

Induced spawning of *Pangasius sutchi* with pituitary extract

N.R. Chattopadhyay, B. Mazumder and B. Mazumdar

Faculty of Fishery Sciences, West Bengal University of Animal and Fishery Sciences, Mohanpur, West Bengal, India

The main species of Pangasid catfishes recently adopted for culture with Indian Major Carps are Yellowtail catfish (*Pangasius pangasius*) and Sutchi catfish (*Pangasius sutchi*). These fishes were introduced into the farming system of Bengal from Thailand through Bangladesh in 1994-95. Though carnivorous at an early stage, the fish are compatible with Indian Major Carps from five days onwards and can grow to 3 kg/year on a balanced diet^{1,2}. These fish have already established their importance as profitable species in aquafarming of Bengal. As a result of its remarkable growth rate (almost one kg in 90 days), now there is much enthusiasm among the fish-breeders and farmers of Bengal for its artificial spawning and culture. The demand for its seed is increasing by day.

In view of the increasing demand for *Pangasius sutchi* seed we tested techniques for induced spawning and larval rearing of this fish.

Technique for induced spawning

Brood fish were raised in farm ponds (area 2,500 m³) from fry stage using a high protein balanced diet composed of cereal waste (25%), rice-bran (20%), mustard oil cake (15-20%) broken grain (25%) and animal meat (10-15%). The diet was provided 2-3 times per day at the rate of 5% of body weight. To check growth rate the percentage of animal meat was reduced as per requirement. The fish attain sexual maturity at four years when they normally reach a size of 7 kg. However, for the convenience of breeding the weight of brood fish we used was restricted to 1.5 to 2.0 kg with intensive stocking.

Males and females are easily distinguished particularly around April. Egg-bearing females are identified by their big, soft and distended belly with swollen and reddish pink vent (Fig. 1).

Males could easily be identified by their reddish genital opening and oozing of milt, when the abdomen is pressed³.



Pangasius catfish. This specimen comes from a farm in Myanmar, close to Yangon.

As with clarid Catfish only carp pituitary extract (CPE) was used as the agent for inducing spawning. The results were promising. There are also reports regarding the successful use of human chorionic gonadotrophin, (HCG) and LRH-A in combination^{3,4}.

A stimulatory first dose of 1.5-mg CPE/kg body weight was injected into mature females (Fig 2). After 5-6 hours the second resolving dose of 6 mg CPE/kg body weight administered to females. Males were injected at the rate of 1 mg CPE/kg body weight at the same time as the second injection to female. In the case that female broodstock failed to reach the peak of maturity, the stimulatory dose would be increased to 2-2 mg CPE/kg body weight. The resolving dose in such situations would be 9-10 mg CPE/kg body weight.

Males were given a single resolving dose of 2 mg/kg body weight at the time of second injection to female. Variations in environmental temperature have a strong effect on the effectiveness of the dose. When temperature rises above 30°C less CPE is required and more is needed when the temperature falls below 28°C.

Breeding starts from April and continues until mid September. One brooder can be used at least two times during the same breeding season. After injection the fishes were returned to their respective cement tanks or hapa.

Spawning occurs after an interval of 5-6 hours. Both natural spawning and stripping is possible, but as the eggs are adhesive in nature stripping was considered best (Figs. 3 to 5).



Fig. 1. Mature female Pangasius sutchi taken for injection (top).



Fig. 2. The first injection to the female (bottom).



Fig. 3. Stripping the female



Fig. 4. Stripping the male.



Fig. 5. Eggs and milt are mixed with a feather; water is added.



Fig. 6. Fertilized eggs are mixed with milk solution to remove their adhesive covering.

Table 1. Positive fish response to trials after second injection.

Date	No. of females per trial	Average weight of females (kg)	Does of pituitary extract per kg body weight		Response to treatment (ovulation + fertilization) %	Hatching %	
			Male	Female			
				1 st			2 nd
5/4/2000	3	1.5	2.0	1.5	8.5	70-89	90-92
9/4/2000	3	2.0	2.0	1.5	8.5	75-90	90-92
15/4/2000	2	2.5	2.0	2.5	8.0	80-96	95
20/4/2000	3	1.8	2.0	1.5	8.5	80-89	95
25/4/2000	2	1.7	2.0	1.5	9.0	85-98	96
28/4/2000	3	2.5	2.0	2.5	8.0	85-92	90

Windmill software monitors environmental conditions for fish farming research

The Seafish Industries Research Station in Scotland is studying the farming of cod, hake and halibut in a recirculating system. The station pumps around 110 tons of seawater per hour into their tanks. Monitoring and maintaining this flow and other environmental conditions is essential to their success. To achieve this they have chosen a Windmill Software system.

