

Courtship Behaviour and Breeding Success of Climbing Perch, *Anabas Testudineus* (Bloch) In Three Different Breeding Sets with the Application of A Synthetic Hormone (WOVA-FH)

**Samarendra Behera¹, Abu Shamim Ahmed², Sanjeev Kumar*³, Rinku Gogoi³,
Olik Jomang³ And Snigdha Baksi³**

¹Consultant (Fishery) NFDB Regional centre Guwahati

²Reader, ³Research Scholars

Department of Fisheries Resource Management, Faculty of Fishery Sciences,
West Bengal University of Animal and Fishery Sciences
5, Budherhat Road, Chakgaria, P.O. Panchasayar, Kolkata – 700 094, India.

Abstracts

In this study a synthetic hormone WOVA-FH is injected intramuscularly for the induced breeding of *Anabas testudineus* in three different breeding sets during August to July. Breeding sets were made on the basis of the number of female and male ratio as Set-I= 1:1, Set-II=1:2 & Set-III=1:3 respectively. WOVA-FH was injected intramuscularly in single dose (0.9 ml/kg body weight for female and 0.4ml/kg body weight for male). Hormonal action was started within 30 minutes of post injection in all the fishes of three sets, where the fishes showed some uncommon behaviors than controlled fishes. The restless behavior of males was observed more in comparison to females. The agitation of fishes was reduced by decreasing the water temperature nearer to 26⁰C within one hour by adding the ice cubes. Then the courtship behavior (pairing & chasing) of female and male fishes was started in the above three sets. However, the courtship behavior shown by the fishes of different sets were quite interesting and different from one another. The breeding success (spawning fecundity, rate of fertilization, and rate of hatching) were also studied by using random sampling method. Out of these three sets, set-II was considered better than other two due to its maximum breeding success.

Keywords: *Anabas testudineus*, Courtship, Spawning, Breeding set.

INTRODUCTION

Anabas testudineus is an air breathing fish and has a high market demand in West Bengal. So, the culture of this fish cannot be ignored in West Bengal because of the availability of vast wetland resources in the form of swamps, beels, jheels, and other derelict water bodies. These resources can be judiciously utilized for production of anabas and other air breathing fishes (Dehadrai, 1975). West Bengal has made considerable progress in the field of fish seed production and inland fish production through aquaculture. Fishery sector of West Bengal has to play a prominent role in rural development and poverty alleviation through fish seed production, aquaculture and ornamental fish production (Samanta, 2001). Culture of anabas completely depends on the availability of quality seed which is neither available neither from the natural resources nor from artificial propagation. To sustain the interest of fish farmers, it is needed to standardize the seed production technology of anabas in captive condition. Banerjee and Thakur (1981) made some observations on the spawning behavior of *A. tes tudineus* while breeding the fish through hypophysation. Mookerjee and Mazumdar (1946b) describe in details the mating behavior of *A. tes tudineus*. Current investigation was carried out to study the effect of a synthetic hormone WOVA-FH on the courtship behaviour and breeding success of *A. testudineus* in male and female. Its response in the breeding success (spawning fecundity, rate of fertilization, and rate of hatching) were also studied by using random sampling method.

MATERIALS AND METHODS

A study on artificial propagation of *Anabas tes tudineus* was conducted by using WOVA-FH a synthetic hormone in the Department of Fishery Resources Management, Faculty of Fishery Sciences, and West Bengal, India during August to July.

Selection of brood fishes and Segregation of sex:

Adults of anabas were reared in the laboratory with high rich protein feed at a rate of 3 to 4 % of their body weight for gonadal maturation (Ghosh and Das, 2004). Water quality was maintained at an optimum level. Among the reared stock healthy spawners ranging to the length of 120 to 180 mm and weighing (w/w) 30 to 78 gm were selected for this study. Morphological characters such as colouration of body and fins, shape of the black spot at the caudal region, size of belly, structure of the vent were observed. On the basis of these secondary sexual characteristics (Lagler, 1962); male and female fishes of *Anabas testudineus* were segregated for induced breeding (Behera et. al. 2009).

