

Induced breeding of Crescent Perch, *Terapon jarbua* under controlled conditions

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Crescent Perch, *Terapon jarbua* is an important candidate species for brackish water ornamental and food fishes. This fish inhabits brackish water of much of the tropical and sub-tropical Indo-Pacific region on sandy bottom including estuaries. During December 2014, a fully matured female with average egg diameter of 450 μ along with two oozing males were selected for induced spawning trials. Fishes were induced to spawn with Human Chorionic Gonadotropin, HCG hormone @300 IU/kg body weight and Luteinising Hormone Releasing Hormone analogue, LHRHa @ 75 μ g/kg body weight; half the hormone dose was administered to male fishes. After 36 h of post-injection, all sets were spawned (fertilized egg mean size: 720 μ \pm 34.96 μ); the eggs were semi-buoyant in nature, Hatching was noticed after 16-18 h of incubation period. Average size of hatchlings was 2.04 mm \pm 0.05 with the yolk sac length of 75 μ and presence of a single oil globule. A total of 3 lakh newly hatched larvae from four sets were collected and used for standardization of nursery rearing protocol. The larvae were reared for 60 days feeding with rotifers and artemia nauplii which then reached the fry size of 30 mm with 20% of survival rate.

[**Keywords:** Crescent Perch; *Terapon jarbua* ; Hormones; Induced breeding; Spawning]

Introduction

Crescent Perch, *Terapon jarbua* is a candidate species for brackishwater ornamental and food fishes commonly called as Target Fish, Crescent Bass, Tiger Bass, Tiger Perch, belonging to the family of Terapontidae and order Perciformes. This species is euryhaline in nature and can tolerate fresh to seawater salinity and could be a potential candidate species in brackish and freshwater aquaculture both for food and ornamental purposes. This fish inhabits in brackishwater of much of the tropical and sub-tropical Indo-Pacific region on sandy bottom including estuaries¹. Young ones migrate to sea to attain sexual maturity and mature fish migrates to brackishwater for spawning. Perch is widely distributed from southern Japan to north-western Australia and westward to South Africa. Induced breeding and larval seed production process is one of the major constraints in brackish water aquaculture sector, hence a breeding trail was attempted for seed production of this fish under captive conditions at Muttukadu Experimental Station, Indian Council of Agricultural Research- Central Institute of Brackish water Aquaculture (CIBA), Chennai.

Materials and Methods

Mature male and female (Average. length and weight: 20.46 \pm 1.59 cm; and 114.06 \pm 19.59 g) was

collected from brackish water ponds of CIBA and acclimatized to hatchery environment for a week under flow through system (Temp: 25-27 °C; salinity: 25-27 ppt, pH: 7.5-8.2, and dissolved oxygen: 6.0-7.5 ppm² (Fig 1 and Table 1). To determine the maturity stages, female fishes were cannulated and male fishes were gently pressed near the vent. Female having the intra-ovarian oocyte diameter above 450 μ (Fig. 2) were selected along with the oozing male for induced breeding trials. Four breeding trials were arranged, and in each trials two males and one female was introduced (Fig. 2). From the four trials, two trials were administered with Human Chorionic Gonadotropin, HCG @300 IU/kg body weight and the other two sets with Luteinising Hormone Releasing Hormone analogue, LHRHa @ 75 μ g/kg body weight, while half the dose of hormone was given to males. After 36 h of post-injection, all sets were spawned (fertilized egg mean size: 720 μ \pm 34.96 μ); The eggs were semi-buoyant in nature. Hatching was noticed after 16-18 h of incubation period. Average size of hatchlings was 2.04 mm \pm 0.05 with the yolk sac length of 75 μ and presence of a single oil globule (Fig. 2). After 12 h of post-hatching, concentrated algae, *Chlorella salina* were introduced in the larval rearing tanks and after 48 h, Rotifer, *Brachionus plicatilis* was given @ 20-30 numbers/ml. A total of



Fig.1— Brooders of Crescent Perch, *Terapon jarbua* and larval rearing protocol were carried out at MES of Muttukadu, CIBA.

