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Catch Length Variation of *Tenualosa ilisha* (Hamilton, 1822) in the River Meghna and Meghna Estuary of Bangladesh: An Overview of Catch Percentage in Three Important Hilsa Abundant Areas

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Abstract: A study was conducted to identify the variation in catch percentage at different length classes in three different locations of River Meghna and Meghna estuary during the period of pre-peak and peak spawning season of Hilsa in Bangladesh. Approximately 1542 Hilsa fishes were randomly selected from the commercial catches of fishermen in each sampling site in these sequential months. Total Length data of Hilsa fishes were taken thoroughly using a measuring tape and grouped into classes of five centimeter intervals and then length classes were determined. At higher length classes (36-40 cm or more), the catch percentage was found to be relatively higher in the month of October and at lower length classes the catch percentage was found to be relatively higher in the month of August among three different months. Among the three selected sites (Chandpur, Chairman Ghat and Monpura), the catch percentage was found to be the highest at length classes 31-35 cm in both Chandpur and Chairman Ghat and 36-40 cm in Monpura. Location wise catch length variation of *Tenualosa ilisha* reveals that higher length class fishes were available in the month of October in all three locations, the chance of getting caught in the fishing net was also higher. The present study tries to give a glimpse of comparison of variation in catch percentage at different length classes among three different locations of River Meghna and Meghna estuary, Bangladesh. Further in-depth studies are needed to collect more data from different Hilsa abundant areas of Bangladesh in order to formulate effective policies and better management applications of Hilsa Fishery which will also be helpful to implement and improve Hilsa Fishery Management Action Plan (HFMAP) in Bangladesh.

Key words: Hilsa · Catch Length · *Tenualosa ilisha* · Meghna River · Bangladesh

INTRODUCTION

Hilsa, *Tenualosa ilisha* (Hamilton, 1822) is an important diadromous fish species in the South and Southeast Asia especially in Bangladesh. It is the national fish of Bangladesh and it comprises the largest single species open water fishery of the country [1]. It contributes about 11% of the total fish production, adding approximately 1% to the Gross Domestic Product (GDP) [2].

Hilsa attains maturity in the sea and then undertakes upstream migration in the rivers for the purpose of breeding. The fishery is mainly concentrated in the down streams of the rivers, estuaries and in the sea. Hilsa catch is the greatest in the peak spawning season (August to October). During the spawning season, over 65% of the Hilsa are found to be sexually mature and ripe. At least 30% of the population appears to be ripe at any time in most areas [3]. From the studies of the Riverine Station, Bangladesh Fisheries Research Institute (BFRI), the lower stretches and estuarine part of Meghna River are identified as the major spawning grounds of Hilsa. The fishes have been caught extensively during the upstream migration in the major spawning grounds. For that, a twenty two days fishing ban has been implemented by the govt. of Bangladesh in the month of September and October (Ashwin-Kartik) every year which includes full moon and new moon as well [4].

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Different works have already been done on the Hilsa fishery although catch variation at different length classes has not been done yet. The present study aims to identify the variation in catch percentage at different length classes in three different locations of River Meghna and Meghna estuary during the period of pre-peak and peak spawning season of Hilsa in Bangladesh. This study will give an insight about length class basis catch percentages of Hilsa in these months in some of the exclusive Hilsa catching areas of Bangladesh.

MATERIALS AND METHODS

Site Selection: Major spawning grounds were selected for the present study. The Hilsa Research Team of BFRI visited those selected sites for the comprehensive study. These sites are important Hilsa catch zones in Bangladesh and lots of Hilsa fishes are being landed there. The study sites are as follows:

Table 1: Selected sites for sampling

Sl. No.	Sites	District	River
1	Chandpur	Chandpur	Meghna
2	Chairman Ghat	Noakhali	Meghna Estuary
3	Monpura	Bhola	Meghna Estuary

Time Frame: Two time periods in the year 2016 were selected for completing the study:

- Before spawning period (August): This month is just before the highest peak season of Hilsa in the river and estuarine areas and Hilsa has been caught extensively during this month.
- Spawning period (September-October): Although Hilsa spawn all the year round, they have a major spawning season during the Bengali month of Ashwin-Kartik (September-October) which is moon basis. It has been declared by the Govt. of Bangladesh that 4 (four) days before and 17 (seventeen) days after the full moon including the day of full moon, altogether 22 (twenty two) days of the first appeared moon in the Bengali month Ashwin will be the major spawning period of Hilsa each year [4]. Some Hilsa fishermen try to catch Hilsa illegally during this period although fishing has been banned at that time.

