Catch Per Unit Effort (CPUE) and Hydrological Aspect of Major Spawning Site of Hilsa, *Tenualosa Ilisha* in Bangladesh

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Abstract: Catch per unit effort (CPUE) and total catch of *Tenualosa Ilisha* during peak period (September-October) were recorded as 45.70 kg/boat/day and 166.63 tons/day respectively in the lower Meghna river of Bangladesh. Current velocity in the lower estuary at the point Hatia was found to be 2.28 m/sec during neap tide and 0.75 m/sec during spring tide. It was 2.01 m/sec during neap tide and 1.60 m/sec during spring tide at the point Ramgoti. Mean air temperature was recorded as 30.5°C. The mean surface and bottom water temperature was found to be 32.4°C and 32.23°C respectively. Average dissolved oxygen content was observed as 6.40 mg/L and 6.24 mg/L in the surface and bottom water respectively. Surface water salinity was very low (0.056 ppt) in the upper region and it was gradually increased towards lower region of the south. Hydrogen ion concentration (pH) was varied between 7.5 and 8.5 in the investigated area. The highest transparency was recorded in the upper reaches at South Haimchar (18.5 cm) and the lowest in the lower reaches of the Meghna River at Hatia (9.25 cm). Ten genera of the phytoplankton belong to four groups and six genera of zooplankton composed of four groups were found in the study area.

Key words: CPUE, *Tenualosa Ilisha*, Hydrology, Spawning ground, Bangladesh

INTRODUCTION

*Tenualosa Ilisha*, the hilsa shad, the largest single fishery in Bangladesh in almost all the river systems, estuaries and the sea, contributes about 13.82% of the total fish production of the country. The country's 140 million people are heavily dependent on this dietary fish. About 2% of the total population of the country is engaged directly or indirectly in the fishery for livelihood[1]. The fishery is exploited by some 18,000 fishing units[12]. There is uncertainty about the total figure of fishing crafts in Bangladesh, as most of the crafts are not registered.

Historically, the locations of major hilsa fishing grounds were restricted to the upper reaches of the main rivers. At present, the major fishing activities are confined to the lower reaches, estuaries and the coastal waters. This paper describes the results of investigations conducted by Bangladesh Fisheries Research Institute (BFRI), Riverine station, Chandpur from Meghna river of Chandpur to Hatia estuarine region. Fishing crafts that are engaged in Hilsa fishery of Meghna River locally familiar as chandi nouka is very important for hilsa fishery. Information is available on the hydro-meteorological and biological aspect of the coastal region of the Bay of Bengal[12,13], However, there is no information on the hydro biological aspects in the investigated area.

Therefore, the present study was undertaken to estimate the catch per unit effort (CPUE), total catch of hilsa during peak period of harvesting (September-October) and the hydro biological aspects of Meghna River for the future progress of hilsa fishery management.

MATERIALS AND METHODS

Survey was conducted once in 1998 and then in 2000 from Chandpur (N 23°10'75" and E 90°36'02") to Hatia (N 22°26'95" and E 90°53'86") estuary of Meghna River. Research vessel (F.B. Ilish) was used during sampling from Chandpur to Hatia. Two scientists, two research assistants, six trained fishermen and other necessary manpower were engaged in research survey. Hilsa fishing boats (Chandi nouka) were enumerated by direct observation. Global Positioning System (GPS 12) was used to locate the sampling spot. Total length of boat, length of net, mesh size and catch per unit effort data were collected from 49 hilsa fishing boats (Chandi nouka), among them 17 crafts from Ramgoti and rest of 32 crafts from Hatia. Speedboat was used for this purpose for random selection.
Air temperature was recorded by a centigrade thermometer. Surface and bottom water temperature, dissolved oxygen and salinity were recorded by oxygen-salinity meter (Model 90 -FL). The pH of surface water was determined by using water test kit box (HACH FF1A). Secchi-disk was used for water transparency measurement.

For the quantitative and qualitative study of phytoplankton and zooplankton of water, 85 litres sample were collected from each sampling place of the river and passed through plankton net and finally concentrated to 50 ml. Then concentrated samples were poured into plastic bottles, preserved in 5% formalin, and then studied subsequently in the laboratory under microscope. Sedgwick-rafter was used for counting the plankton. Identification of plankton was made up to genus level according to Needham and Needham[9], Prescott[11] and Belcher and Swale[15].

