

**INDUCED BREEDING OF GRASS CARP,  
*CTENOPHARYNGODON IDELLA* (VALENCIENNES) IN  
RUPANDEHI, NEPAL**

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**ABSTRACT**

Induced breeding is a scientific approach to the modern fish breeding procedure whereby ripen brood fishes are stimulated to release the eggs by pituitary hormone or any other synthetic hormone to breed in captive condition. Fish pituitary is mainly used for induced breeding but due to difficulties in the preparation of injections and preservation, nowadays synthetic hormones like LHRH-a, Ovaprim, WOVA-FH, Ovatide etc. are found to be used for induced breeding. A total of 4 sets of female grass carp were used for induced breeding with application of LHRH-a and pituitary extract in April at Mandal Fish Hatchery, Rupandehi. In total 23,67,500 eggs were collected and incubated. Fecundity, fertility and hatching rates were 1,25,000, 40-70% and 60-70% respectively. The rate of breeding especially, fertilization and hatching rate with LHRH-a was found better than with pituitary extracts.

**Key words:** Induced breeding, grass carp, releasing hormone, pituitary gland, LHRH-a.

**INTRODUCTION**

Fish is consumed by non-vegetarian consumers of all ethnic groups as one of the protein source and tasty food items in Nepal. Due to this the demand of fish flesh is high. To fulfill the demand, many people are involving in fish farming. Fish farming is also an economic agricultural activity to uplift the economic status of farmer and of the nation. In 2016-2017, total national fish production from aquaculture and natural catch was 83,898 metric ton (DoFD, 2018). For the farming of fish, the availability of fingerlings is essential. The total pond area of aquaculture was 11,396 ha and fry distribution was 282.585 million in 2016-2017 in the country. (DoFD, 2018) The number of fry produced in the country seems enough to fulfill the demand based on the area of coverage. However, the fry production and distribution of carp is not

sufficient to fulfill the demand of fish farmer. The demand of fish seed is highly increasing day by day. Thus, the induced breeding of fish for increasing seed production is important.

Fish breeding is the process of mating and production of young fishes which ensures species continuity and survival. In aquaculture, fish breeding is very important activity ensuring availability of fingerlings for stocking of ponds, pens, tanks, cages and open water stocking. Fishes can be bred naturally in their aquatic habitat under suitable conditions but, the availability of fish seed from natural habitat is quite difficult and is not sure to get pure seed. So, during last few decades efforts have been made by fishery scientists to tackle the problem of shortage of fish seed by evolving suitable methods of breeding of carps (both naturally as well as induced) in fish farms purely by

Use of Medicinal Plants in Eastern Part of Pokhara, Nepal induced breeding (Gupta and Gupta, 2006). Induced breeding is a scientific approach to the modern fish breeding whereby ripen brood fish are stimulated by pituitary hormone or any other synthetic hormone to breed in captive condition. Fish pituitary was mainly used for induced breeding but due to difficulties in the preparation of injection and preservation, nowadays synthetic hormones like LHRH-a, Ovaprim, WOVA-FH, ovatide etc. have been used.

Many cultured farm-fish do not breed in captivity. The reason may be insufficient release of hormone (Chaudari and Alikhuni, 1957). So, the induced breeding is the scientific technique to overcome such problem. Fish pituitary can be collected and other synthetic hormones are available in market for the induced fish breeding. Fish pituitary is not available in 'ready to use' product as like other synthetic hormone. The preparation of injection of pituitary is quite difficult than that of other synthetic hormone. The injection of inducing agent is usually given intramuscularly to the dorsal fin of the fish so, that the fish gets excited and lays large number of eggs.

This paper deals about the induced breeding of grass carp, *Ctenopharyngodon idella* (Valenciennes) and present study may support the fish farmers who are involved in aquaculture fisheries or hatchery management as well as to the researcher and students who need to understand the scientific method of fish breeding.

## MATERIALS AND METHODS

### Study area

This study was conducted in Mandal Fish Hatchery, which is a private fish farm in Rupandehi district at Patthardanda near Butwal (Figure 1). The total area occupied by the farm

is 5 ha. The main water source for the fish seed production in this farm is deep boring. The hatchery is producing the fish seed of common carp, silver carp, bighead carp, grass carp, rohu, naini etc. The farm is famous in western Nepal and is able to fulfill the demand of fish farmer.

