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## Present status of fish hatchlings and fry production management in greater Jessore, Bangladesh

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### Abstract

The study was carried out to access on the present status of fish fry, hatchlings production and trade at Jessore sadar in Jessore district. Study period was carried out during October to December, 2013. In the selected areas, the study was conducted on 135 persons, including 30 hatchery owners, 50 nursery operators and 55 fry traders. Carp hatchlings that produced in hatcheries were commonly Indian Major Carps, Exotic Carps like Silver carp, Grass carp, Black Carp, Bighead carp, Common carp, Mirror carp and other species like Pangus, Punti, Thai punti, African magur, Koi and Tilapia. Hatchlings production of Indian major carps were 24720 kg, Exotic carps were 21754 kg, and other species were 2966 kg respectively in 2013 at Jessore sadar. Fry production of Indian major carps were 399596 kg, Exotic carps were 391272 kg, and other species were 41625 kg. In the year 2013 the highest production was found 8,500 kg while the lowest was 700 kg. It was estimated that 49440 kg hatchlings were produced from 30 hatcheries and 737291 kg fingerlings and 832493 kg fry were produced from 50 nurseries at Jessore sadar in the year 2013. The price of the hatchlings of different species varies from 2000-30000 taka year round. About 25% of credit are contributed by nurserer, 40% farmers got loan from bank whereas 35% farmers took loan from local moneylenders with high interest of credit. It was observed that the marketing channel consisted of Brood Fish (Collection from mainly in Halda and Jamuna River), hatchlings production, nursery owners, fry production, wholesaler, retailer, and farmer. Most of the species of carps are bred from April to August, so these months are the peak business season of the study area. Fry were distributed from Jessore to North-West part in 2013 was 15%, North-East part was 16%, South-West part was 46%, South-East part was 18% and West-Bengal and Assam was 5% respectively. Everyday more than 350 fry traders come here and carry the fry by means of van, pick-up van, bus, truck, train, nosimon etc. In the study it was reported that the highest mortality was within 10%. In the present study only 15% of the nursery operators attained training and the others had no training knowledge. The main problem is Argulus diseases, 95% of hatchlings mortality is caused by Argulus disease.

**Keywords:** Hatchlings, Fry and fingerling, Price, Fry distribution, Transportation and Marketing.

### 1. Introduction

Fisheries sector provides about 60% of the animal protein intake and more than 11% of the total population of the country is directly or indirectly involved in this sector for their livelihoods [7]. The inland water bodies are rich in freshwater fish species comprising 260 indigenous, 12 exotic and 24 fresh water prawn species [5]. The species mostly cultured in freshwaters and the seed of which being produced are Catla, Rohu, Mrigal, Silver carp, Grass carp, Bighead carp, Thai punti etc. species [8]. In 1984, the spawn production in Bangladesh was estimated to be 23657 kg from Padma-Brahmaputra River system, 895 kg from Halda River and 625 kg from all hatcheries [13]. They contributes respectively 93.86%, 3.55% and 2.59% of the total spawn supply (25203 kg) for pond fish culture in the country. There are five large hatcheries and 106 fish seed multiplication farms established in public sector [4]. Apart from Government hatcheries a large number of carp hatcheries had been built in the private sector in different parts of Bangladesh. In 1980 the total hatchery produced carp fry was estimated at about 22 million [4]. In 1984 hatchery produced carp fry was estimated to be about 249 million, which is more than ten times of 1980 production. From the beginning the natural sources of rivers were the major source of carp seed production in Bangladesh. In 1987, private nurseries produced about 666 million fingerlings of 2-3cm size while the public sector farms produced about 30 million fingerlings [8]. Millions of eggs and spawn were collected from the rivers during monsoon (May-August).

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At Jessore sadar numbers of total hatcheries are 35 and 361 nurseries. In the year 2013, 49440 kg hatchlings were produced from 30 hatcheries, 737291 kg fingerlings and 832493 kg fry were produced from 50 nurseries at Jessore sadar. The investigation was carried out during the month of October to December 2013. In this investigation, a well-formed questionnaire was used and a total of 135 persons, including hatchery owners, nursery operators and fry traders were interviewed to collect the information. It was observed that the nursery operators rear the hatchlings in traditional. The objective of the current study to know present status of fish hatchlings and fry production management at Jessore sadar.

