Induced Breeding Of *Labeo Rohita* With "Ovatide"

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ABSTRACT
Labeo rohita commonly known as Rohu, is a prominent freshwater fish in South Asian aquaculture due to its high commercial value and nutritional benefits. Aquaculture uses induced breeding as a technique to stimulate fish to spawn in a controlled environment. The technique involves the administration of hormones that trigger the fish's reproductive system to undergo final maturation, ovulation, and spawning. We calibrated this hormone Ovatide usage based on the weight and maturity stage of the broodstock. The ovatide significantly enhances the ovulation rate and egg quality, with spawning initiated within 12 to 24 hours of injection. Depending on the environmental conditions, the breeding rate reaches 80%, and the fertilization rate is around 90% enhanced compared to the other methods.

Key words *Labeo rohita*, Ovatide, Broodstock, hormones, spawning.

Introduction

India began cultivating fish in freshwater lakes as early as 350 B.C., although on a limited scale. Carp culture is common in India. Aquaculture in the State of Punjab is a rapidly developing industry that provides individuals with high-quality, low-cost protein at a reduced cost (Agarwal, 1999). Currently, about 9890 hectares are under cultivation, compared to 343 hectares in 1980–81, and the amount of fish produced has increased from 2800 to 86000 tons, which includes both capture fisheries and aquaculture. Over the past ten years, the aquaculture sector in the state has contributed an average annual growth of 6000 tons. Carp culture has significantly improved the socio-financial status of fish agriculturists by embracing previously unused logical innovations for breeding (Nandeesha and Rao, 1989). Freshwater streams and lakes typically host Rohu, also known as *Labeo rohita*. Topographically, they disperse along calm and tropical districts such as Vietnam, Pakistan, Nepal, India, Myanmar, and Bangladesh. Generally, *Labeo* breeds in wide-ranging tanks and waterways, but it does not thrive in restricted waters. The mature *Labeo rohita* measures approximately 0.5 to 2 meters in length and weighs approximately 4 kg, with the most extreme species reaching up to 45 kg. Their dorsal surface is brownish or pale blue, while the underside is silvery-white. Huge cycloid scales, of ordered significance, secure the body surface. These cycloid scales are circular, hard, and level. The tubes of the sidelong line framework puncture the scales overlying the horizontal line.

MATERIALS & METHODS

Ovatide, injection, clothes, hapa net, beaker.

Kingdom -Animalia
phylum -Chordata
Class -Actinopterygii
Order -Cypriniformes
Genus -*Labeo*
Species- *rohita*

SELECTION CRITERIA FOR BROODER FISHES

MALE	FEMALE
Active and relatively larger size	Active and larger in size
Pectoral fin was rough	Pectoral fin was slimy
Abdomen normal	Bulky abdomen, elastic and soft
Slightly producing reddish vent seemed best criteria for male	Small number of eggs from the ovary with small pressure were observed for maturity

OVATIDE a synthetic Gonadotropin Releasing Hormone analogue (SGnRH), has proven to be effective for induced breeding in Indian Major Carp, Exotic Carp and Catfish. SGnRHs are often used to manipulate reproductive processes in fish,and their success in inducing breeding are a valuable tool in aquaculture and fisheries management.

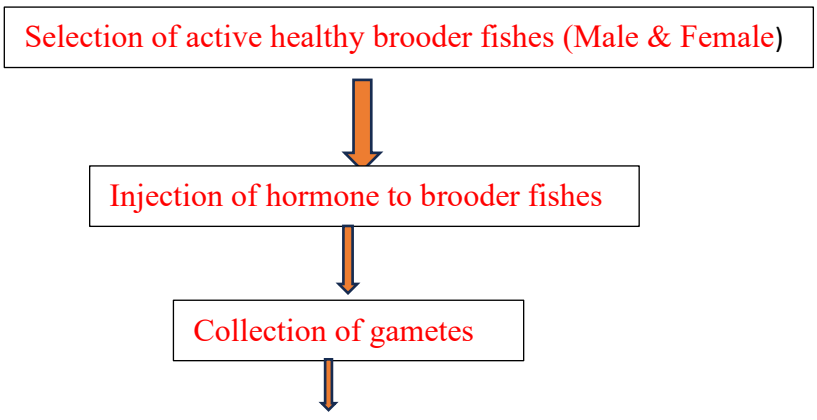
METHOD OF APPLICATION

Once you've selected a sexually mature and healthy female or male fish, measure its weight and determine the necessary injection amount of Ovatide. If sedation is required in the case of a highly sensitive variety of fish, anesthetize the fish using any recommended agent in the usual manner. Using a 2 ml hypodermic syringe with 0.1 ml graduations and a No. 22 needle, firmly hold the fish and inject the calculated amount of Ovatide solution intramuscularly in the region of the caudal peduncle above the lateral line. Draw only the required amount of Ovatide from the vial directly through the syringe and expel the trapped air, if any, with the needle pointing upwards before giving the injection.

