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STUDY ON MANAGEMENT OF FISH FRY AND FINGERLING MARKETING OF JESSORE IN BANGLADESH

Abdulla-Al-Asif[1], Md. Abdus Samad[1], B.M. Shahinur Rahman[2]*, Md. Anisur Rahman[1], Md. Habibur Rahman[1], Syeda Maksuda Yeasmin[1], and Akhery Nima[3]

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Abstract

The study was conducted to assess the management of fish fry and fingerling marketing of jessore in Bangladesh. The data was collected from 417 respondent were randomly selected during April 2013 to March 2014. The hatchery owner sold their spawn 77% to nursery and 23 % are sold to fish farmer. The hatcheries were commonly breed Rohu, Catla, Mrigel, Silver carp, Grass carp, Common carp, Thai puti, Pangus, Kalbaus, Bata and often Black carp, Bighead carp, Koi and Tilapia etc. Total running nurseries were 477 at Jessore sadar. The average depth of pond in the study area was found 2.45 meter. In Chachra, it was observed that maximum 5 cycles of rearing fingerlings was conducted in 2012. It was reported that approximately 4689653 kg fry were produced from 477 nurseries during the year 2013. In the Chachra region it was observed that 64% nursery owner used leased ponds. In case of trading pond trader use leased pond 86% and owned pond 14%. Trading pond's water temperature fluctuated 11° to 37°. Last 3 years ago the total number of traders was 186 people and now it is 300 people. 49% are used plastic drum for transportation of fry and fingerling, 32% used Aluminum bowl, 7% is used oxygenating poly bag and rest 12% are transported by oxygenating drum. The marketing channel of fish fry and fingerling is start with brood pond and continues with hatchery, nursery, fry and fingerling traders, intermediates, buyer, farmer, and then farming pond. In the present study the business running year round from January to December. Fry traders used to come from different districts of Bangladesh and also fry are distributed in India at west Bengal, Assam and other region.

Key words: Fry and fingerling, Trading, Marketing system, Jessore.

Introduction

Today aquaculture has established itself as one of the fastest growing science for quality food production activities in the world (FAO, 1997). The present study is about fish fry and fingerling management and marketing system. Fish fry is the size with 2-3 cm and fingerling is about 7-8 cm respectively. Fish fry production and marketing make significant contributions to economic growth, livelihood support and poverty alleviation in the country. So, farmer friendly fish culture is an economic activity of the rural people for augmenting their income, generating employment and ensuring food and nutritional security (Randhir, 1984). Therefore, fry marketing is a vital aspect for sellers, consumers and other facilitating agencies, including the government. In fish fry and fingerling marketing hatchery traders, Nursery traders, fry traders, patilwala and farmer are involved. Fishery, like many other farming practices, relies heavily on natural resources, such as water, land, seed and feed (Jhingran, 1991). This paper focuses on the fish fry marketing channel in Jessore region as well as production, marketing steps etc.

Materials and Methods

The study was conducted in five number villages of greater Jessore district named Noapara in Obhoynagor upazila, Burujbagan in Sharsha upazila, Bankra in Jhikargacha upazila, Pantapara and Koyerpara in Chowgacha upazila, were the nursery clusters, among the locations surveyed for farmers. In addition, Bablatola market is meeting points for Agents and wholesalers. The study was conducted from April 2013 to March 2014.

The primary data were assembled through the survey at the hatchery respondent (21 person) 5%, nursery respondent (63 person) 15%, fry and fingerling trader respondent (300 person) 72%, intermediaries respondent (25 person) 6%, and fish buyer respondent (8 person) 2% respectively in Chachra region. by using some prescribed questionnaires. The questionnaires were prepared adhering to the objectives of the

*Corresponding Authors Email: bmshahin.bfri@gmail.com
[1]Department of Fisheries and Marine Bioscience, Jessore University of Science and Technology, Jessore, Bangladesh
[2]Bangladesh Fisheries Research Institute (BFRI), Shrimp Research Station, Bagerhat, Bangladesh
[3]Bangladesh Fisheries Research Institute (BFRI), Riverine Station, Chandpur, Bangladesh

study. FGD (Focus group discussion), PRA (Participatory rural appraisal), collection of secondary data was used to collect data. The data was collected from 417 respondent were randomly selected during April 2013 to March 2014. Responses are limited to the questions included in the survey. Collected data were analyzed through different software. Statistical and graphical analyzes were done by Microsoft Excel (Microsoft office 2010).