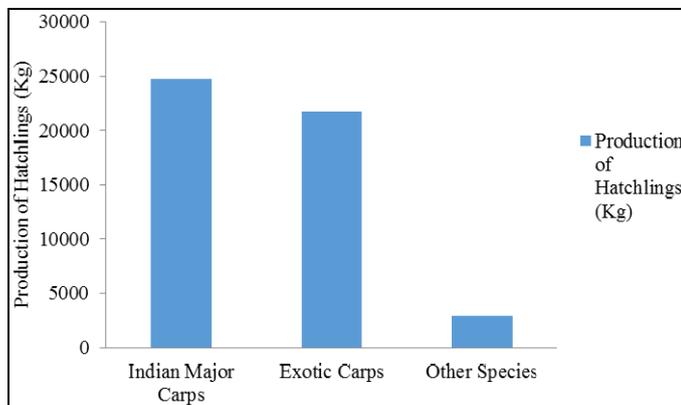
**2. Materials and Methods**

The study was conducted at Jessore sadar of Jessore district in Bangladesh. Study period was carried out during October to December, 2013. In the selected areas, the study was conducted on 135 persons including 30 hatchery owners, 50 nursery operators and 55 fry traders. The hatchery owners, nursery operators and the fry traders were selected on the basis of the random sampling method. For this study the necessary data were collected from both primary and secondary sources. Data were analyzed using MS Excel 2007.

**3. Results**

**3.1 Hatchlings Production**

Carp hatchlings that produced in hatcheries were commonly Indian Major Carps, Exotic Carps like Silver carp, Grass carp, Black Carp, Bighead carp, Common carp, Mirror carp and other species like Pangus, Punti, Thai punti, African magur, Koi and Tilapia. Hatchlings production of Indian major carps were 24720 kg, Exotic carps were 21754 kg, and other species were 2966 kg respectively in 2013 at Jessore sadar.

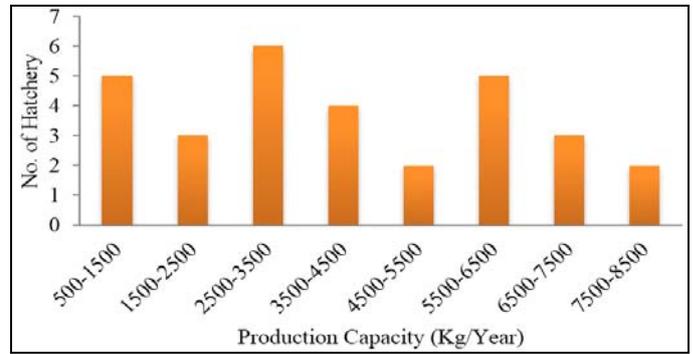


**Fig 1:** Hatchlings production at Jessore sadar

**3.2 Hatchlings Production capacity and species bred**

Carp hatchlings that produced in hatcheries were commonly Indian Major Carps, Exotic Carps like Silver carp, Grass carp, Black Carp, Bighead carp, Common carp, Mirror carp and other species like Pangus, Punti, Thai punti, African magur, Koi and Tilapia.

In the year of 2013, highest production was found 8,500 kg while the lowest was 700 kg was found in 30 hatcheries. Production capacity of thirty different hatcheries is given below.



**Fig 2:** Production capacity (in average) of different hatcheries in Jessore Sadar.

**3.3 Price of hatchlings**

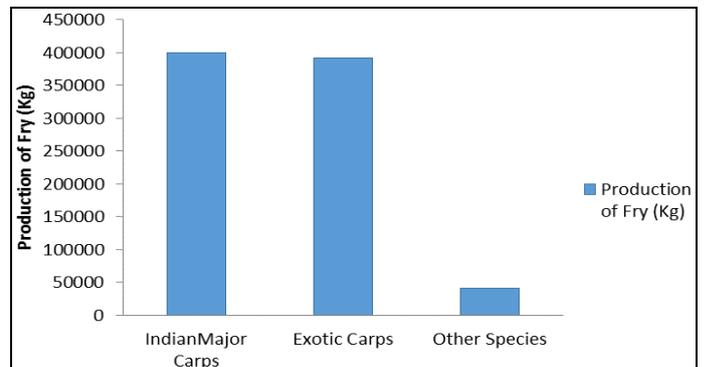
The price of the hatchlings of different species varies through the year round. The price was high at the beginning of the season and at the end of the season, but the price was comparatively less when the supplies of hatchlings were available. It was reported that, there were 30 running hatcheries that produced 49440 kg hatchlings in the year 2013. Average prices of hatchlings of different species are shown in Table 1.

