Journal of Entomology and Zoology Studies

Available online at www.entomoljournal.com

E-ISSN: 2320-7078
P-ISSN: 2349-6800
JEZS 2019; 7(4): 935-939

Received: 20-05-2019
Accepted: 22-06-2019

S Nahar
Deputy Director, Bangladesh Fisheries Research Institute (BFRI), Bangladesh

MM Nabi
Joint Director, Bangabandhu Academy for Poverty Alleviation and Rural Development BAPARD, Kotalipara, Gopalgonj, Bangladesh

MA Halim
Assistant Director, Bangabandhu Academy for Poverty Alleviation and Rural Development BAPARD, Kotalipara, Gopalgonj, Bangladesh

Correspondence
MA Halim
Assistant Director, Bangabandhu Academy for Poverty Alleviation and Rural Development BAPARD, Kotalipara, Gopalgonj, Bangladesh

Study the growth performance of *Ompok pabda* (Hamilton 1822) in cemented dewatering canal at Bapard campus, Gopalgonj

S Nahar, MM Nabi and MA Halim

Abstract
An experiment was conducted to observe growth performance of *Ompok pabda* in a cemented dewatering canal with six segments in Bangabandhu Academy for Poverty Alleviation and Rural Development (BAPARD), Kotalipara campus under Gopalgonj district, Bangladesh from 5 March to 5 July, 2019. Three stocking densities such as 20 (T1), 25 (T2) and 30 (T3) per m^2 were tested with two replications each. Fish were fed with commercial pelleted feed containing 36% crude protein. After five months rearing, the mean harvesting weights of *Ompok pabda* were 26.9±0.51, 25.8±0.87 and 24.96±1.23 g in T1, T2 and T3, respectively. The FCR was 2.30, 2.50 and 2.72 in T1, T2 and T3 respectively. SGR in T1 (1.30) was significantly higher than T2 (1.26) and T3 (1.24). The survival rate was recorded in the present study area as 85%, 75% and 72% for T1, T2 and T3, respectively. The mean production of *Ompok pabda* was 0.46, 0.48 and 0.54 kg per m2 or 18.40, 19.20 and 21.60 kg/dec in T1, T2 and T3, respectively. In the present study, the total expenditure of production (BDT/dec) was lower in T1 (3845.60) than T2 (4440.80) and T3 (5300.40). The net return was highest in T1 (5354.40) than T2 (5159.20) and T3 (5500.00) BDT/dec respectively.

Keywords: Growth, stocking densities, cemented reservoir

1. Introduction
Ompok pabda (Hamilton, 1822), an indigenous catfish belongs to the family Siluridae of the order Siluriformes. Catches of this fish have drastically declined from open waters like rivers, beels, haors, etc. in recent year due to various ecological change in the inland water bodies and this fish is now considered as an endangered species [17]. *Ompok pabda* body is elongated and laterally compressed with dorsal-ventrally flattened head. Snout rounded and two pair of barbells present. Superior mouth with lower jaw, *O. pabda* caudal fin is forked with rounded lobes and pectoral fin with smooth spines [35]. This species occurs in the lotic and freshwater ecosystem [3, 4]. It attains a length of 17 cm and geographically distribution of Pabda in many neighbor countries like Bangladesh, Pakistan, Afghanistan, and Myanmar [4, 10]. This species is omnivorous in nature [36]. It can withstand harsh environmental conditions such as low oxygen and wide range of temperature fluctuations [35]. This small fish plays an important role in the inland fisheries catch because of its nutritive value and high market price. Due to rich lipoprotein content and soft bony structure this fish species is considered delicious and nutritious to the people of East India, North East India and Bangladesh as [12, 13, 20, 27]. It has extensive geographical distribution covering India, Bangladesh, Pakistan, Afghanistan and Burma [1, 2, 10, 18, 33]. Despite its greater economic value this species did not receive sufficient attention in aquaculture. Insufficient existence of live samples in nature and poor survival of the larvae are major constrain of the observations [2]. As a result of indiscriminate fishing during monsoon, application of pesticide in agriculture, soil erosion and siltation formation in river, contamination of habitat due to sewage and industrial pollution etc. the population of this fish species is sharply tainted [3, 11, 12].
But it is not receiving a good response in aquaculture sector because of not proper productive knowledge about feeding, breeding and culture techniques. Internationally [17] declared pabda in red list near threatened species in the whole world. So, there is need to full the demand by improve our skills in fisheries sector by which we can introduce a more productive growth of *Ompok pabda* in aquaculture. Although pabda is a high valued endangered small catfish in Bangladesh, literature on culture of this species are scanty.