RESULTS AND DISCUSSIONS

Catch per unit effort (CPUE) of hilsa: In the year 1998, mean CPUE was recorded as 45.70 kg/boat/day and total catch was found to be 166.63 tons/day. In the same region during the year 2000, mean CPUE was recorded as 33.0 kg/boat/day. It is observed that CPUE has decreased 12.70% i.e. about 28.22% in the year 2000. During 1998, the number of boats for catching hilsa was estimated as 3646. Total length of boat was varied between 6.86 m and 16.00 m and average was 12.98 m. The smallest length of fishing net (gillnet) was observed 914.40 m, the highest length was 2743.20 m and mean length was 1636.122 m. The mesh size of the net varied from 10.66 to 19.05 cm and mean was 13.06 cm (SD±1.905). The total catch of T. ilisha was estimated to be 9997.77 tons during peak period (September-October) in the investigated area. Haldar et al.[15] reported that the mean total landing of hilsa from the Feni River was 125.0 metric tons during July-October 1979 and quantitative catch during October 1979 was 264.38 metric tons, which is much higher than that of the previous months. Ali[5] has mentioned that hilsa production in the riverine and estuarine sectors is 40.4% of 207,786 i.e., about 90,000 tons. So, in the present case total catch 9997.77 tons during peak period (September-October) of Meghna belt was not an over estimation.

Air temperature: The maximum, minimum and mean air temperature was recorded as 27.0 °C, 34.0 °C and 30.5±2.12 °C respectively in the investigated area (Table 1).

Water temperature: Surface water temperature varied with the atmospheric temperature. The maximum, minimum and average surface water temperature was

<table>
<thead>
<tr>
<th>Sampling station</th>
<th>Location</th>
<th>WT (°C)</th>
<th>DO (mg/L)</th>
<th>Sal. (ppt)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. South Haimchar</td>
<td>(N 22°58'44&quot; E 90°38'75&quot;)</td>
<td>32</td>
<td>32.4</td>
<td>32.2</td>
</tr>
<tr>
<td>2. Horina</td>
<td>(N 23°09'01&quot; E 90°38'64&quot;)</td>
<td>32</td>
<td>32.4</td>
<td>32.3</td>
</tr>
<tr>
<td>3. Ramgoti</td>
<td>(N 22°41'11&quot; E 90°39'77&quot;)</td>
<td>28</td>
<td>31.8</td>
<td>31.9</td>
</tr>
<tr>
<td>4. Ramgoti</td>
<td>(N 22°36'33&quot; E 90°54'58&quot;)</td>
<td>31.5</td>
<td>32.1</td>
<td>31.6</td>
</tr>
<tr>
<td>5. Ramgoti</td>
<td>(N 22°37'78&quot; E 90°54'82&quot;)</td>
<td>34</td>
<td>33.6</td>
<td>33.3</td>
</tr>
<tr>
<td>6. Ramgoti</td>
<td>(N 22°37'78&quot; E 90°54'82&quot;)</td>
<td>32</td>
<td>33.3</td>
<td>32.8</td>
</tr>
<tr>
<td>7. Ramgoti</td>
<td>(N 22°25'01&quot; E 91°06'35&quot;)</td>
<td>27</td>
<td>32.3</td>
<td>32.3</td>
</tr>
<tr>
<td>8. North Hatia</td>
<td>-</td>
<td>28</td>
<td>32.2</td>
<td>32.3</td>
</tr>
<tr>
<td>9. South Hatia</td>
<td>-</td>
<td>30</td>
<td>32.4</td>
<td>32.3</td>
</tr>
<tr>
<td>10. Hatia</td>
<td>(N 22°26'20&quot; E 91°06'28&quot;)</td>
<td>29.5</td>
<td>32.3</td>
<td>32.2</td>
</tr>
<tr>
<td>11. Hatia</td>
<td>(N 22°29'61&quot; E 91°04'22&quot;)</td>
<td>28</td>
<td>32</td>
<td>31.6</td>
</tr>
<tr>
<td>12. Hatia</td>
<td>(N 22°25'01&quot; E 91°06'35&quot;)</td>
<td>32</td>
<td>32.1</td>
<td>32.2</td>
</tr>
<tr>
<td>13. Hatia</td>
<td>(N 22°26'95&quot; E 91°05'25&quot;)</td>
<td>32.5</td>
<td>32.4</td>
<td>32.0</td>
</tr>
</tbody>
</table>

The quantities of plankton were 609, 941 and 411 individuals/L respectively in the upper regions of the Meghna River at South Haimchar, Horina and Hatia respectively. The identified phytoplankton genera were Spirougyra, Zygmena, Volvox, Pediastrum, Anabaena, Desmidium, Gonatozygon, Mougeotia and Microcystis and the zooplankton genera were, Asplanchina, Notholca, Daphnia, Filinia and Cyclops. Crustacean larvae (Nauplii) were also observed.

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REFERENCES


