www.ijbtjournal.com
International Journal of Biological Technology (2012) 3(1):1- 4.
ISSN: 0976 – 4313

Original Article

Captive breeding and Larval rearing of an endangered fish, *Ompok pabo* (Hamilton-Buchanan) through low cost technology

***D.Sarma[1], J. Das[1] , A. Dutta[2] & U. C. Goswami[2]**
[1]Department of Zoology, Goalpara College, Goalpara-783101(Assam)
[2]Department of Zoology, Gauhati University, Guwahati-781014(Assam)
*Corresponding Author: sarma_dandadhar@yahoo.com

Published: 15, April, 2012; Vol. No. 3(1):1- 4; Online:www.ijbtjournal.com/documents/ijbt150412101.

Abstract

Induced breeding and larval rearing of an endangered fish species, *Ompok pabo* was carried out in captive condition using low cost technology. About 90% spawning was recorded and 76% fertilized eggs were collected through hapa breeding using ovatide as inducing agent. Hatching of embryo were performed in a series of earthen tubs fitted with continuous shower and renewal and removal of water. Hatching was occurred 22 hours after spawning. A total of 7,972 numbers hatchling were achieved to introduce in rearing pond.

Key words: Captive breeding, endangered, *Ompok pabo*, low cost technology

International Journal of Biological Technology

Introduction

Ompok pabo (Hamilton-Buchanan) commonly known as '*pabo*' is an Indian freshwater cat fish with good market demands particularly in North-Eastern part of India. It is a delicious, tasty, nutritious catfish having relatively few bones. *Ompok pabo* dwells and breeds in the rivers and reservoirs (Mukherjee *et al.*, 2002). In spite of all these characters, it has not received much attention in aquaculture mainly due to non-availability of information regarding feeding, breeding and culture technique of this important fish species. Over the last few decades, its wild population has undergone a steady decline mainly due to over exploitation, loss of habitat, disease, pollution, siltation, poisoning, dynamite and other destructive fishing.

Ompok pabo's fry are very rare in nature because of many adverse changes in their natural breeding and growing habitats (Hossain *et al*., 2006). *Ompok pabo* has already been declared as an endangered species (Datta *et al*., 2003; NBFGR, 2010). In Assam, this species now restricted to only few natural habitat including Goronga *beel* of Morigaon district of Assam. So the seed production in captivity will be the only alternative for obtaining optimum quantity of seed for the fish culture practices as well as conservation of the species.

Induced breeding of many freshwater catfishes in captive condition has been achieved successfully by various workers in India. The Asian catfish *Clarias batrachus* was successfully bred and reared in captivity by different scientists (Cheah, 1990; Goswami and Sarma, 1997; Das, 2002; Mahapatra, 2004; Hossain *et al*., 2006; Sahoo *et al*., 2007). Captive breeding of *Ompok pabda* has also been carried out successfully in different parts of India (Akhteruzzaman *et al*., 1993; Bhowmik *et al*., 2000; Mukherjee & Das, 2001; Mollah, 2003; Sarkar *et al*., 2005; Hussain, 2006; Mahmood, 2006; Roy *et al*., 2007; Rahman *et al*., 2008; Chakrabarty *et al*., 2008). The Indian butter-catfish *Ompok bimaculatus* which is also an endangered species was artificially spawned by scientists to propagate its existing population (Choudhury, 1962; Sridharan *et al*., 1998). However, nothing has been reported regarding successful captive breeding technique of *Ompok pabo*. The present work has been undertaken to develop a suitable low cost technology for seed production and larval rearing of *Ompok pabo* in agro-climatic condition of Assam.

Observation and Results

The study was conducted for a period of three years from December, 2008 to November, 2010. The breeding experiments were carried out in the pond located inside the Goalpara College campus. A total of 130 nos. brooders of *Ompok pabo* comprises of both the sexes were collected from its natural habitat, Goronga *beel* (Wetland) near Pobitara Wildlife Sanctuary of Morigaon district, Assam on December, 2007. The size of the species was 12 to 16

www.ijbtjournal.com
International Journal of Biological Technology (2012) 3(1):1- 4.
ISSN: 0976 – 4313

cm in total length and 22.19gm to 25.20gm in weight. Collected Brood fishes were transported to the Goalpara college pond in well oxygenated polythene bag. The culture pond was also pretreated with $KMnO_4$ @ 5% concentration before 7 days of releasing of the brooders. Water of the pond was disinfected with Bleaching powder @ 2mg l^{-1} to eradicate insects and predators. To maintain delicate balance as well as to utilize total food chain of the pond, fingerlings of *Labeo rohita, Cirrhinus mrigala, Ctenopharyngodon idella, Hypopthalmychthys molitrix, Catla catla* and *Cyprinus carpio* were also released along with Pabo. The brooders were fed with fry of IMC and chopped earthworm. Foods were given one day interval either by throwing or through bag.