**Table 1:** Price chart of hatchlings

Species (Local name)	Scientific name	Price (Taka/kg)
Rui	<i>Labeo rohita</i>	2000
Catla	<i>Catla catla</i>	2500
Mrigal	<i>Cirrhina cirrhosis</i>	1500
Silver carp	<i>Hypophthalmichthys molitrix</i>	1500
Grass carp	<i>Ctenopharyngodon idella</i>	2300-2500
Mirror carp	<i>Cyprinus carpio var. specularis</i>	2000-2300
Common carp	<i>Cyprinus carpio var. flavipinnis</i>	1800-2200
Tilapia	<i>Oreochromis mossambicus</i>	1600
Thai punti	<i>Puntius gonionotus</i>	1500-1800
Black carp	<i>Mylopharyngodon piceus</i>	25000-30000
Calbaus	<i>Labeo calbasu</i>	2000-2500
Pangus	<i>Pangasius hypophthalmus</i>	2500-2800

**3.4 Fry production**

Carp fry that produced in hatcheries and nurseries were commonly Indian Major Carps, Exotic Carps like Silver carp, Grass carp, Black Carp, Bighead carp, Common carp, Mirror carp and other species like Pangus, Punti, Thai punti, African magur, Koi and Tilapia. Fry production of Indian major carps were 399596 kg, Exotic carps were 391272 kg, and other species were 41625 kg respectively in 2013 at Jessore sadar.



**Fig 3:** Fry production at Jessore sadar

### 3.5 Price of fry

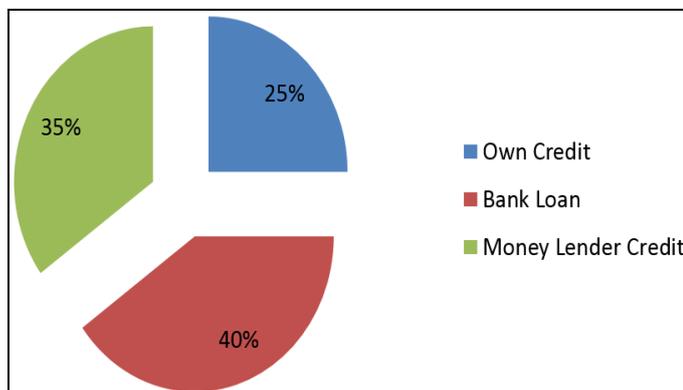
The price of the fries of different species was found to vary through the year round. The price was high at the beginning of the season and at the end of the season but he price was comparatively less when the supplies of fries were available.

**Table 2:** Average price of fries of different species

Species (Common name)	Scientific name	Price
Rui	<i>Labeo rohita</i>	1800-1900 (Tk/kg)
Catla	<i>Catla catla</i>	2200-2400 (Tk/kg)
Mrigal	<i>Cirrhina cirrhosis</i>	1400-1500(Tk/kg)
Silver carp	<i>Hypophthalmichthys molitrix</i>	1300-1400(Tk/kg)
Grass carp	<i>Ctenopharyngodon idella</i>	2200-2500(Tk/kg)
Mirror carp	<i>Cyprinus carpio var. specularis</i>	2100-2200 (Tk/kg)
Common carp	<i>Cyprinus carpio var. flavipinnis</i>	2300-2400(Tk/kg)
Thai puti	<i>Puntius gonionotus</i>	1400-1700 (Tk/kg)
Black carp	<i>Mylopharyngodon piceus</i>	24000-28000Tk/piece
African magur	<i>Clarias lazera</i>	3-4 Tk/piece
Pangus	<i>Pangasius hypophthalmus</i>	2600-3000 Tk/piece

### 3.6 Credit facilities

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 25% of credit are contributed by nurserer, 40% farmers got loan from bank whereas 35% farmers took loan from local moneylenders with high interest of credit.

