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# Induced Spawning of *Clarias batrachus* (Linn.): Effect of Ovaprim Doses and Latency Periods on the Weight of Stripped Eggs and Ovary

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## Abstract

The breeding performance of *Clarias batrachus* was evaluated at four doses of Ovaprim (0.5, 1.0, 1.5 and 2.0 ml•kg<sup>-1</sup> body weight of female) in combination with five latency periods (11, 14, 17, 20 and 23 h). The breeding performance was judged by the total weight of stripped eggs and ovary. The lowest ( $P < 0.05$ ) weight of stripped eggs was obtained from the females injected with 0.5 ml Ovaprim and stripped at 11-17 h. A steady increase in stripped egg weight was observed by the use of hormone doses beyond 0.5 ml with 11 h latency combinations. Free flow of eggs was observed at 1.0 and 1.5 ml dose, when stripped respectively at 14-23 h and 14-17 h post-injection. These doses and latency period treatments produced the significantly ( $P < 0.05$ ) highest weight of stripped eggs compared to other treatments. The stripped ovary weight was significantly ( $P < 0.05$ ) lowest when the females were injected with 1 ml dose and stripped at 14-23 h, or 1.5 ml dose and stripped at 14-17 h. The injection of 1.0-1.5 ml Ovaprim dose per kg female weight in combination with 14-17 h latency was suitable for obtaining the highest weight of stripped eggs in *C. batrachus* during induced breeding operation.

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## Introduction

*Clarias batrachus* is a high valued catfish that supports important commercial aquaculture in the Indian sub-continent. However, the availability of stocking material in this catfish remains a major constraint for its aquaculture. Wild collection of seed may not be the dependable source of seed supply for its intensive culture. So induced breeding is the only alternative source for getting the stocking material. Successful induced breeding of the species has been reported by the use of LHRHa (Manickam & Joy 1989), HCG (Zonneveld et al. 1990) and pituitary extract (Rao & Ram 1991) as inducing agents in the hatchery condition. The use of synthetic analogue of gonadotropin-releasing hormone (SGnRHa) is a new addition for spawning as an inducing agent that stimulates endogenous gonadotropin release from the pituitary. The successful use of SGnRHa in combination with dopamine blocker receptor for induced ovulation has been reported in several cultivable species (Lin & Peter 1996). Several commercial inducing agents viz. Ovaprim, Ovatide, Ovopel and Dagin are in regular use for successful spawning of fishes (Brzuska 2001; Szabo 2003; Sahoo et al. 2004). Ovaprim, a leading synthetic hormone is a combination of SGnRHa and domperidone, which is suitable for efficient ovulation in catfishes (Cheah & Lee 2000; Sahoo et al. 2003). The success of induced breeding depends on the type of hormone used and its potency, dose of hormone and maturity status of the fish. The success of induced breeding also depends on the latency period, which has been discussed for several species (Hogendoorn & Vismanas 1980; Legendre & Oteme 1995; Legendre et al. 2000). This condition suggested that optimum hormone dose in combination with the latency period is desirable for the collection of highest quantity of eggs from a female *C. batrachus* during spawning induction, which has not been evaluated properly in many cases. So the study reports the effect of different doses of Ovaprim, together with latency periods, on the weight of stripped eggs and ovary of *C. batrachus* during induced breeding.

## Materials and Methods

The *C. batrachus* brood were raised in 0.01 ha earthen pond at the Central Institute of Freshwater Aquaculture, India. The fish were regularly fed at 2% of their body weight with laboratory made pelleted feed contain-