Measuring of Length: Approximately 1542 Hilsa fishes were randomly selected from the commercial catches of fishermen and from experimental fishing by Hilsa Research Team of BFRI in each sampling site in these sequential months. Total Length of Hilsa fishes was taken thoroughly in size range 20 to 55 cm using a measuring tape.

Length Group Determination: The length data of Hilsa were grouped into classes of five centimeter intervals and then length classes were determined. The lowest and highest length class were determined as 51-55 cm.

Percentage Determination: Then the catch percentage of three Hilsa fishing sites at different length classes in three different months was calculated.

Statistical Analysis: MS Excel 2013 was used for statistical analysis and graphical representations.

RESULTS AND DISCUSSION

The length class interval was five centimeter and six length groups were determined (Table 2).

At Chandpur differences in catch percentage at different length classes were observed from the graphical representation of catch length variation of *Tenualosa ilisha* (Fig. 1). The catch percentage of Hilsa was found to be the highest at length class 31-35 cm and whereas the lowest at length class 51-55 cm. [4] found slightly different result that highest catch percentage came from 36-40 cm and lowest from 46-50 cm length classes. They also found that catch percentage was higher at higher length classes (36-40 cm, 41-45 cm, 46-50 cm) than lower length classes (21-25 cm, 26-30 cm, 31-35 cm). The catch percentage was found to be the highest in the month of October at most length classes (26-30 cm, 36-40 cm, 41-45 cm, 46-50 cm, 51-55 cm). On the other hand catch percentage was found to be the lowest in the month of August at most length classes although at length class 31-35 cm it was found to be the highest. In the month of September, the catch percentage was found to be the highest only at length class 20-25 cm and 26-30 cm. At length classes 26-30 cm and 51-55 cm the catch percentage were almost same in the month of August, September and October. It is evident that bigger size Hilsa catch percentage increases during the peak spawning season of Hilsa.

At Chairman Ghat differences in catch percentage at different length classes were observed from the graphical representation of catch length variation of *Tenualosa ilisha* (Fig. 2). The catch percentage of Hilsa was found to be the highest at length class 31-35 cm and whereas the

Table 2: Length class of Hilsa

Length class of Hilsa						
21-25 cm	26-30 cm	31-35 cm	36-40 cm	41-45 cm	46-50 cm	51-55 cm