Results

Hatchery status

Total number of hatcheries at Jessore sadar was 89. Only 35 hatcheries are involved year round operation. According to the respondent hatcheries, of the total volume of spawn produced in the Jessore region, 77% is sold to nurseries and 23% is sold to the fish farmers (Fig. 1).

Available fry species

The main species that 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 fry etc. (Fig. 2).

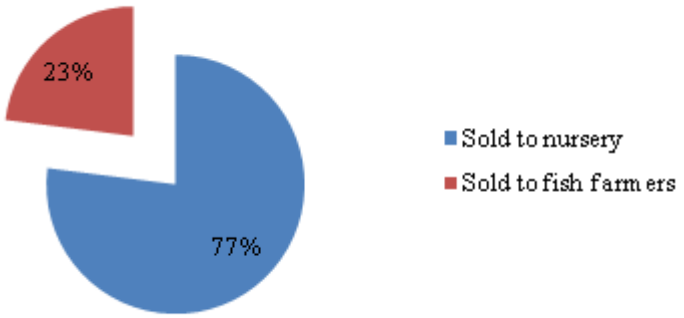

Figure 1. Hatchery selling percentage in Jessore region

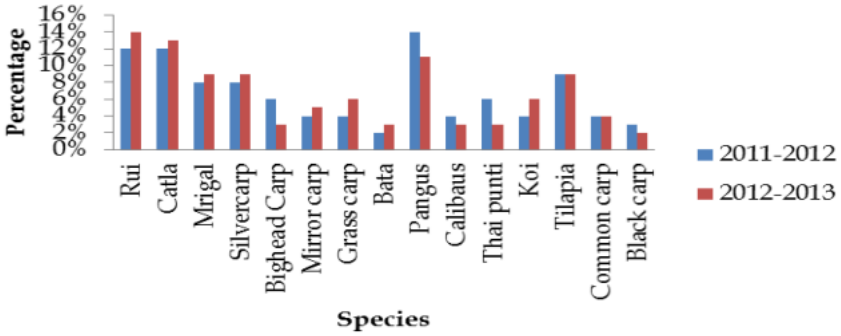

Figure 2. Showing species Bred in hatcheries in Jessore

Spawn Production

An important point to note is that even though number of hatcheries operational in Jessore is about 29% of the total number of hatcheries in the region, the hatcheries in Jessore produced over 71% of the total volume of production of spawn in the region.

The price chart of Egg and hatchling

Table 1. The price chart of Egg and hatchling in chachra region

Sl No	Species	Breeding Season	Egg/Larvae / (Kg/Tk.)	Sl No.	Species	Breeding Season	Egg/Larvae/ (Kg/Tk.)
1.	Mirror carp	Jan-Aug	6000	10.	Thai koi	Apr-Aug	8000
2.	Grass Carp	Feb-Aug	6500	11.	Shing	Apr-Aug	21000
3.	Silver carp	Mar-Aug	4500	12.	Magur	Apr-Aug	25000
4.	Raj punti	Apr-Aug	6000	13.	Pabda	Apr-Aug	35000
5.	Rui	Mar-Apr	5000	14.	Tengra	Apr-Aug	20000
6.	Catla	Apr-Aug	8000	15.	Thai pangus	Apr-Aug	4000
7.	Mrigal	Apr-Aug	6000	16.	Black carp	Apr-Aug	6000
8.	Big head	Apr-Aug	7000	17.	Elshebata	Apr-Aug	6000
9.	Tilapia	Apr-Aug	16000	18.	Kalibaus	Apr-Aug	6000

Nursery status

The primary buyer for spawn is the nurserer who rears the spawn to produce fry or fingerling and then sell it to the grow-out fish farmers. Since they own several ponds the large scale farmers are able to play the dual role of a nurserer and a grow-out fish farmer. This means, the nurseries have a conflicting interest with the small and medium scale grow out fish farmers. Total running nurseries were 477 at Jessore sadar. In nurseries, hatchlings were reared for 30-50 days and then made ready for sale.