ing 30% crude protein and 3.5 Mcal gross energy per kg feed. Female *C. batrachus* of  $120 \pm 8.37 - 138 \pm 5.83$  g (mean  $\pm$  SE) size were selected for induced breeding during monsoon (July - August). The females were considered based on their soft distended belly and uniform shining intra-ovarian oocytes. Ovaprim was used as inducing agent, which contains 20  $\mu$ g of SGNRH $\alpha$  (D-Arg<sup>6</sup>, Trp<sup>7</sup>, Leu<sup>8</sup>, Pro<sup>9</sup>, Net) and 10 mg domperidone per ml. Four doses of Ovaprim (0.5, 1.0, 1.5 and 2.0 ml per kg female weight) and five latency periods (11, 14, 17, 20 and 23 h) were used in twenty (4x5) different combinations. Five females were used for each combination. The body weight of each female was recorded before injecting Ovaprim. They were marked with coloured chips tied to their dorsal fin to record the breeding performance (weight of stripped eggs and ovary) for each female. The females were injected with selected doses of Ovaprim and kept separately in tubs (100L) provided with flow-through water system till the desired latency period. The females of each combination were hand stripped and eggs were collected individually in pre-weighed plastic petri plate. The weights of stripped eggs of all five females were pooled. The mean was considered as the average weight of stripped eggs for a particular dose and latency period treatment. The stripped females were dissected; ovaries were collected and weighed in a similar fashion as in the case of stripped egg weight.

The statistical analysis of data was performed using two way ANOVA (Snedecor & Cochran 1967), which included effects due to Ovaprim doses and latency periods. Treatment effect was considered significant at  $P < 0.05$ .

## Results and Discussion

The weight of stripped eggs at various Ovaprim doses and latency period combinations is depicted in table 1. The abdomen of females was hard when injected 0.5 ml per kg body weight and stripped at 11-17 h latency. The weight of stripped eggs was significantly ( $P < 0.05$ ) lowest at these combinations. This could be due to the ovulation failure for insufficient gonadotropin release at the lowest dose, which has also been reported in other species (Tan-Fermin et al. 1997). But, increasing the latency period, over 17 h, at this dose of Ovaprim, the output of egg was increased significantly ( $P < 0.05$ ). The longer latency period might have helped the gonadotropin to ovulate more eggs. A steady increase in the weight of

stripped eggs was observed with an increase in hormone doses beyond 0.5 ml and stripped at 11 h latency. It was due to the higher quantity of releasing hormone present in higher doses. The stripping of females was easy and free flowing of eggs was observed at 1.0-1.5 ml Ovaprim dose and stripped during 14-17 h latency. The weight of stripped eggs in these combinations was significantly ( $P < 0.05$ ) higher compared to other dose treatments. So it is suggested that these doses and latency period combinations are ideal for getting more strippable eggs in *C. batrachus*, which agrees to the earlier observation of [Zonneveld et al. \(1988\)](#). The egg output was significantly ( $P < 0.05$ ) decreased at 1.5-2.0 ml dose and 20-23 h latency period. This reduced output of egg was due to plugging of genital aperture by egg bunches during stripping of the females. This clearly suggests an overdose effect from the gonadotropic agent.

Table 1. Effect of different doses of Ovaprim and latency periods on stripped egg weight of *C. batrachus* during induced breeding operation.

Latency period (h)	Ovaprim dose (ml) per kg of body weight			
	0.5	1.0	1.5	2.0
11	0.72 ± 0.72 <sub>x</sub> <sup>c</sup>	3.90 ± 1.01 <sub>x</sub> <sup>b</sup>	5.23 ± 0.35 <sub>x</sub> <sup>b</sup>	7.55 ± 0.21 <sub>w</sub> <sup>a</sup>
14	2.79 ± 0.79 <sub>w</sub> <sup>c</sup>	11.16 ± 0.70 <sub>w</sub> <sup>ab</sup>	11.52 ± 0.46 <sub>v</sub> <sup>a</sup>	9.66 ± 0.63 <sub>v</sub> <sup>b</sup>
17	7.09 ± 0.16 <sub>w</sub> <sup>c</sup>	10.97 ± 0.86 <sub>w</sub> <sup>a</sup>	9.83 ± 0.31 <sub>v</sub> <sup>a</sup>	7.10 ± 0.30 <sub>w</sub> <sup>b</sup>
20	7.09 ± 0.26 <sub>v</sub> <sup>b</sup>	12.32 ± 0.90 <sub>vw</sub> <sup>a</sup>	6.50 ± 0.43 <sub>x</sub> <sup>b</sup>	6.14 ± 0.32 <sub>w</sub> <sup>b</sup>
23	7.65 ± 0.18 <sub>v</sub> <sup>b</sup>	13.27 ± 0.64 <sub>v</sub> <sup>a</sup>	6.60 ± 0.27 <sub>x</sub> <sup>b</sup>	6.38 ± 0.48 <sub>w</sub> <sup>b</sup>

