

## Studies on the growth parameters of hilsa at Chandpur region in different season

Bijon Kumar Dewan<sup>1</sup>, Md. Sumon Mia<sup>2\*</sup>, Farida Yeasmin<sup>2</sup>, Flura<sup>3</sup>, Debashis Kumar Mondal<sup>4</sup>, Md. Kamal<sup>1</sup>

<sup>1</sup>Department of Fisheries Technology, Bangladesh agricultural university, Mymensingh, Bangladesh

<sup>2</sup>Department of Fisheries Management, Bangladesh agricultural university, Mymensingh, Bangladesh

<sup>3</sup>Bangladesh Fisheries Research Institute, Riverine Station, Chandpur-3602, Bangladesh

<sup>4</sup>Scientific Officer, Bangladesh Fisheries Research Institute, Freshwater sub-station, Jessore, Bangladesh

### ARTICLE INFO

#### Article history:

Received 09 April 2015

Accepted 03 May 2015

Available online 06 May 2015

#### Keywords:

*Tenualosa ilisha*

Growth performance

#### \*Corresponding Author:

Md Sumon Mia

Email: [summon\\_reod@yahoo.com](mailto:summon_reod@yahoo.com)

### ABSTRACT

A survey was also conducted on the growth parameters (length and weight) of hilsa at Chandpur region. The length and weight of a large number of samples was analyzed in this study to observe the appreciable changes that might have occurred in response to different months. Data from primary source (landing station) was collected for growth study. On growth study, the highest average length found in month June (38.66 cm) and lowest average length found in month November (33.77 cm). The highest average weight found in month June (603.83 gm) and lowest average weight found in month November (445.13 gm). The length and weight of a large number of samples was analyzed in this study to observe the appreciable changes that might have occurred in response to different months. The study deserves further survey in different places of Bangladesh. However, the study will help in formulating management and conservation policies as well as in the further development of the fishery for this species in Bangladesh.

### INTRODUCTION

*Tenualosa ilisha* (Hamilton), a diadromous fish, is the largest single fishery in both the inland and marine waters of Bangladesh. About 16% of the country's total fish production (1.3 million tonnes) is generated by this fishery. This fishery provides livelihood directly or indirectly to about 2.5 million people (2% of the total population). The reduction in the depth and discharge of rivers due to construction of dams and barrages has affected the spawning, feeding and migration of this fish. Despite increasing fishing effect in the upstream rivers, landing of hilsa from the inland waters has sharply declined. However, total production has remained stable due to an increased harvest by the marine sector. Hilsa (ilish) is locally known as Ilish, the fish has been designated as the national fish of Bangladesh. A large-sized hilsa weighs about 2.5 kg. Females grow faster, and are usually larger than males. The hilsa is known to be a fast swimmer, and attains maturity in one to two years. Hilsa has a wide range of distribution and occurs in marine, estuarine and riverine environments. The fish is found in the Persian Gulf, Red Sea, Arabian Sea, Bay of Bengal, Vietnam Sea and China Sea. The riverine habitat covers the Satil Arab, and the Tigris and Euphrates of Iran and Iraq, the Indus of Pakistan, the rivers of Eastern and Western India, the Irrawaddy of Myanmar, and the Padma, Jamuna, Meghna, Karnafully and other coastal rivers of Bangladesh (National Encyclopedia of Bangladesh).

The fish hilsa is anadromous, with a life cycle that follows the general pattern of breeding upstream in fresh water and the larvae hatching from the free-floating eggs. The immature young stages grow in river channels and then descend to the sea for a period of feeding and growth

before returning to the rivers as mature breeding adults to complete the cycle. The hilsa is a highly fecund fish. A large-sized female may produce up to 2 million eggs. Although hilsa spawn more or less throughout the year, they have a minor spawning season during February-March and a major season in September-October. Immature hilsa fish (6-10 cm), known as *jatka*, are extensively caught during their seaward migration in some of the major rivers of the country (National Encyclopedia of Bangladesh).

During the commencement of the south-west monsoon and consequent flooding of all the rivers, Hilsa shad starts its spawning migration upstream. A mature Hilsa shad with a length ranging from 30-55 cm lays 0.1-2.0 million eggs, the eggs are deposited in fresh water, and hatching takes place in about 23 to 26 hours at an average temperature of 23° C. The newly hatched larvae is recorded as 2.3 mm in size and the larvae and juveniles make their way downstream to the sea during a period of several months, feeding and growing on the way. At this stage of their life cycle they are locally known as "Jatka". Jatka the juveniles of Hilsa shad from 4-15 cm are widely available during the period from February to May in the foreshore and riverine water of Padma, Meghna and other deltaic rivers of Bangladesh (Mizanur Rahman, Ph.D. Formerly of the Department of Fisheries and Marine Biology, University of Bergen, Norway).

