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Species diversity and seasonal composition of aquatic weeds in Tanguar haor area at Taherpur upazilla under Sunamganj district, Bangladesh

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Abstract

The study was conducted to collect, identify and assess the weed biodiversity of Tanguar haor in a different season. It was done for 9 months from December' 2015 to August' 2016 in three seasons named as pre monsoon, monsoon and winter. A total of 26 species of aquatic weeds under 20 families were identified from the haor areas. Among 3 common groups of aquatic weeds, 11 species of emergent, 12 species of floating 3 species of submerged were collected. Various aquatic weeds were found in different seasons i.e. *Ecchornia crassipes*, *Pistia stratiotes*, *Nymphoides indicum* were found in the summer season, *Nymphaea pubescens*, *Ipomoea aquatic*, *Enhydra fluctuans*, *Ludwigia adscendens*, *Azolla pinnata* were found in winter and *Ipomea fistulosa*, *Hidrilla verticulata*, *Najas minor* were found in the year round. The season-based composition of weeds also observed where the highest number of composition was found in summer following by monsoon and winter. As the temperature is a factor for the growth of plants the temperature record was also studied, it was found highest in September and lowest in January. Therefore, as there was no previous study on particularly aquatic weeds this study will reveal some important information for the future study. Various recommendations and measures have been suggested to improve the biodiversity of aquatic weeds in Tanguar haor area at Taherpur upazilla under Sunamganj district.

Keywords: Tanguar haor, aquatic weed, species abundance

Introduction

Bangladesh is a relatively small country crisscrossed by innumerable rivers, lakes, haor, baor, beel, tributaries, floodplain and man-made ponds which offer one of the largest inland fisheries in the world [1]. Water is one of the most important natural resources and in fact the basis of all life forms on earth [2]. Tanguar Haor, which is located in the north-eastern region of Bangladesh, is characterized by a large round shaped floodplain depressions and marshy lands [3]. The haor is the ecologically critical area of Bangladesh, because the existing of natural resources are degrading and management prospects for biodiversity conservation [4]. More than two thirds landmass of this country may be classified as wetlands according to the definition of the enunciated in the Ramsar Convention. The Government of Bangladesh declared Tanguar Haor as an Ecologically Critical Area in 1999 considering its critical condition as a result of over exploitation of its natural resources and declared as a Ramsar site in 2000 [5].

Aquatic weeds are aquatic photosynthetic organisms, large enough to see with the naked eye, that actively grow permanently or periodically submerged below, floating on or growing up through the water surface [6]. It has importance as a food and medicine in fish culture, agriculture and also as a human consumption also [7]. It plays role in the increasing productivity and balancing of the aquatic ecosystem [8]. In Bangladesh about 350 species were recorded as weeds of the cultivated field [9]. The excessive growth of aquatic weed restricts fishing, swimming and recreational activities, causes foul taste and odor of drinking water supplies. It also leads to stunting of fish populations and fish kill due to decomposition [10]. Aquatic weeds are classified as submersed weeds, emerged weeds, marginal weeds and floating weeds [11]. Many aquatic weeds such as *Pistia stratiotes*, *Azolla pinnata*, *Eichhornia crassipes* etc. are used for making compost fertilizer to use in the fish pond and agriculture land. Some fishes use aquatic weed as food.

Grass carp (*Ctenopharyngodon idella*) largely uses aquatic weed as food. Tilapia spp. *Cyprinus carpio* use weeds as food to some extent. Many fishes eat soft parts of these plants in small quantity.

Beside fish consumption human also take weeds as a plant source food such as Water Spinch (locally, Kolmi shak). Many submerged or floating species may enhance the sedimentation of the soil or silt particles carried by the water currents. Water hyacinth and other submerged or emergent plants grown in large quantities disturb the navigation and transportation of boats. Variation in aquatic weeds is different from one season to another season. They play impacts on biodiversity physically and chemically. There is a scarcity of information on aquatic weeds in haor region. There is an urgent need to study on aquatic weeds. Therefore the study was undertaken to identify commonly found aquatic weeds in Tanguar Haor.

Materials and Methods

Description of Study Area and Period of Study

The primary criterion for the selection of the study area was a suitable geographical coverage of haor as far as possible. At first, primary information was collected from Tahirpur Upazila Fisheries Officer regarding the concentration of aquatic weeds of the particular study area.