Different superscripts in a row differ significantly ( $P < 0.05$ ).

Different subscripts in a column differ significantly ( $P < 0.05$ ).

The variation of stripped ovary weight is reflected in [table 2](#). The stripped ovary weight was significantly ( $P < 0.05$ ) lowest at 0.5 ml dose and 11 h latency combination. This was due to the partial stripping of only one female out of five females. The levels of Ovaprim (1.0-2.0 ml·kg<sup>-1</sup>) had no effect on stripped ovary weight at 11 h latency, also at 0.5 ml dose in combination with 14-23 h latency periods. This higher weight of ovary was due to the unovulatory condition. The lowest ( $P < 0.05$ ) ovary weight was observed when the females were either injected 1.0-1.5 ml Ovaprim per kg body weight and stripped at 14-17 h or at 1 ml dose in combination with 20-23 h post-injection. This could be due to more complete ovulation and smooth stripping.

Table 2. Effect of different doses of Ovaprim and latency periods on stripped ovary weight of *C. batrachus* during induced breeding operation

Latency period (h)	Ovaprim dose (ml) per kg of body weight			
	0.5	1.0	1.5	2.0
11	1.66 ± 1.66 <sub>w</sub> <sup>c</sup>	8.34 ± 2.11 <sub>v</sub> <sup>a</sup>	10.38 ± 0.18 <sub>v</sub> <sup>a</sup>	8.03 ± 0.77 <sub>wx</sub> <sup>a</sup>
14	8.56 ± 2.26 <sub>v</sub> <sup>a</sup>	4.77 ± 0.12 <sub>w</sub> <sup>b</sup>	4.60 ± 0.18 <sub>w</sub> <sup>b</sup>	5.82 ± 0.34 <sub>x</sub> <sup>b</sup>
17	10.85 ± 0.46 <sub>v</sub> <sup>a</sup>	4.86 ± 0.26 <sub>w</sub> <sup>b</sup>	6.67 ± 0.77 <sub>w</sub> <sup>b</sup>	9.25 ± 0.39 <sub>vw</sub> <sup>a</sup>
20	10.79 ± 0.52 <sub>v</sub> <sup>a</sup>	4.61 ± 0.21 <sub>w</sub> <sup>b</sup>	10.62 ± 0.65 <sub>v</sub> <sup>a</sup>	10.75 ± 0.48 <sub>vw</sub> <sup>a</sup>
23	9.78 ± 0.16 <sub>v</sub> <sup>a</sup>	4.44 ± 0.34 <sub>w</sub> <sup>b</sup>	10.91 ± 0.44 <sub>v</sub> <sup>a</sup>	10.91 ± 0.58 <sub>v</sub> <sup>a</sup>

Different superscripts in a row differ significantly ( $P < 0.05$ ); Different subscripts in a column differ significantly ( $P < 0.05$ )

## Conclusion

The study indicated that the best breeding performance in *C. batrachus* was obtained at 14-17 h latency in combination with 1.0-1.5 ml Ovaprim dose. This information is of value for a commercial hatchery to get optimum quantity of egg during induced spawning of this catfish. However, the results of the study must be verified by measuring the quality of ovulated eggs through fertilization and hatching. Also, studies are required to quantify the change in hormone levels in response to Ovaprim dose, and the level for gonadotropin that is responsible for successful ovulation in this catfish when these doses and latency period combinations are used.

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