2. Materials and methods

a) Dewatering canal selection and preparation

The experiment was conducted for a period of five months from 05 March to 05 July 2019 in six dewatering canal of length 40±0.5 meter and width 1.5±0.25 meter with a depth of 1.00 meter at BAPARD campus, Kotalipara (22.9833°N 89.9917°E), Gopalgonj. Prior to stocking, cemented dewatering canal were cleaned with bleaching powder.

Indicate the location of study area (Source.

a) Experimental design

Two different stocking densities of Pabda (*Ompok pabda*) were tested in the experiment. Stocking density was maintained as treatment and which replicated twice.

Table. 1: Experimental design

SL	Treatments	Replications	Initial Length (cm)	Initial Weight (GM)	Stocking Density (per m2)	Feeding rate
01.	T1	2	7.10±0.20	3.85±0.25	20	3-10% Twice daily
02.	T2				25	
03.	T3				30	

b) Source of fingerlings

The fingerlings of Pabda (*Ompok pabda*) were used in this experiment were collected from a private hatchery of Mymensingh, Bangladesh.

c) Fish stocking

Fingerlings of Pabda (*Ompok pabda*) were stocked in 5 March 2019 according to the experimental design. Fingerlings of Pabda (*Ompok pabda*) were stocked at the rate of 20, 25 and 30 per m2 in T1, T2 and T3, respectively.

d) Fish sampling

Random samples of ten fishes from each dewatering canal was sampled fortnightly by using a scoop net. The total weight was measured by using a portable balance (Tanita, Japan).

e) Feeding

After stocking, in order to meet up the increasing dietary demand, commercial fish feed named Nourish feed (Nursery-2 to Grower) containing average 36% crude protein were applied as supplementary feed at the rate of 3-10% of standing biomass of fish twice daily.

f) Water sampling and analysis

Water quality parameters such as air temperature, water temperature, pH, dissolved oxygen (DO), total alkalinity and transparency were determined at weekly interval. Temperature was recorded using a Celsius Thermometer, dissolve oxygen and pH meter (Hanna pH 300) and a portable digital DO meter (MI 605, MARTINI).

g) Harvesting of fish

At the end of the experiment, the fishes were harvested by removing water from canal. The harvested fishes were counted and weight were recorded.

h) Data analysis

Data were analyzed using the SPSS Version-20. ANOVA was performed on all the dependent variables to see whether the treatment had any significant effect or not.

3. Results

a) Water quality parameters

Mean values of physico-chemical parameters over the period of *Ompok pabda* fish farming are presented in Table 2.

Table 2: Water quality parameters

Water Quality Parameters	Treatments		
	T1	T2	T3
Water temperature (0c)	29.00±0.50	28.90±0.51	28.84±0.47
pH	7.70±0.04	7.80±0.10	7.86±0.14
DO (mg/L)	5.00±0.50	4.40±0.49	4.43±0.46
Ammonia	0.25±0.00	0.35±0.12	00.50±0.20
Total alkalinity (mg/L)	120.30±0.41	120.60±0.44	121.00±0.30
Transparency (cm)	25.20±1.60	25.10±1.30	24.13±1.80

b) Growth and production

Table 3: Details of stocking, harvesting, growth, FCR, SGR and production of *Ompok pabda* in the three treatments during the study period are shown in Table 3.

Parameters	Treatments		
	T1	T2	T3
Stocking densities (No./m2)	20	25	30
Initial length (cm)	7.10±0.20	7.10±0.20	7.10±0.20
Initial weight (gm)	3.85±0.25	3.85±0.25	3.85±0.25
Culture duration (Days)	150	150	150
Final length (cm)	20.10±0.25	19.34±0.73	18.23±0.52
Final weight (gm)	26.9±0.51	25.8±0.87	24.96±1.23
FCR	2.30	2.50	2.72
SGR	1.30	1.26	1.24
Survival rate (%)	85.00	75.00	72.00
Production (kg/m2)	0.46	0.48	0.54
Production (kg/dec)	18.40	19.20	21.60

Table 4: Economic analysis for *Ompok pabda* production in ponds reared for 150 days