RECOMMENDED DOSES

SPECIES	DOSE	
	Male (ml/kg)	**Female (ml/kg)**
Catla catla	0.20-0.30(ml/kg)	0.40-0.50(ml/kg)
Labeo rohita	0.10-0.20(ml/kg)	0.20-0.40(ml/kg)
Cirrhinus mrigal	0.10-0.20(ml/kg)	0.20-0.40(ml/kg)
Silver carp	0.20-0.25(ml/kg)	0.40-0.50(ml/kg)
Grass carp	0.20-0.25(ml/kg)	0.40-0.50(ml/kg)

Steps for INDUCED BREEDING



Separation of spawn from the hapa

PARAMETERS TO BE MAINTAINED

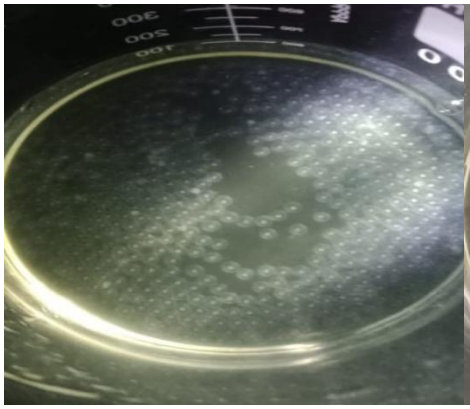
pH: The carps are capable of breeding throughout a broad pH spectrum. Nonetheless, alkaline pH values (7-8) are crucial for success.

Light: Light regulates fish reproduction. Extended photoperiods might cause fish to mature and spawn earlier.

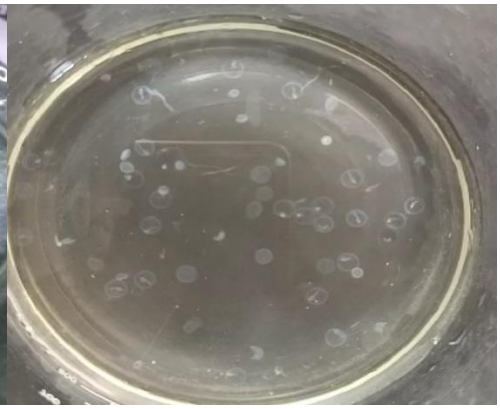
Temperature: Natural environmental temperature influences the maturation of individual male and female and breeding of fishes. The presence of optimum temperature ranges and critical limits, beyond which fish won't reproduce, is a consistent finding. Warm temperatures play a central role in stimulating gonadal maturation and accelerating spermiation in many fish species. This suggests that temperature directly impacts gonads and indirectly affects their responsiveness to pituitary gland stimulation, consequently influencing the gonadotropin synthesis and their release. For Indian major carps, it's noted that their breeding occurs in the temperature range of 24°C to 37°C, with the best temperature being around 27°C (Chaudhary 1968). Breeding success diminishes significantly beyond 30°C.

Selection of brooders

Injecting of hormone to brooder fishes



Observation of fertilized eggs



Hatched eggs

We relocated the brooders to different tanks during ovulation to prevent self-fertilization and ensure effective fertilization. We utilized the stripping process to retrieve eggs from ovulated females and milt from males. The fertilization procedure started with the careful collection of eggs into a receptacle, then followed by the application of male milt over the same dish. Carefully combine the eggs and milk, ensuring complete amalgamation for two minutes.

Hatching - Hatching occurs when the eggs are fertilized, which takes 18-25 hours. The fertilized eggs are moved to a hatching hapa. The hatching hapa consists of two rectangular mosquito nets. It's suspended in water. The hatching hapa is made up of two hapas: an inner and an outer. The eggs hatch in the inner hapa. The hatchlings crawl through the inner hapa's meshes and make their way to the outside hapa.