Formation of breeding sets for Induced breeding of A. testudineus:

one month prior to the commencement of induced breeding programme, male and females were segregated and kept separately to increase their urge of mating. Induced breeding programme was conducted during peak breeding season (July to August) (Behera et. al. 2009) in glass aquaria (60 x 30 x30 cm³) with three different sex ratio

(1:1, 1:2, 1:3 = female: male) making three breeding sets (Set-I= 1:1, Set-II=1:2& Set-III=1).

Preparation of inducing hormone and injection procedure:

WOVA-FH is a synthetic Gonado tropin releasing hormone analogue (SGnRh) and a product of Biostadt Agrisciences, WOCKHARD, and Mumbai and used for this study. Selected brood fishes were taken in plastic tubs and the hormone was injected at a dose of 0.4 ml per kg body weight and 0.9 ml per kg body weight for male and female respectively. For injection the graduated (0.0025ml) insulin syringe of 1 ml capacity was used. Fishes were caught carefully at the head region with wet cloth to avoid stress during injection. Brood fishes were injected intra muscularly at caudal peduncle region above the lateral line. Immediately after injection fishes were released into the glass aquarium and covered with nylon nets. Initially a vigorous aeration was given and then water temperature was reduced to avoid stress due to hormonal action. The courtship behavior of brood fishes in different breeding sets was observed keenly till successful spawning of eggs.

Hormonal response and breeding success:

The breeding success (spawning fecundity, rate of fertilization, and rate of hatching) were also studied by using random sampling methods.

RESULTS AND DISCUSSION

Courtship behavior:

Brood fishes of *A. testudineus* in three different sets (Set-I= 1:1, Set-II=1:2 & Set-III=1:3) were observed after injection till the end of spawning. Within 30 minutes of post injection the male and female fishes were found to swim up to the surface for aerial respiration irrespective of breeding sets (Table 1). They were moving here and there restlessly. The agitation movement of male was more in comparison to female. This movement was minimized when the water temperature was reduced to 26⁰C by using clean ice blocks within one hour. Then the actual courtship behavior was started in different breeding sets (Table 3).

Courtship behavior and breeding success in SET-I:

In set-I (1:1= female: male) one males was paired with a female by number but not by weight. Initially both the brood fishes were spending their time on engulfing air from water surface due to hormonal action. After reduction of water temperature the fishes stated their breeding behavior. The male started chasing on female. After continuous chasing the male suddenly bended around the female and both the male and female tried to hold each other. At that time both the male and female brought their vents nearer and lasted for 10 to 15 seconds. Then the female slowly release its grip. Similar activities are started after 5 to 8 seconds intervals till three hours. About 15 to 20 times both sexes participated in courtship activities (Table 1). The female was found with an urge of sexual play, but the male was found little dull and found to be isolated

from female. Female starts to bite the male and try to instigate for sexual play. From these activities it is understood that the female's urge towards mating is not fulfilled. The spawning activity was started quite late about 3 hours of injection. Before separation the female released a batch of eggs. Ejection of milt was not visible due to its quick miscibility in water. As a result, it took 11 to 12 hours for complete release of 24430 to 28650 numbers of eggs (Table 2). Therefore batch release as well as incomplete release of eggs was observed. From this experiment it is concluded that breeding set-I (1:1= female: male) is not suitable.

Courtship behavior and breeding success in SET-II:

In set-II two males were paired with a female by number and approximately by weight also. After one hour of post injection the mating activity between the fishes were started. One male seemed to be domination over the other and the dominant male drove away the other male with sharp bites. The spawning activity was started after 6 hours of infection (Table 1). The dominant male nudged the female at side where the second male was staying near the vicinity. When the mating commenced between the dominant male and female, the weaker male always tried to intrude and the dominant male chased him away no sooner it was free of the mating act. However, during the closing phase of the spawning when the dominant male took longer spells of rest after mating, the weaker male availed the opportunity of mating with the female. Thus, the second male participated actively in mating. Presence of second male was found important for the success of spawning. In this set, total numbers of mating was observed to be 30 to 35 times. As a result, the female took less time (10 hours) to release the eggs completely. Total number of eggs released was estimated to 29840 when the weight of female was 70 to 74 gm (Table 2).