Components	Treatments		
	T1	T2	T3
Expenditure (Tk/m2.)			
Fingerlings cost (1.5 Taka/Pic)	30	37.50	45.00
Feed cost (52 Taka/Kg)	55.01	62.40	76.38
Lime cost (15 Tk/kg)	1.125	1.125	1.125
Operational cost	10.00	10.00	10.00
Total expenditures (Tk/m2)	96.14	111.02	132.51
Total expenditures (Tk/dec.)	3845.60	4440.80	5300.40
Income			
Gross return (500 Taka/Kg)	230.00	240.00	270.00
Net return (Tk/m2.)	133.86	128.98	137.50
Net return (Tk/dec.)	5354.40	5159.20	5500.00
BCR (Benefit Cost Ratio)	1.39	1.16	1.04

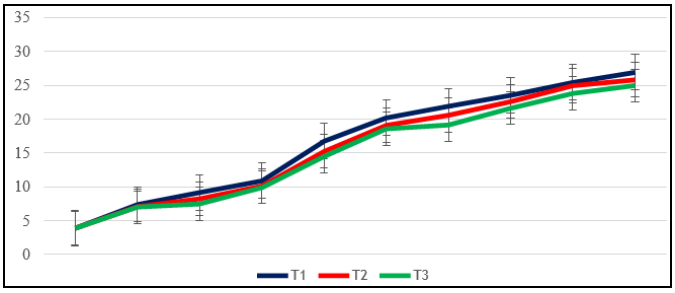

Fig 1: Growth performance of *Ompok pabda*

4. Discussion

The water quality parameters measured throughout the experimental period were found within the acceptable range for fish culture [19]. In the study, water temperature (^{0}c) in T1, T2 and T3 were 29.00±0.50, 28.90±0.51 and 28.48±0.47, respectively. The variations in temperature among the treatment means were found similar and within the suitable range of growth of fish in tropical ponds [6, 24, 29, 31]. The water transparency (cm) were 25.20±1.60, 25.10±1.30 and 24.13±1.80 in T1, T2 and T3, respectively similar [8]. Boyd (1982) [7] recommended a transparency from 15 to 40 cm. The level of pH in T1, T2 and T3 were 7.70±0.04, 7.80±0.10 and 7.86±0.14, respectively. The mean pH level indicated optimum condition for the best growth and health of aquatic organisms [14]. Different authors have reported a wide variations in pH from 7.18 to 9.24 [23], 7.03 to 9.03 [31], 6.8 to 8.20 [6] and 7.50 to 8.20 [9, 30] in fertilized fish pond. The dissolved oxygen (mg/L) content in T1, T2 and T3 were 5.00±0.50, 4.40±0.49 and 4.43±0.46, respectively similar [26]. Although catfish usually can tolerate reduce oxygen level [32]. Total alkalinity were 120.30±0.41, 120.60±0.44 and 121.00±0.30 mg/L in T1, T2 and T3, respectively. Total alkalinity levels for natural waters may range from less than 5 mg/L to more than 500 mg/L [8]. Kohinoor *et al*., 1998 [23] and Roy *et al*., 2002 [31] were found the average total alkalinity above 100 mg/L in their study. The mean values of ammonia-nitrogen (unionized) was 0.25±0.00, 0.35±0.12 and 00.50±0.20 in T1, T2 and T3, similar [34].

The end of experiment, the mean harvesting weights of *Ompok pabda* were 26.9±0.51, 25.8±0.87 and 24.96±1.23 g in T1, T2 and T3, respectively. Kohinoor *et al*., 1991 [21] reported a weight gain of 28-33g for *Ompok pabda* in polyculture with rajputi and minor carp for a rearing period of 6 months. However, it was 48±4.22, 42±2.99 and 38±3.81 in treatments T1, T2 and T3 respectively [6]. The specific growth rate (SGR % per day) of fish in different treatments varied among the treatments. Highest value was obtained in T1 (1.30) and lowest in T3 (1.24). The SGR values obtained in the present study are T1, T2 and T3 similar to reported [22]. The specific growth rate (SGR % per day) of Pabda in different treatments ranged between 2.98 and 3.28 [15]. FCR was significantly lower in T1 (2.30) than in T2 (2.50) and T3 (2.72) similar [28]. The percentage of survival as recorded in the present study was 85, 75 and 72 for T1, T2 and T3, respectively. The survival (%) of Pabda varied between 75 and 87 % [15]. Islam (2002) [16] found that the survival rate of *O. pabda* larvae fed with different feeding frequencies was in the range of 66.25% to 81.5%.

The mean production of *Ompok pabda* was 0.46, 0.48 and 0.54 kg per m2 or 18.40, 19.20 and
21.60 kg/dec in T1, T2 and T3, respectively similar to [25]. In the present study, the total expenditure of production (BDT/dec) was lower in T1 (3845.60) than T2 (4440.80) and T3 (5300.40). The net return was highest in T1 (5354.40) than T2 (5159.20) and T3 (5500.00) BDT/dec respectively.