Nursery Pond status

In the Chachra region it was observed that 64% farmers used leased ponds. The lease value of nursery pond varied considerably from place to place. The lease value of Chachra region in Jessore district was given below.

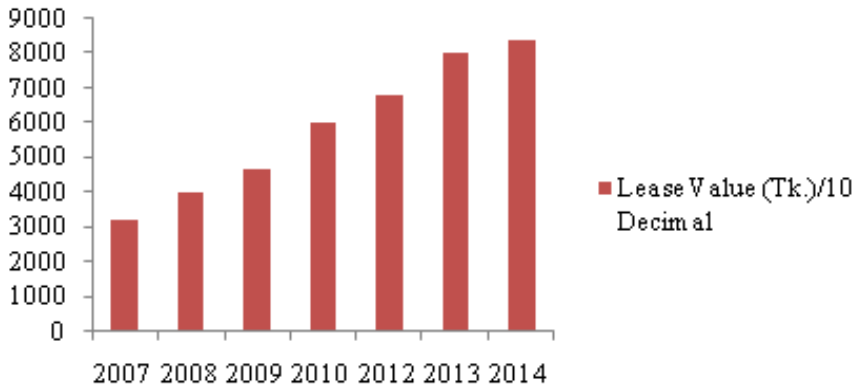

Figure 3. Year based lease value of nursery in Jessore region

Pond Size and Depth

The trading pond is 69% perennial pond and 31% ponds are seasonal pond. The average size of the pond is 15 decimal to 30 decimal. The average depth of pond in the study area was found 2.45 meter.

Stocking 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 that 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 about 5-7 cm before being sold to the pond culturists.

Nursing cycle

The nursery operators reared hatchlings collected from hatchery in the nursery pond up to 3-5 cm. before selling to the pond culturists or to the fry traders. But generally 4-5 cycles are 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. In order to make the hatchlings to marketable size (5-7 cm) the nursery operators had to rear the hatchlings in the nursery ponds for 15 to 40 days. The highest production cycle were reared in the month of May to June.

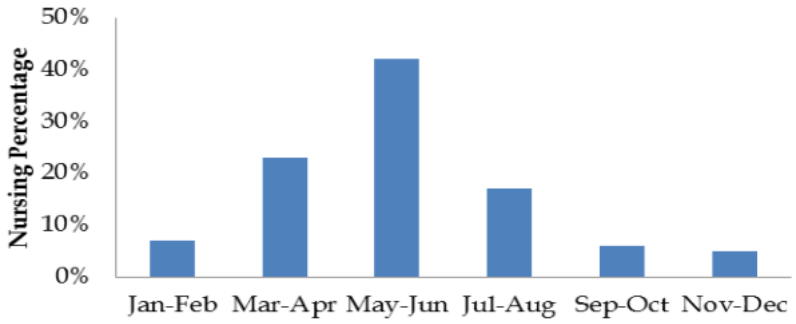

Figure 4. Year round nursing cycle 2013 in different nurseries in Jessore

Food and feeding

Generally mustard oil cake, rice bran, wheat polish etc. were given to fish fry for feeding. The farmers did regular monitoring of growth and health checking of fry. They gave feed twice in a day.

Fertilizer

In Chachra nurserers use Nitrogen, Phosphorus, and Potash fertilizer for increasing the production of plankton. Naturally found organic cow dung is used as fertilizer.

Production of fry

It was reported that approximately 4689653 kg fry were produced from 477 nurseries during the year 2013 (Table. 2).

Table 2. Year round production of fry and fingerling in Jessore region

Year	Number of nursery	Fry Production (Kg)
2008	180	2048394
2009	210	2985567
2010	241	3282842
2011	317	3967589
2012	395	4376752
2013	477	4689653

Price of fry and fingerling

The price of fry and fingerling in chachra region is given below in chart.

