



## PRESENT STATUS OF FISH FRY PRODUCTION AND TRADE AT CHACHRA IN JESSORE, BANGLADESH

Wasim Sabbir, Mst Nadira Nusrat, Biplab Kumar Shaha, Alokesh Kumar Ghosh\*, Md.  
Rashedul Islam and S.M. Ashik Mahmud

*Fisheries and Marine Resource Technology Discipline, Khulna University, Khulna 9208, Bangladesh*

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**Abstract:** The study was based on a survey report to know the present status of fish fry production and trade at *Chachra* in Jessore district by 20 hatchery owners, 45 nursery operators and 50 fry traders. The study was made on the total production of fry, number of people involved in the business, technical knowledge of the nursery operators, marketing channel, area of distribution of fry, means of transportation and facilities available. It was reported that 79,420 kg hatchlings were produced from 38 hatcheries and 948,394 kg fingerlings were produced from 180 nurseries at Jessore sadar in the year 2008. The fingerlings produced from this region were distributed to different parts of the country. Everyday more than 200 fry traders came to *Chachra* and carried the fry by means of van, pick-up van, bus, truck, train etc. Commission agents played an important role in this trade. It was observed that due to poor technical knowledge and improper transportation, fry mortality was high. Besides, insufficient credit support and unexpected disease infection were found to be the major problems in this business.

**Keywords:** Fry, hatchery, nursery, trade

### Introduction

Fish and fisheries sector contributes 4.90% of the total export earning, 4.07% of total GDP of the country and 22% of the national animal protein consumption (*Motso unnayon ovigan*, 2008). A total of 463,576 kg hatchlings were produced in the country in 2007-2008 of which capture hatchlings from the natural sources were 2,061 kg. Private hatchery produced spawns were 457,288 kg. The contribution of the private hatchery compared to the total hatchling production was 97.5 % (Anon, 2008).

For an aquaculture system, to be successful, an interrupted, timely supply of high quality fish fry is highly essential. The species mostly cultured in freshwaters and the seed being produced are *catla*, *rohu*, *mrigal*, silver carp, grass carp, bighead carp, Thai *puti* etc. (Islam 1989). At present due to consequent destruction of natural habitats the natural availability of carp seed has largely gone down and the aquaculture venture are now fully dependent on the hatchery produced fry. At present total number of private fish hatcheries and nurseries in Bangladesh are 860 and 8,712 respectively and their total production are 457,288 kg hatchlings and 62,210 lac fry, respectively (Anon, 2008). In the year 2008 the carp hatchling productions from private hatcheries were 457288 kg of which Jessore district contributes 79420 kg that is 18% of the total hatchling production of the country from 83 hatcheries (DoF, 2008). The carp nursery trade in Jessore region has been developed based on the increasing seed demand all over the country. The ultimate

\*Corresponding author: <alokesh\_ku@yahoo.com>

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goal of this business in these regions is to meet the seed supply for pond fish culture all over the country, solve the employment problems and improve socio economic condition of fish fry production community.

The hatchery-produced hatchling cannot be directly stocked in the culture ponds. They need to be reared an intermediate stage in a nursery pond before stocking in the culture pond. Associated with the development of carp hatchery operation, major expansions of private nursery operation are spread in different parts of the country including Jessore district especially at *Chachra* region. It has now become a potential and profitable business in this region. The fish fry produced in the nursery pond are distributed to the pond culturists through different channels or levels. However, favorable soil condition, water quality, good marketing and communication facilities provided a greater prospect for this trade. At Jessore sadar the numbers of total nursery are 180 and the total production from these nurseries were 2048394 kg (DoF, 2008). But the survivability of the hatchlings is not so satisfactory due to the lack of technical knowledge of the nursery operators. A marketing system is formed here for purchasing fish fry. To find out the present status of the fish fry production and trade at *Chachra*, Jessore region an investigation was conducted. The investigation was carried out to find out the present status of fish fry production and trade at *Chachra* in the Jessore district.