The survey was conducted for 9 months from December’ 2015 to August’ 2016. The study season can be named as Winter (December’15 to February’16), Pre monsoon (March’16 to May’16) and Monsoon (June’16 to August’16). Data were collected from fourteen villages of the seven unions under Tahirpur upazilla of Sunamganj District. The name of the study area listed in Table-1 and location of study area shown in Figure-1:

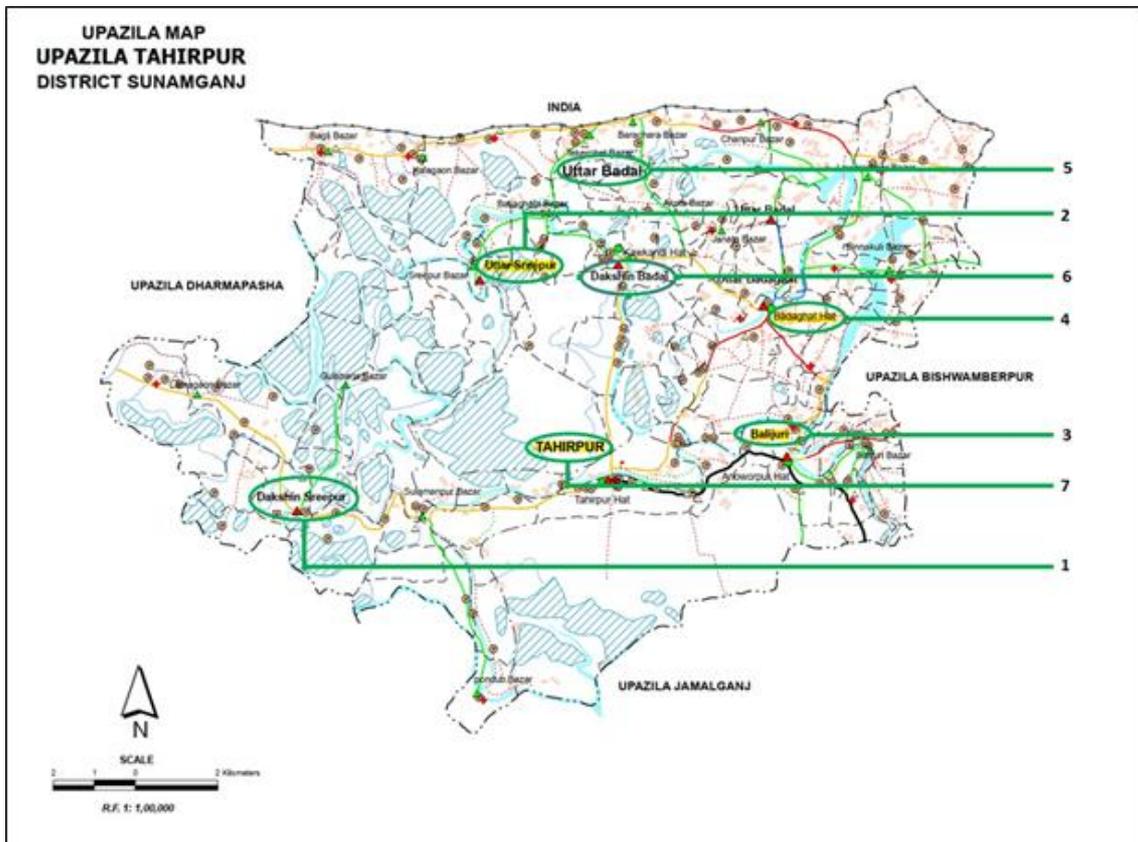


Fig 1: Round marked in the map showing the study area

Table 1: List of Study Area

Upazilla	Union	Village
Tahirpur	Sreepur South	Lamagaon
		Ramshingpur
	Sreepur North	Binodpur
		Indropur
	Balijuri	Shantipur
		Hossainpur
	Badaghat	Nurpur
		Badaghat Bazar
	Badal North	Shimultola
		Mahram
	Badal South	Kamarkandi
		Holholia
	Tahirpur Sadar	Gobindosree
		Thakurhati

Data Collection

Every sampling day samples of aquatic weed were collected from Tanguar Haor. Different sites of the study area are considered for sampling. Monthly sampling was done and data were recorded. Weeds were manually collected from the sampling spots and then brought to the laboratory immediately and preserved in 7-10% formalin for further classification and identification.

Data processing, analysis and identification

Data processed and analyzed has done by using simple Microsoft Excel 2007. Samples of weeds were placed on a table for the easy contrast of vision for the identification. Identification was done according to [12, 13].