Table 3. Price of fry and fingerling

Sl No	Species	2000pcs (Kg/Tk.)	500 pcs(Kg/Tk.)	Sl No	Species	2000pcs (Kg/Tk.)	500 pcs(Kg/Tk.)
1.	Mirror carp	330	220	10.	Thai koi	370	220
2.	Grass Carp	350	280	11.	Shing	320	240
3.	Silver carp	340	180	12.	Magur	340	230
4.	Raj punti	330	220	13.	Pabda	320	220
5.	Rui	340	210	14.	Tengra	310	230
6.	Catla	330	220	15.	Thai pangus	340	250
7.	Mrigal	320	280	16.	Black carp	380	230
8.	Big head	370	210	17.	Elshebata	320	240
9.	Tilapia	350	250	18.	Kalibaus	300	230

Fry trading Center

Fry trading pond status

The trading pond is the pond where the fry and fingerling are keeps for 10-25 days before they sell it to buyer or patiwala. Every year before beginning of trading season the fry and fingerling traders prepared their ponds. They followed all steps of pond preparation manually. Only a few had their own ponds. They usually used pond of others as lease. In the survey it was observed that 86% traders used leased ponds. The lease value of trading pond varied considerably from place to place. At the year of 2013 the lease value was 18000 Tk./10 decimal/year. And at the year of 2014 the value is 19400Tk. /10

decimal/year (Fig. 5).

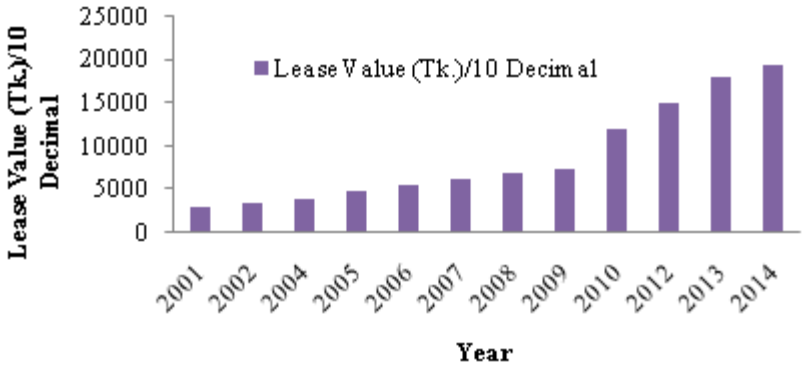

Figure 5. Yearly lease value of trading pond of Chachra in Jessore region

And the percentage of leased pond used or fries and fingerlings supplied by traders is Leased pond 86% and owned pond 14%. (Fig. 6)

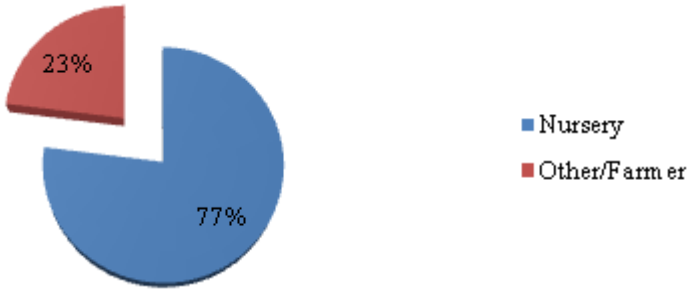

Figure 6. The percentage of leased and owned pond

Stocking fry and fingerling in the trading pond

Fry and fingerling collected from nursery were primarily stocked in a cloth "Hapa" at a high density and stocked for 10 to 25 days. The stocking density of fry and fingerlings 1/inch² for all species. If the fry is larger the stocking rate in this hapa is reduced. The fry released in the trading pond after acclimatization them with pond water for 20-30 minutes. But it was observed that they often stocked at high density fry and fingerling and they did not maintain the acclimatization process properly.

Pond water temperature

In the present experiment the water temperature fluctuated from 25°to 32°C at the time of peak trading season April to September. And the other time the water temperature fluctuated 11° to 37° (Fig. 7). The water temperature remains more or less similar due to rainy season.

