OBSERVATION ON THE INDUCED SPAWNING PRACTICES IN THE HATCHERIES OF RAJSHAHI DISTRICT OF BANGLADESH

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Abstract: An investigation was conducted during the period from March to December 2009 to investigate the induced spawning practices in 22 hatcheries of 6 Upazilas of Rajshahi District of Bangladesh. It was observed that, 6 native fish species *viz.* rui (*Labeo rohita*), catla (*Catla catla*), mrigal (*Cirrhina mrigala*), calibaush (*Labeo calbasu*), bata (*Labeo bata*), gonia (*Labeo gonius*) and six exotic fish species such as silver carp (*Hypophthalmichthys moltrix*), bighead carp (*Aristichthys nobilis*), grass carp (*Ctenopharyngodon idella*), common carp (*Cyprinus carpio*), Thai pangus (*Pangasius sutchi*), rajputi (*Puntius gonionotus*) were used in the surveyed hatcheries for induced spawning purpose. The average length limit was 41.70±13.02 to 72.81±25.98 cm, average age limit was 1.96±0.75 to 3.08±0.90 years and average weight limit was 1.83±0.79 to 7.54±3.92 kg of the brood fish. Two types of hormone injections like PG (pituitary gland) and HCG (human chorionic gonadotropin) were used for induced spawning. The rate of 1st doses of injections of PG were from 1 to 4 mg/kg and HCG from 150 to 500 IU/kg and the rate of 2nd doses of injections of PG for native and exotic species were from 4 to 8 mg/kg and 4 to 10 mg/kg respectively. The incubation period and hatching rate in different fish species varied from 10 to 72 hours and 55% to 80%, respectively.

Key words: Induced spawning, inducing agents (PG and HCG), brood fishes, hatcheries.

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Introduction

Induced spawning refers to a process in which some stimulants, hormones or pituitary extracts are injected in the brood fishes, which do not spawn in the closed water bodies, causing the fishes to spawn (Bhuiyan *et al.* 2007). Induced spawning of local carps through hypophysation became a common practice in Bangladesh since 1967 (Ali, 1967). Meanwhile a large number of hatcheries in the private sector (estimated at over 700) have been established with the introduction of artificial breeding of exotic species (Ali, 1998). Induced spawning has opened the door of new era in the production of fish throughout the world. In Bangladesh, successful induced spawning was first done by Ali (1967) in carps through hypophysation having been standardized (Haque, 1975, Islam and Chowdhury, 1976; Ahmed, 1983 and Alam 1983).

The Department of Fisheries, Government of Bangladesh reported that a couple of years ago the number of government fish and prawn training farms

were 6, training academy 1, fish hatcheries or fry production farms 112, bagda prawn hatcheries 2 and golda prawn hatcheries 17 (DoF 2009). Total fry production from government hatcheries in 2007-2008 was 7040 kg. In 2007-2008, the number of private fish hatcheries were 873, fish nurseries 8712, bagda hatcheries 57, golda hatcheries 53 and the fry production from private hatcheries 4,16,946 kg in the country.

The annual fish spawn production from Rajshahi district of Bangladesh by the private hatcheries was 10,536 kg (DoF, 2009). The annual fish spawn production was 1.92 kg, carp fry production 1.92 kg, shorputi fry production 0.49 kg, golda prawn juvenile production 0.15 kg and brood fish production was 1500 kg from Rajshahi district by the two public hatcheries (DoF 2009). Hatcheries therefore, play an important role for fish production. All government and non-government organizations should have more effective, ethical and planned activities to make artificial and induced spawning of fishes at grass-root levels (Hossain and Siddique, 2009). The present work was done

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with a view to knowing about the induced breeding techniques and practices in some selected hatcheries of Rajshahi in Bangladesh.

Materials and Methods

Data on induced spawning practices from 22 hatcheries under 6 Upazilas of Rajshahi District were collected during

the period from March to December, 2009 (Table 1). Two public and 20 private hatcheries scattered over Paba, Puthia, Mohonpur, Durgapur, Bagmara and Bagha Upazilas were surveyed. For the study, a survey schedule was prepared and the data of induced spawning practices in the hatcheries were collected from the District and Upazila Fishery Offices by direct interview methods. The data were then scrutinized carefully, summarized and analyzed statistically.

Table 1. Name and addresses of the hatcheries under study in Rajshahi District.

Hatcharies	Names	Locations in Upazilas
1*	Rajshahi Matshow Beej Utpadon Khamar	Paba, Thana-Boalia
2	Mashud Matshow Hatchery	Paba, Thana-Rajpara
3	Anand Matshow Hatchery	Paba, Thana-Boalia
4	Sarkar Matshow Hatchery	Paba, Thana-Rajpara
5*	Puthia Matshow Beej Utpadon Khamar	Puthia
6	Mullata Hatchery	Puthia
7	Shuvo-Irin Matshow Prokolpo Hatchery	Puthia
8	Atique Matshow Hatchery	Puthia
9	Duivai Sonali Matshow Hatchery	Mohonpur
10	Faisal Agro Fisheries	Mohonpur
11	Merina Matshow Hatchery	Bagmara
12	Bani Matshow Hatchery	Bagmara
13	Bahi Bhai Matshow Hatchery	Bagmara
14	Monika Hatchery	Bagmara
15	Manchur Matshow Hatchery	Durgapur
16	Amagachi Carp Hatchery	Durgapur
17	Bhai Bon Matshow Hatchery	Durgapur
18	Inni Matshow Prozonon Khamar	Durgapur
19	Ibne Salam Matshow Hatchery	Durgapur
20	Zahid Matshow Hatchery	Durgapur
21	Sarker Matshow Hatchery	Durgapur
22	Seba Agro Company Ltd.	Bagha

^{*}Government hatcheries.