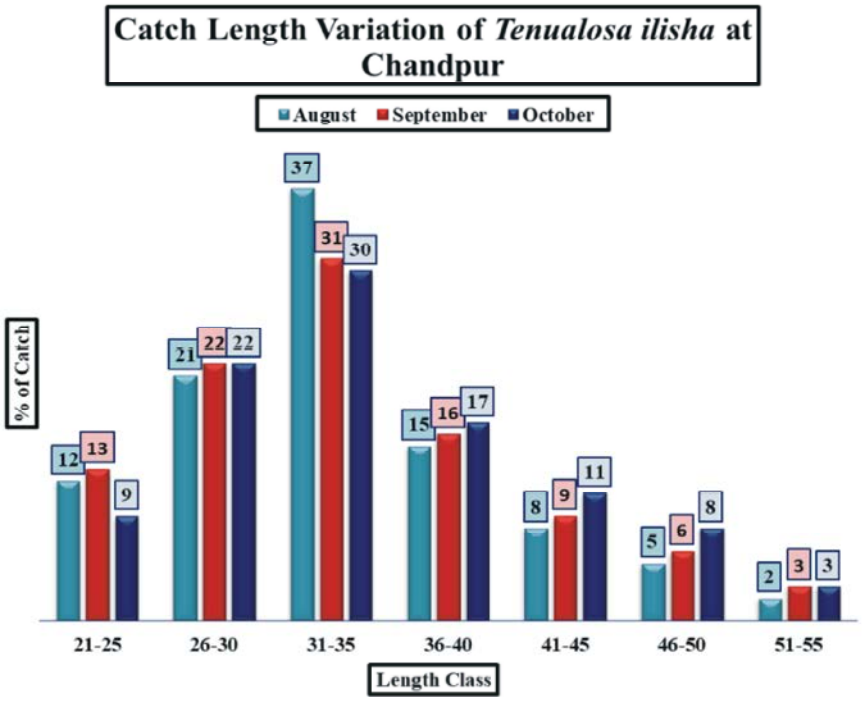

Fig. 1: Catch Length Variation of *Tenualosa ilisha* at Chandpur

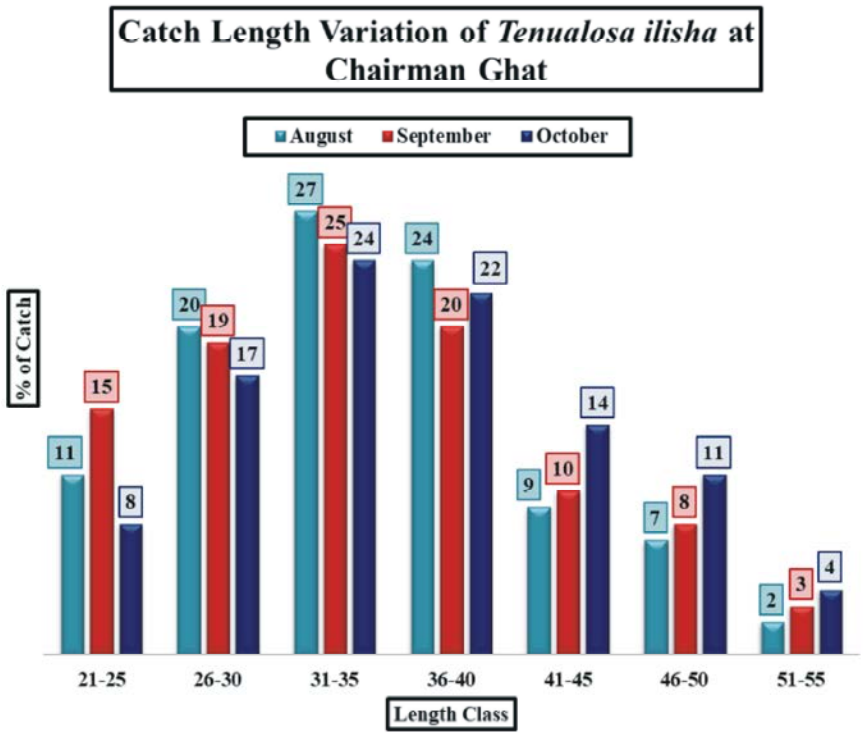

Fig. 2: Catch Length Variation of *Tenualosa ilisha* at Chairman Ghat

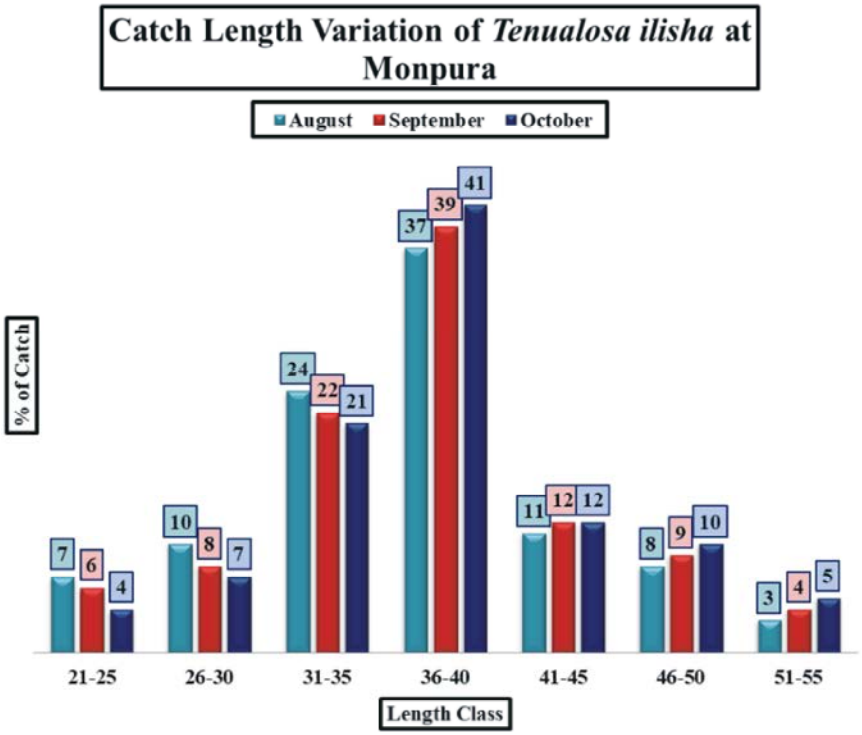

Fig. 3: Catch Length Variation of *Tenualosa ilisha* at Monpura

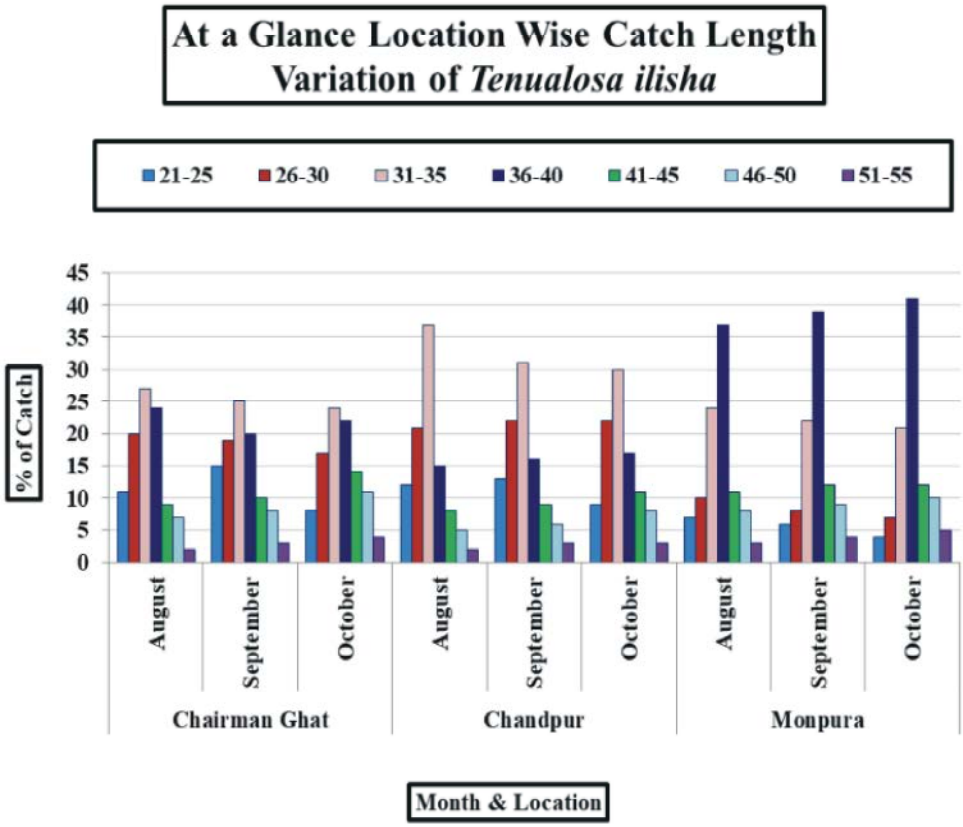

Fig. 4: At a Glance Location Wise Catch Length Variation of *Tenualosa ilisha*

Fig. 5: Pictorial view of *Tenualosa ilisha* at different length size

lowest at length class 51-55 cm. [4] found different result that the highest catch percentage came from 36-40 cm and lowest from 15-20 cm length classes. They also found that catch percentage was much higher at higher length classes (36-40 cm, 41-45 cm, 46-50 cm) than lower length classes (21-25 cm, 26-30 cm, 31-35 cm).In the month of October, catch percentage was found to be the highest at upper length classes (41-45 cm, 46-50 cm, 51-55 cm) and lowest at lower length classes (20-25 cm, 26-30 cm, 31-35 cm). In the month of August, catch percentage was found to be the highest at lower length classes (26-30 cm, 31-35 cm, 36-40 cm) and lowest at upper length classes (41-45 cm, 46-50 cm, 51-55 cm). In the month of September, the catch percentage was found to be the highest only at length class 20-25 cm. It is evident that during the peak spawning season big size Hilsa were caught whereas relatively smaller size Hilsa were caught just before the peak spawning season.

At Monpura differences in catch percentage at different length classes were observed from the graphical representation of catch length variation of *Tenualosa ilisha* (Fig. 3). The catch percentage of Hilsa was found to be the highest at length class 36-40 cm and whereas