Courtship behavior and breeding success in SET-III:

In set-III three males were paired with a female by number and not by weight. The mating activity was also started after one hour of post injection. One male became dominant over other two and always busy on driving them away when they try to meet the female. The active male was not getting much time to chase properly the female. On the other hand, other two males were not allowed to meet. Frequently the recessive males were busy in disturbing the dominant male. Number of mating was recorded 20 to 23 times (Table 1). The spawning activity was commenced after 7 hours of injection. As a result, the female released less numbers of eggs 27528 to 30730 and also took longer to time (11 hours) for complete release of eggs (Table 2).

The observations of the present study indicated that, the second set-II (1:2= female: male) was found comparatively better than other two sets in terms of spawning time and fecundity. This study was in consonance with the findings of Banerji and Thakur (1981). Fish seed producing hatcheries can be recommended to make the ratio of

breeding set (1:2= female: male) for successful commercial seed production of *Anabas testudineus*.

Table 1: Breeding sets of *Anabas testudineus* and their breeding response with synthetic hormone WOVA-FH.

Breeding sets	Male: Female ratio	Length (mm)		Weight (gm)		Time of injection	Dose of WOVA-FH (ml/kg)	Spawning Time (egg)	Spawning Interval (hr)
		Female	Male	Female	Male				
I	1:1	168	-	70	-	6pm	0.60	5.30am	11.30
		-	130	-	40		0.20		
II	1:2	170	-	74	-	6.30pm	0.60	4.30am	10.00
		-	128	-	39.5		0.20		
		-	127	-	38		0.20		
III	1:3	166	-	71	-	6.15pm	0.60	5.30am	11.45
		-	128	-	37.5		0.20		
		-	126	-	36		0.20		
		-	127	-	38		0.20		

Table 2: Spawning and hatching of *Anabas testudineus*

Breed. sets	Male :Female	Fecundity	Egg release /gm body wt.	Fertilization (%)	Hatching	
					Time (hr)	Rate (%)
I	1:1	26980	384.429	70	18.30	80
II	1:2	32930	445.000	85	19	80
III	1:3	30380	427.000	75	19	75

Table 3: Physico-chemical parameters of the water used for induced breeding of *Anabas testudineus*

Parameters	Temperature (°C)	pH	Dissolved Oxygen	Free CO ₂	Alkalinity (mg ⁻¹)	Hardness (mg ⁻¹)	Ammonia Nitrogen (mg ⁻¹)
Breed set. I	29	7.8	5.75	0.56	30	47	0.011
II	28	7.9	6.0	0.62	30	52	0.025
III	29	7.9	6.0	0.73	32	55	0.091

REFERENCES

- [1] Banerji SR, Thakur NK (1981). Observation on the spawning behaviour of *Anabas testudineus* (Bloch). Indian J. Anim. Sci 51 (6): 651-654.
- [2] Behera S, Ahamad S, Khan MI (2009). Sexual dimorphism and gonadal development of *Anabas testudineus*, reared in captive condition. J. Environ & Socibiolo 6 (1): 73-37.

- [3] Dehadrai PV (1975). Derelict waters for air breathing fish culture. *Indian Farming* 2 (6): 19-20.
- [4] Ghosh M, Das SK (2004). Effect of dietary protein levels on the growth of *Anabas testudineus* (Bloch) fingerling. *Indian J. fisheries* 51(4): 425-430.
- [5] Lagler KF, Bardach JE, Miller RR (1962). *Ichthyology* -John Willey & Sons, Inc. New York, p.546
- [6] Mookerjee HK, Mazumdar SR (1946b). On the life history, breeding and rearing of *Anabas tesudinneus* (Bloch). *J. Dep.Sc. Cal. Univ* 2: 101-140.
- [7] Samanta PK (2001). West Bengal news Utter. *Fishing Chimes*. 21(7):74-76.