

INDUCED SPAWNING OF *LABEO ROHITA* USING SYNTHETIC HORMONES

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Abstract: “Ovaprim-C” manufactured by a Canada-based company, M/s Syndel laboratories, is in use world over today for induced spawning of fishes. Ovaprim-C contains 20 µg of Salmon gonadotropin releasing hormone (GnRH) and 10 mg of domperidone ml. The high cost and viscosity of Ovaprim proved a prohibitive factor. Another synthetic hormone “Ovatide” has been manufactured by a Mumbai based M/s Hemmo Pharma for the same purpose. The main ingredient of ovatide is a synthetic peptide protein, which is analogous to naturally occurring gonadotropin releasing hormone GnRH and dopamine antagonist. Ovatide composed of 20 µg of Salmon GnRH and 10 mg of domperidone per milliliter. However, Ovatide is cheap and less viscous as compared to Ovaprim. Present research was planned to work out the efficacy and usefulness of both the hormones using Rohu (*Labeo rohita*) at Government Fish Seed Hatchery, Bahawalpur, Punjab. A comparison was carried out for both the drugs for fecundity, fertilization, and hatching rate during the induced spawning of *rohita* administered single dose of each hormone. Ovatide performed much better than Ovaprim.

Keywords: *Induced spawning, Ovatide, Labeo rohita, GnRH analogue.*

INTRODUCTION

Most of the fishes for aquaculture such as Asiatic carps, mullet, milkfish are open water breeders and breed under the influence of environmental stimuli. They become refractory when subjected to confinements of ponds. They either do not mature or become incapable to reproduce in confined environment. Efforts were made to find out ways and means to induce these fishes to breed under controlled conditions and

facilitates easy availability of seed for aquaculture. For many pond breeding species such as common carp and tawes a suitable hormone was necessary for synchronizing large-scale spawning.

A Canada-based company, M/s Syndel laboratories prepared the LH-RH analogue in the form of a ready-to-inject solution and named it "Ovaprim" which is used the world over today. Ovaprim contains of 20 μ g of salmon GnRH and 10mg of domperidone per milliliter. In India trials with Ovaprim have given very encouraging results (Nandeesh *et al.*, 1990, 1991). Kaula and Rishi (1986) reported the successful spawning of Mrigal with Ovaprim. Nandeesh *et al.*, (1990, 1991) reported very satisfactory results in trials with Ovaprim. Khan *et al.*, (1992) reported successful spawning of Rohu and Mrigal with Ovaprim at Fish seed hatchery Rawal Town, Islamabad.. However, a major handicap in the use of Ovaprim is its high viscosity, which causes difficulty in injection. Its high cost is also a prohibitive factor.

The aforstated contraining factors of Ovaprim promoted a Mumbai-based pharmaceutical company, M/s Hemmo Pharma, to undertake synthesis of GnRH analogues and develop an indigenous hormonal formulation, which can be made available to the fish hatchery operators at an affordable price. This ultimately led to the formulation of Ovatide. Central Institute of fisheries education India (CIFE) (1997-1998) carried out extensive field trails on induced breeding of fishes including carps using Ovatide in Madhya Pradesh, Andhra Pradesh, Haryana and Maharashtra and reported encouraging results. At government fish seed hatchery Muzaffar Garh, Pakistan, Ovatide treated grass carp showed high rate of fertilization, fecundity and hatching as compared to Ovaprim treated grass carp (Bhatti and Qureshi, 1999). Ovatide is cheaper as compared to Ovaprim and it is also going to be synthesized in Pakistan by Star Laboratories, Multan Road, Lahore.

MATERIALS AND METHODS

Experiments were conducted at Punjab Government Fish Seed Hatchery, Bahawalpur. Trials were taken during May-July 2004. Only

Rohu (*Labeo rohita*) was trailed for the said experiment. Brood stocks from the above said hatchery was utilized to administer the standardized doses of Ovaprim-C and ovatide inducing agents. Both the agents were used in a single dose for both sexes as Nandeeshia *et al.*, (1990) did for Ovaprim trials.

Dose of ovatide used for female is 0.45 ml/kg and for male is 0.2 ml/kg as reported by CIFE (1998). Dose of Ovaprim for female is 0.6 ml/kg and for male is 0.2ml/kg as used by Nandeeshia *et al.*, (1990). In all trials only one specific dose was tried due to the shortage of hormone and brood stock. So risk was not taken to use varied dosage because these experiments were done to produce fish seed for sale to farmers. Breeding trials were conducted in circular ponds. Most of the breeding trials were taken by the already available infrastructural facilities of the above said hatchery.

Water quality parameters, *viz.*, temperature, dissolved oxygen, pH and CO₂, were checked through out the experiment to note the malfunction, if any. Weight of male, fecundity, percentage of fertilization and hatching percentage were recorded for every pair to compare the efficacy and usefulness of both induced agents. Percentage of fertilization and hatching percentage were taken by using following formulae:

$$\text{Fertilization (\%)} = \frac{\text{Average no. of fertilized eggs in sample}}{\text{Average total no. of eggs in a sample}} \times 100$$

$$\text{Total No. of Spawn} = \frac{\text{Average spawn No.}}{\text{sample}} \times \text{Total volume of spawn}$$

The results of trials conducted are summarized in Table I.