Table -1: Results of Captive breeding and larval rearing of *Ompok pabo*

Year	Size of male		Size of female		Hormone dosage (ml/kg bw)	Latency period (hrs)	No. of eggs spawned	Fertilization (%)	Fertilized eggs	Hatching (%)	No. of hatchlings
	L(cm)	Wt(gm)	L(cm)	Wt(gm)							
2008	19.5-21.8	36.3-37.7	20.1-22.2	39.3-42.6	M-0.5 F-0.6	9.5-10.5	10,323	73.35	7,600	42.75	3,236
2009	19.8-21.9	37.2-37.5	21.4-23.0	41.4-45.3	M-0.6 F-0.7	10.5-11.5	8,615	73.00	6,285	41.40	2,608
2010	21.2-22.9	39.1-46.3	20.7-23.3	41.8-48.7	M-0.5 F-0.6	9.0-10.3	20,476	82.73	17,006	51.08	7,972

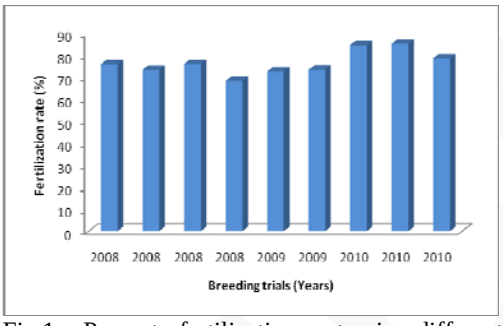

Fig.1: Percent fertilization rate in different breeding trials

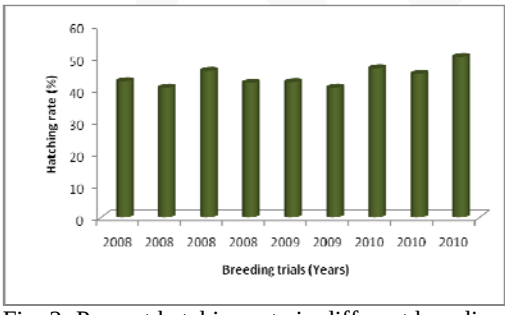

Fig. 2: Percent hatching rate in different breeding trials

Breeding performance was carried out using synthetic hormone ovatide as inducing agent. Procedures for induced breeding was carried out followed after the methods of Bhowmik *et al.* (2000); Mukherjee *et al.* (2002); Das and Kalita (2003); Mollah (2003); Sarkar *et al.* (2005) and Chakraborty & Chakraborty (2005). Males and females were collected from the stocking pond, segregated and stocked in two hapa (135cm x 90cm x 130cm) fixed in the pond five hours before injection of inducing agent. Length and weight of the brood fishes were measured for selection of appropriate doses (as per insulin syringe of 1ml capacity) of ovatide for both male and female. For female it was 0.6ml per kg body weight while in case of male it was 0.5ml per kg body weight. Administrations of synthetic hormone to brood fish were done in the evening time (5pm to 6 pm). Females were injected first then the male. Injection was given intramuscularly in upper side of the anal opening. After the injection, both males and females were released into the hapa in 2: 1 ratio (*i.e.* 2 male and 1 female) fixed in the pond under continuous shower.

The latency period of spawning has been observed between the ranges of 9.5 to 11.5 hours after injection. Fertilization rate was observed about 82.73%, where a total of about 20, 476 numbers of fertilized eggs were produced per trial. Eggs were brownish in color and adhesive in nature. Fertilized eggs were very transparent and had a reddish brown spot on one side which can be easily recognizable with naked eye. The size of the fertilized eggs is about 1.3mm in diameter. The fertilized eggs were than transferred to a set of five earthen tubs. The tubs were rectangular in shape having the diameter of 100 cm with 50 cm depth. Prior to stocking of hatchlings, each of the tubs was cleaned and

prepared with all facilities necessary to run the experiment efficiently. In order to facilitate renewal and removal of water concomitantly, an inlet and an outlet was provided with each of the tubs. Each tub was provided with a gentle shower throughout the experimental period.

