INDUCED BREEDING IN FISHES

Course: DSE-I (ZD607T)
Fish and Fisheries
B.Sc 6th Semester

By-
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- **Definition**: Induced breeding is a technique by which ripe fishes are stimulated by pituitary hormone or other synthetic hormone injection to breed in captivity.

- The stimulation helps timely release of eggs and sperms from the ripe gonads.

- **NEED OF INDUCED BREEDING:**

- Because of environmental condition like photoperiod, rain, temperature, currents of water.

- Insufficient release of hormones in captive condition.

- Lack of sufficient natural food.

History of Induced Breeding

- The history of Induced breeding dates back to 1930 when B. A. Hussay from Argentina, first developed the pituitary extract.

- In India, first attempt to induced breding was done on *Cirrhinus mrigala* by Hamid Khan in 1937.

- K. H. Alikunhi and H. L. Chaudhury in 1957 are the pioneers of hypophysation in Indian Major Carps.

Identification and Selection of Brooders

i) Healthy and uninjured fishes are collected.

ii) Brooders should be collected in the proportion of 1:2 female to male ratio.

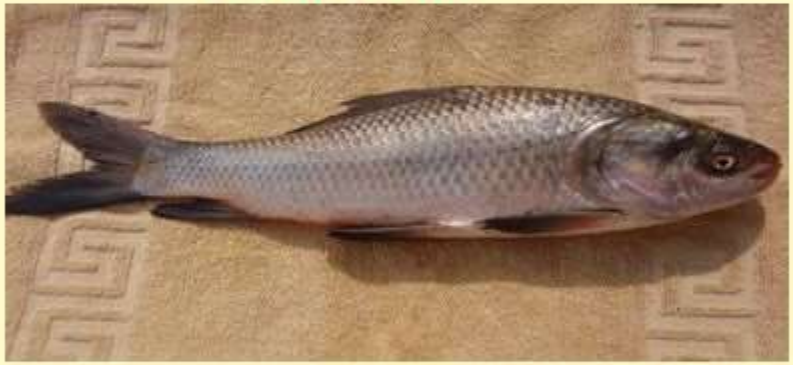
iii) Fishes of almost equal size, weight range and of same species are collected.

iv) Brooders of more than 1-3 years of age are preferred.

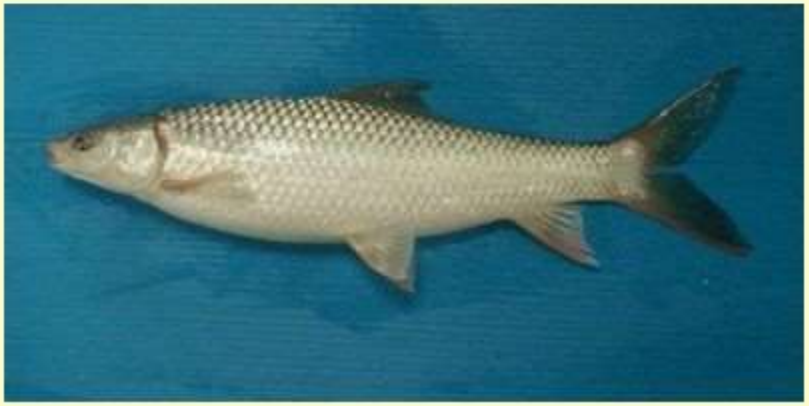
Indian Major Carps (IMCs)

Labeo rohita

Catla catla



Cirrhinus mrigala



Technique of Induced Breeding

i) Particulars of the donor fish

ii) Stage of maturity of donor fish

iii) Condition of donor fish

iv) Sources of Pituitary Gland

Methods of Gland Collection

i) By Cutting and Removing a Portion of the Brain-Case

ii) Collection of Gland through the Foramen Magnum

- The second method of gland collection is less time consuming and economical as the heads are used for human consumption later.

Preservation of Pituitary Gland

i) Preservation in Absolute Alcohol

(ii) Preservation in Acetone

iii) Gland preserved by immediate freezing

Preparation of Pituitary Gland

- Known amount of gland is taken by estimating the total quantity of fish to be bred.
- Gland is dried in air by using blotting paper.
- Gland is taken in tissue homogenizer with little amount of distilled water.
- The dilution rate is 0.2ml/kg body weight of the fish.
- The pituitary extract is then centrifuged and only the supernatant solution is used for injection.

