A Study on the Catch Composition of Set Bag Net Used in the Ramnabad River, Patuakhali District (in Bangladesh)

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Abstract

The field study was conducted on the set bag net (Behundi jal) fishery and species composition of set bag net in the Ramnabad River adjacent to the Galachipa upazila of Patuakhali district. The study was conducted for a period of eight months from July-2012 to February-2013. A total of twelve fishes and shellfishes such as *Poa, Tengra, Ilish, Chewya, Golda chingri, Ramsos, Horina chingri, Kajli, Chapila, Motka chingri, Dogri, Boiragi* were identified in the catches of set bag net used by the fishermen during the study period. Among that species Chewya (*Taenioides cirratus*) and Horina chingri (*Metapenaeus monoceros)* were the dominant fishes. The Chewya was dominant in winter season while salinity was high. Horina chingri was dominant in rainy season when water current increased. The other fishes were found a little amount but not significant and had no relation with salinity and current. Salinity and water current was the main factors for the variation of total catch and availability of fish. In July to October the water level of the river remained high, so the abundance and availability of fish was high. For fishing fishermen used set bag net from July to February when the water level was high in rainy season and salinity was high in winter season. During high tide the water entered into the adjacent estuary and the fishermen used set bag net in the mouth of the estuary.

Keywords: Catch composition, set bag net, SBN, Ramnsbad River

Introduction

Bangladesh is blessed with a vast water bodies in the form of rivers, haors and beels, canals, reservoirs, Kaptai Lake, ox-bow lakes (baors), ponds, tanks, seasonally flooded areas and the Bay of Bengal. All these water bodies offer tremendous scope and potentiality for augmenting fish production from them by adopting proper management techniques. In Bangladesh there are two sources of fisheries-inland and marine fisheries. Inland open water fishery resources play a significant role in the economy and food habits of the people of Bangladesh (Khan, K., Ahmed, U. and B. Hambrey. 2005). For fishing, different types of crafts, gears and traps are used. Generally gears are those equipment's that are used to catch the fishes. Among fishing gear the predominant fishing gear used are gillnets and set bag nets. The latter is locally known as behundi jal. The set bag nets (SBN) account for a considerable portion of the river and estuarine catch.The set bag net, a traditional fishing gear in the Bay of Bengal region, is still being operated by small-scale fisher folk in Bangladesh, India, Indonesia, Malaysia, Myanmar and Thailand, with some regional variations in design and mode of operation. However, the gear is more dominant in Bangladesh than in any of the other countries. Among the set bag net fishery, 73% is contributed by the estuarine set bag net (ESBN) while the rest is from the marine set bag net (MSBN) which is highly seasonal. Around one million people in the coastal area of Bangladesh are fully or partially dependent on the estuarine set bag net fishery in Bangladesh (Sabbir, 2005). The set bag net (SBN) fishery is spread throughout the channels, canals, tributaries and estuaries of the country in coastal and brackish water environment. This gear is operated mostly within 10 m depth line throughout the year. The present study has been undertaken with the following objectives:

- To undertake a catch assessment and species composition of the Ramnabad River by set bag net, and
- To know the hydrographic parameters effect on catch composition.

Materials and methods:

3.1 Study Area

Selection of the study areas is an important step for conducting research because it indicates a premise from where required data would be collected in accordance with the objectives set for the study (Harmen, 1994). The study area was selected in the Ramnabad River adjacent to the Galachipa upazila under the district Patuakhali.

3.2 Study period

The study was conducted for a period of 8 (eight) months from July-2012 to February-2013, in the Ramnabad River adjacent to the Galachipa upazila under the district Patuakhali.

3.4 Collection of data

During collection of data, primary sources were considered. Data were collected from fishermen by the researcher himself several visits were made to the study area to collect accurate information related to objectives of the study.

3.5 Data processing, Analysis and Presentation

The collected data were summarized and processed for analysis. These data were verified to eliminate all

possible errors and inconsistencies. Tabular technique was applied for the analysis of data by using simple statistical tools like averages and percentages. Finally, the processed data were transferred to a master sheet from which classified tables were prepared revealing the finding of the study. For processing and analysis purpose, MS Excel and MS word have been used. Tables, pie-charts etc. had been used for data processing and analysis.

