes darker in colour in breeding season.
- Body shape- A female *Clarias batrachus* has a broader belly than a male that is especially prominent during mating season.
- Female genital papilla- The genital papilla of female is slit and oval-like.
- Spot- A female can also be recognized by the absence of dorsal fin spots.

5. AGE OF MATURITY

The fish, *Clarias batrachus* (Magur) reach their reproductive nature at one year of age. But some fishes are not proper healthy so those fishes cannot breed in the first year. In some fishes, eggs are not arrived in the first year.



Fig.4. Brood Fish

6. SIZE OF MATURITY

- **SIZE OF FISH-** This species is reported when they reach a length of around 15cm they can breed. But, the suitable size for successful breeder's minimum length is 25-30cm.
- **WEIGHT OF FISH-** The fish can breed when it reached near about 80 gm they can breed. But, the suitable size of brooder fish is 100-200 or above.
- **SIZE OF EGG-** When egg size is 0.12 to 0.14 cm the female fish is suitable and good for breeding.

7. TIME OF MATURITY

The female fish mature once in the year. In the year, July and August month is best time for breeding with high success rate. July and August are the pick season of the laying eggs for breeding. Also, this month, makes perfect weather for breeding.

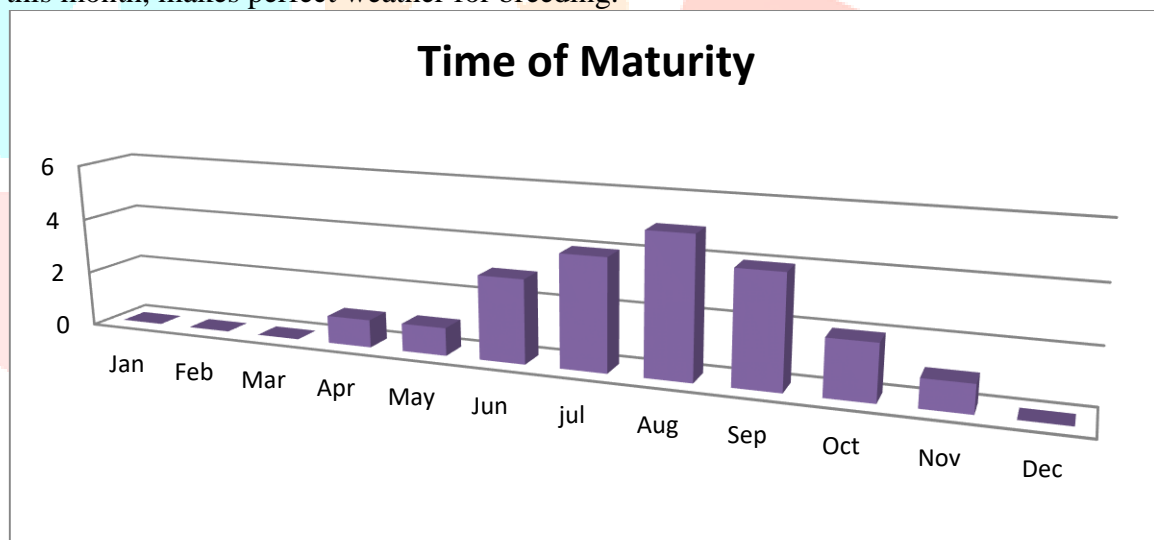


Fig.5. Table of Maturity time

8. INJECTION

For induced breeding injection is the main part of successful *Clarias batrachus* breeding. First, calculate the body weight of the fish. Then use different types of synthetic hormone with different doses.

For induced breeding I used WOVA-FH injection. Which is the analog form of salmon Gonadotrophic releasing hormone (sGNRH). The dose of male is 0.2-0.3ml/kg body weight and the dose of the female Magur is 0.5ml/kg body weight. Male Magur fish's body weight is 200gm so, the dose is <0.1ml. and female fish is 230 gm. So, the dose is 0.2ml (about). The injection injects in the fish in 45° angles.



Fig.6. Injection

Injecting of brooders are three methods:

1. Intra-muscular
2. Intra-peritoneal
3. Sub-cutaneous



Fig.7. Sub-cutaneous injection to Brood fish.

9. SYRINGE & NEEDLE

- The extract of pituitary or synthetic hormone is injected through a disposable or glass syringe, capacity is 2.0 ml, with 0.1 ml marking.
- The needle size depends on the brooder fish weight.
- Used For small fish 24 number needle, for 1 to 3 kg fish 22 number needle and 19 number needles for larger fish.

9.1. Dosage: General dose of WOVA-FH is 0.5ml per body weight of fish. Dose may be varied among species and location.

- Female fish- 0.3-0.4ml/kg body weight and Male Fish- 0.1-0.2ml/kg body weight.



Fig.8. Synthetic hormone

9.2. During injection: Ensure that all equipment's, collecting tank, syringes etc should be clean and if possible sterilized. Always handle gently to the fish. Always withdraw required quantity of WOVA-FH. Withdraw trapped air from the syringe before inject. Hold fish firmly and insert needle firmly at the belly behind pelvic fin or in the mussels of either side. Inject Spawn Pro carefully. Gently place the fish in to container of fresh and aerated water.

9.3. After injection: Generally, fish require 5 to 10 minutes for recovery. After that it can be return back to breeding tank. More than one fish may be induced at the same time.