Method of Injection

i) Intra-muscular

- The injection is given on the dorsal-lateral muscle towards the caudal peduncle region on the muscles.
- Two doses are given for carp spawning, one on either side(left & right).
- The needle is inserted under the scale or skin parallel to the body of the fish and then turn 45° angle to pierce quickly the muscles and inject the fluid.

ii) Intra-peritoneal/Coelomic

- The injection is inserted through the soft regions at the base of the pectoral or pelvic fins.
- The needle is inserted at an angle of 45°to the body's longitudinal axis.
- The specification of needle comprising thickness and the length depends on the size of the recipient fish.

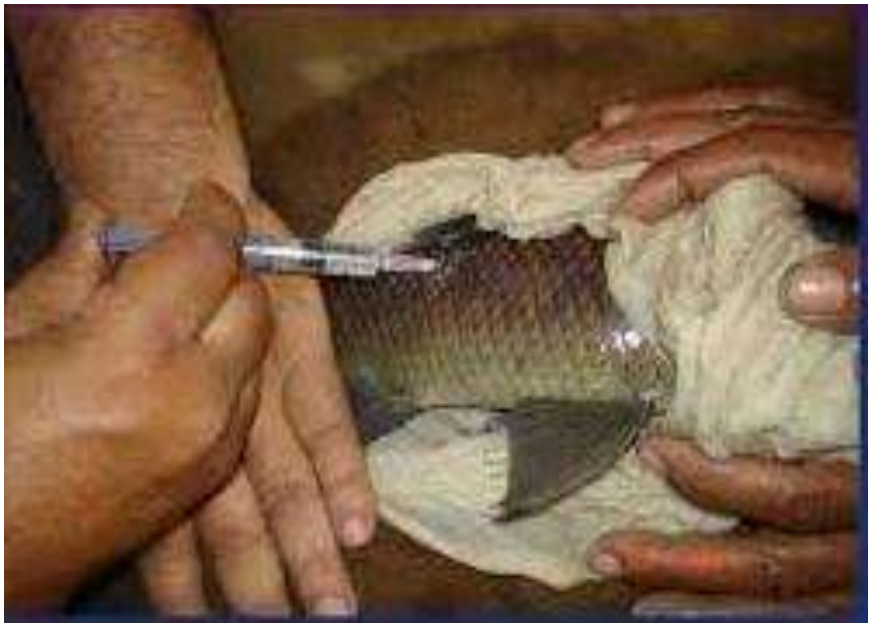


Fig: Injecting a brood fish

Fig : Intra-peritoneal injection

Fig: Intra-muscular Injection

Doses of Pituitary Extract

- Female is given 2 doses:

1. Initial dose: 2-3mg/kg body weight.
2. Final Dose: 6-8mg/kg body weight (after 5-6 Hrs of initial dose)

- Male is given only 1 dose (2-3mg/kg body weight) at the time of 2nd dose to the female.