5. Acknowledgement

The authors are thankful and grateful to BAPARD faculty members, Department of Fisheries, the hatchery owners, fishery officers, staffs etc. for their kind cooperation to supply data and information related to the farmers.

6. Conclusion

After end of the experiment, it can be decided that treatment T1 (20 fingerlings/m^2 or fingerlings/dec) is suitable for *Ompok pabda* due to higher total weight gain, better feed conversion ratios as well as higher net profit. Application of

this findings for *Ompok pabda* culture might be developed the aquaculture production especially in cemented dewatering canal.

6. References

1. Banik S and Malla S. Rotifer as Growth Promoter for a Rare Fish *Ompok bimaculatus* Related to Climate Change. Proceedings of the Workshop on Aquaculture Biotechnology for Rural Development, July 25-28, 2008, West Tripura India. Tripura, Dept. of Zoology, Tripura University. 2009, 18-28.
2. Banik S Goswami P, Malla S. Ex-Situ Studies of Captive Breeding of *Ompok bimaculatus* (Bloch, 1794) in Tripura. J Adv. Lab. Res. Bio. 2011; 2(3):133-137.
3. Banik S, Malla S. Habitat Mapping for *Ompok pabda* (Hamilton-Buchanan, 1822) in Gomoti River of Tripura. Proceedings of the 10th Agricultural Science Congress, February 10-12, 2011, Lucknow India. Lucknow, National Bureau of Fish Genetic Resources (ICAR), 2011, 388.
4. Banik S, Goswami P, Malla S. Studies on Breeding Physiology of *Ompok bimaculatus* (Bloch, 1794) in Tripura. U.P. Journal of Zoology. 2012; 32(1):67-72.
5. Banik S, Bhattacharya P. *Ompok pabo* (Hamilton, 1822) of Tripura, India: An Endangered Fish Species in Relation to Some Biological Parameters. Res. J Biol. 2012; 2(3):91-97.
6. Begum M, Hossain MY, Wahab MA and Kohinoor AKM. Effects of Iso-phosphorus Fertilizers on Water Quality & Biological Productivity in Fish Pond. J Aqua. Trop. 2003; 18(1):1-12.
7. Boyd CE. Water Quality Management for Pond Fish Culture. Elsevier Sci. Publ. Co. Amsterdam-Oxford- New York, 1982, 318
8. Boyd CE. Water Quality in Ponds for Aquaculture, Alabama Agricultural Experiment Station, Auburn University, Alabama, USA, 1990, 482.
9. Chakraborty BK, Miah MI, Mirza MJA and Habib MAB. Growth, Yield and Returns to *Puntius sarana* (Hamilton) Sharpunti, in Bangladesh under Semi-intensive Aquaculture. Asian Fisheries Science. 2005; 18:307-322.
10. Chakrabarti NM, Chakrabarti PP, Mondal SC. Artificial Breeding Seed Production and Rearing of Butter Fish *Ompok pabda*-A Significant Mile Stone in Technology Advancement. Fishing Chimes. 2007; 26(10):134-136.
11. Chakrabarti NM, Chakrabarti PP, Mondal SC. *Ompak bimaculatus* and *Ompak pabda* Comparative Morphometric and Meristic Study of Embryonic Larval Development. Fishing Chimes. 2009; 29(6):8-9.
12. Demska ZK, Dlugosz M. Fecundity of Vendace from Two Lakes of Mazurian District. Rybna. 1995; 31: 37-50.
13. Fagede SO, Adebisi AA, Aatanda, AN. The Breeding Cycle of Tilapia, *Sarotherodon galilaeus* in the IITA Lake, Ibadan, Nigeria. Hydrobiologia. 1984; 100:493-500.
14. Hora SL and Pillay TVR Hand Book of Fish Culture in Indo-Pacific Fisheries Region. FAO Fish. Biol. Tech. Pap. 1962; 14:203.
15. Hossain MA. Development of a Suitable Diet for Culture of Pabda (*Ompok pabda*) in Cage Using Locally Available F'eed Ingredients. Ann. Bangladesh Agric. 2008; 2(2):55-62
16. Islam, MM. Dose Optimization for Induced Breeding of *Ompok pabda* (Hamitton) and Their Larvae and Fry Rearing. MS Thesis, Bangladesh Agricultural University, Mymensingh. 2002, 123.