Usually Jatka grazes for five to six months age in fresh water before they migrate to seawater. They are caught in large amount using current nets of small mesh size during their grazing period in rivers as well as in sea shore by artisanal fishermen to sell them in local markets, calling them "Chapilla" instead of "Jatka", which is a different species of fish, and thus exploiting this resource

in a way. According to a report published through Bangladesh Fisheries Research Institute, over 3700 metric tons of Jatka are caught annually during their nursery season from inland rivers (National Encyclopedia of Bangladesh).

Jatka is usually a plankton feeder preferring zooplankton, and the rate of food intake is comparatively very high at this stage, but with the age and seasonal variability it changes its food habitat, and becoming bigger changes to phytoplankton feeder. And during maturation Hilsa shad decreases its food intake and cease feeding for the duration of spawning migration. After growing for 1-2 years in sea, Hilsa shad matures and reaches a size of 32-55 cm prior to their spawning migration towards inland rivers, and the cycle continues. Hilsa is primarily a plankton feeder and its food includes blue-green algae, diatoms, desmids, copepods, cladocera, rotifers, etc. The feeding habit may vary according to the season and age of the fish

Until 1972, the upstream rivers were characterized by high abundance of hilsa. Subsequently, abundance in the upstream rivers started declining gradually, though simultaneously it increased in the downstream, the estuaries and the sea. Different aspects of biological work of hilsa have been done by different authors (Miah et al. 1997, Rahman et al. 1998 and Rahman et al. 2000) but little work has been done on the stock assessment of this species in Bangladesh. The present study was undertaken to know the size groups of Hilsa fish in different seasons for better understanding the sociological, economic and social variables in the exploitation of this fishery resource.

## MATERIALS AND METHODS

### Collection of sample

Fresh Hilsa shad *Tenualosa ilisa* were procured from Chandpur Landing Center during June-December, 2009. The fish were packed in layered ice (1:1, w/w) in a polystyrene insulated box and transported to the Bangladesh Agricultural University, Mymensingh. The box was provided with holes at the bottom to drain out melting water and stowed the box of a bottom layer of about 5 cm. in crushed ice and then layers of fish sprinkled with ice and a top layer of about 5 cm. of ice again. The data was collected unbiased way from different shops of landing stations. These samples of *T. ilisha* were mainly caught by gill net. The data were then pooled monthly from landing site.

### Preparation of sample

The collected fish samples were washed properly with fresh water to remove all dirt, slime, and unnecessary particles. Then the fishes were separated according to size. The different size groups were categorized according to length and weight. Jatka (Length: <23cm, Weight: 10 to 130 gm); Sub-adult (Length: 24 to 37 cm, Weight: 150 to 600 gm); Adult (Length: 38 cm and above, Weight: 700 gm and above) and Brood (Length: 38 cm and above, Weight: 700 gm and above). Then each category fish was cut by sharp knife and ground in a mechanical grinder to make a paste. This ground sample was used for further biochemical analysis.

In second step, white muscle, dark muscle and viscera were collected from adult fish. The samples were then ground in a mechanical grinder to make a paste. This ground sample was used for further biochemical analysis.

### Measuring of length and weight

The total length of fish were measured in the size range 19.0 to 48.0 cm using a meter scale (1+mm) and weighed using a Salter spring balance. The length was measured thoroughly and more than 200 data was collected in every month.

### Length-frequency analysis

Length-frequency analysis was done by using data of length which is subsequently grouped into classes of two centimeter intervals. It was done in every month and then represent graphically.

### Average length

Average length was determined by calculating average length from 200 fish in every month and then compiling the data in a table and then the average length was representing graphically. Length-frequency analysis was done by using data of length which is subsequently grouped into classes of two centimeter intervals.

### Average weight

Average weight was determined by calculating average weight from 200 fish in every month and then compiling the data in a table and then the average weight was representing graphically.

## RESULTS AND DISCUSSIONS

### Length frequency data

The length of a large number of samples was analyzed in this experiment to observe any appreciable changes that might have occurred in response to different months. The length frequency distributions of hilsa in different months were shown in below. In this study, the highest number of fish was found in length range (37.1-39cm) and (39.1-41cm) and lowest number of fish was found in length range (31.1-33cm) and (45.1-47cm) in June. In July, the highest number of fish was found in length range (27.1-29cm) and lowest number of fish was found in length range (21-23cm). In August, the highest number of fish was found in length range (35.1-37cm) and lowest number of fish was found in length range (43.1-45cm). In September, the highest number of fish is found in length range (41.1-43cm) and lowest number of fish is found in length range (19-21 cm) and (45.1-47cm). In October, the highest number of fish is found in length range (35.1-37cm) and lowest number of fish is found in length range (25.1-27cm).