To enhance the fertilization process, a specialized solution comprising 0.3% urea and0.4% sodium chloride in distilled water was introduced into the mixture. This solution temporarily reduced the stickiness of the eggs while simultaneously prolonging the fertilizing capacity of the milt.

$$\textbf{Relative fecundity} = \frac{\textbf{number of eggs laid}}{\textbf{weight of fish in gms}} \textbf{x } 1000$$

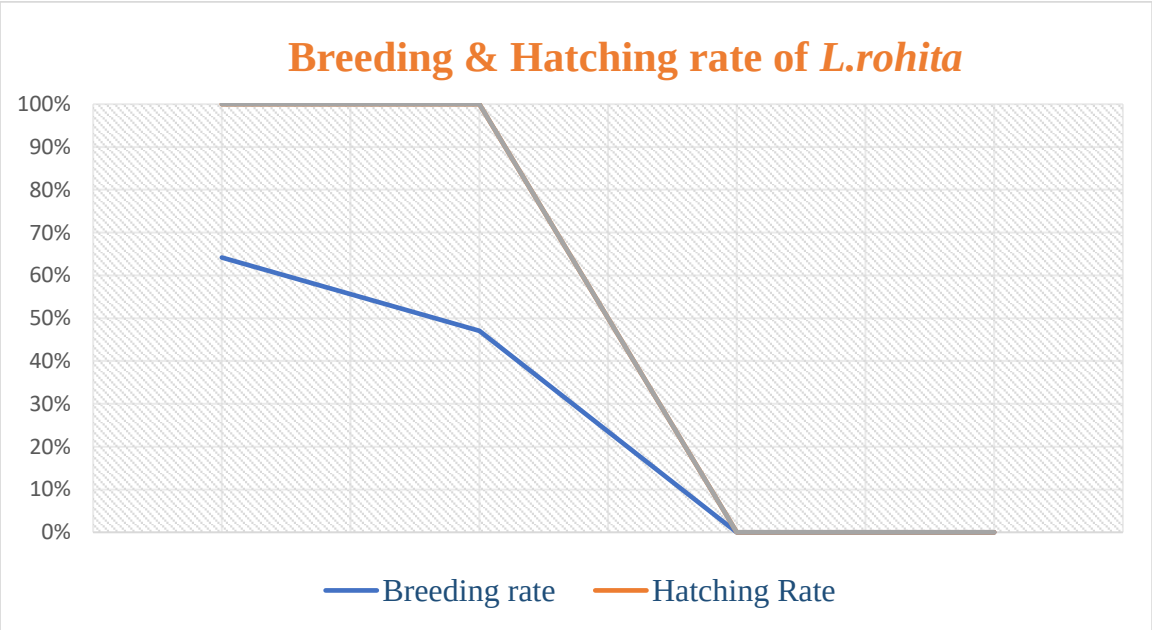
$$\textbf{spawning} = \frac{\textbf{number of fish ovulated}}{\textbf{total numberof fish injected}} \textbf{x 100}$$

$$\textbf{Hatching}(\%) = \frac{\textbf{number of Hatchlings}}{\textbf{No. of fertilized eggs kept for hatching}} \textbf{x 100}$$

$$\textbf{Fertilization } (\%) = \frac{\textbf{number of fertilized eggs in a sample}}{\textbf{total number of eggs in a sample (Both fertilized and unfertilized)}} \textbf{x 100}$$

RESULT AND DISCUSSION

Induced breeding of *Labeo rohita* (Rohu) using ovatide, a synthetic hormone preparation, has shown positive results in enhancing spawning. The breeding rate is around ~80% and the fertilization rate is ~90%.



Graph: -*Breeding and Hatching rate*

Table-*Required parameters for breeding*

S.no	***Parameters***	***Range***
1	*pH*	*7-8*
2	*Temperature*	*27-29 ^0C*
3	*Dissolved oxygen (mg/l)*	*7.5-8.0*
4	*Free CO_2 (mg/l)*	*0.40-0.50*
5	*Total alkalinity (ppm)*	*83-85*

DISCUSSION

Dr. T. Jagadeeshwara Chari, et al 2023 The breeding technique is most effective where we can get desired quality of seeds with almost same size so that we can get huge crop by culturing. Tilapia is a lean protein source rich in vitamins and minerals.
MH Rahman et al 2023 The Indian major carps are very suitable for fish production under the sub continental conditions. They grow quickly and are easy to raise in our ponds. However, the greatest barrier to commercial carp production is a lack of availability.

B. Govind Kumar, et al 2023 Stated that the breeding technique is most effective where we can get desired quality of seeds with almost same size so that we can get huge crop by culturing the murrels with almost same size cannibalism is avoided, the survival rate of murrel is so high

CONCLUSION

Induced breeding of *Labeo rohita* (Rohu) using ovatide, a synthetic hormone preparation, has shown positive results in enhancing spawning. The breeding rate is around ~80% and the fertilization rate is ~90%. the breeding technique is most successive here we can get desired qualities of seeds throughout the year and in a required place. By maintaining the optimum water quality parameters the spawning, hatching rate is maximised.

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