The Windmill system continually monitors the temperature of the air and water, flow rate, dissolved oxygen concentration, salinity, pH, light and water levels and various alarm switches. Windmill provides mimic displays of the site showing pictures of the tanks and their current data values. Every 30 minutes the software logs the data to the computer's hard disk.

It is extremely important that alarms are raised when conditions fall below optimum. Windmill lets the researchers set thresholds which, when crossed, cause an audible

alarm to sound on site, and an auto-dialler to telephone staff who may be off-site. The alarm thresholds can be set for individual measurements, with delays if necessary before alarms are triggered.

A computer running Windmill broadcasts its data values over the site network using the Windmill Repeat program. Each department can therefore log their own data sets incorporating data gathered both locally and around the site. The monitoring equipment communicates with the software over microlink units enabling the equipment to be up to 1 km away from the PC. Future versions are planned to enable remote monitoring over the Internet.

For more information visit <http://www.windmill.co.uk/fish.html> or email sales@windmill.co.uk, Fax +44 (161) 833 2190.

We rinsed eggs in milk powder solution in aluminium hundi to remove the adhesive gelatinous covering of the fertilized eggs (Fig. 6). We prepared the milk solution by adding 200 ml of milk in 30 liters of water for 20 minutes. Afterwards the fertilized eggs were transferred to a Chinese hatchery.

Effectiveness of the technique

In all trials, the fish responded positively and ovulated within 5-6 hours after the second injection. The fertilization rate ranged from 95-100%. The fertilized egg doesn't swell as with carps and hatched within 24 hours at temperature ranges between 30-32°C. Temperature was a prime factor for fertilization and hatching.

There are several other reports of the successful breeding of *P. sutchi* in Indonesia and Thailand⁵. According Saidin and Othman⁴ the hatching period ranged between 24 to 26 hours at a water temperature of 28-32°C with ovulation occurring in between 70-80% and with a survival of hatchlings from 30-45%. Milt from one male is sufficient to fertilize the eggs of three to four females. The dry method of egg fertilization was followed. They also found that the hatchlings became cannibalistic if sufficient food is not available after 3 days of hatching.

We fed our hatchlings on lactogen for the first 48 hours. The hatchlings become carnivorous from about 72 hours and at this stage weigh 500 mg. We fed earthworm dust three times day continuing up to 5-8 days. After 10 days we fed soyabean dust as supplementary feed. Afterwards we transferred the hatchlings to a rearing pond with natural feed.

References

- (1) Rahaman, M.K., Mazid M.A., Rahman, M.A. and Akhter J.N., 1991. Formulation of quality fish feeds from indigenous raw materials and its effect on the growth of Catfish *Pangasius pangasius* (Ham.). J. Zool. 6: 4 1-48.
- (2) Rahaman, M.K., Akhter, J. N., Mazid, M.A. and Halder, C.G. 1992. Culture Feasibility of exotic catfish *Pangasius sutchi* (Fowler) in Freshwater Ponds of Bangladesh. J. Inland Fish. Soc. India. 25 (2): 26-30.
- (3) Rahaman, M.K., Akhter, J. N., Mazid, M.A. and Halder, C.G. 1993. First record of Induced Breeding of Thai Panyas, *Pangasius sutchi* (Fowler) in Bangladesh J. Inland Fish. Soc. India. 25(2): 26-30.
- (4) Saidin, T., Othman, A.F., 1986. Induced spawning of *Pangasius sutchi* (fowler) using an analog of luteinising releasing hormone and homoplastic pituitary extract., Proceedings of the first Asian Fisheries Forum. pp 687-688.
- (5) Hardjamulia, A. Dajajadredya, R., Atmawinata, S. and Idris, D., 1981. The propagation of Jambal Siam (*Pangasius sutchi*) by injection of common carp (*Cyprinus carpio*) pituitary extracts. Bulletin-Penelitian-Parikana (Indonesia). 1(2): 183-190.