#### **Materials and Methods**

**Study area:** The study was conducted at *Chachra* of Jessore district during the month of August to December 2008. The study was conducted with a questionnaire on 115 persons including 20 hatchery owners, 45 nursery operators and 50 fry traders. The hatchery owners, nursery operators and the fry traders were selected to be interviewed on the basis of the random sampling method.

**Data from primary sources:** Primary data were mainly collected through field survey. For collection of data a questionnaire was prepared. Before formulating the questionnaire, visits were made on the study area. Different information about hatcheries and nurseries were collected during the visit at *Chachra* in Jessore through interview. After finalizing the questionnaire, relevant data were collected by interviewing the hatchery owners, the nursery operators and the fry traders directly.

**Data from secondary sources:** The secondary sources were Bangladesh fisheries research institute (BFRI), Department of fisheries (DoF), Books and journals and other concern sources like researchers, fisheries extension workers etc.

**Analysis:** The collected data were carefully edited to eliminate errors after sorting and checking. The data were then transferred to tabular forms after careful examination and calculation. The analysis of data was mainly based on tabular, diagram and descriptive techniques. The graphs were prepared by using MS excel program.

#### **Results**

**Hatchery status:** Total number of hatcheries at Jessore sadar was 83. Most of the hatcheries in Jessore sadar were situated at *Chachra* region. At present, 38 carp hatcheries were found in operation in the area. Most of the hatcheries had the capacity of producing average 3,463.6 kg spawn per year. In the year 2008, the average production was 2,090 kg and the highest production was 4,500 kg while the lowest was 120 kg. The fish species found to breed in these hatcheries were commonly *rohu*, *catla*, *mrigel*, silver carp, grass carp, common carp, thai *puti*, *pangus*, *kalbaus*, *bata* and often black carp, bighead carp, *koi* and tilapia. Production capacity of twenty different hatcheries is shown in fig. 1.

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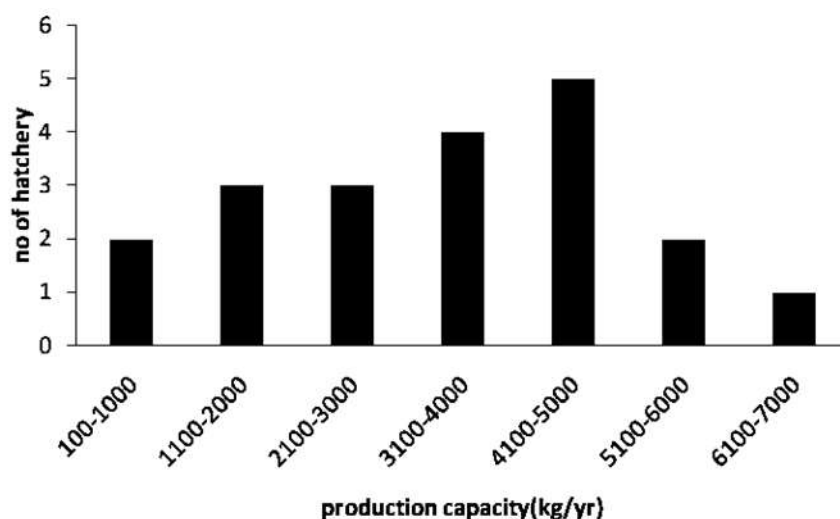


Fig 1. Production capacity (in average) of different hatcheries

**Price of hatchlings:** The price of the hatchlings of different species varied year round. The price was higher at the beginning of the season and at the end of the season but the price was comparatively less when the supplies of hatchlings were available. Average prices of hatchlings of different species are shown in Table 1. The price of hatchlings was relatively higher from February to May.

Table 1. Price of hatchlings of different carp species

Species (Common name)	Scientific name	Price (Taka/kg)
Rui	<i>Labeo rohita</i>	1400-1600
Catla	<i>Catla catla</i>	1600-1800
Mrigal	<i>Cirrhina cirrhosus</i>	1300
Silver carp	<i>Hypophthalmichthys molitrix</i>	1200
Grass carp	<i>Ctenopharyngodon iddella</i>	2200-2500
Mirror carp	<i>Cyprinus carpio var. specularis</i>	2000-2500
Common carp	<i>Cyprinus carpio var. flavipinnis</i>	2000-2500
Calbasu	<i>Labeo calbasu</i>	1600
Thai puti	<i>Puntius gonionotus</i>	1000-1200
Pangus	<i>Pangasius pangasius</i>	2500-2800
Telapia	<i>Oreochromis mossambicus</i>	1300
Black carp	<i>Mylopharyngodon piceus</i>	12-15/piece

**Problems faced by hatchery owners:** Sound health management practice is a key to success in any hatchery or nursery operation. In the study area hatchery operators mentioned several problems that they encountered in their operations.