17. IUCN. Bangladesher Bipanna Prani. IUCN, The world Conservarion Union, 2003, 294
18. Jayaram KC. Freshwater Fishes of Indian Region. New Delhi, Narendra Publishing House, 1999, 551.
19. Jhingran VG. Fish and Fisheries of India. 3rd edition, Hindustan Publishing Corporation. India, 1991, 727.
20. Jhingran VG. Fish and Fisheries of India. Reprint ed. Delhi, Daya Publisher, 2004.
21. Kohinoor AHM, Akhteruzzaman M, Hussain MG, Shah MS. 1991. Observations on the Induced Breeding of Koi Fish, *Anabas testudineus* (Bloch) in Bangladesh. Bangladesh J Fish. 1991; 14(1-2):73-77.
22. Kohinoor AHM, Hossain MA, Hussain MG. Semi-intensive Culture and Production Cost of Pabda (*Ompok pabda*) with Rajpunti (*Puntius gonionotus*) and Mirror Carp (*Cyprrinus carpio* var. *specularis*) in Mini Ponds. Bangaladesh J, Zool. 1997; 25(2):129- 133.
23. Kohinoor AHM, Islam ML, Wahab MA, Thilsted SH 1998. Effect of Mola (*Amblypharyngodon mola* Ham.) on the Growth and Production of Carps in Polyculture. Bangladesh J Fish. 1998; 2(2):119-126.
24. Kohinoor AHM, Begum M, Hussain MG. Culture Potentials of Gulsha, *Mystus cavasius* in Monoculture Management under Different Stocking Densities. Bangladesh J Fish. Res. 2004; 8(2):95-100.
25. Kohinoor AHM, Begum M, Hussain MG. Evaluation of Different Stocking Density of Two Indigenous Fish, *Ompok pabda* and Gulsha with Indian Major Carp in Polyculture System Iranian Journal of Fisheries Sciences. 2009; 8(1):57-64.
26. Kohinoor AHM, Rahman MM, Moniruzzaman HM and Chakraborty SC. Production Performance of Pabda (*Ompok pabda*) and Gulsha (*Mystus cavasius*) with GIFT Strain (*Oreochromis niloticus*) in On-Farm Management System. Bangladesh J Fish. Res. 2011; 15(16):27-36
27. Pillay TVR. Aquaculture-Principles and Practices. Cambridge, Fishing News Books, 2000.
28. Paul BN, Chanda S, Giri SS. Effect of Feeding Frequency on Growth Performance of *Ompok pabda* fry, Short Communication. Indian Journal of Animal Nutrition. 2014; 31(2):200 -202.
29. Rahman MS, Chowdhury MY, Haque AKMA, Haq MS. Limnological Studies of Four Ponds. Bangladesh J Fish. 1982; 2-5(1-2):25-35.
30. Rahman MA, Mazid MA, Rahman MR, Khan MN, Hossain MA, Hussain MG. Effect of Stocking Density on Survival and Growth of Critically Endangered Mahseer, *Tor putitora* (Hamilton) in Nursery Ponds. Aquaculture. 2005; 249:275-284.
31. Roy NC, Kohinoor AHM, Wahab MA, Thilsted SH. Evaluation of Performance of Carp-SIS Polyculture Technology in the Rural Farmer's Pond. Asian Fisheries Science. 2002; 15:41-50.
32. Stickney RR. Principles of Warm Aquaculture. John Willey and Sons. New York, 1979, 375.
33. Siddiqua KA, Islam MS, Hossain MG, Ahmed ATA. A Histological Study of the Spermatogenesis in *Ompak pabda* (Hamilton-Buchanan, 1822). Bangladesh J of Fish. Res. 200; 4:185-189.
34. Singh P, Nayak SK, Reang D, Singh R. A Study on Growth Performance and Survivability of *Ompok pabda* (Hamilton 1822) Fingerlings in Earthen Pond Fed with

Different Feed Ingredients. International Journal of Fisheries and Aquatic Studies. 2017; 5(4):289-294.
35. Talwar PK, Jhingran AG. Inland Fishes of India and Adjacent Countries. Oxford & IBH Publishing Co. Pvt. Ltd., New Delhi, 1991, 584.
36. Taleb MA, Rahman MH, Hossain MA. Food and Feeding Habit of Small Omnivorous Fish, *Ompok pabda* (Hamilton). Proc. 15th Annual Bangladesh Sci. Con. Abstracts: Section IX, No. 20, 1991, 17.