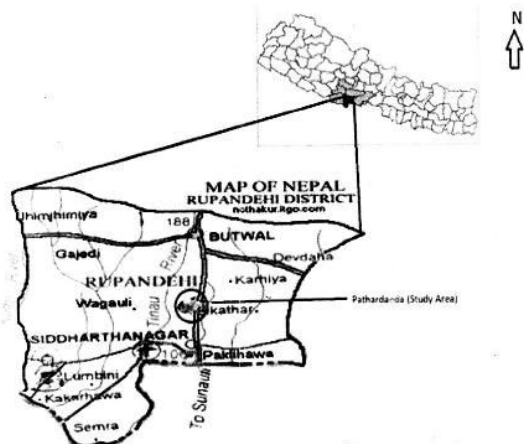


Figure 1. Location map of study area.

### Breeding techniques

For present work, field visits were made to Mandal Fish Hatchery Farm (MFHF) during the breeding season from January-April, 2018. All activities such as maintenance of brood stocks, brood selection, methods of injection, spawning, incubation and hatching were observed. The selection of male and female brood fishes for the breeding was carried out by identifying the external characters. The mature male had rough pectoral fins, milt oozed out when pressed on abdomen. The mature female had soft pectoral fin, round abdomen with reddish vent, ova oozed out when pressed on abdomen. A total of 4 females and 8 males of grass carp were used to spawn with application of LHRH-a hormone. LHRH-a hormone was administered at the rate of 0.6µg/kg for female fishes by splitting into two doses and 0.15µg/kg to male with single dose. Each female was given two injection of LHRH-a (25% first dose and 75% second dose).

The first injection was given in the day time (2-3pm). The second dose was administered after 6-8 hrs of the first injection (9-10pm). The male was given only one injection at the time of second injection to the female.

The ratio of brood fishes for breeding was 2:1 (male and female). The female fishes showed response after 5-6 hrs of second dose of injection. In grass carp self fertilization occurs.

released eggs, fecundity and hatchlings.

S. N.	Weight of female spawner (kg)	Amount of hormone LHRH-a ( $\mu\text{g}/\text{kg}$ )	Released eggs (no.)	Fecundity (no. of egg/kg fish)	Number of hatchlings	Remarks
1	9.1 kg	5.46	11,37,500	1,25,000	6,82,500	
2	8.4 kg	5.04	10,50,000	1,25,000	6,82,500	
3	9 kg	5.4	11,25,000	1,25,000	7,87,500	
4	7.4 kg	4.44	-	-	-	could not respond

The records that were kept by the workers of the farm show that the fertilization rate with pituitary was (45-60%). The fertility with LHRH-a was recorded upto 88.11-97.94% (Gupta and Gupta, 2006). But during this study the fertility rate was recorded 40-70% due to the low temperature of water (23°C) during the breeding season.

## CONCLUSION

From the direct observation of induced breeding at Mandal Fish Hatchery it was found that the synthetic hormones were replacing the pituitary extracts because of difficulties during preparation of injection. The rate of fertilization depends on the temperature, water quality and selection of good brood fishes. The induced breeding was successfully carried out in the farm. The rate of breeding especially, fertilization and hatching rate with LHRH-a was found higher than with the pituitary extracts.

## RESULTS AND DISCUSSION

Induced breeding of carp is successfully performed by using LHRH-a hormone as the inducing agent. In total 4 females of average 8.47 kg size and 8 males of matured grass carp were used as spawner and 15,38,250 hatchlings were produced in the present study (Table 1).

**Table 1.** Number female used for induced breeding with dose of hormone, number of

## REFERENCES

- Chaudari, H. and K. H. Alikunhi (1957). Observations on the spawning in Indian carps by hormone injection. *Current Science*. **26**: 381-382.
- DoFD (2018). *Fisheries Statistics and Annual Report, 2073/74 (in Nepali)*. Directorate of Fisheries Development, Balaju, Kathmandu.
- Gupta, S. K. and P. C. Gupta (2006). *General and Applied Ichthyology (1<sup>st</sup> edition)*. S. Chand and Company, New Delhi, India.

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