3.6 Catch Assessment Survey (CAS)

Sampling of catches and their assessment were done twice per month during the study period. The fishermen were selected on the basis of types of gear they operate. The total catches were weighted by a balance and the representative samples were taken with the help of hand without repetition of the net in each sampling day.

Results:

4.1 Seasonal variations of catch composition of set bag net:

During the study period, it was observed that catch composition of fish varies with seasonal variation. Chewya was the highest in total catch in both weight and number during the study period. The second highest was Horina chingri in both weight and number. Chewya was abundant in winter season and Horina chingri was abundant in rainy season. The other species had no regular trend like chewya and Horina chingri and their catch composition was not significant.

4.1.1 Variations of catch composition by the weight basis:

The total weight of chewya was 42 kg (27.30%) which was the highest catch in weight during the study period. Chewya was dominant in December 5kg (24.7%), January 15kg (49.18%), and February 16kg (51.95%). The contribution of Horina chingri 24.80 kg (16.12%), was second highest in the total catch. Horina chongri was dominant in the month of July 4kg (34.7%), August 2 kg (12.90%) and September (10.53%). A little amount of Motka chingri (1 kg) and Golda Chingri (3.4 kg) were found during the study period. They were mainly found in July, August and September.
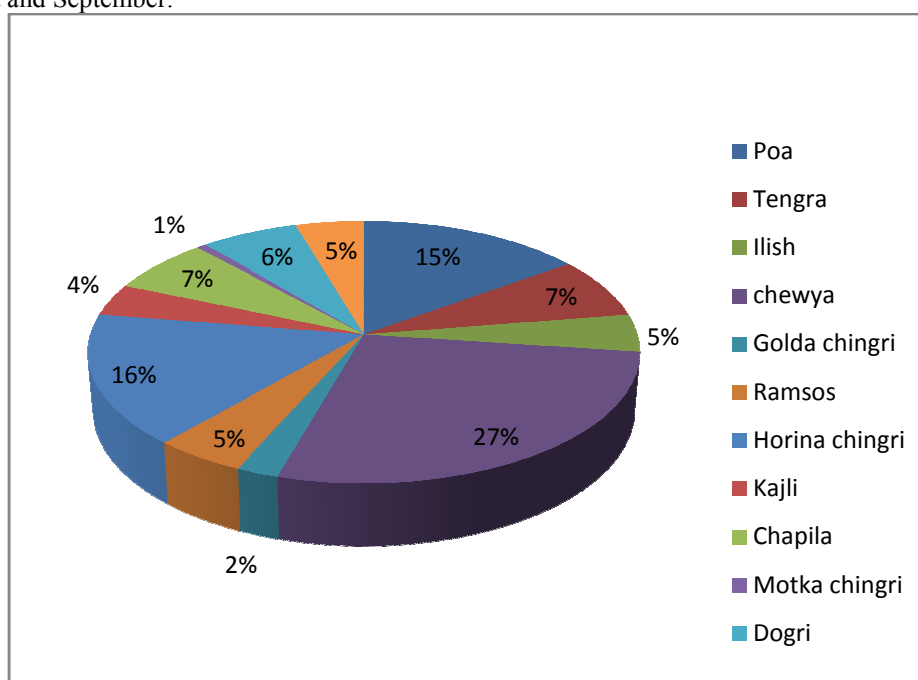

Figure 1: Variations of catch composition (By weight basis) during the study period

4.1.2 Variations of catch composition by the number of fish basis:

The total number of chewya was 4200 (31.69%) which was the highest catch in number during the study period. Chewya was dominant in December, January, and February. The contribution of Horina chingri 2655 (20.03%), was second highest in the total catch. In July, August and September the dominant species was Horina Chingri. The third highest was Boiragi which was found in October. A little number of Ilish (12) and Golda Chingri (45) and Motka chingri were found during the study period. Motka chingri was found only August.