In month November, the highest number of fish is found in length range (28.1-30cm) and (36.1-38cm) and lowest number of fish is found in length range (46.1-48cm). In month December, the highest number of fish is found in length range (28.1-30cm) and lowest number of fish is found in length range (44.1-46cm) (Figure 1).

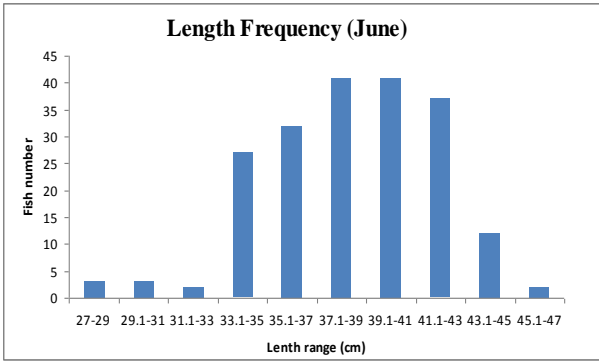


Figure 1. Graphical representation of length frequency of hilsa at month June.

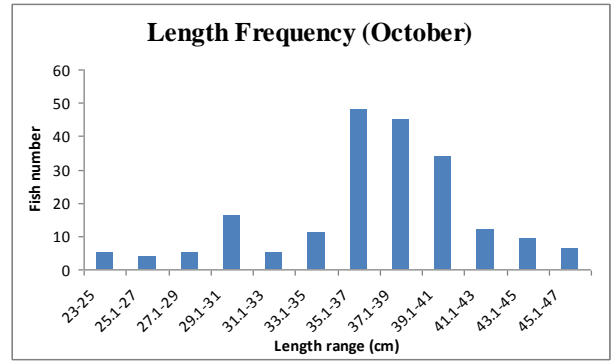


Figure 5 Graphical representation of length frequency of hilsa at month October.

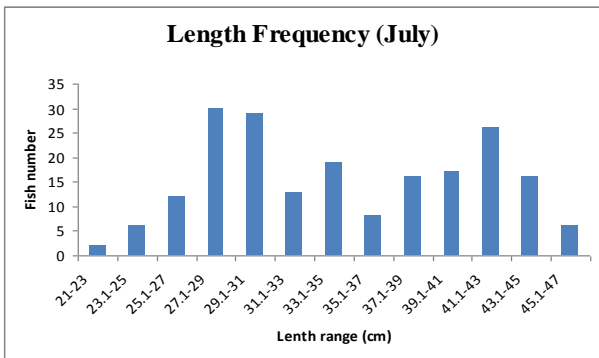


Figure 2. Graphical representation of length frequency of hilsa at month July.

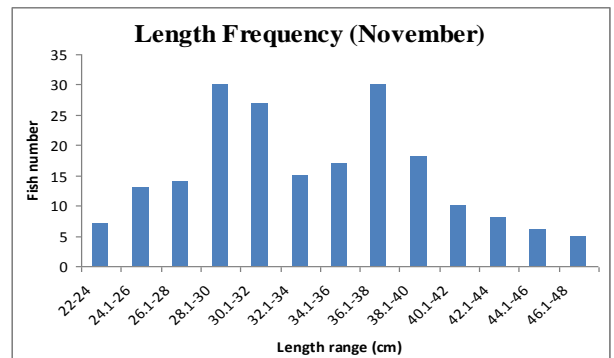


Figure 6. Graphical representation of length frequency of hilsa at month November.

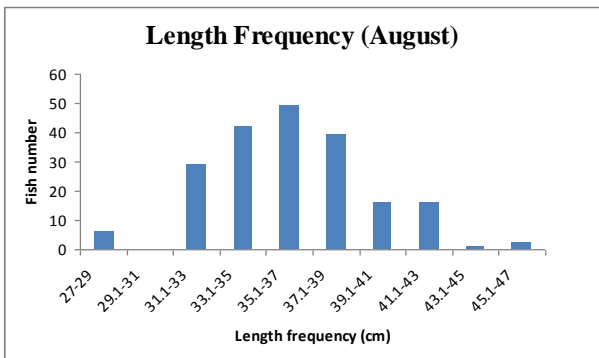


Figure 3. Graphical representation of length frequency of hilsa at month August.

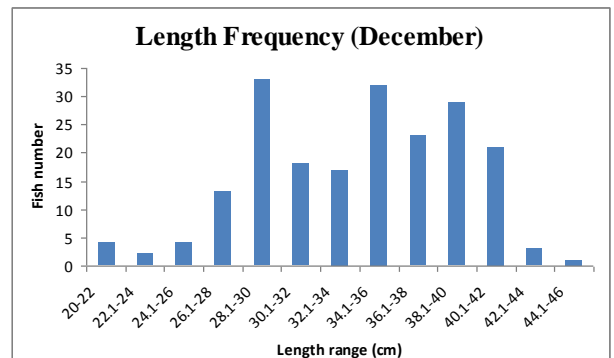


Figure 7. Graphical representation of length frequency of hilsa at month December.

