UNIT-3, ECONOMIC ZOOLOGY-AQUACULTURE

Induced Breeding in Fishes

Introduction:

The technique of induced breeding was first evolved in Argentina after producing pituitary extract by B. A. Hussay in 1930. Brazilian was the first country to develop a technique for hypophysation in 1934.In India, first attempt to induce breeding was made by Hamid khan in 1937 on *Cirrhinus mrigala*. Hiralal Choudhary applied this technique in minor carps like *Esomus danricus* in 1955.

What Is Induced Breeding?

Induced breeding is a technique where by ripe fish breeders are stimulated by pituitary hormone or any other synthetic hormone introduction to breed in captive condition. Then the carps being excited lay eggs in the pond water and the process is called **inducedbreeding.**This process of breeding is also known as **hypophysation**

.Major carps are most important species from the point of view of their high food and nutritive values. Hence they have kept attention of scientists and aqua farmers. They have peculiar habit of breeding in running waters of rivers and streams where they have large space for movement

Principle:

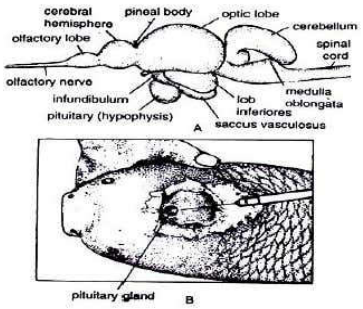
Environmental Factors
↓
Brain
↓
Hypothalamus
(Releasing Hormone)
↓
Pituitary Gland
(Gonado Tropic Hormone (FSH & LH))
↓
Gonads
(Gonadotrophic Hormones)
↓
Gamets
(Spawning)

Collection of Pituitary Extract:

From the matured fishes of both sexes either belonging the same species (Homo plastic) or a closely related (Hetero Plastic) the pituitary glands are collected.

It is preferred to collect the pituitary gland from freshly killed fishes. But it has been observed that the pituitary glands taken from five to eight days old ice-preserved fishes have also given successful results. The pituitary glands can be taken out from the posterior end of the cranium through the foramen magnum after cleaning the brain tissue. After the collection of the pituitary glands are kept in absolute alcohol for dehydration. After 24 hours, the alcohol is changed for further dehydration and de fattening. The glands are then weighed and preserve in fresh alcohol in dark colored phials. It may be stored at room temperature or in a refrigerator. At the time of injection to carps for the induced breeding, the required quantity of pi tuitary glands are taken out of the phials and the alcohol is allowed to evaporate. The glands are then macerated with a tissue homogenizer either in distilled water or 0.3percent of saline water.

The gland suspension is then centrifuged and the supernatant fluid is drawn into a hypodermic syringe for the injection



2. Selection of Breeders:

Medium sized fully ripe and healthy fish of around 2 to 4 years of age is preferred for induced breeding. The weight should be 1 to 5 kg. Healthy male and female breeders should be identified and netted out before the breeding season and should be kept in spawning pools.

3. Method of Injection:

During the rainy season or cloudy, the extract of the pituitary gland of the same species which is prepared on the above said scientific process is injected in the muscle of the matured carps.

Just before evening, per one female with two males of the approximate same body weight are to be injected the pituitary extract by hypodermic syringe. In case of male carps the pituitary extracts are introduced once and in case of female carps it is introduced twice. At first, at the rate

of 2 to 3 mg of pituitary extract per kg of body weight is introduced in the muscle of the caudal peduncle or near the dorsal fin of the female carp. The needle of the syringe is to be introduced between the scales but with an angle of 45° with the body. After six hours of first injection, the second injection is given to the same female at the rate of 5 to 8 mg of pituitary extract per kg of body weight. There is no need of injecting dose to the male breeder if it in a state of milt oozing.

4. Synthetic Hormones:

HCG (human chorionic gonadotropin hormone), Synahorin, Ovatide, Ovaprim. It is the new inducing hormone for fish and absolute substitute of pituitary extract though it'scostly. Ovaprim is far superior to carp pituitary in inducing spawning in several species of carps.These synthetic drugs are better than the pituitary extract andeasiertoadministrate. Only single dose injection is enough to induced craps.

5. Spawning

Then the carps, one female and two male are placed in a breeding hapa for spawning. Inside of the breeding hapa both the female and male carps are exited. After the excitation the female carps lays eggs. The eggs are externally fertilized by the spermatozoa(milt)that are discharged by the males.

6. Spawning Hapa

Hapa for larger fishes its size is 8′ x 3′ x 3′, but for the smaller fishes it is 5'x 3'x 3′.It isheld on four bamboo poles, one at each corner of the rectangular case. After that all the fishes are removed from the breeding hapa and then the eggs arecollected by a net and are transferred to the inner part of the hatching hapa. After 14 to 18 hours, the spawns enter into the outer hapa and the induced breedingprocess completed. Then the spawns are collected from the outer hapa and transferredto the pond for nursery.

Precautions for Induce Breeding

(1) To avoid diseases and parasitic infections,
(2) Breeders should be properly washed with $KMnO_4$ solution for a few minutes.
(3) Breeder should be protected from mechanical injuries during handling.
(4) Water condition should be favourable having temperature about 24 to 31°C and turbidity about 100 to 1000 ppm.
5)Flowing water with higher O_2 content is of great use.(6)The intensity and duration of light also affect the induced breeding and spawning.Pituitary glands taken from the same or related species as the recipient species aresaidto be more effective.

Advantagesof Induced Breeding

i) A pure spawn of a desired species is made available. The spawn obtained from the rivers are not pure. They are mixed with the spawns of other species and sorting of pure seed from the mixedspawn is not possible.
ii) Desired species of carps can be cultured through the induced breeding.
iii) Large numbers of eggs are available from a fish through induced breeding.
iv) In the same season, a carp can be induced to breed more than once.

v) Transportation cost becomes very low as the carps can be breed in any desired pond.
vi) Between the different species of fishes hybridization can be done and it is possible to get hybrid variety of fishes.

Questions

1.Hypophysation Techniques2.Methodof Injectionin Major carps3.Advantagesof Induced Breeding

References:

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Induced Fish Breeding:
A Practical Guide forHatcheries.2.A Text Book ofFishBiology &Fisheries. byS S Khannaand H R Singh3.FisheriesScience. Author, R.Santhanam