4.2 Hydrographic Parameters of the Ramnabad River

In the present study, the hydrographic parameters of the Ramnabad River were studied for a period of 8 (months).

4.2.1. Salinity

The highest salinity (3.5 ppt) was recorded in February and the lowest salinity (0.5 ppt) was recorded in July respectively with a mean value of 1.318 ± 1.118.

In July, august and September were rainy season. In that season salinity were lower. From December salinity began to increase and in February it was 3.5 ppt.

4.2.2 Current (m/sec)

The minimum water current (0.30 m/sec) was in January and the maximum water current (0.80 m/see) was in July with a mean value of 0.5162 ± 0.165 m/sec.

4.2.3 Water temperature (°C)

Monthly average water temperature was ranged from 12 to 30 °C. The highest and the lowest water temperatures were recorded in July and December respectively with a mean value of 20.20 ± 6.524°C.

4.2.4 Air temperature (°C)

Monthly average air temperature was ranged from 13 to 31 ^{0}C. The highest and the lowest air temperatures were recorded in July and December respectively with a mean value of 22.375 ± 6.022°C.

4.2.5 Transparency (cm)

Average transparency was the highest (18cm) in December and the lowest (8cm) in July with a mean value of 12.625 ± 3.114 cm.

4.2.6 Dissolved oxygen (mg/L)

Monthly average dissolved oxygen was the highest (7 mg/L) in July and the lowest (4.00 mg/L) in December and February with a mean value of 5.925 ± 0.8154 mg/L.

4.2.7 pH

The highest pH (7.8) was in February and the lowest pH (6.0) was recorded in July respectively with a mean value of 6.912 ± 0.58248.
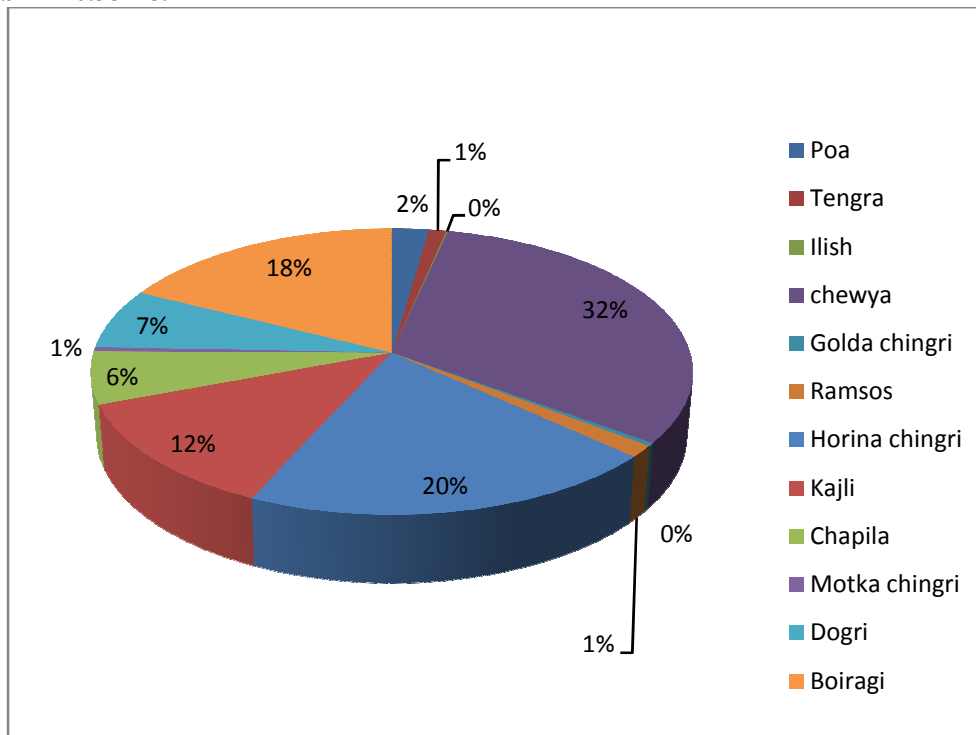

Figure 4: Variations of catch composition (By Number of fish basis) during the study period