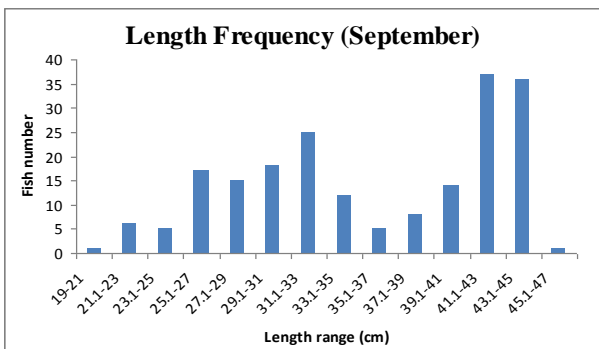


Figure 4 Graphical representation of length frequency of hilsa at month September

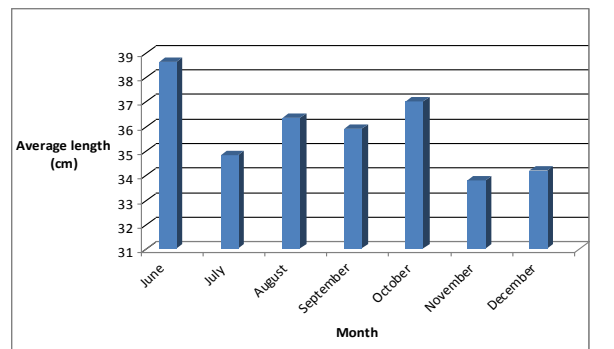


Figure 8. Graphical representation of average length of hilsa from month June to December.

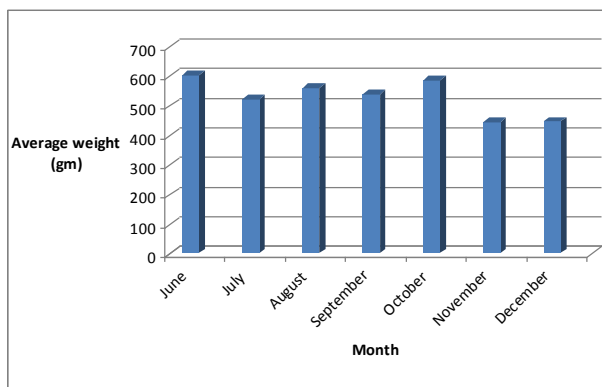


Figure 9. Graphical representation of average weight from month June to December.

### Average length

The overall mean values of length of Hilsa recorded from different months are presented in Fig. 4.13. The average length in different months were found to be 38.66 cm (June), 34.83 cm (July), 36.35 cm (August), 35.91 cm (September), 37.01 cm (October), 33.77 cm (November) and 34.17 cm (December). From this above result we see that the highest average length found in month June (38.66 cm) and lowest average length found in month November (33.77 cm) (Figure 2).

### Average weight

The average weight recorded in different months were 603.83 gm (June), 522.53 gm (July), 559.98 gm (August),

539.65 gm (September), 586.40 gm (October), 445.13 gm (November) and 447.73 gm (December). From this above result we see that the highest average weight found in month June (603.83 gm) and lowest average weight found in month November (445.13 gm) (Figure 9).

### CONCLUSION

The length and weight of a large number of samples was analyzed in this study to observe the appreciable changes that might have occurred in response to different months. However, in the present study, both the average length and weight was found to be highest in the samples collected in June and lowest in that of November. Further studies are needed to collect more data from different areas of Bangladesh in order to formulate effective policies for development of the fishery for this species in Bangladesh

### REFERENCES

- Miah, M.S., G.C. Haldar and M.A. Rahman. 1997. Estimation of growth and mortality parameters *Tenualosa ilisha* (Ham.) population in the Meghna river of Bangladesh. *Indian Journal of Fisheries*, 44(2). 133-139.
- Rahman, M.J., M.G. Mustafa and M.A. Rahman. 1998. Population dynamics and recruitment pattern of hilsa, *Tenualosa ilisha*. *Proceedings of BFR/ACIAR/CSIRO*, 6:28-36.
- Rahman, M.A., S.M. Nurul Amin, G.C. Haldar and M.A. Mazid, 2000. Population Dynamics of *Tenualosa ilisha* of Bangladesh water. *Pakistan Journal of Biological Sciences*, 3(4): 564-567.