**Occurrence of the diseases:** Most of the hatchery owners (99.8%) mentioned that they encountered diseases in their farms. They considered diseases to be an important issue in hatcheries. The diseases that were reported such as fish lice, tail and fin rot disease, sudden spawn mortality, gill rot disease, air gulping, deformed larvae etc. But the occurrence of fish lice was the most common diseases in this region.

**Unsuitable weather:** Some times lack of unsuitable weather becomes a great problem for induced breeding. When weather becomes too hot or too cold, it is very difficult for the hatchery owners to complete a successful breeding cycle.

**Poaching:** Poaching of brood fish and hatchery equipment was an often reported problem in the hatcheries, if those were not properly taken care of.

**Lack of finance:** Fifty percent of the hatchery owners identified the lack of credit facilities as their problem.

**Bad communication:** Bad road communication causes the increases of mortality of fry during handling and transportation. So it was also a problem for the hatchery owners to supply good quality seed to the buyers.

**Nursery status:** Total running nurseries were 180 at Jessore sadar and situated near the surrounding of Chachra region. In nurseries, hatchlings were reared for 30-40 days and then made ready for sale. Most of the nursery operators had no ponds of their own. They usually used pond of others as lease. In the area, 77% farmers used leased ponds which were 16,000 to 25,000 taka per year for each *bigha* (33 decimal).

**Stocking of hatchlings:** Hatchlings collected from hatchery were primarily stocked in a double walled cloth *Hapa* at a high density and reared for 3-4 days. After the first stage of rearing, hatchlings were transferred to the nursery pond and stocked at different density ranged from 70000 to 130000 per acre and reared for 20-30 days to a size of around 5 cm before being sold to the pond culturists.

**Nursing cycle:** There are several runs or cycles conducted by the nursery operators in a year. In the study area, 2-12 cycles of rearing fingerlings were conducted in 2008. But generally 6-10 cycles were most common in a season. It was observed that 25% farmers used to complete 6-8 cycles/year and 30% farmers used to complete 8-10 cycles/year that is shown in Fig 2.

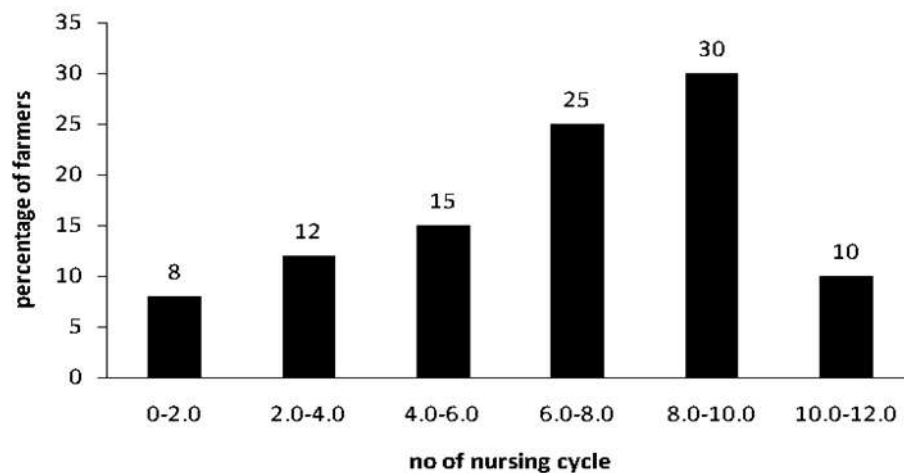


Fig 2. No. of nursing cycle per year

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**Production and prices of fry:** The nursery operators purchased the hatchlings from the hatchery and stocked them in the nursery ponds for rearing. It was reported that approximately 20,48,394 kg fry were produced from 180 nurseries during the year 2008. The price of the fries of different species was found to vary through year round. The price was high at the beginning and at the end of the season but the price was comparatively less when the supplies of fries were available. Average price of fries of different species has been shown in Table 2.

