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Hypophysation An Induced Breeding Technique In "Cyprinus Carpio"

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ABSTRACT

Hypophysation, also known as hypophyseal injection or induced breeding, is a technique used in aquaculture to induce spawning in fish species, including Cyprinus carpio (common carp). This method involves the administration of hormones to stimulate the reproductive system of fish, leading to the release of eggs and sperm. This technique is an artificial induced breeding technique. Cyprinus carpio are induced to spawn by the injection of pituitary extract. Hypophysation is a technique of induced breeding in Cyprinus carpio by injecting pituitary gland extract. In this method the pituitary gland extract is injected into intramuscular/pectoral fin region of fish. The gland stimulates the development of gonads which helps fish to breed. When the pituitary gland of the same species is used, its referred as homoplastic injection method. Induced breeding is practiced in a wide variety of species, with this technique we can produce fish seed in large number in all seasons. With this technique we can produce hybrid varieties of species. This technique shows accurate fertilization (78-85%) and Hatching rate (70-85%) this present study reveals the process engaged in Hypophysation technique.

Keywords: Pituitary gland, Cyprinus carpio, Fertilization, Hybrid varieties, Homoplastic.

INTRODUCTION

Induced spawning in common carp, C. carpio , iscurrently carried out in Iran by the hypophyseal approach utilizing carp pituitary extract (C.P.E) which is expensive, not always readily available and with unpredictable activity (Drori et al., 1994). The success of this method is quite variable and average percentage of ovulated female carp reaches only about 60-70% in fish farms around the world (Weil et al., 1986).Furthermore, there is a possibility that pathogen maybe present in the donor fish and can be passed on to recipient fish (Zohar, 1989). With respect to these factors, searching for an alternative approach to spawning induction in cultured fish have started. The latest approach is the stimulation of spawning by a synthetic super active analogue, to release the endoge-nous gonadotropin (GtH) from the pituitary of treated fish. One of the most effective analogues is GnRH ethylamide (Zohar, 1989). The Common Carp, or Cyprinus carpio (Linnaeus, 1758), is really an important fish in freshwater. It's part of the Cyprinidae family, which is the biggest family of freshwater fish. This fish can be found in all sorts of water places like ponds, lakes, & rivers. Sometimes, it even goes into brackish water Isn't that neat, you can see Common Carp all over the world, but they're especially popular in Asia & some parts of Europe. This fish is super important because it's the third most cultivated freshwater fish globally. Fun fact: In 2010, it was ranked third for finfish aquaculture production worldwide .in Hypophysation In this method the pituitary gland extract is injected into intramuscular/pectoral fin region of fish. The gland stimulates the development of gonads which helps fish to breed. When the pituitary gland of the same species is used, its referred as homoplastic injection method. Induced breeding is practiced in a wide variety of species, with this technique we can produce fish seed in large number in all seasons. With this technique we can produce hybrid varieties of species. This technique shows accurate fertilization The pituitary gland is super important tiny, pea-sized gland hangs out at the base of fish brain. It plays a big role in controlling growth, development, and how other glands work too. If you look on the ventral side of the brain, It's a small, soft body that can look different depending on the species. For example, in carps, it's more or less round. But in catla and rohu, it's oval-shaped, while in mrigal, it's kind of pear-shaped ,This gland located in a special cavity known as sella turcica. it's wrapped up in a membrane called durometer, which connects it to the brain through an infundibular stalk. The pituitary creates gonadotropic hormones (GtH) that are super important for helping fish mature & spawn. These hormones include Follicle Stimulating Hormone (FSH) and Luteinizing Hormone (LH). They are released and play a big part in the cycles of gonadal maturity.

MATERIALS & METHODS

- Healthy Common carp fish
- Acetone
- Sterile blade
- syringe
- Distilled water
- Cotton
- Centrifuge
- alcohol.

This research study done at Government Arts & Science College (A), Kamareddy of Telangana state.

Hypophysation involves the following steps

1. Collection of pituitary glands
2. Preparation of pituitary extract
3. Selection of breeders
4. Injection of pituitary extract
5. Breeding
6. Hatching Steps involved in Hypophysation

1. Collection of Pituitary Gland:- In the first step in Hypophysation is the collection of pituitary glands. The gland is collected from Cyprinus carpio fishes The pituitary gland is located on the ventral side of the brain. Then the head is dissected out to expose the brain. The pituitary gland is isolated from the ventral side of the brain. The pituitary glands are stored in alcohol for better use.

2. Preparation of Pituitary Extract:- The glands are macerated in a tissue homogenizer with a little distilled water. The homogenate is diluted with distilled water. The preparation is centrifuged at about 1000rpm for 5 minutes. The supernatant is the pituitary extract. It is preserved in glycol. Preservation of pituitary glands. If the collected glands are not meant for use then and there, they must be preserved to their glycol- or muco- protein nature, they are liable to immediate enzymatic Danet The pituitary glands can be preserved by three methods absolute alcohol action. The freezing Preservation of fish pituitary gland in absolute alcohol is preferred in India. Moreover, experiments done so far with alcohol preserved glands on Indian major carps have given more positive results than with acetone preserved glands. The glands after collection are immediately put in absolute alcohol for defatting and dehydration. Each gland is kept in a separate phial marked serially to facilitate identification. After 24 hours, the glands are washed with absolute alcohol and kept again in fresh absolute alcohol contained in dark colour bottles and stored either at room temperature or in a refrigerator. Occasional changing of alcohol helps in keeping the glands in good condition for longer periods. In order to prevent moisture from getting inside the phials, they may be kept inside a desiccator containing some anhydrous calcium

chloride. It is preferable to keep the glands in a refrigerator. They can be stored in refrigerator upto 2-3 years and at room temperature upto one year. Acetone also is a good preservative. In this method, soon after collection, the glands are kept in fresh acetone or in dry ice-chilled acetone inside a refrigerator at 10° C for 36-48 hours. During this period, the acetone is changed 2-3 times at about 8-12 hours intervals for proper defatting and dehydration. The glands are then taken out of acetone, put on a filter paper and allowed to dry at room temperature for one hour. They are then stored in a refrigerator at 10°C, preferably in a desiccator charged with calcium chloride or any other drying agents. The preservation of glands in acetone is largely practiced in USSR and USA.