4.3 Effects of hydrographic parameter on catch composition:

Waters of lower transparency were found in the rainy season. The catch decreased with increases of turbidity and decreases of transparency. The salinity becomes too low for many of the fishes in the river during the month of July, August and September due to heavy rain in Bangladesh. But with the higher water current Horina chingri and Poa drifted with the water current which were found as the dominant species during rainy season. Higher salinity tolerant fish like Chewya was not dominant on that time. The total catch on that time was lower compared with other month. From December to February salinity became higher and temperature became lower day by day. Chewya was the dominant species during that season. A high amount of Chewya was caught in set bagnet in December, January and February. The amount of catch was relatively higher during the spring tide when the high tide water moved from the sea into the estuary.
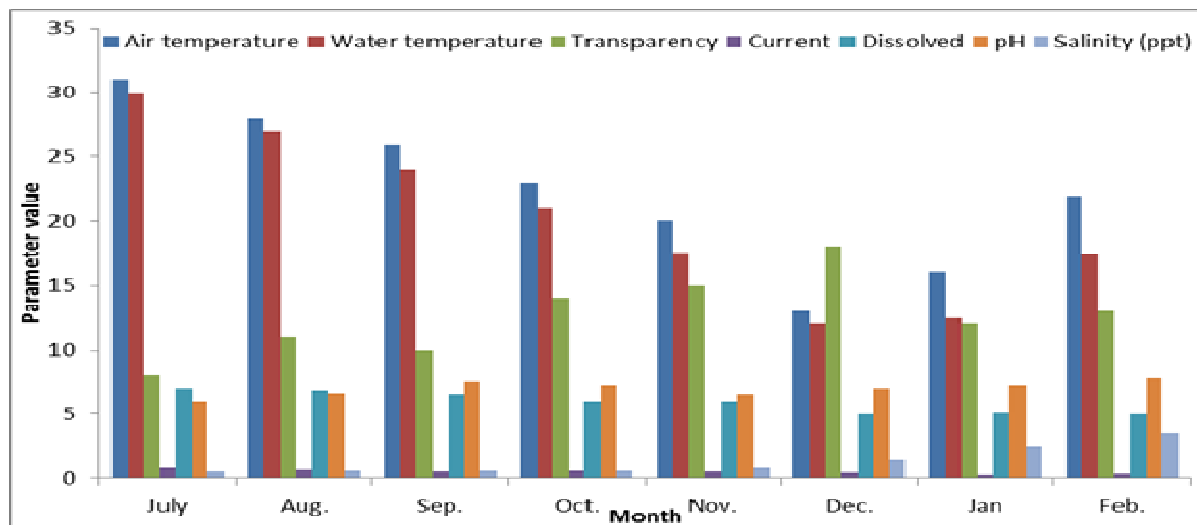
Figure 5: Hydrographic parameter of Ramnabad River

Discussions

Variation of catch composition of Set bag net:

Chewya was the highest catch on the basis of weight (27.30%) and on the basis of number (31.69%). However Horina chingri was the second highest catch on the basis of weight (16.12%) and on the basis of number (20.03%) during the study period. These two species inhabit in estuary and it might be the cause of dominance in the catch as the study area near the estuary. Halfman (1988), Pillay and Ghose (1962) reported similar observation in their study.

In December, January and February Chewya was the dominant species. In winter season when the salinity was increased (3.5 ppt) and water current was lowered (0.30 m/sec) Chewya moved towards river from estuary which might be the reason of higher catch of Chewya in the set bag net in that months. Helfman (1988) reported that Chewya was abundant in estuarine ecosystem when salinity was above 3 ppt.

In July, August and September Horina chingri was the dominant species. In rainy season when water current was higher (0.80 m/sec) and salinity was decreased (0.5 ppt) Horina chingri drifted with water current which might be the reason of higher catch of Horina chingri in the set bag net in that months.

According to Pillay and Ghose (1962), shrimp was more dominant in the set bag net catches in India. This was probably due to differences in the environmental conditions in which the gear is operated.