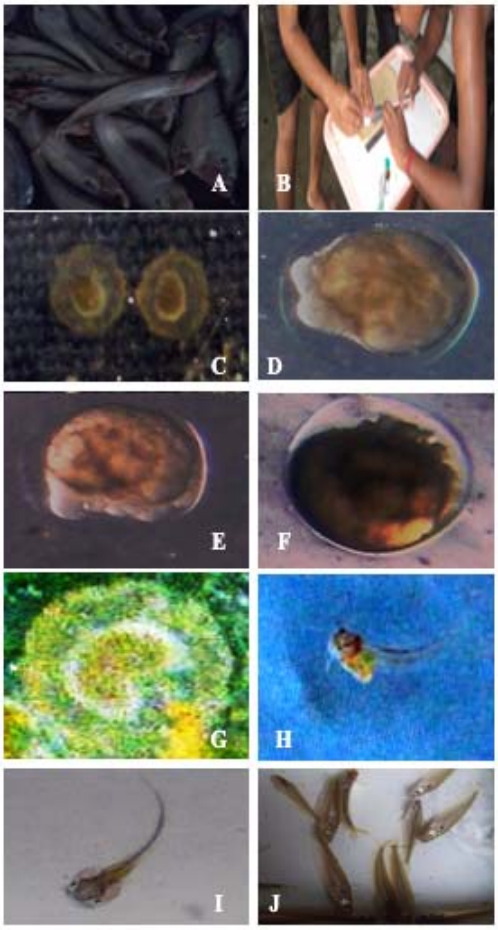

Fig.3: A. A haul of *Ompok pabo* at market
B. Intra-muscular hormone injections to Brooders
C. Fertilized eggs of *Ompok pabo*
D. Two cell stage (48 minutes after fertilization)
E. Four cell stage (60 minutes after fertilization)
F. Eight cell stage (68 minutes after fertilization)
G. Kidney shaped embryo (10 hours)
H. Newly hatched larvae (22 hours)
I. Thirty two hours old larva of *Ompok pabo*
J. Fry of *Ompok pabo* (50 days old)

Double filtered water was used in the tub throughout the experiment. The outlets were covered by nylon net to stop hatchling escape. The eggs remains and other debris of the tubs were cleared regularly by a brush made up of fine Jute fiber. The embryos hatched out in 22 hours of incubation after fertilization. Hatching rate was recorded between the ranges of 41.40% to 47.16%. The newly hatched larva was slender, transparent and lack of mouth and pectoral fin. Eye was distinct. Rudiments of maxillary and mandibular barbels were also noticed. Body was observed without pigmentation. The hatchlings were yellowish black in colour and measuring 0.45 cm in total length and 0.0075 gm in weight. A small yolk sac which is oval in shape was found attached below the head region. They were found very active and moved very fast around the rearing tub. Maximum hatching percentage (51.08%) recorded in the trial of 2010 with a production of 7,972 numbers of hatchlings (Table-1). After completion of hatching process, the tubs were cleaned one by one and hatchlings were reared in same process up to twenty days. Size of the larvae was 3.6 cm in total length after 20 days. From the fourth day after hatching, boiled chicken egg and filtered zooplankton were used as food for the newly hatched larva. The yolk of an egg was grinded in tiny particles and given to the larva @ 50 - 60% of total body weight thrice daily (early morning, noon and evening time). The larva were than transferred to two rearing hapa (135 cm x 90 cm x 130 cm) fixed in the pond for further growth. The size of the 40 and 50 days old larva (from the date of hatching) were measured 5.9 and 6.5 cm respectively. After 50 days, they were directly released into the rearing pond.

From the investigation, it can be concluded that the induced breeding and larval rearing of *Ompok pabo* is also possible in low cost technology to generate revenue for the fishers and to save the species from extinction.

Acknowledgments
We are grateful to the University Grants Commission, New Delhi for financial support to carry out the present investigation.

References

Akhteruzzaman, M., Kohinoor, A. H. M., Shah, M. S. and Hussain, M. G. 1993. Observation on the induced breeding of silurid catfish, *Ompok pabda* (Hamilton). *Bangladesh Journal of Life Science*, 5(1): 71-75.

Bhowmik, M. L., Mondal, S. C., Chakrabarti, P. P., Das, N. K., Das, K. M., Saha, R. N. and Ayyappan, S. 2000. Captive breeding and rearing of *Ompok pabo* (Hamilton-Buchanan)-a

threatened species, p.120-121. In A.G. Ponniah and U.K. Sarkar (eds). Fish Biodiversity of North East India. NBFGR. NATP Publ. 2, p. 228.

Chakrabarty, N. M., Chakrabarty, P. P. 2005. Embryonic development and larval rearing of *Ompok pabda* (Hamilton). *J. Inland Fish. Soc. India*, 37(1): 71-74.