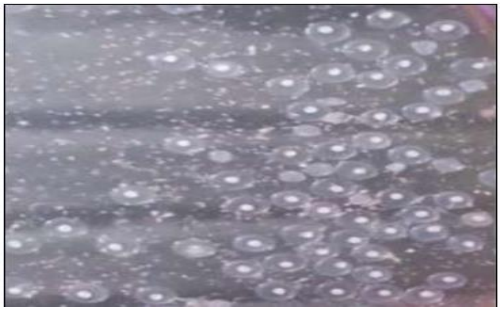
3. Selection of Breeders:- Mature males and females are selected and stocked for Hypophysation. Two males and one female form one unit for Hypophysation.

4. Injection of Pituitary Extract:- The selected males and females are kept on a table; the extract is injected intramuscularly at the base of the pectoral fin or pelvic fin or caudal fin. About 0.5 to 2ml of extract is given for breeder's weighing up to 10 kg. The female is given two doses, namely the first dose is preparatory dose and second one resolving dose. about 4 hours interval is given between the two doses. The male is given only one dose.

5. Breeding:- After injection of the pituitary extract the breeders are introduced into a breeding hapa. The breeding hapa is a rectangular mosquito net cloth enclosure. The breeding hapa is built at our college premises. It is suspended in a pond water with the help of four poles. To provide the running water similar to river conditions is maintained in the hapa with the help of electric motors. the breeder's mate in the hapa. They breed in 14-17 hours.

6. Hatching:- In 18-25 hours, the eggs are fertilized. The fertilized eggs are transferred to a hatching hapa which is at our Department. The hatching hapa is made up of two rectangular mosquito nets. It is suspended in water. The hatching hapa consists of an inner hapa and an outer hapa The eggs are hatched in the inner hapa. The hatchlings wriggle out through meshes of the inner hapa and reach the outer hapa. The shells and dead eggs present in the inner hapa a are removed. The hatchlings are kept in the outer hapa for three days Then they are transferred to nursery ponds at behind our college premises in cement tanks. And reared the seeds till they attained fingerling stage .

Fertilization rate=Number of fertilized eggs/Number of estimated eggs x 100



Fertilized and Unfertilized eggs **KMnO4 added for clear observation**

Technique of hatching the eggs

The eggs collected from breeding hapas are transferred into the hatching hapas. A hatching hap: consists of two separate pieces of hapas, the outer hapa and the inner hapa. The inner hapa is smaller in size and is fitted inside the outer hapa. **Hapa**

The outer hapa is made up of a thin cloth in the standard size of 2 x 1 x 1 m while the inner hapa is made of round meshed mosquito net cloth in the dimension of 1.75 x 0.75 x0.5 m. All the comers of the outer and inner hapas are provided with loops and ropes to facilitate installation. About 75,000 to 1,00,000 eggs are uniformly spread inside each inner hapa. The eggs hatch out in 14-20 hours at a temperature range . **Hatchlings** of 24-310 C. The period of incubation, in fact, is inversely proportional to the temperature. After hatching, the hatchlings escape into the outer hapa through the meshes of the inner hapa The inner hapa containing the egg shells and the dead eggs which are removed when the hatching is complete. The hatchlings remain in outer hapa undisturbed till the third day after hatching. During this period, they subsist on the food stored up in their yolk sac. By the third day the mouth is formed and the hatchlings begin directive movement and feeding. At this stage they are carefully collected from the outer hatching hapa and stocked into prepared nurseries.

It has been found that Indian major carps could be induced to spawn twice in the same season with an interval of two months. The breeders after the first spawning are fed with groundnut oilcake and rice-bran in the ratio 1:1 at 2.5 percent of the body weight. When favorable climatic conditions occur, they mature and are ready for spawning.

RESULT & DISCUSSION

Induced breeding with Hypophysation we can get pure seeds in large number in all seasons. With this technique we can produce hybrid varieties of species. This technique shows high fertilization rate78-85%) and Hatching rate (70-85%) this study explodes about procedure and result of Hypophysation technique. Here we can get best quality of fish seeds

CONCLUSION

We here by conclude that The breeding technique is most effective where we can get desired quality of seeds, provide specific benefits for aqua-culturists: Increased Control: Induced breeding allows for precise control over the timing of reproduction, facilitating synchronized spawning and better management of fish populations. Enhanced Productivity: By inducing breeding, farmers can achieve higher reproductive rates, leading to increased production of Cyprinus carpio fish, thereby improving overall farm yield.

Genetic Selection: This technique enables selective breeding, allowing farmers to choose desirable traits such as faster growth, disease resistance, or better meat quality, leading to improved stock characteristics.

Optimized Resources: Induced breeding helps utilize resources more efficiently by aligning the reproduction cycle with favorable environmental conditions, resulting in better survival rates for the offspring.

Reduced Dependency on Natural Cycles: Farmers are less reliant on unpredictable natural breeding seasons, making it possible to breed Cyprinus carpio throughout the year, contributing to a steady and reliable supply.

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