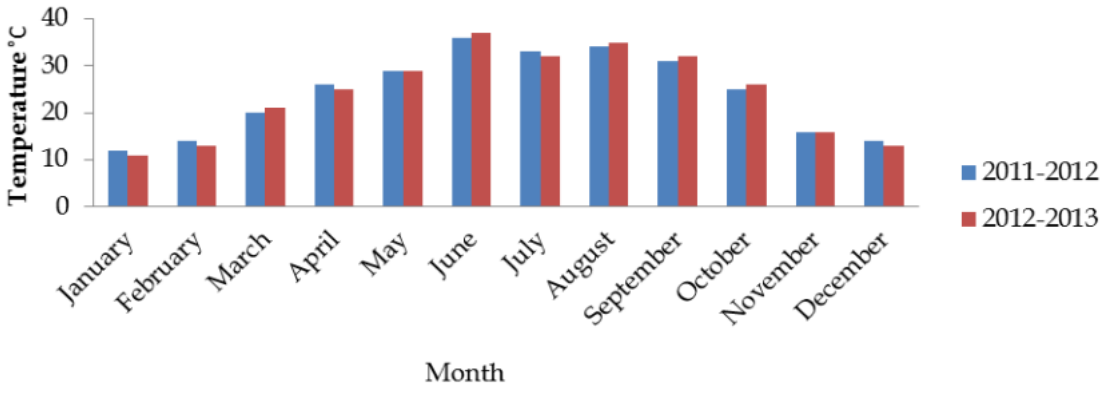

Figure 7. Year round trading pond water temperature

Manpower

The average number of man power found at every trading pond is two to three including one manager, two assistant or helper. Most of the hatchery ensured a manager and an assistant. Sometimes the business partner performs the assistant or helper.

Total businessman of trading center

There are 300 traders in the trading center. Last 3 years ago the total number of traders is 186 and now it is 300 (Fig. 8). The main reason is to grow the number of trader is sometimes the helper and supervisor collects money and start their own business.

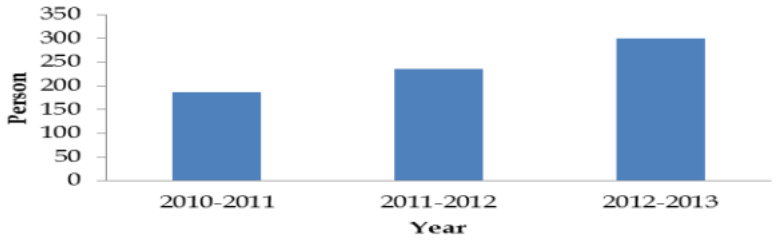

Figure 8. Traders number increasing year after year

Sources of fry and fingerling

The main sources of fry and fingerling are nursery. Traders also collect the fry and fingerling from farmer. 77% of fry and fingerling is collected from nursery and 23% are collected from farmer.

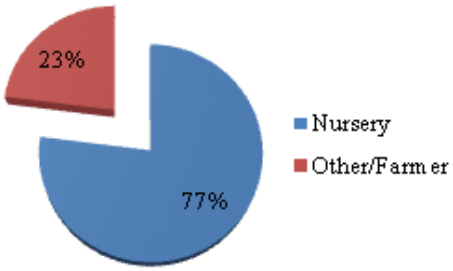

Figure 9. Sources of fry and fingerling

The nurseries are located in Chachra region and distance place like Chowgacha, Jhikargacha, Manirampur, Sarsha, Keshobpur and Avoynagar. The distance from fish trading center to nursery is 1-35 km.

Fry and fingerling production

Accounting for 400000 pieces of fry from 1 kg spawn we estimate that the total production of

Fry in the region was about 1768 crores which is about 34% of the total national production (5200 crores). However, according to industry experts, average production per kilo spawn should not be more than 300000-350000.

Transportation of fry and fingerling

Nursery owner and traders supply fish fry and fingerling from nursery to trading center by using aluminum bowl (Patil), plastic drum, and oxygenating drum and oxygenating poly bag. 49%are used plastic drum for transportation of fry and fingerling, 32% used Aluminum bowl, 7% is used oxygenating poly bag and rest 12% are transported by oxygenating drum. Fries were conditioning with 48 to 72 hours. Empty intestine fish fry consume less oxygen than full intestine fry (Fig. 10).

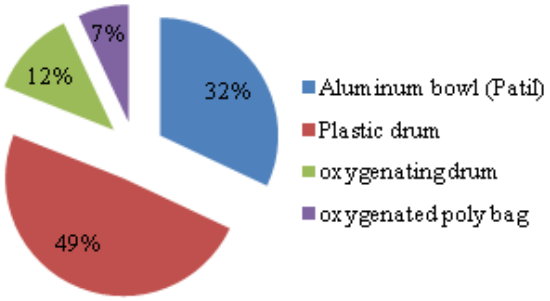

Figure 10. The main way transportation of fry and fingerling

Record keeping system of fry and fingerling trading center

Only 11% of traders keep their buying and selling documents or records and other 89% does not keep

any documents or records.

