Induced breeding in fishes by hypophysation

In simple words spawning in fishes induced by some artificial breeding stimuli is called "induced breeding".

It is a technique by which ripe fish breeders are stimulated by injecting pituitary hormone to breed in caplivity. It facilates timely release of sperms and eggs from ripe gonads.

Discovery - Brazil was the first country to develop a technique for hypophysation (1929-28) & Gerbilskii (1938) finally succeeded in its application.

In India Hamid Khan in 1934 first attempted for it & Chaudhary (1955) ward the first to successfully induce fishes by using piscine pituitary.

Methodology - It includes following steps :—

a) Pituitary location - Pituitary is located on the ventral side of the brain near optic chiasma just below the hypothalamus. It contains gonad stimulating hormone FSH & LH

b) Source of pituitary gland - Collection is made only from fully ripe gravid fish.

Suitable periods for the collection of gland for major carps is from May to July when majority of fishes attain advanced stage of maturity. Gland should be collected from living or just killed specimens but not from rotten or semi-rotten specimens

c) Dissection & removal of gland - Care should be taken that pituitary gland is not damaged. When the gland is exposed, it is carefully picked up by a forcep

d) Preservation & storage of pituitary - The glands are stored in 100% alcohol at ordinary temperature. After each 24 hrs, the alcohol is changed. The gland is stored in a refrigerator.

Extract may be preserved in glycerine (3 ml extract + 1 ml distilled water + 2 ml glycerine)

short while to evaporate the alcohol, the gland is then homogenized with little water or 0.3% saline. The homogenized glands are then diluted with the same liquid. The dilution is ordinarily made at the rate of 0.22 cc/kg body wt. of the breeders. The gland suspension is centrifuged at about 1000 to r.p.m for about 15 mins.

The supernatant fluid is diluted to desired dosage & drawn up into hypodermic syringe for injection. The leftover part is rejected

f) Dosage - Hypophyseal dosage depends chiefly on the pre-spa stage of sexual maturity of the breeders.

The potency of gland also depends on the stage of maturity of the donor fish.

A single injection of 5-10 mg of gland extraction per kg. body wt. of a female breeder & 2-3 mg/kg body wt. of male breeders give satisfactory result at optimum temp.

If first injection ~~to~~ does not work, a second injection is given 8-10 hrs. after the first injection.

More satisfactory results are obtained when female alone is given a preliminary dose of 2-3 mg/kg body wt. & kept in segregation. After 6 hrs a second dose of 5-8 mg/kg body wt. is given to the female & first dose of 2-3 mg/kg body wt. is given to the male.

Two males per female are given the dose & both the injected males & the female are put together in a breeding hapa.

g) Method of injection - Intramuscular injection on the caudal peduncle or shoulder region near the base of the dorsal fin with 2 ml syringe is given.

Collection, rearing & selection of breeders.

Breeders are collected during winter months, are stocked & if needed artificial food like rice bran or oil cake (@ 1% of body) is given. Feeding is stopped one day before the administration of injection.

During breeding season a sex of the male & female fishes can easily be distinguished. Dorsal surface of the pectoral fin of male becomes rough & a fully ripe male oozes ~~milt~~ ~~mil~~ milt on slight pressure on the abdomen whereas fully ripe female has bulging abdomen & swollen vent. Healthy breeders weighing 1.5 kg to 5.00 kg are selected.

Breeding hapa – After injection, both the injected males and one female are introduced together in breeding hapa. Spawning usually occurs within 3-6 hrs after 2nd injection. When spawning is over, the breeders are removed & fertilised eggs are transferred to hatching happa.

With the advancement of fish culture programme, synthetic hormones are prepared as the substitute of pituitary hormones (There are – i) chorionic gonadotropin (mammalian hormone), ii) Human chorionic gonadotropin (HCG) iii) methyl testosterone iv) Methyl forgesterone etc.).

Induced factors influencing induced breeding –

1) Favourable climate & water condition.
2) Dissolved oxygen concentration
3) Rainy periods & cool temp. (24-31°C)
4) Light

Advantages of induced breeding

1) Particular species of fish seeds can be obtained.
2) Spawns will not mix up with undesirable & foreda ceous fish spawn.