Results and Discussion

Selection of brood fishes for spawning: According to the length, age and weight of the brood fishes, the appropriate species were selected in the hatcheries (Table 2). Length of the fishes varied around 42-73 cm, age between 1.96 and 3.08 years and weight between 1.87 and 7.54 kg. Khan (1943), Islam and Chowdhury (1976), Penman and McAndrew (1998) emphasized the role of proper species selection of brood fishes for successful induced spawning. The present results corroborate with those of Bhuiyan *et al.* (2008) who demonstrated that induced spawning of *Labeo rohita* was dependent on selecting healthy brood fishes.

Inducing agents for induced breeding: Mainly two types of inducing agents *viz*. pituitary gland (PG) and the human chorionic gonadotropin (HCG) were used in the hatcheries under survey. PG was used for all fishes except the silver and bighead carps where HCG was used. For the 1st and 2nd doses, PG of 1 to 4 mg/kg and 4-10 mg/kg,

respectively, were applied. On the other hand, 150-500 IU/kg HCG were applied only as the 1st dose (Table 3). Fontenel (1955), Atz and Pickford (1959), Das and Khan (1962), Chaudhuri (1976), Crim and Evans (1976), Mirza et al. (1993), Verdia (1994) and Alam and Bhuiyan (1999) also adopted similar practices for induced breeding in various fishes. It was found that fishes with correct dose of hormone injection spawned under artificial condition and gave good results. According to Ahmed (1945) PG influenced the spawning of *L. rohita*. In agreement with the present doses Khan (1938), Alikunhi et al. (1960), Haque (1975), Chaudhuri (1977), Moitra and Sarker (1970), Khan et al. (1992), Mahanta et al. (1998) and Bhuiyan et al. (2008) used similar doses for induced spawning in common carps.

Incubation and hatching: The incubation period of different fish species was found to range between the minimum of 10 and the maximum of 72 hours and the rate of hatching in different hatcheries ranged between 55% and 80% (Fig. 1). These findings are similar to the observations of Alikunhi *et al.* (1964), Ali (1967) and Singh *et al.* (2000).

Type	Common	ommon Length (cm)		Age (year)		Weight (kg)		
	names	Scientific names	Min	Max	Min	Max	Min	Max
Native species	Rui	Labeo rohita	45.72	76.2	2	3	2	8
	Catla	Catla catla	63.5	88.9	3	5	3	15
	Mrigel	Cirrhina mrigala	45.72	76.2	2	3	2	8
	Calibaush	Labeo calbasu	30.48	50.8	2	3	2	5
	Bata	Labeo bata	17.78	22.86	1	2	0.4	1
	Gonia	Labeo gonius	45.72	96.52	1.5	3	1.5	10
Exotic species	Silver carp	Hypopthalmicthys molitrix	45.72	81.28	2	3	2	8
	Bighead carp	Aristichthys nobilis	50.8	101.6	2	3	2	8
	Grass carp	Ctenopharyngodon idella	50.8	88.9	3	4	3	7
	Common carp	Cyprinus carpio	40.64	63.5	3	4	2	7
	Thai pangus	Pangasius sutchi	43.18	96.52	1	2	1.5	12
	Rajputi	Puntius gonionotus	20.32	30.48	1	2	0.5	1.5
	Total		500.38	873.76	23.5	37	21.9	90.5
	Mean±SD		41.70 ±	72.81 ±	1.96 ±	3.08 ±	1.83 ±	7.54 ±
			13.02	25 98	0.75	0.90	0.79	3.92

Table 2. Species-, length-, age- and weight-wise selection of brood fishes for spawning in Rajshahi.

Table 3. Hormonal doses used in different brood fishes for induced spawning in Rajshahi.

	Hormonal doses					
Common names of	1st doses of PG (mg/k	g) and HCG (IU/kg)	2 nd doses of PG (mg/kg)			
fishes	Minimum	Maximum	Minimum	Maximum		
Rui	1.25	2.5	6	8		
Catla	1.25	3	5	8		
Mrigel	1	3	5	8		
Calibaush	1	3	4	8		
Bata	1	4	4	8		
Gonia	1	3	6	8		
Silver carp	150*	500*	6	8		
Bighead carp	150*	500*	6	9		
Grass carp	1	3	4	8		
Common carp	1	3	4	8		
Thai pangus	2	2	6	10		
Rajputi	1	4	4	8		

PG = pituitary gland; HCG = Human chorionic gonadotropin; *values for HCG doses only.

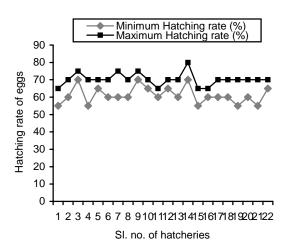


Fig. 1. Hatching rates of eggs in different hatcheries under study.

Conclusion

Six native and six exotic fish species were used by the surveyed hatcheries for induced spawning. The average length of the brood fishes was 41.70±13.02 to 72.81±25.98 cm, age 1.96±0.75 to 3.08±0.90 years and weight 1.83±0.79 to 7.54±3.92 kg in which PG and HCG were used. The 1st doses of PG varied from 1 to 4 mg/kg but the 2nd doses ranged between 4 to 8 mg/kg and 4 to 10 mg/kg for the native and exotic species. Whereas only the 1st dose of HCG is used for exotic species, that varied between 150 and 500 IU/kg. The hatching rate of the studies fishes ranged between 55% and 80%. The present study thus gives a brief account of induced spawning practices in 22 hatcheries from 6 Upazilas in Rajshahi District of Bangladesh.

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