**Fry marketing:** In the study area, the marketing channel consisted of hatchery owner, nursery owner, aratdar, fry seller and pond owner. The nursery owners collected hatchlings from hatcheries and reared in the nursery ponds. Within 40 days of rearing, the fry were transferred to the depot or sales center where the fry were kept in small hapa. Buyers came from different areas of the country and bought the fry from the Depots. Some nursery owners sold the fry from ponds directly to buyers. The wholesalers of far way districts supplied the fry to the respective local fry traders who distributed the fry to the pond culturists or sold to the pond culturists directly. In some cases the pond culturists bought the fry from the nursery owners directly. Fry traders used to come from Khulna, Satkhira, Bagerhat, Pirozpur, Barishal, Jhalukati, Borguna, Faridpur, Bhola, Madaripur, Gopalganj, Kushtia, Jhenidah, Magura, Narail, Pabna, Bogra, Dinajpur, Rangpur, Nator, Mymensing Comilla, Chandpur, Chuadanga, Dhaka, Manikganj and other districts of Bangladesh.

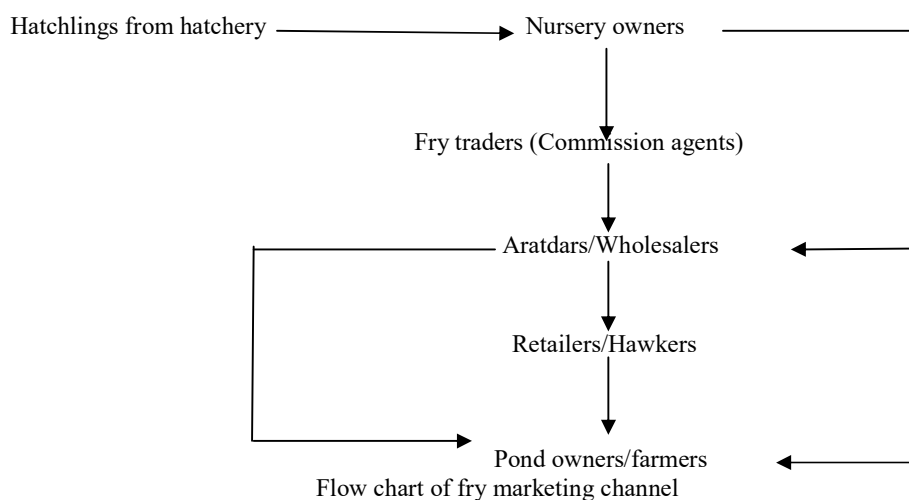


Table 2. Price of fry observed in the study area

Species (Common name)	Scientific name	Price(Tk/kg)
Rui	<i>Labeo rohita</i>	60-80
Catla	<i>Catla catla</i>	60-70
Mrigel	<i>Cirrhina cirrhosus</i>	60-80
Silver carp	<i>Hypophthalmichthys molitrix</i>	50-60
Grass carp	<i>Ctenopharyngodon iddella</i>	90-110
Mirror carp	<i>Cyprinus carpio var. specularis</i>	90-110
Common carp	<i>Cyprinus carpio var. flavipinnis</i>	80-110
Thai puti	<i>Puntius gonionotus</i>	80-100
Black carp	<i>Mylopharyngodon piceus</i>	20-40 Tk/piece
Pungus	<i>Pangasius pangasius</i>	1-5 Tk/piece
African magur	<i>Clarius lazera</i>	1-3 Tk/piece

**Problems faced by the nursery owner:** In the study area it was observed that there were some other problems associated with the business, which hindered the real progress of the business.

**Lack of technical Knowledge:** Lack of technical knowledge was observed to be the most vital problem of carp nursery. There was no fisheries specialist among the nursery operators. Most of them practiced nursery operation on the basis of their own knowledge and practical experience that they gathered by observation.