Chakrabarty, N. M., Chakrabarty, P. P. Mondal, S. C. and Sarangi, N. 2008. Embryonic development of Pabda (*Ompok pabda*) - with notes on its farming. *Fishing Chimes*, 28 (1): 55 – 59.

Cheah, S. H., Siraj, S. S. and Ang, K. J. 1990. A preliminary study on induced spawning of the catfish *Clarias batrachus* (Linnaeus) in Malayasia. *Pertanika*, 13 (1): 63-66.

Choudhury, H. 1962. Induced breeding and development of a common catfish, *Ompok bimaculatus* (Blotch). *Proc. Indian Science Congress*, 49(3): 390-391. (Abstract)

Das, S. K. 2002. Seed production of Magur (*Clarias batrachus*) using a rural model portable hatchery in Assam, India – A farmer proven technology. *Aquaculture Asia.* Vol. VII. No. 2: 19-20.

Das, S. K. and Kalita, N. 2003. Captive breeding of Peacock Eel, *Macrognathus aculeatus*. *Aquaculture Asia* 8 (3): 17-21.

Datta, S., Rahman, M. M., Haque, M. A., Islam, M. M. and Mollah, M. F. A. 2003. Chromosomal Studies on *Ompok pabda* (Hamilton). *On Line Journal of Biological Sciences*, 3(5): 460-465.

Goswami, U. C. and Sarma, N. N. 1997. Pituitary dose optimization for induced ovulation, *in vitro* fertilization and production of normal fry of *Clarias batrachus* (Linn.). *Asian Fisheries Science*, Vol. 10: 163-167.

Hossain, Q., Hossain, M. A. and Parween, S. 2006. Artificial breeding and nursery practices of *Clarias batrachus* (Linnaeus, 1758). *Scientific World*, Vol. 4, No. 4: 32-37.

Hussain, A. 2006. Seed production of *Ompok pabda* (Ham) in hatchery of C.G. Co-operative Fish Federation, *Fishing Chimes*, 26 (1): 136 – 139.

Mahapatra, B. K. 2004. Conservation of the Asiatic catfish, *Clarias batrachus* through artificial propagation and larval rearing technique in Imdia. *Aquaculture Asia*, Vol. IX, No. 4: 8-9.

Mahmood, S. U. 2006. Effects of different feeds on the larval rearing of Pabda, *Ompok pabda*. *Bangladesh Journal of Zoology*, Vol.34, No.1.

Mollah, M. F. A. 2003. Mass Production of Stockable Sized Fry of *Ompok pabda* (Hamilton). *University link*, No-3.

Mukherjee, M. and Das, S. 2001. Artificial propagation of a siluroid fish *Ompok pabda* (Ham). *Fishing Chimes*, 26 (1): 75 – 79.

Mukherjee, M., Praharaj, A. and Das, S. 2002. Conservation of endangered fish stocks through artificial propagation and larval rearing technique in West Bengal, India. *Aquaculture Asia*, Vol-VII, No-2.

NBFGR. 2010. Threatened freshwater fishes of India. Published by National Bureau of Fish Genetic Resource (ICAR), Lucknow, U.P., pp.1-20.

Rahman, A., Yeasmine, S and Khan, M. M. 2008. Growth Survival and Production of a threatened siluried catfish, *Ompok pabda* (Hamilton) Fingerlings in nursery ponds. *Malays. Appl. Biol*, 37 (1): 47-56.

Roy, A. K., Sarma, S., Bhuyan, D. K., Das, M. and Das, A. K. 2007. Captive breeding of an endangered fish *Ompok pabda* (Hamilton-Buchanan) using different doses of ovatide. In National seminar on Recent Advances & Rebuilding of Fish and Fisheries in North east India. Department of Pisciculture, St. Anthony College, Shillong-1. (Abstract)

Sahoo, S. K., Giri, S. S. and Sahu, A. K. 2005. Effect on Breeding Performance and Egg Quality of *Clarias batrachus* (Linn.) at Various Doses of Ovatide during Spawning Induction. *Asian Fisheries Science*,18: 77-83

Sarkar, U. K., Deepak, P. K., Negi, R. S., Paul, S. K. and Sing, S. P. 2005. Captive breeding of an endangered fish *Ompok pabda* (Hamilton-Buchanan) using different doses of Ovaprim. *J. Inland Fish. Soc. India*, 37(2): 37-42.

Sridharan S., Vijoykumar, C. and Haniffa, M. A. 1998. Induced spawning and establishment of captive population of an endangered fish *Ompok bimaculatus* in India. *Curr. Sci*., 75: 1066-1068.

Manuscript Progress Date

Received : 06 .01.2012
Revised : 21.01.2012
Accepted : 27.01.2012