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Arpita Dey
Research Scholar, Aquaculture
and Limnology Research Unit,
Department of Zoology,
University of North Bengal,
Darjeeling, Siliguri - 734 013,
West Bengal, India.

Dr. Debapriya Sarkar
Associate Professor, Fishery
Unit, Uttar Banga Krishi
Viswavidyalaya, Pundibari-
736165, Cooch Behar, West
Bengal, India.

Dr. Sudip Barat
Professor, Department of
Zoology, University of North
Bengal, Darjeeling, Siliguri -
734 013, West Bengal, India.

Spawning biology and proper dose of hormone for captive breeding of vulnerable fish, *Botia rostrata* (Gunther), in Cooch Behar, West Bengal, India

Arpita Dey, Debapriya Sarkar, Sudip Barat

Abstract

Botia rostrata is an vulnerable species (CAMP, 1998) having high ornamental value. Breeding experiments in captivity were conducted successfully for the ornamental fish, *Botia rostrata* using synthetic hormones. Induced breeding of *B. rostrata* with WOVA-FH at 0.025 ml per fish was achieved. Sex ratio 1:1 (male: female) were maintained in two trials. These fish spawned only in running water system. The fecundity of females ranged from 14,103 to 21, 352. The average fertilization rate was found to be 67.60%. The present work contributed to the information lacking on induced breeding and breeding behaviour of *Botia rostrata*.

Keywords: *Botia rostrata*, Fecundity, Captive breeding and Conservation.

1. Introduction

Botia rostrata [1], commonly known as “Ladder Loach”, is a vulnerable fish [2] and very rare in the Terai region of West Bengal. *Botia rostrata* belongs to the family Cobitidae and is very beautifully coloured indigenous ornamental fish and has a great value in the ornamental fish market. It is distributed in West Bengal, Assam and Bangladesh. Many ornamental fishes like *D. aequipinnatus*, *D. dangila*, *D. rerio*, *B. bendelisis*, *B. rostrata*, *E.danricus*, *P. shalynius*, *L. guntea* and so on are exported out of the State as an aquarium fish and also consumed by the local populace [3].

2. Materials and Methods

2.1 Collection and experimental site

The sampling sites located at Bhelakopa, Dwitiya Khanda of Cooch Behar district of West Bengal, India which lies at 26°18' North latitude and 89°34' East longitude. Live fishes were sampled from different sampling sites of Kaljani River. The fishes were packed in polythene bags filled with 1/3 water and 2/3 pure oxygen and then packed in cartons transport to site. The experiments were conducted in the Wet Laboratory in the Fishery laboratory in Uttar Banga Krishi Viswavidyalaya, Cooch Behar, West Bengal, India. The fishes were regularly observed for their maturation.



Fig 1: Matured female fish



Fig 2: Matured male fish



Fig 3: One month old fish

2.2 Fecundity and Fertilization rate

The fecundity of a fish is defined as the number of ova found in the ovary of a female fish prior to spawning was determined. Absolute fecundity was also calculated according to the method of Hartman and Conkle [4] using the expression $F = nG/g$ where, 'F' is Fecundity; 'n' is mean numbers of eggs in all samples, 'G' is weight of ovaries and g is weight of samples. After 1 hour of spawning 2 litre of water and eggs were collected from the hatchery.

Correspondence

Arpita Dey
Research Scholar, Aquaculture
and Limnology Research Unit,
Department of Zoology,
University of North Bengal,
Darjeeling, Siliguri - 734 013,
West Bengal, India.

This process was continued for 4 hours. Counting of the fertilized egg and unfertilized eggs were done. Fertilization rate was estimated by using the formula,
 Fertilization rate (%) = Fertilized eggs×100/ Total no of eggs in sample.

2.3. Induced Breeding

10 pairs of matured fish were injected with synthetic hormone WOVA-FH. The fish were injected at the base of pelvic fin. Each fish was given a dose of 0.025ml of WOVA-FH. Two different Set-ups A and B were used for spawning and 5 pairs of fish were put in each Set-up. Both the Set-ups consisted of Chinese hatchery of diameter 2 m and height 0.5 m having running water facility with a process of increasing or decreasing speed of water flow check valve. A flow rate of 1000 L⁻¹hr and 5000L⁻¹ was maintained in each circular tank.

3. Results and Discussion

3.1 Fecundity and fertilization rate

The fecundity was estimated by random sampling method. The fecundity of females ranged from 14,103 to 21,352. On

the basis of present experimental results, average fecundity is 15941. The fertilization rate was found to be 89.28%, 72.41%, 65.67% and 43.05% for each hour, respectively. The average fertilization rate was found to be 67.60%.

3.2 Breeding in different set-ups

Breeding experiments in captivity were conducted successfully for the ornamental fish *Botia rostrata* in May 2013 and May 2015 using synthetic hormone WOVA-FH. Fertilisation was external and spawning occurred once a year during the monsoon months (May–August) with a peak in July. Observations were done at hourly intervals. Spawning pattern was observed in both male and female fish during the night. The male was found constantly hitting the female on the abdomen with its head while chasing her all around the aquarium. Cracking sound was heard every now and then. Females were being chased by more than one male at the same time and males were fighting with each other. Spawning started after half an hour of chasing .All fishes spawned but best result was observed as per Set-up B(Table-1).

Table 1: Summary of the stages of breeding of *Botia rostrata* in the Set-ups at different time intervals

Time	Set-up -A	Set-up -B
10p.m	Fishes were swimming against flow of water	Fishes were swimming against flow of water
11p.m	Same	Same
12a.m	Females were chase by the males at and at the same time the males were fighting with each other	Females were chased by the males at the same time the males were fighting with each other
1a.m.	Cracking sound was heard every now and then.	Cracking sound was heard every now and thenSpawning had started.The paired fishes were swimming with the current and appearing at the surface clinging to each other hooked with the spine loach below the eyes which was making the cracking sound.
2a.m.	Spawning had started	All the fishes started spawning
3a.m.	Same	Same
4 a.m.	Same	Stopped spawning
5 a.m.	Stopped spawning	Stopped spawning

The present study revealed, that flowing water was essential for induced spawning of *Botia rostrata*. The latency period was between 4.30 and 05.00 hours in fish injected with a dosage of 0.025ml WOVA-FH per fish. As observed in other studies, the latency period was very low in *Botia rostrata*. The latency period of *Puntius sarana* [5] was 8 to 9 hours after administration of inducing agent, that of *Ompok pabda* [6] was 06.00 hrs to 08.00 hrs of administration of Ovotide. The fertilized eggs were transparent and unfertilized ones were opaque and white. Similar type of captive breeding, fecundity and fertilization rate were reported by Udit *et al.* [5] on *Puntius sarana*, captive breeding of *Ompok pabda* [6] and reproductive biology of *Ompok bimaculatus* [7].

4. Conclusion

Botia rostrata can be easily matured and bred successfully under captive conditions similar to the other ornamental fish. Establishment of proper sanctuaries in selected areas of rivers, floodplain and reservoirs is recommended for conservation of this species. This study documents the breeding of ornamental fish *Botia rostrata* in captivity with the use of synthetic hormones. The subject matter in this paper is useful for fish breeders and aquarium keepers.

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