Fry marketing

In the study area, it was observed that 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 culture, 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. Buyers from fry way districts came with container and pick-up van. But local buyers came with aluminum pots and buy the fry from the depot and distributed the fry in their relevant local areas. 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.

Marketing Channel

The marketing channel of fish fry and fingerling is start with brood pond and continues with hatchery, nursery, fry and fingerling traders, intermediates, buyer, farmer, then farming pond or rearing pond. In this channel hatchery owner, nursery owner, fry and fingerling traders, intermediates, buyer, farmer are include in the whole process (Diagram. 1).

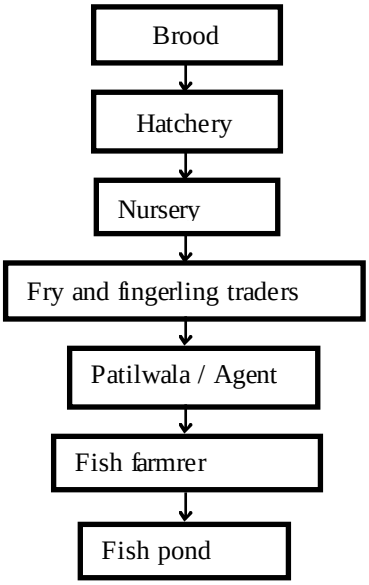

Diagram 01. The marketing channel of fish.

Distribution Channel

The distribution channel of fish fry and fingerling is shown the figure below.

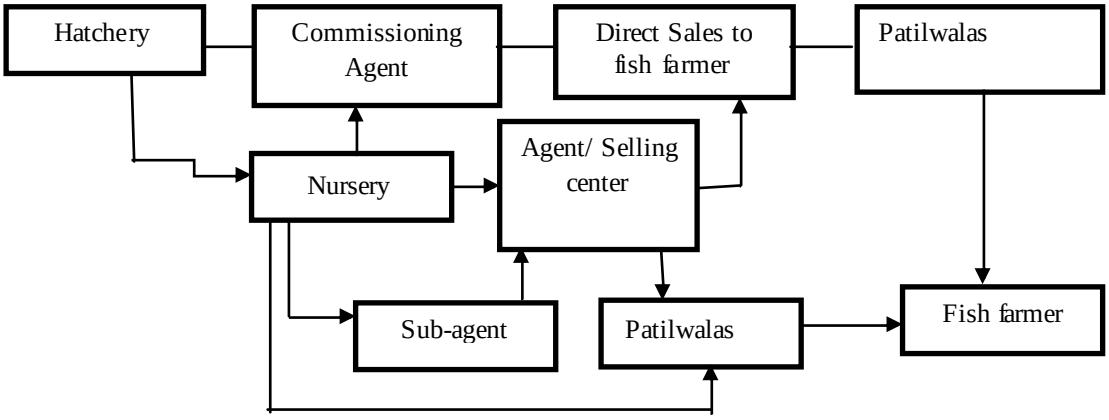

Diagram 02. The distribution channel of fish fry and fingerling.

Time of trading:

In chachra region 55% of fry and fingerling are sold in morning, 13%are sold in noon and rest 32% are sold in evening (Fig. 12).

Figure 12. Time of trading of fish fry and fingerling

Credit facilities

The fry traders reported that they could not use proper dose of fertilizer and other inputs timely in addition to special care due to insufficient capital. The nursery operators need credit support at the beginning of the season for pond preparation and collection of necessary inputs. In the study area, it was observed that 24% farmers got loan from bank whereas 31% farmers took loan from local moneylenders with high interest of credit (Fig. 13).