Table 1 — Induced breeding and seed production trials of Crescent perch, *Terapon jarbua* at Muttudadu Experimental Station, Muttukadu, CIBA, Chennai

Date	Females Length (cm)	Females Weight (g)	Initial Oocyte Diameter (µm)	Males Length (cm)	Males Weight (g)	Hormone Dose of HCG BW	Hormone Dose of LHRHa BW	Induced Breeding Responses
23.12.2014	22	142	460	25	103	HCG: 300IU/Kg BW	LHRHa: 75µg/Kg BW	Fish spawned after 72hrs of administration of HCG and LHRHa through intramuscular injection. A total of 202100 eggs were obtained with the mean diameter of 720 ± 34.96 mm. Two sets of fishes were spawned. Fertilized eggs were transparent and semi-pelagic in nature.
12.01.2015	25	155	450	19	89	HCG: 300IU/Kg BW	LHRHa: 75µg/Kg BW	Fish spawned after 72hrs of administration of hormones through intramuscular injection. A total of 1,05500 eggs were obtained. Fertilized eggs were transparent and semi-pelagic in nature.

BW: Body Weight.

more than 3 lakhs spawns were collected and transferred to larval rearing tanks.

Results and Discussion

Ovarian stimulation were influenced by many factors, such as hormone dose, methods of administration and degree of ovarian development³. In wild striped bass, *Morone saxatilis* (Walbaum) HCG acts as a faster stimulation agent of final oocyte maturation, spermiation and spawning process⁴.

In *M. saxatilis* fishes, HCG was administered with a single dose, which ranges between 100 and 4000 IU per kg BW-1 for spawning process⁵. In Cobia, *Rachycentron canadum* a single low dose of HCG

(275 IU BW-1) was found to be sufficient to induce ovulation process during post-vitellogenic oocytes development⁶. In our present study, HCG and LHRHa hormones were tried for spawning induction trials in *T. jarbua*. In the first two trials, fishes were induced by four split doses of HCG and last dose with LHRHa. In all the induced spawning trials, fishes were successfully spawned. Better spawning was observed in LHRHa-induced fishes than those with HCG doses. The present success in the induced spawning of crescent perch is a major step towards development of successful breeding and seed production technology under controlled conditions and to promote brackishwater ornamental fish farming practices in India.



Fig. 2 — Embryonic and larval development of Crescent Perch, A: Unfertilized eggs, B: Fertilized eggs, C: 1-day old larvae, D: 3-day old larvae, E: 5-day old larvae, F: 12-day old larvae, G: 42-day old larvae, and H: 52-day old larvae.

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References

- 1 APHA., Standard methods for the examination of water and wastewater, 17th edn. American Public Health Association, Washington D. C., USA, (1989), 10-203.
- 2 Caylor, R.E., Biesiot, P.M., & Franks, J.S., Culture of cobia (*Rachycentron canadum*): cryopreservation of sperm and induced spawning. *Aquaculture*, 125 (1994): 81-92.
- 3 Hodson, R., & Sullivan, C.V., Induced maturation and spawning of domestic and wild striped bass, *Morone saxatilis* (Walbaum), broodstock with implanted GnRH analogue and injected HCG. *Aquacult. Fish. Manage.*, 24 (1993) : 389-398.
- 4 Mylonas, C.C., & Zohar, Y., Endocrine regulation and artificial induction of oocyte maturation and spermiation in basses of the genus *Morone saxatilis* (Walbaum). *Aquaculture*, 202 (2001): 205-220.
- 5 Shao, K.T., *Fish and Shell, Part II*. Department of Fisheries, Council of Agriculture, Executive Yuen, Taipei, Taiwan (1996), 282.
- 6 Zohar, Y., & Mylonas, C.C., Endocrine manipulations of spawning in cultured fish: from hormones to genes. *Aquaculture*, 197 (2001): 99-136.