

EFFECT OF DOUBLE DOSE OF CARP PITUITARY EXTRACT ON THE BREEDING PERFORMANCE OF THE SNAKEHEAD MURREL, *Channa punctatus* (BLOCH)

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ABSTRACT

The work was carried out to evaluate the effects of double dose injection of Carp Pituitary Extract (CPE) on breeding performance of snakehead murrel, *Channa punctatus* during June to August 2014. The CPE dose 0.5 mg for male fish and 10mg for female fish was used. The six replicate trials were carried out to observe the effect of CPE doses on spawning behavior of *C. punctatus*. In six replicate trials the female were injected with CPE hormone at the rate of 10mg/100g body weight & 10mg/100g body weight for 1st & 2nd dose respectively an interval of 7 hours. The males were injected 0.5mg.100g at the time of 2nd injection of female & gave satisfactory result. The ovulation was recorded after 9-12 hours of 2nd dose. The average fecundity was noted to be 11166.16. The fertilization rate was noted 70.10 to 85.30 % & hatching rate 60.60 to 70.80 % at water temperature of $28 \pm 1^{\circ}$ C. Therefore, the second injection of CPE dose may also be beneficial over the single dose of CPE in fish, *C. punctatus*.

Keywords: *Channa punctatus*, Carp Pituitary Extract, Fertilization, Fecundity, Hatching.

Introduction

The murrels breed naturally during monsoon in flooded rivers & ponds of India. The snakehead murrel is commercially important species. The striped snakehead *Channa punctatus*, a carnivorous air breather, is one of the valuable food fishes in the inland regions of India and hence has a good culture potential. The candidate species can survive in harsh environments with low dissolved oxygen. The flesh of this fish is firm, white, practically boneless, and has a most agreeable flavor. The heavy dark skin is good for soup and is usually sold separately. It is cultivated in India, Pakistan and Thailand. Its flesh is claimed to be rejuvenating, particularly during convalescence from serious illness and as a post natal diet.

To obtain quality fish, fish seed is the main precondition. The fish seeds from the natural spawning grounds still remain the main source of seed supply in the country. But the supply of fish seeds from the natural spawning

grounds is not sufficient and is also decreasing day by day due to unplanned development projects of flood control and irrigation, dams, embankments and modification of river courses. Therefore, proper management initiatives of this species should be taken to save this fish. The knowledge on the proper breeding techniques is one of them. For this reason, hormonal treatment been attempted for stimulating of gametes maturation and have been successfully used to spawn many commercially important fish species that exhibit arrested reproductive development (Zohar and Mylonas 2001).

The Parameswaran & Murugesan (1976) attempted induced breeding by carp pituitary glands. The control is mediated through actions of various hormones along the brain-hypothalamus-pituitary-gonad axis. The most important reproductive hormone is gonadotropin-releasing hormone (GnRH) that regulates gonadotropic hormone, GtH (Peter and Yu 1997). The induced spawning of Carps is being a common practice in our Vidarbha

region. But no systematic research works have so far undertaken in Vidarbha on the induced breeding of *C. punctatus*. Considering the economical as well as the biological importance of *C. punctatus* an attempt was made to develop the induced breeding techniques of this species using pituitary gland (PG) hormone.

Materials & Methods

The fertilized eggs of *C. punctatus* were obtained from induced breeding of both male and female by intramuscular injection of pituitary gland. The experiments were conducted during the natural breeding season of *C. punctatus* during June to August 2014. The brood fishes were reared in the miniponds providing supplementary feeds, viz., small fishes, prawns, aquatic insects, tadpoles at the rate of 5% of their body weight per day and chicken-viscera was also fed at the rate of 2% of their body weight daily. *Hydrilla verticillata* were provided into the breeding pond for hiding purposes. Mature females were selected by their bulging soft abdomen, oval shaped reddish vent slit and smooth pectoral fins while mature males were selected by pale reddish vent slit and rough pectoral fins. The weights of male and female breeders were 49- 54g and 48-50g respectively. The length of the male and female breeders varied from 10 to 14 and from 12 to 14 cm respectively. The experiment of induced spawning was designed with six replicate trials throughout the study period. The first dose for female consisted of 10mg of Carp Pituitary Extract per kg body weight of the fish in six different trials. The 2nd dose consisted of 10mg/100g PG body weight of the female. The 2nd dose was given after 7 hours of first injection. The males were given single dose at the time of 2nd injection of the female which was also 0.5 mg/100g PG body

weight of the fishes in different trials respectively.

Spawning behavior of hormonally induced fishes was closely observed. After spawning, the fertilized eggs were carefully collected from the breeding tank using a 500 ml beaker and transferred to a glass aquarium containing 15 L of water under gentle aeration. The water quality parameters including temperature $28 \pm 1^\circ\text{C}$ were recorded in the breeding pond and larval rearing tank throughout the experimental period. Eggs and milt were collected by stripping method. Fertilization was done by mixing of eggs and milts (sperms) and gently stirred with a clean feather to hasten the fertilization of eggs. Sperms were allowed to remain with the eggs for 5-10 minutes, and then the excess sperms were removed by 3-4 consecutive washes with saline (0.36%) water. The transparent eggs were considered as fertilized ones whereas the opaque eggs were considered as dead eggs.