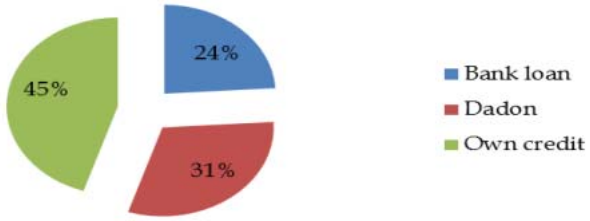

Figure 13. Credit facilities of fry and fingerling traders

Training

Training is very much essential to run a work properly and scientifically. In the study area it was observed that only 33% of the fish fry and fingerling traders attained training and the rest had no training knowledge. Most of the farmers worked on the basis of their own observation and experience. The training was provided by Department of Fisheries and Youth Development Department. Beside this some NGO's also provide training to the farmers

Discussion

Around 89654 kg hatchlings were produced in the year 2013 in this reason. Secondary data suggests a surplus of 1728 crore hatchlings in the national market and around 79420 kg hatchlings were produced in the year 2008 in this reason. Secondary data suggests a surplus of 1565crore hatchlings in the national market. It has been estimated that in 2009-2010, (source: DoF, 2009). This is similar to the current study.

Javed *et al.*(1995) who reported significant differences among the taste scores of three fish species *C. catla*, *Cirrhinus mrigala* and *L. rohita* reared under inorganic fertilizers (N:P:K) and combination of organic manure (poultry and cow dung) and artificial feed. That is relevant with the present study.

The trading pond is 69% perennial pond and 31% ponds are seasonal pond. But it can be used year round by supplying water into pond. Khan, M.S., (1986) stated that fish culture efficiency in the varied with the size of ponds. Ali *et al.* (2008) found 46% of the nursing and fry trading ponds were seasonal and 54% ponds were perennial in Rajshahi district. This is same with this current study.

The average depth of nursing pond in the study area was found 2.45 meter. According to DoF, 2010 the average depth of nursing ponds in Bangladesh is between 2 and 5 meter which correspond well with the present study.

In the present experiment the water temperature fluctuated from 25° to 32°C at the time of peak trading season April to September. And the other time the water temperature fluctuated 11° to 37°. Ali, 1998 found water temperature of ponds 20.50 to 36.50°C which was favorable for fish culture.

Aluminum bowl are used to 49% transportation of fry and fingerling, 32% used to plastic drum, 7% is used oxygenating poly bag and rest 12% are transported by oxygenating drum. (Alikunhi, 1957) reported that about 6 hours of conditioning is required before fry should be packed for transportation. Jagannadhan, J. N. (1947) stated that Catla fry need 48 to 72 hours of conditioning. Empty intestine fish fry consume less oxygen than full intestine fry. Berka, R. (1986) said that the vital key factor in

transporting fry is providing an adequate level of dissolved oxygen. Lewis, D. J. (1996) reported that *Labeo rohita* fry are relatively sensitive to the stress of transport; as a result there is a high mortality among transported fry.

The marketing channel of fish fry and fingerling is start with brood pond and continues with hatchery, nursery, fry and fingerling traders, intermediates, buyer, farmer, then farming pond or rearing pond. In this channel hatchery owner, nursery owner, fry and fingerling traders, intermediates, buyer, farmer are include in the whole process.

The fry produced from the hatcheries and nurseries in the area were distributed in most parts of the country and abroad. Fry traders used to come from Khulna, Satkhira, Bagarhat, Pirozpur, Barisal, Jhalukati, Borguna, Faridpur, Bhola, Madaripur, Gopalgonj, Kushtia, Jhenaidah, Magura, Naraial, Pabna, Bogura, Dinajpur, Rangpur, Nator, Mymensingh, Comilla, Chadpur, Chuadanga, Dhaka, Manikganj and other districts of Banladesh. Fry is also distributed in India at west Bengal, Assam and other region in India.

In the study area, it was observed that 24% farmers got loan from bank whereas 31% farmers took loan from local moneylenders with high interest of credit. Quddus *et al*. (2000) found that, only 34% farmers got bank loan for fish culture while majority (53%) of farmers expend from their own sources. The present study is relevant with the previous work.

Conclusion

Fish fry and fingerling is the most important element for the development of pond fish culture in the country. Fry and fingerling trading business make a progress to sustainable aquaculture in Jessore district. Jessore produces a large amount of fry and fingerling to satisfy the demand of the district and this production is also satisfying the other region of Bangladesh and India.

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