the lowest at length class 51-55 cm. [4] found that highest catch percentage came from 36-40 cm and lowest from 15-20 cm length classes. They also found that catch percentage was much bigger at higher length classes (36-40 cm, 41-45 cm, 46-50 cm) than lower length classes (21-25 cm, 26-30 cm, 31-35 cm). In the month of October, catch percentage was found to be the highest at upper length classes (36-40 cm, 41-45 cm, 46-50 cm, 51-55 cm) and lowest at lower length classes (20-25 cm, 26-30 cm, 31-35 cm). In the month of August, catch percentage was found to be the highest at lower length classes (20-25 cm, 26-30 cm, 31-35 cm) and lowest at upper length classes (41-45 cm, 46-50 cm, 51-55 cm). In September the catch percentage also increases with the increase in higher length classes. It is evident that the closer it comes to the spawning period, the increase in catch percentage at higher length classes of Hilsa occurs. It means matured gravid Hilsa are available in these months, [5] mentioned Hilsa attains maturity at 21 cm and 32 cm for male and female respectively in the River Meghna. Higher percentage of Hilsa with length group greater than 35 cm was observed in the downstream areas of Monpura which is supported by [6]. Almost all the larger Hilsa found in the downstream areas were matured gravid Hilsa.

From the graphical representation of location wise catch length variation of *Tenualosa ilisha,* it was observed that catch percentage of higher length classes were much higher in Monpura than Chairman Ghat and Chandpur (Fig. 4). Catch percentage at length class 36-40 cm was found to be the highest in Monpura which indicates why it is one of the four major spawning grounds of Hilsa in Bangladesh. At length class 31-35 cm catch percentage