

Breeding of Koi carp (*Cyprinus carpio*) and gold fish (*Carassius auratus*) using Synchronate B.(GnRh regulator)

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ABSTRACT

Use of synthetic hormone Synchronate B, in induced breeding of koi carp and gold fish has been studied for a period of 20 days. The study reveals that the hormone induction at the rate of 0.1ml per gold fish of 25 g and 0.25 ml per koi carp of 250 g yielded a potential fry stock of 1600±604 and 30880±7121 respectively. At preliminary level this study portends ease of breeding of fishes at farmer's choice, in spite of the need for further inquest.

INTRODUCTION

Ornamental fish rearing is becoming a necessity from luxury. Ornamental fishes are assuming importance in recent days as stress removers. Of these gold fish and koi carp are standard ornamental fishes enjoying constant support among ornamental fish lovers. The rearing of these fishes has been standardized over centuries. But breeding still remains to be a technique familiar only to breeders. Breeding with hormones is a common practice among edible fishes. Considering the demand and need to produce these ornamental fishes at specified period and place, induced breeding merits due research. Ovaprim though claimed to yield good performance in breeding (Nandeeshan *et al.*, 1993, Francis and Sundararaj, 1998, and Vincent and Thomas, 2008), its availability is not on par with other veterinary drugs and hormones in remote places of fish breeding. Further alternate sources also need to be standardized to avoid dependence on a single source. Hence, an attempt has been made to induce breed these fishes through a deviant mechanism from conventional path, with a commonly available hormone Synchronate B. which is frequently used to synchronize breeding in cattle (Oliveira *et al.*, 2001 and Whiteley and Jackson, 2004).

MATERIALS AND METHODS

The gold fish and koi carp earmarked for this study have been segregated from the common lot of fishes maintained at the ornamental fish culture unit of Livestock Research Station, Kattupakkam during February, 2005. The gold fish weighing around 25 g and koi carp around 250 g have been selected for the study. The males and females have been maintained separately and fed with boiled chicken entrails, tubifex worms and prepared feed containing protein density of 30 % *ad libitum* for 15 days.

At the day of breeding during evening hours around 5 O' Clock, the gold fish were injected with 0.1 ml of synchronate B, at caudal region and released into hapa of size 1m x 1m x 0.5m. The hapa was placed inside a 3m diameter and 1.5m height circular tanks. The tanks had the facility for central drainage. The sex ratio was maintained at two males for one female. In the case of koi carp 0.25 ml of infusion was given for each fish. The hapa size was 1m x 2m x 1m. In koi carp also two males for one female were allowed for breeding in hapa. Shower arrangements were made from a syntax tank above so that three tons of water was flowing through the hapa in a period of 24 h. The

water level was maintained in the tank at 1.25 m and the hapa was immersed leaving 15 cm of free board above. Plenty of *Ceratophyllum* leaves have been immersed for serving as a substrate for the adherence of eggs. Similar arrangements were also made for control without induction. These tanks were also arranged alongside of the experimental set up.

Good breeding performance could be noticed in all the tanks, as the breeders were in good condition. The subsequent day eggs could be noticed, and during third day onwards hatching could be observed. Though some free swimming could be observed during fourth and fifth day, total free swimming could be observed only from sixth day onwards. After thorough mixing of water three buckets of water was taken and the fries were counted. Egg yolk suspension was given as feed, three times a day.

The temperature, pH and dissolved oxygen were observed and estimated as per the prescriptions of APHA (1989), at 0900 h daily.

RESULTS AND DISCUSSION

The temperature, dissolved oxygen and pH observed during the study period have not shown much of variation among the tanks. The temperature at the time of breeding was 27.6°C, and shown a range of variation from 27.2 to 28.7°C. The pH of different tanks fluctuated from 7.2 to 7.4. The dissolved oxygen estimated has shown a range of variation from 5.3 to 5.7 ml/l. Due to aeration by shower arrangements, the deficiency impact of this parameter did not seem to have a pronounced effect.

A good chasing behavior was observed in all the sets. The number of eggs released and fertilized was comparatively higher than the control both in gold fish as well as in koi carp. Indeed this is a qualitative estimate, since the eggs have been sporadically scattered and seen all through the

tank, hapa and plants sticking here and there. A quantitative estimate of hatchlings could be made on fifth day. The table 1 categorically illustrates the number of hatchlings and survival up to 16th day in all the treatments.

The commercial breeders are breeding the fishes without hormonal induction, claiming success. Nevertheless this study proves that their efforts could be more meaningful by utilizing the full breeding potential of the animal. The estimated number of hatchlings in the tanks has vouched for this superior performance of hormone induced breeding in both the cases. Taking the economic considerations into account the hormone administration appears to be costlier. The dosage has been fixed arbitrarily on the higher side, depending upon the fish's acceptance of undiluted hormonal preparation on body weight basis. Capitalizing the demand and the ease of using this hormone in producing desirable results, this study merits further extensions for optimization especially in terms of dosage. The prostaglandin's regulative impact on release of GnRh (Zreik and Behrman, 2008) warrants in depth study in fishes as there is a possibility of induction using little quantity of this hormone through feed back mechanism. This would help in reducing the cost by using lesser quantity of hormone befitting the demand. Further comparative study using synchromate and ovaprim under synchronous conditions would throw more light on economic considerations in variant empirical situations. Grafted to that studies on their varied mechanisms of actions, either independently or in sequence or in combination at various stages of less studied estrus cycle of fishes, may render some more understanding on the reproductive nature of these animals, under external hormonal influences. As there are variations in reproductive performance depending upon GnRh levels mediated by acute and sustained administration of extraneous GnRh (Breton et al., 1990), the use of Synchromate b, as GnRh regulator merits further investigation.

The final survival in all the cases appeared to be very low portending deficiency in nutrition and nursery management. In induced cases, the survival was on par with the natural breeding indicating equivalence in subsequent performance of juveniles indicating the fact that full breeding potential can be harnessed through hormone induction.

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Table 1: The number of hatchlings in a span of 16 days of observation

Sl. No.	Day of hatching	Gold fish (induced)	Gold fish (non induced)	Koi carp (induced)	Koi carp (non induced)
1	6	3360±720	1120±500	54320±6840	16800±2949
2	7	2960±733	1040±604	51929±6726	16080±2133
3	8	2880±720	1120±733	48480±6733	13440±1964
4	9	2640±720	1040±843	46880±6517	12400±3328
5	10	2480±843	880±500	43920±7212	12560±2644
6	11	2320±1208	880±277	42160±7837	12400±1322
7	12	2000±843	800±139	39200±7233	11840±1703
8	13	1760±604	640±277	36640±7027	9520±4194
9	14	1680±480	640±139	31600±6721	9280±2069
10	15	1760±843	560±139	31600±6849	9200±2521
11	16	1600±604	560±139	30880±7121	9040±2331
% survival		46.6%	50%	56.8%	53.8%

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