10. SPERM SUSPENSION PREPARATION

The collection technique of sperm from male Magur fish is called as sperm suspension preparation.

- Take the selected male fish for breeding operation.
- Make a 0.9% saline water. (Means 9gram NaCl in 1L water.)
- The male *Clarias batrachus* fish do not respond to stripping. So, the male fish are sacrificed for collection of testis.
- The fish is cut in ventral side from anal to toward mouth.
- For preparing sperm suspension the creamy white testis is selected. Cut or press the testis by using prepared saline water. Use net for fine finishing.
- At last, the sperm suspension is prepared.

The ideal sex ratio for higher fertilization rate is 1 male and 2-3 females. To take high succeed rate I used 1male and 1female for breeding.



Fig.9. Sperm collection

11. EGG COLLECTION

Egg collection is an important part in the *Clarias batrachus* (Magur) breeding.

- Take the selected female fish for breeding.
- Place the fish in hand by using soft cloth also cover fish eye. Gently press the belly toward female genital papilla. Keep continue up to end falling of eggs.
- In case, the female not release egg or release blood then stops stripping. That indicates the immature or unhealthy or no eggs in fish.
- If the eggs are white that shows the immature eggs. If the size of egg is too small that shows unhealthy eggs. With low success rate with poor quality seed.
- To make sure inside the eggs present or not by pressing the female fish. The fish release free eggs. 100gm Magur fish carry about 4000-5000 eggs.
- On the expert view, I collected around 10,000 pis eggs.



Fig.10. Egg collection

12. FERTIZATION

The process of combining the male sperm, with the female egg, is called as fertilization.

- Mix egg and sperm as first as possible by feather. And keep continue up to fertilization (around 5-10 minutes).
- Wash 2-3 times to remove unfertilized eggs with tank water. Collect fertilized eggs.
- Then, gently spread eggs by feather on the net. And start water flow to make artificial rain and a water flow for reduce ammonia level in the tank by continue washing.



Fig.11. Fertilization

RESULT AND DISCUSSION

13. HATCHLING

The newly hatched fish length was 0.40 ± 0.05 cm. The yellowish body and the yolk sac were large. The fish took place at the bottom placing the body at any one side due to heavy load of yolk. The head of hatchling bended downwards and the tail end looked like a flagellum.

- At day 1, the length of fish was 0.45 ± 0.05 cm and the yolk sac was large. Fish was straw yellow colour, transparent body with dark small eye. Appeared a small cut like mouth in this stage. The alimentary canal start appearing as a tube-like structure in the post area of the yolk sac. The fish started to try body movement by lashing the tail in the bottom.
- At day 2, the length of fish was 0.50 ± 0.05 cm and the yolk sac started to reduce. The head of developing fish became prominent with fully pigmented large eye with small barbels. Two fine reddish vessels appeared in the yolk sac's ventral side.
- At day 3, the length of fish was 0.55 ± 0.05 cm the barbels were prominent and pectoral fin bud appeared.
- At day 4, the length of fish was 0.60 ± 0.05 cm and the yolk sac fully reduced. The gills area became reddish with more prominent barbels. The fish preferred to hide very fast in the tank's dark corner.

14. SPAWN TO FRY

In *Clarias batrachus* breeding, when the hatchlings are fully absorbed the yolk sac, this stage is called as spawn. In between spawn and fingerling stage the fry stage is present.

- At day 5-9, the length was 0.90 ± 0.20 cm. Yolk sac was absent. Pigmentation appeared all over the body. The fish became reddish brown in colour. Head was provided with 4 pairs of distinct barbels. Pectoral fin with fin rays was well developed, anal and dorsal fins were continuous with caudal fin. The fish preferred to hide very fast in the aquarium's dark corner. On days, ventral fin buds were found.
- At day 10-15, the length was 1.80 ± 0.20 cm. Body was light reddish brown in colour. The caudal fin separated from the dorsal fin and anal fin. Well-developed ventral fin and dorsal fin with fin rays in most fish were noticed.
- At day 16-27, the length of fish was 3.50 ± 0.20 cm. Caudal fin became homocercal and spine developed in the pectoral fin. No other significant morphological changes were found up to day 16-27.
- At day 28-35, the length was around 3.85 ± 0.20 cm. Fish changed their body colour from light to dark reddish brown.
- At day 45, the length and weight were 5.50 ± 0.20 cm and 1.5 ± 0.30 gm respectively. At this stage fish was provided with all morphological characters like an adult. The fish was dark reddish brown in colour. The well-formed dorso-ventrally flattened head. Two depressions were found on the head. The mouth was terminal, transverse and wide. The fish preferred to stay in the resting state with an angle of 20° - 60° touching the bottom with caudal fin during most of the day time but occasionally came to surface water for engulfing air.



Fig.12. Hatchling



Fig.13. Spawn



Fig.14. Fry



Fig.15. Fingerling

CONCLUSION

My work shows that the breeding of Magur (*Clarias batrachus*) can be achieved at the village level condition using a simple low-cost technology.

Since, it is a small-scale unit, a greater number of farmers can adopt the technology for producing the seed as per requirement.

The model came out with a significant techno-economic viability and can be up-scaled as a low-cost farmers-friendly model. This type of extension research in aquaculture field is very much important for extension research in aquaculture field is very much important for the developing countries like India, where rural fishermen communities will be benefited by the production of high valued fish followed by this simple technique.

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