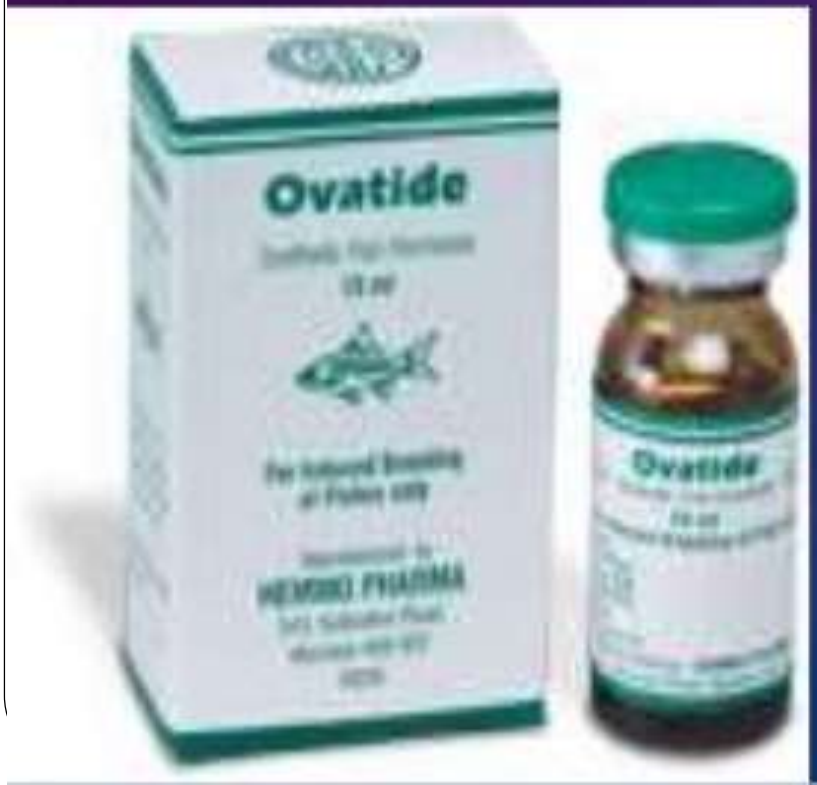
Spawning

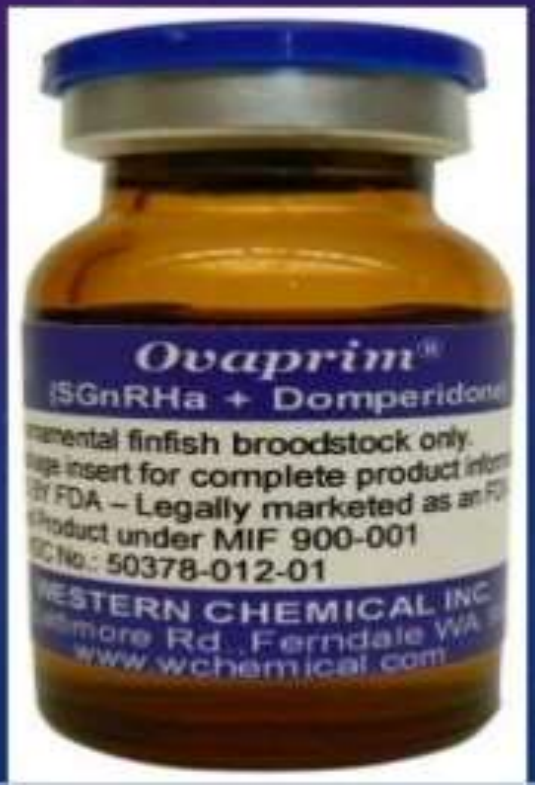
- After injection to the brooders, a set of brooders are released into the breeding hapa.
- The size of the hapa should from 3*5 meters.
- The spawning takes place within 3-6 hrs after final injection.

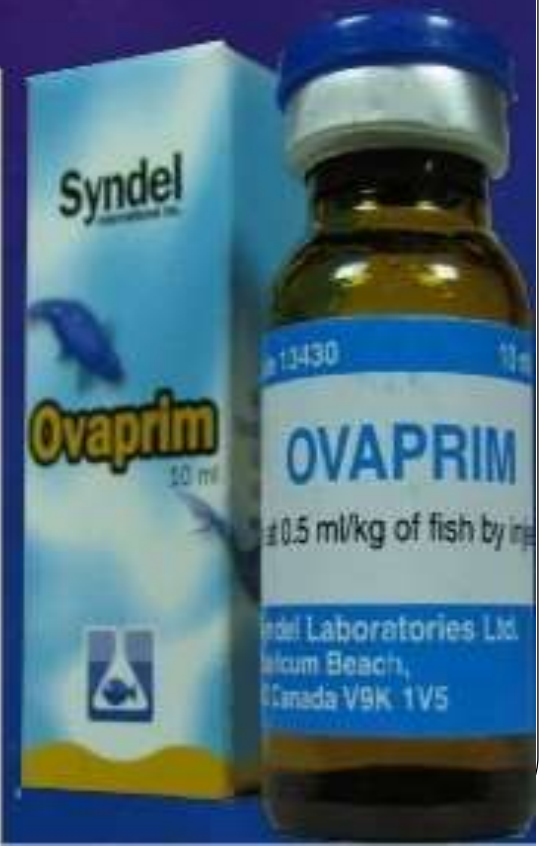
Substitutes of fish pituitary gland

SYNTHETIC HORMONE OF FISH SPAWNING

OVAPRIM AND OVATIDE :-







Significance of Induced Breeding

- Production of Spawn of pure varieties.
- Securing unmixed pure quality of fish seed in large quantities.
- It assures timely available of pure seed, where as in nature the availability of seed is quite uncertain.
- Increase the per unit yield in fish culture.
- Spawning of IMC’s twice within an interval of 2-3 months during the same breeding season.

Problems of Hypophysation technique

- Farmers cannot measure the potency of the available gland.
- Serious difficulties in large scale collection and storage of pituitary.
- Large gap between the demand and supply of pituitary.
- Basic equipments like chemical balance, refrigerator and centrifuge not available in many farms.
- Pituitary gland very costly in market.

References

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- General and applied Ichthyology – S. K. Gupta and P.C. Gupta
- Fundamentals of Ichthyology – S. P. Biswas
- A textbook of Fish and Fisheries – Pandey and Shukla

THANK YOU