**Disease:** One of the most important problems that the nursery operator commonly faced was disease outbreak of the stocked hatchling in the nursery ponds. It was observed that the hatchlings were commonly died by gas bubble disease, which might be due to rise of temperature above the ambient level, excessive food supply and shortage of oxygen. Sometimes the nursery owner failed to diagnosis the water contamination earlier which resulting loses of the business. Some farmers controlled these sorts of problems by controlling the water depth and providing water flow, controlling food supply while the others applied lime or other chemicals.

**High price of various inputs:** Higher price of various inputs was a general problem faced by the farmers in the country. Feed, fertilizer and seed etc. are vital inputs in the production of fish fry. Most of the nursery owner mentioned that they had to purchase feed, seed, fertilizer and other inputs with high price during pick season.

**Lack of sufficient/ modern equipment:** In the study it was observed that only a few farmers were using modern equipment. The major part of the nursery operators in the study area possessed no facilities of using modern equipment. Thus they could not maintain the physiochemical parameters of the nursery pond. If the modern equipment is supplied, they can use test kit for diagnosis water quality like DO, hardness, alkalinity etc. They could also use pH meter for determining water pH and locally made aerator for maintaining dissolve oxygen level in the ponds.

**Unexpected market competition:** It was observed that there was no uniform market price for selling the fry. This often creates a big problem in this trade. Customers usually tend to buy fry where the price is relatively less. So nursery operators used to sell the fry below the prevailing rate. This destabilized the uniformity of the market price and results loss of the business.

**Lack of policy:** There was no business policy in the study area so the fry traders can do anything they can expect. Due to lack of policy the hatchery owner produced fry without maintaining any regulation; the fry traders produced and sold fry without any regulation. This unwanted situation create massive problem of the trade.

**Record keeping system:** In the study area, it was observed that the nursery owner had no systematic record keeping system. So they could not find out the differences between the lots. Sometimes they could not able to mention the actual production of a lot. They only took purchase and sell record in taka of a year.

## **Discussion**

For an effective development of aquaculture, availability of fish seed and good quality seed is highly essential. The hatchery and nursery trade in Jessore region has been developed based on the seed demand all over the country. The ultimate goal of this business is to meet the seed supply for pond fish culture all over the country and as well as to solve the unemployment problem. With the existing facilities, the hatcheries surveyed produced an average quantity of 3,463.6 kg spawn, the production ranged from maximum of 7,000 kg to a minimum of 600 kg per year (Fig 1). But in the year 2008 the average production was 2,090 kg and the range was from a maximum of 4,500 kg to a minimum of 120. It can be said that with the improvement of existing facilities of hatcheries they are able to produce more fish seed. Breeding of fishes throughout the breeding

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season increases the chance of breeding more fishes from different species. Running the hatchery for some specified time during the breeding season is not advisable from the point of view of conservation of genetic variation; repeated act of such practice can create the incidence of negative selection in favor of restricted breeding season (Shah, 2004). In the study area, it was observed that eighty percent of the surveyed hatcheries bred fish throughout the year, however February to August was considered to be the peak breeding season. The majority of the hatcheries had reported that they stocked broods in the previous year and eighty percent of them had mentioned that they partially exchanged their brood fishes every year. This phenomenon reduces the chance of mating of closely related individual avoiding inbreeding to occur in the seed. Most brood fishes were normally collected from the local gher, pond own farm and baor indicates the possibility of having closeness of the fishes which ultimately will invite inbreeding in the seed produced from the broods.

In the study area, except few most of the nursery operators had no ponds of their own. They usually used pond of others as lease. In comparison with the paddy field, lease value of a nursery pond was so much high. The nursery operator had to pay a lion shear of their profit for the payment of lease value. Therefore, high lease value of pond was a major constraint for expansion of the business. Due to high lease value of ponds, the nursery operators conducted more production cycles in a year with a view to compensate excessive cost. They also stocked the hatchlings in the nursery pond at extremely high density. This often causes the deterioration of water quality and results into higher mortality or hinders the fingerlings' growth.