Result and Discussion

During the study period a number of aquatic weeds were listed and they are mainly classified into three groups, these

are – Emergent weeds, Floating weeds and Submerged weeds. During study period total 26 species of aquatic weed was identified. Group wise list of aquatic weed has given below

Table 2: List of available Emergent aquatic weeds in Tanguar Haor area at Tahirpur upazila

Sl. No.:	Common Name	Scientific name	Local name	Family
1	Water thyme	<i>Hydrilla verticilata</i>	Hydrilla	Hydrocharitaceae
2	Minor naiad	<i>Najas minor</i>	Jhaudham	Hydrocharitaceae
3	Con's tail	<i>Ceratophyllum demersum</i>	Sheola	Ceratophyllaceae

Table 3: List of available Floating aquatic weeds in Tanguar Haor area at Tahirpur upazila

Sl. No.:	Common Name	Scientific name	Local name	Family
1	Chinese Water chestnu	<i>Eleocharis dulcis</i>	Chesra	Cyperaceae
2	Coco-grass	<i>Cyperus rotundus</i>	Mutha	Cyperaceae
3	Water Spinch	<i>Ipomoea aquatica</i>	Kalmishak.	Convolvulaceae
4	Gloria-d la manana	<i>Ipomea fistulosa</i>	Dholkolmi	Convolvulaceae
5	Alligator weed	<i>Alternanthera aphiloxeroides</i>	Malancha	Amaranthaceae
6	Water primrose	<i>Ludwigia adscendens</i>	Kesara-dum	Onagraceae
7	Water cress	<i>Enhydra fluctuans</i>	Helencha	Asteraceae
8	Polygonum	<i>Polygonum glabrum</i>	Bishkatali	Polygonaceae
9	Dayflower	<i>Commerlina bengalensis</i>	Kanai bashi	Commelinaceae
10	Arrowhead	<i>Sagittaria sp.</i>	Pani kochu	Allismataceae
11	Water clover	<i>Marsilea quadrifolia</i>	Susni Shak	Marsileaceae

Table 4: List of available submersed aquatic weeds in Tanguar Haor area at Tahirpur upazila

Sl. No.	Common Name	Scientific name	Local name	Family
1	Blue Water lily	<i>Nymphaea nouchali</i>	Nil Shapla	Nymphaeaceae
2	Water lily	<i>Nymphaea pubescens</i>	Sada shapla	Nymphaeaceae
3	Red water lily	<i>Nymphaea rubra</i>	Lal shapla	Nymphaeaceae
4	Lotus	<i>Nelumbo nucifera</i>	Padma	Nelumbonaceae
5	Elephant Ear	<i>Colocasia esculenta</i>	Kochu	Araceae
6	Water hyacinth	<i>Ecchornia crassipes</i>	Kachuripana	Pontideriaceae
7	Water lettuce	<i>Pistia straties</i>	Topapana	Araceae
8	Mosquito fern	<i>Azolla pinnata</i>	Kutipana	Salviniaceae
9	Water chest nut	<i>Trapa maximowiczii</i>	Paniphall	Trapaceae
10	Water stargrass	<i>Hygroryza aristata</i>	Phutki	Poaceae
11	Duck Weed	<i>Lemna perpusilla</i>	Khudipana	Lemnaceae
12	White water fringe	<i>Nymphoides indicum</i>	Panchuli	Menyanthaceae

According to the table (1, 2 and 3) in the present study total 26 Species were identified belongs to 20 Family (Figure 1). Among 26 species, 11, 12 and 3 number of species has identified as emergent, floating and submerged aquatic weed

respectively. Only 10 species of aquatic weed were identified in the *haor* of Karimgonj, Kishoregonj district which is lower than the present study^[9].