Set bagnet was operated in such mechanism that these bottom dwelling fishes and shellfishes were trapped in set bag net. This trend of catch composition showed similar consistency with the study reported by Tham (1954) for Singapore waters where the major catch composition was also shrimp.

5.2 Hydrographic Parameters of the Ramnabad River

5.2.1. Salinity and Current

The highest salinity was observed in February (3.5 ppt) and lowest in July (0.5 ppt.). In case of current, it was highest in July (0.80 m/sec.) and lowest in January (0.3 m/sec.). In July, August and September heavy rainfall was occurred which might be the cause of decrease of salinity and increase of water current. In December, January and February there was no or little rainfall which might be the cause of increase of salinity and decrease of current.

Rahman *et al.* (1992) conducted a year round observation on the physico-Chemical parameters of two zones of the river Meghna. The water was less saline than Ramnabad river.

Similar results were reported by Singh *et al.* (1990), Hossain (1998) and Shahjahan (2000). River current increased due to heavy rain fall and created over flood in July.

5.2.2 Water temperature (°C)

The highest and lowest water temperature was recorded in July (30°C) and December (12°C) respectively. Water temperature was always less than air temperature. Similar results were also observed by Patra and Azadi (1987), Singh *et al.*(1990) and Hossain (1998) and Shahjahan (2000).

5.2.3 Air temperature (°C)

The highest air temperate was recorded in July (31°C) and the lowest air temperature was in December (13°C). The highest value in July was due to summer season and the lowest in December due to comparatively cold weather   in   winter   season.

Similar results of air temperature were also observed by Shahjahan (2000) and Hossain (1998).

5.2.4 Transparency (cm)

In the present study, transparency of water was lowest in July (8 cm) and highest in December (18 cm). Similar results were reported by Patra and Azadi (1987), Singh *et al.* (1990), Hossain (1998) and Shahjahan (2000). During October to February transparency were increased because turbidity decreased during this period due to water current, absence of heavy rain fall and possibly less erosion.

5.2.5 Dissolved oxygen (mg/L)

The highest dissolved oxygen was recorded in July (7.0mg/L) and the lowest in December and February (5.0 mg/L). Dissolved oxygen decreases due to decrease in water movement and high turbidity. Dissolved oxygen range which was studied by Putra and Azadi (1987) in Halda River, Hossain (1998) in old Brahmaputra River and Shahjahan (2000) in Jamuna River was similar.

5.2.6 pH

In the Ramnabad River pH was slightly alkaline ranged from 6.0 to 7.8. These were similar findings of Allanson (1961), Islam (1977), Hossain (1998) and Shahjahan (2000). Most of the study on river water pH has found alkaline.

Conclusions

A total of twelve species of fishes and shellfishes were recorded in the catches of set bag net during the study period. Chewya and Horina chingri was the most dominant species. The other species was insignificant in quantity. Tough chewya and Horina chingri was the highest catch so set bag net was mainly used for chewya and horina chingri fishery.

In the present investigation, it has revealed that most of the hydrographic parameters of the Ramnabad River were suitable for the habitat of fishes and other aquatic fauna. But during rainy season, soil erosion and heavy rainfall became a great problem for fish habitat. At that time hydrographic parameters changed frequently. The SBN was being used along the entire coast of Bangladesh with heavy concentration in some areas. It is most usable net in Ramnabad region. But some fisherman using extra fine nets, bank to bank netting and illegal catching of brood fish and fish fry have serious adverse effect on these fishery resources. A number of traditional and recently introduced fishing gear are used for harvesting fry of large number of commercially valuable species.

The following recommendations could be conserved and can provide the sustainable development of fisheries:

- ❖ Existing fisheries rules and regulations should be implemented.
- ❖ Fishing during the breeding season should be prohibited strictly.
- ❖ Over fishing should not be allowed at all.
- ❖ Indiscriminate uses of current jal and set bagnet should be prohibited.
- ❖ Natural habitat of fishes and other aquatic resources should not be disturbed.
- ❖ To conserve and development of biodiversity, fish and fisheries item's habitat should be improved through excavating bed for brood one.
- ❖ Any poisonous or toxic substance should not be applied in the water body.

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