RESULTS

The results of the trials are summarized as Fecundity, Fertilization and Hatching rates.

Fecundity

During the experiment it was observed that fecundity (Egg production) rate was better under the Ovaprim treatment as compared to the Ovatide. Ovaprim perform 0.58-lac eggs/kg and ovatide as 0.49-lac egg/kg on average basis. Fecundity remains high for Ovaprim treated fish as compared to ovatide treated fish (Table I).

Table I: Comparison of Ovaprim and Ovatide for different parameters in female, *Labeo rohita*.

Parameters	Ovaprim	Ovatide
1. No. of females treated	8	8
2. Total weight of females (Kg)	11.4	10.9
3. Total no. of eggs obtained (Millions)	0.64	0.57
4. Average no. of eggs ($\times 10^3$)/ kg	58	49
5. Fertilization percentage	53	69
6. No. of post larvae obtained ($\times 10^3$)	359	432
7. Latency period (Hrs)	8.40	10.25

Fertilization rate

Fertilization rate with Ovaprim was calculated as 54% while for Ovatide it remained as 69%. So Ovatide contributed 16% better results towards fertilization rate of eggs.

Hatching rate

As the hatching percentage of eggs is concerned for the Ovaprim, it remained as 42% and for ovatide as 37%, which revealed that Ovaprim gave 5% better performance towards hatching rate.

Post larvae obtained

Number of the hatchlings (post larvae) obtained under Ovaprim treatment were 1.26 lac while under Ovatide treatment their number were 1.63 lac. Here also ovatide performs better.

Latency period

Latency period remained shorter in Ovaprim treated fish as compared to ovatide treated ones (Table I).

DISCUSSION

Overall, the results of this experiment revealed that there remained non-significant difference between the efficacies of two utilized synthetic hormones (Ovaprim-C & Ovatide) for the breeding of *Labeo rohita* in Fish Seed Hatchery, Bahawalpur. The results are contrasting with the results of such trials in Central Institute of Fisheries Education (CIFE), 1997-98 except that of the results of latency period where ovatide showed significantly positive results as compared to Ovaprim. The significant difference between results of two hormones for latency period (spawning time) could not revealed any sound base. This may be due to the dose difference of two treatments. The dose of ovatide used was 0.45 ml/kg of fish, on the basis of the report of CIFE (1998). On the other hand Ovaprim dose used was 0.06 ml/kg as used by Nandeeshia *et. al.* (1990).

Interestingly, *L. rohita* showed entirely different response here in Punjab (Pakistan) than reported by CIFE (1998). There may be many factors affecting for this difference. This may be due to difference in handling, water quality, and other environmental physio-chemical conditions (temperature etc.). For instance, rainfall is better in experimental sites of India like Madhya Pradesh, Andra Pradesh, Haryana Maharashtra as compared to the Bahawalpur, Pakistan. Thus, induced spawning of *L. rohita* with ovatide showed different response.

As aforesaid the water quality parameters (alkalinity, DO, hardness), may also be different at two experimental sites of India and

Pakistan. All these water quality parameter as reported by CIFE (1998) are more suitable when we compare to our Central Fish Seed Hatchery, Bahawalpur. Spawning efficiencies of two hormones remained statistically non-significant but economical efficacy is very much considerable. Ovotide is the cheaper hormone, was calculated as 70% more economical as compared to Ovaprim (Bhatti and Qureshi, 2000). This economically better position of ovotide suppresses the Ovaprim giving an equal result of seed production at hatcheries where the hatchery managers are always to raise the economic position of the unit.

REFERENCES

- BHATTI, M. N. and QURESHI, T. S., 2000. A note on the comparison of efficiency of Ovotide and Ovaprim on Grass Carp with reference to fecundity, Fertilization and hatching at Fish Nursery Complex Muzaffargarh. *Pakistan J. Fish.*, 1(1): (107).
- CIFE, 1999. *Central Institute of Fisheries Education, Mumbai*. New Synthetic hormone "Ovotide" for Fish Breeding, 1999.
- KAULA, M. and RISHI, K. K., 1986. Induced spawning of Indian Major Carp *Cirrhinus mrigala* with LH-RH analogues or pimozide. *Aquaculture*, **54**: 45-48.
- KHAN, M. N., JANJUA, M. Y. and NAEEM, M., 1992. Breeding of carps with Ovaprim (LH-RH Analogue) at Fish Seed Hatchery Islamabad. *Proc. Pakistan. Congr. Zool.*, **12**: 545-552.
- NANDEESHA, M. C., DAS, S. K., NATHIANIEL, D. E., and VARGHES, T. J., 1990. Project report on breeding of carps with Ovaprim in India. Spl. Publ. No. 4, AFSIB., Mangalore, pp. 41
- NANDEESHA, M. C., DAS, S. K., RAMACHARYA and VARGHES, T. J., 1991. Further observations on breeding of carps with Ovaprim. Spl. Publ. 6, AFSIB Mangalore, pp. 41

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