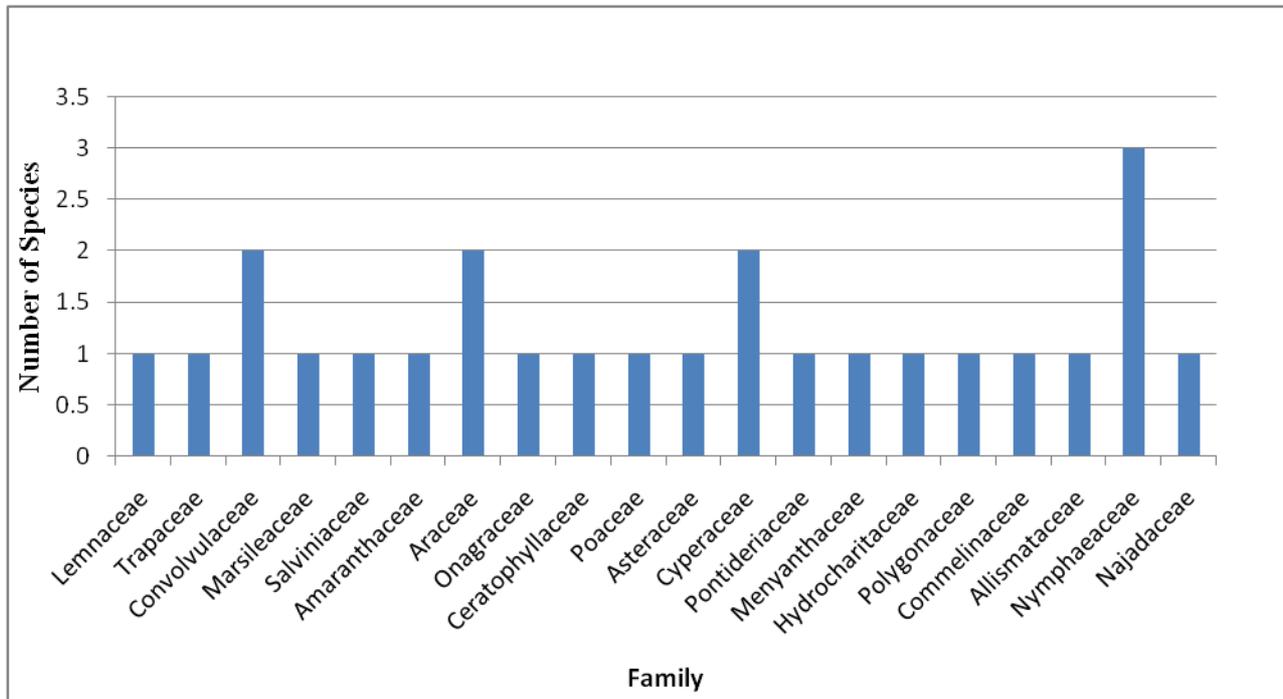


Fig 2: Number of Species belongs to identified families in the study area

A total number of 22 species of 16 families were identified from two fish cultured ponds, two floodplains and two roadside canals in Noakhali Sadar, Bangladesh which is also

lower than the present study ^[14]. In Bangladesh Agricultural University 39 species of aquatic weeds were identified which is more than the present study ^[15].