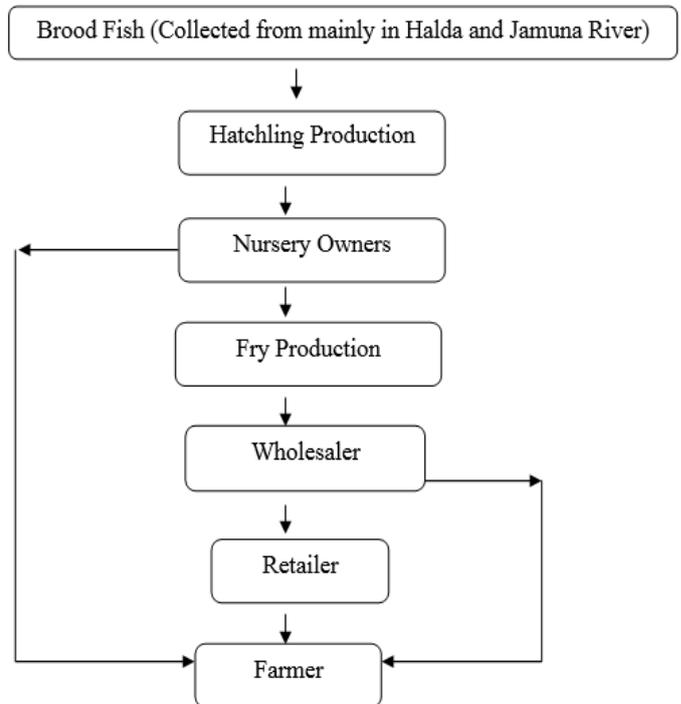


**Fig 4:** Credit source of Nurserers.

### 3.7 Fry marketing

Next to seed production and nursing, timely supply of seed to the farmers is a very important task for aquaculture. In the study area, it was found that the marketing channel start with brood fish collection from river and other farmer ponds or own ponds then hatchery owner, nursery owner, whole seller, retailer, and fish farmer. The nursery owners collected hatchlings, from hatcheries and reared in the nursery ponds. Fingerling marketing is generally done by middlemen since very few fish farmers buy directly from nursery farms. After culture, the fry were transferred to the depot or sales center where the fry were kept in small hapa. Buyers came from various parts of the country and bought the fry from the

wholesaler. Some nursery owners sold the fry from ponds directly to fish farmers. Buyers from different districts came with a container and the pick-up van or locally produced engine van called “Nosimon”. But local buyers came with plastic drum or aluminum bowl and buy the fry from the wholesaler and distributed the fry in their adjacent local areas. There is a complex network of fry supply, not institutionally organized, involving hatchery operators, nursery operators, fry trader and fish farmers. The following flowchart shows the distribution channel of fry.



**Fig 5:** Flow chart of fry marketing channel

The wholesalers of far way districts supplied the fry to the local retailers who distributed the fry to the fish farmer directly.

### 3.8 Season of business

Most of the species of carps are bred from April to August. The breeding season of common carp is from November to March. Though the pick period of the business is centered on from May to August depending on heavy rainfall, favorable temperature for breeding different fish species.

### 3.9 Fry distribution area

The fry produced from the hatcheries in the area were distributed in most parts of the country. Jessore is one of the most important fry markets of the country. Fry traders used to come from Khulna, Satkhira, Bagarhat, Barishal, Jhalukati, Comilla, Chandpur, Chuadanga, Dhaka, Borguna, Faridpur, Madaripur, Kushtia, Magura, Naraial, Pabna, Bogura, Rangpur, Nator, Mymensingh and other districts of Bangladesh. Sometimes fry and fingerling exported from Bangladesh to Assam, West Bengal and adjacent part of India. Fry were distributed from Jessore to North-West part in 2013 was 15%, North-East part was 16%, South-West part was 46%, South-East part was 18% and West-Bengal and Assam was 5% respectively.

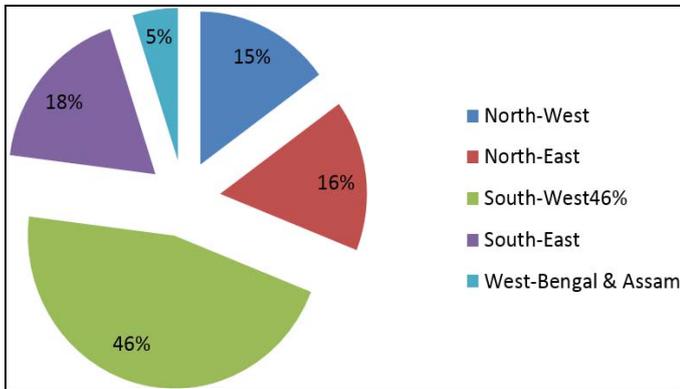


Fig 6: Fry distribution area

**3.10 Transportation**

Fish spawn/hatchlings are transported in polythene bag filled up with oxygen and the mouth of the bag tightly sealed with rope. Fish fingerlings are transported by using indigenous and modern techniques. The fry was found to transport by means of bus, truck, train, pick-up, auto-rickshaw, van, nosimon etc. In local markets the fry are transported by van, public bus and some cases by truck. But train, truck or pick-up are found to be the main means of transportation of fry to the far way districts. In case of large-scale seed transportation, fish hauling tank equipped with agitator and oxygen supply is used. Sometimes the body of the trucks temporary converted into a water pool using plastic pool filled with water. Plastic barrels are also used to transport fry specially the pangas fry and the barrels are carried by pick-up van or truck.