According to Islam (1989) in two stages nursing, fry are reared for a period of 4-6 weeks at a density of 1 million/ha by this time they reach a size of 2-3 inch. Hatchlings collected from natural sources or produced by induced breeding are reared for one to two months in earthen rearing ponds to a size of 5-7 cm before being sold to the pond culturists (Hassan, 1990). In the study area it was observed that to make the hatchlings to marketable size (5-7 cm) the nursery operators reared the hatchlings in the nursery ponds for 15 to 40 days.

In the area, most of the nursery owners had no vehicle for transport. They had to depend on public transport facility even in far away district. The local fry traders transported by means of van, bus or truck. Some time they had to wait for long time with fry into plastic drum or aluminum pot. This would cause much more mortality of the fry. It was reported that about 40% mortality occurred due to bad transport. The farmers were found to transport fry in plastic drum with water or in aluminum pot by hand agitation of water. Such transportation system reduces fry mortality due to physical damage.

Marketing system is both a physical distribution and an economic bridge designated to facilitate the movement and exchange of commodities from the farm to the fork. It is composed of alternative product flows (marketing channel), a variety of farms (middle man) and numerous business activities (marketing function) (Khol's and Uhi 1980). In the area the marketing of fry was generally done by the middlemen, since a very few fish farmers bought the seed directly from the nursery farms. As the nursery owners were poor and they had to use leased pond, they took credit from local moneylender for supplying feed and fertilizer timely and for buying hatchling from hatchery owner. For these they sold fry to middlemen or *aratdars* for cash payment at lower market price but the middlemen sold those fry at higher price to the pond owners. Due to these reason the nursery owners were deprived of getting actual price of the fry and eventually they were losing their benefits.

Rahman (2004) reported that technical knowledge in respect of pond preparation is not bad in the Jessore area. He found that technical knowledge of the nursery operators is poor, have no institutional knowledge. In the area thirty three percent of the nursery operators attained training and the rest had no training knowledge. Most of the farmers worked on the basis of their own observation and experience. They were doing the job on the basis of their practical experience that

they achieved from long time observation. Due to lack of their technical knowledge they sometimes could not able to manage their problems.

### Conclusion

Nursery operation is the consecutive step of hatchery operation as well as pond fish culture. The nursery trade in Jessore region is playing a vital role in producing the carp spawn/fry and providing fry throughout the country. From the study it is now revealed that *Chachra* is a potential and profitable business centre at this region. There are some barriers existing in this trade such as lack of technical knowledge, credit facility, proper policy etc. If these problems were to be minimized, the production of carp seed would have been increased and this will create more employment opportunity. This will also help the development of the overall socio-economic condition of the farmers. In addition, the increased production will be able to meet with the demand of carp fry in Bangladesh.

### References

- Anon, 2008. *Matsya sampad unnoion obhigan* (Development of fisheries resources). Ministry of fisheries and Livestock
- DoF, 2008. Fisheries Resources Information of Bangladesh (2006-2007). *Fish Fortnight, 2008 (12-16 August)*. Department of Fisheries, Ministry of Fisheries and Livestock, People Republic of Bangladesh: 7-15
- Hasan, M.R. 1990. Aquaculture in Bangladesh. pp 106-140. In: Joseph, M.M. (ed.) *Aquaculture in Asia*. Asian Fisheries Society
- Islam, M.A. 1989. Fish seed production in Bangladesh. pp 1-12. Proceeding of the SAARC Workshop on *Fish Seed Production*. June, 11-12, Dhaka, Bangladesh
- Khols, R.L. and Uhi, J.N. 1980. *Marketing of Agricultural Products*. Macmillon Publishing Co. Inc., New York
- Rahman, M.M. 2004. *On the problems and prospects of fish fry trade in Jessore district of Bangladesh*. Undergraduate thesis, Fisheries and Marine Resource Technology Discipline, Khulna University
- Shah, M.S. 2004. *Needs of research in fish breeding and genetics in Bangladesh*. Report on Local Fisheries Consultancy on Fish Breeding and Genetic Research in Bangladesh