was found to be gradually lower from the month of August to October in three locations. As higher length class fish were available in the month of October, the chance of getting caught in the fishing net was also higher. For safe and smooth spawning of Hilsa, fishing has been banned during the spawning period (September-October) in four major spawning grounds [4]. [7] conducted a study on the growth parameters of Hilsa at Chandpur region in three different regions. They observed that in the month of August, September and October, the highest number of fish was found at length class 35.1-37 cm, 41.1-43 cm and 35.1-37 cm and lowest at length class 43.1-45 cm, 19-21 cm & 45.1-47 and 25.1-27 cm respectively.

Considerable Benefit of Research Findings:

- Considering the length of catch, fishing time can be set and restriction on Hilsa fishing can be given.
- Considering the length basis catch percentage, it might be easier to identify spawning and nursery grounds of Hilsa.

- Length basis catch percentage data can be very important for stock assessment of Hilsa
- Considering the importance of length catch percentage, location wise Hilsa fisheries policy can be formulated

CONCLUSION

The present study tries to give a glimpse of comparison of variation in catch percentage at different length classes among three different locations of River Meghna and Meghna estuary of Bangladesh. Further in-depth studies are needed to collect more data from different Hilsa abundant areas of Bangladesh in order to formulate effective policies and better management applications of Hilsa Fishery which will also be helpful to implement and improve Hilsa Fishery Management Action Plan (HFMAP) in Bangladesh.

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