**3.11 Mortality due to transportation**

During transportation, the containers are often covered with moist cloth and gunny bags to keep the container cool. Using indigenous method, earthen pots called *bundis* and other aluminum or metallic containers with hand agitation of water are generally used for transportation of fish fry. It was observed that fries were found to transport by plastic drum and other metal pots with hand agitation of water. Oxygenated poly bag was used for transportation of hatchlings. Sometimes high stocking density in a bag or more time consumes and improper transportation caused higher mortality. In the study it was reported that the highest mortality was within 10%.

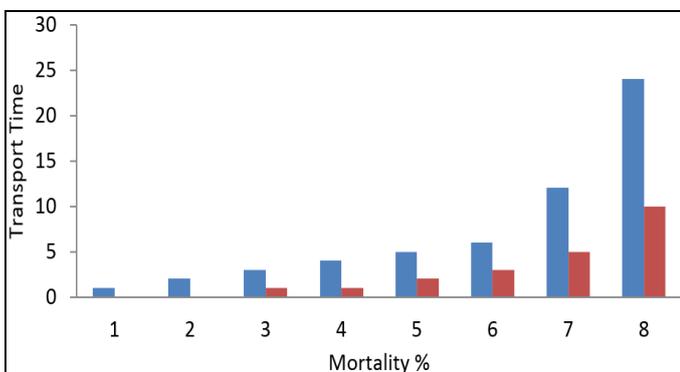


Fig 7: Mortality due to transportation

**3.12 Training**

Training is very important to run a work properly and scientifically. In the study area, it was noticed that only 15% of the nursery operators attained training and the other had no training knowledge.

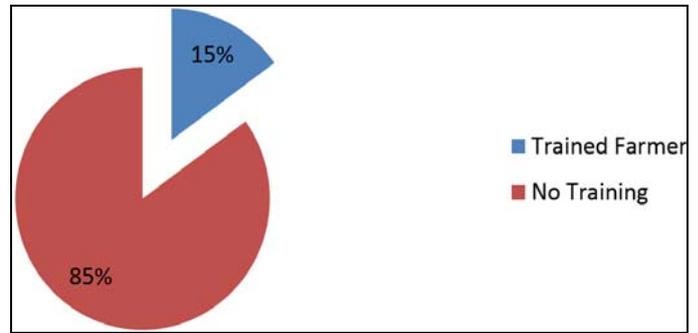


Fig 8: Status of training of the farmers

**3.13 Problems**

The main problems of hatchling production in the jessore region is *Argulus* diseases. 95% of hatchlings mortality is caused by *Argulus* disease. There are no pesticides to control the *argulus* disease. Farmer reported to the study team that nothing can help to prevent or control that fatal disease.

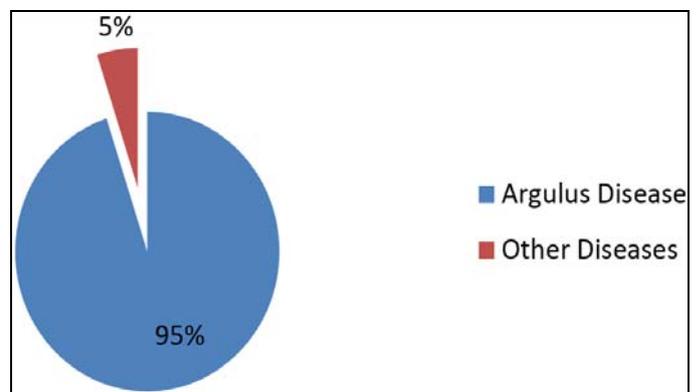


Fig 9: Fatal diseases affected in hatchery (*Argulus*)

**4. Discussion**

Rahaman, M. M. (2007) [12] reported that in Jessore at study period 4211.5 kg hatchling were produced in 85 hatcheries in this area of which 80% were reared in the same area. Present study shows hatchlings production of Indian major carps were 24720 kg, Exotic carps were 21754 kg, and other species were 2966 kg respectively in 2013 at Jessore sadar. The previous work is relevant with my present study.