The fertilization rate was calculated by the following formula:

$$\text{Fertilization rate} = \frac{\text{Number of fertilized eggs}}{\text{Number of total eggs}} \times 100$$

The fertilized eggs were then transferred into a hatching jar and maintained an ambient water temperature (28- 29^oC) and dissolved oxygen through continuous aeration. After 28-40 hours of fertilization, hatchling were started to come out from the egg shell and hatching was completed within another 8 hours.

The rate of hatching was calculated by the following formula:

$$\text{Hatching rate} = \frac{\text{Number of hatchling}}{\text{Number of total egg}} \times 100$$

For estimation of fecundity 10 ripe female of Snakehead Murrel was randomly sampled. In the present study, fecundity of various sizes of *C. punctatus* was estimated by gravimetric method. The fecundity of 06 specimens was computed by counts of ova in 06 samples of 1.0 g from each ovary.

Result and Discussion

The breeders showed aggressiveness after 10 hour of injection of the CPE. Each female paired with only single male & other was rejected. During spawning, the male bent its body closes to the female & released its milt & eggs were fertilized externally (Yaakob & Ali, 1992). The spawning was performed with CPE for the 1st & 2nd dose injection. The only single dose was given to the male breeders and two doses to female after 7-9 hours intervals of 1st injection.

The stripping time was noted after 8-12 hour after 2nd dose of injection. With regard to Pituitary Gland Extract, Parameswaran and Murugesan (1976) reported successful stripping & 28 to 100% fertilization rate. The initial dose of PG from 2 to 20mg/kg body weight of fish was administered to females & 2 to 20 mg/kg to male. Spawning was taken place after 10 to 18 hours of second injection.

In this present study, the pituitary extract hormones are used & showed successful stripping & fertilization. Hossain *et al.*, (2008) observed that the time required for stripping after injection was 9 to 12 hours. In present study the time required is same as like that of Hossain *et al.*, (2008). Hannifa (2000), observed a latency period of 23 -24 hours & fertilization of 60 to 70 % in fish *Channa*

punctatus induced with HCG, Luteinizing hormone and ovaprim.

The fecundity rate of the fish *C. punctatus* has been shown in table 2. The total 06 females of fish *C. punctatus* were to be observed & estimated under different body sizes as well as per kg body weight. The maximum number of ova was recorded 14440 from fish of 51.64g body weight & 13 cm in length. The minimum number of ova was recorded 7,820 from fish of 52.24g body weight & 12 cm in length.

In the present investigation, the fertilization and hatching rates were varied from 70.10 to 85.30% and 60.60 to 70.80% in 6 replicate trials. Das *et al.*, (2007) and Hossain *et al.*, (2008) observed the near about same fertilization and hatching rate of egg in female fish *Clarias batrachus* and *Channa striatus* respectively.

In the present study, the fertilization & hatching rates were good enough for production of fish seed in the environmental condition of Vidarbha region. From this study it is cleared that that artificial propagation through CPE gives more production of fish seed and may help to overcome from the dependency of natural breeding, collection & rearing. The double dose of Pituitary extract could be recommended for induced breeding in *C. punctatus* since it produced better result in terms of fertilization & hatching and the second dose of CPE may also be beneficial over single injection in fish *C. punctatus*.

Table 1 : The number of injections, time interval, weight of brooders, the doses of Carp Pituitary Extract to male and female fish, *Channa punctatus* and ovulation time.

Sr. No.	No. of Injections	Time	Wt. of Brooders		Hormones	Doses (mg)		Ovulation time
			M	F		M	F	
1	1 st	8.00	49.48	48.60	PG	0.5	10	10
	2 nd	17.00					10	
2	1 st	9.00	50.01	52.64	PG	0.5	10	12
	2 nd	19.00					10	
3	1 st	21.00	50.22	52.24	PG	0.5	10	09
	2 nd	6.00					10	
4	1 st	20.00	54.64	55.44	PG	0.5	10	11
	2 nd	6.00					10	
5	1 st	10.00	54.28	51.64	PG	0.5	10	10
	2 nd	20.00					10	
6	1 st	22.00	53.34	49.48	PG	0.5	10	09
	2 nd	7.00					10	

Table 2 : Total fecundity, fertilization rate & hatching rate per kg body wt. of female fish, *C. punctatus* in six replicate trials performed throughout breeding seasons.

Sr. no	Body Length (cm)	Body wt. (mg)	Total Fecundity	Fertilization Rate (%)	Hatching Rate (%)
1	10	48.60	9507	70.26	70.80
2	11	52.64	12310	80.20	60.60
3	12	52.24	7820	85.30	70.70
4	13	55.44	9710	70.10	60.70
5	13	51.64	14440	70.40	68.30
6	14	49.48	13210	80.00	70.10

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