Rahaman, M. M. (2007) [12] reported that A total 1621 lacs of 1-4" sized fry was produced during the study period. Among them Indian major carp 864.3 lacs (53.32%), Chinese carp 621.9 lacs (38.36%), Thai shar punti and pangus 134.8 lacs (8.32%). Present study shows that Fry production of Indian major carps were 399596 kg, Exotic carps were 391272 kg, and other species were 41625 kg respectively in 2013 at Jessore sadar. Previous study and present study is more or less similar at the area of fry production.

With the existing facilities, the hatcheries surveyed produced quantity of 49440 kg hatchlings, 737291 kg fingerlings and 832493 kg fry respectively. Approximately 4689653 kg fry were produced from 477 nurseries during the year 2013 in Jessore region [2]. Secondary data suggests a surplus of 1565 crore hatchlings in the national market. It has been estimated that in 2009-2010, [6]. Which is more similar with my study.

The price of the hatchlings of different species varies through the year round. It varies from 2000-30000 taka. The price of hatchling is more or less similar to the study of [2].

Rahaman, M. M. (2007) [12] reported that average price of per kg hatchling were Indian major carps- Tk.1200 to 1800,

Chinese carp Tk. 1200 to 1600 and Thai shar punti and pungus- Tk. 900 to 1200. Which is relevant with my present work.

In the study area, about 25% of credit are contributed by nurserer, 40% farmers got loan from bank whereas 35% farmers took loan from local moneylenders with high interest of credit. Quddus *et al.* (2000) <sup>[11]</sup> found that, only 34% farmers got bank loan for fish culture while majority (53%) of farmers expend from their own sources. Asif *et al.* (2014) <sup>[2]</sup> reported that the nursery operators need credit support at the beginning of the season for pond preparation and collection of necessary inputs in Jessore region. It was observed that 24% farmers got loan from bank whereas 31% farmers took loan from local moneylenders with high interest of credit. The present study is more or less with the previous work.

Asif *et al.* (2014) <sup>[4]</sup> reported that 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 the present study shows that channel start with Brood Fish (collection from mainly in Halda and Jamuna River) then hatchling Production, nursery owners, fry production, wholesaler, Retailer and finally end with fish Farmer. This is relevant with present work.

The fry produced from the hatcheries in the area were distributed in most parts of the country. Jessore is one of the most important fry markets of the country. Fry traders used to come from Khulna, Satkhira, Bagarhat, Barishal, Jhalukati, Comilla, Chandpur, Chuadanga, Dhaka, Borguna, Faridpur, Madaripur, Kushtia, Magura, Naraijal, Pabna, Bogura, Rangpur, Nator, Mymensingh and other districts of Bangladesh. Sometimes fry and fingerling exported from Bangladesh to Assam, West Bengal and adjacent part of India, (Asif *et al.* 2014) <sup>[4]</sup>. The distribution area of present study was more or less similar with (Asif *et al.* 2014) <sup>[4]</sup> study.

Fry were distributed from Jessore to North-West part in 2013 was 15%, North-East part was 16%, South-West part was 46%, South-East part was 18% and West-Bengal and Assam was 5% respectively.

The fry were found to transport by means of bus, truck, train, pick-up, auto-rickshaw, van, nosimon etc. In local markets the fry are transported by van, metallic pot, spublic bus and some cases by truck. But train, truck or pick-up are found to be the main means of transportation of fry to the far way districts. Alikunhi, (1957) <sup>[1]</sup> reported that about 6 hours of conditioning is required before fry should be packed for transportation. Jagannadhan, J. N. (1947) <sup>[9]</sup> 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) <sup>[3]</sup> said that the vital key factor in transporting fry is providing an adequate level of dissolved oxygen.

Lewis, D. J. (1996) <sup>[10]</sup> reported that *Labeo rohita* fry are relatively sensitive to the stress of transport; as a result, there is a high mortality among transported fry. Asif, A.A. *et al.* (2014) <sup>[2]</sup> studied that 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. The study of fry transportation is more or less similar with the previous work.

Lewis, D. J. (1996) <sup>[10]</sup> reported that *Labeo rohita* fry are relatively sensitive to the stress of transport; as a result, there is a high mortality among transported fry. In the study it was reported that the highest mortality was within 10% which is similar with the previous work.

Asif *et al.* (2014) <sup>[2]</sup> stated that training is very much essential to run a work properly and scientifically. In Jessore region it was observed that only 33% of the fish fry and fingerling traders attained training and the others had no training knowledge. In the present study it was observed that only 15% of the nursery operators attained training and the rest had no training knowledge. This is more or less similar with the present study.

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