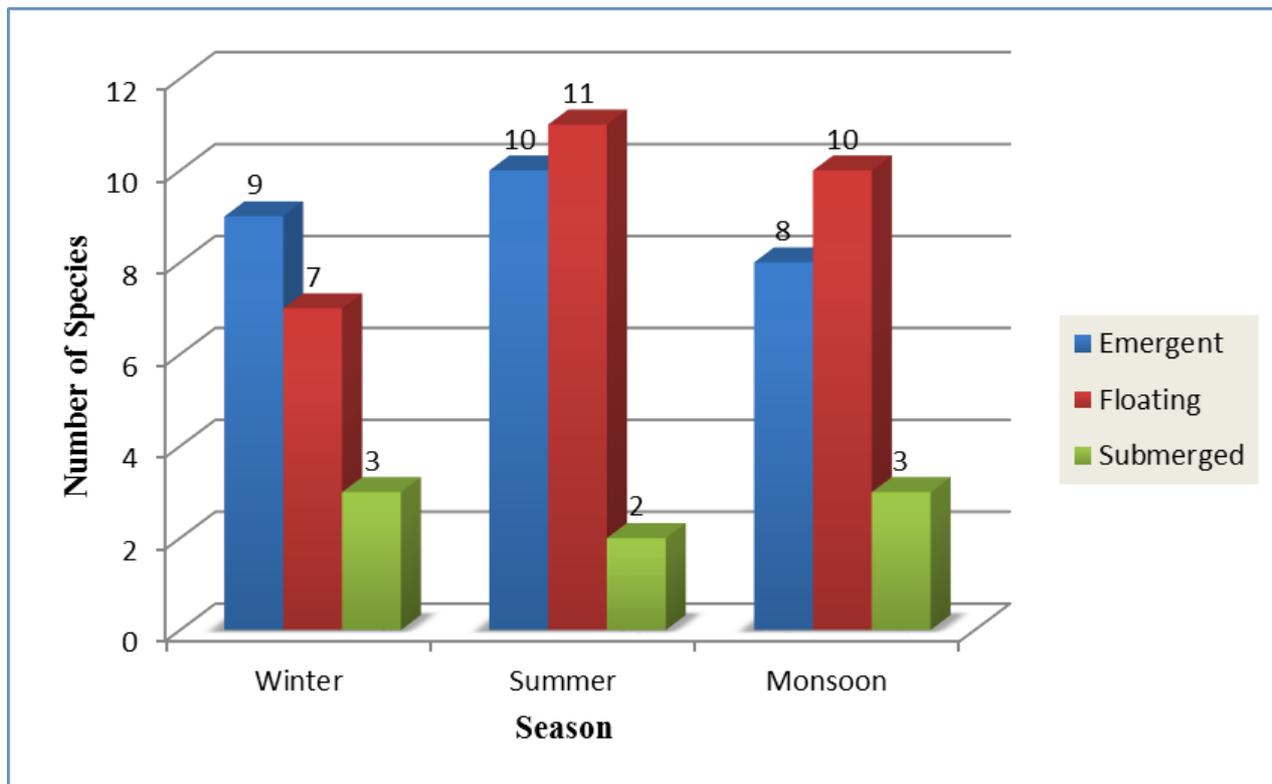


Fig 3: Seasonal composition of aquatic weed species in a number

In case of the seasonal composition of aquatic weed in Tanguar Haor, it's found a highest total number of weed in summer season following by monsoon and winter. In winter emergent weed species is dominant following by floating and

submerged. In the case of summer and monsoon floating species are dominant following by the emergent and submerged. This is happening due to the seasonal succession of aquatic weeds.

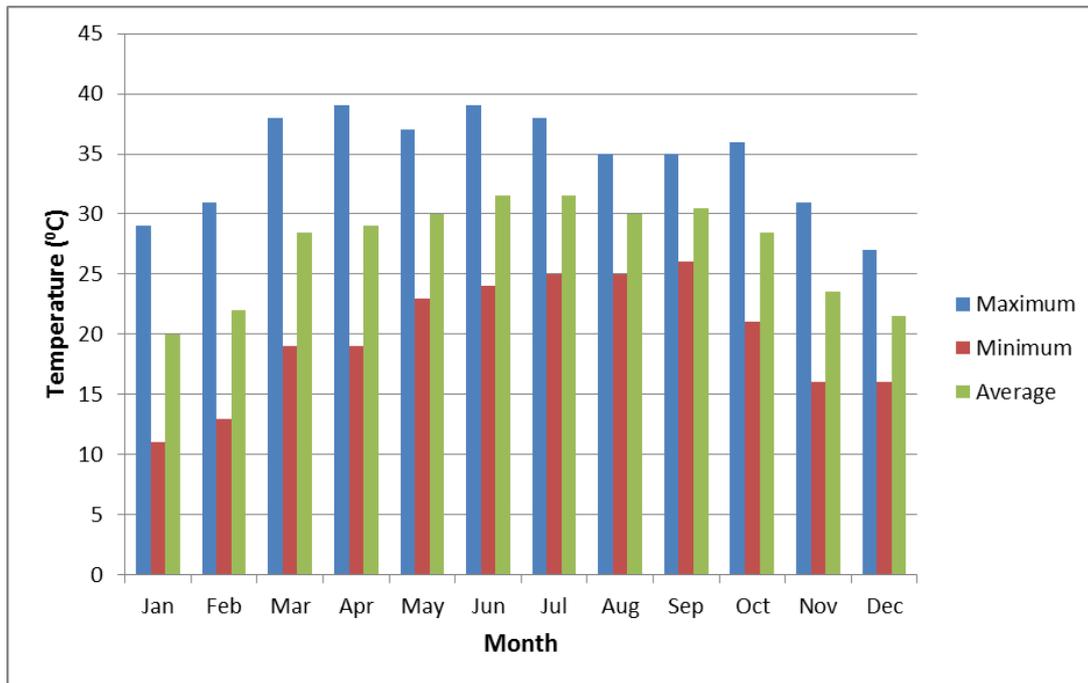


Fig 4: Maximum and Minimum Temperature ($^{\circ}\text{C}$) at Sylhet Station from 1981 to 2016

The rate of plant growth and development is dependent upon the temperature surrounding the plant and each species has a specific temperature range represented by a minimum, maximum, and optimum [16]. The average ranges of temperature for the Sylhet area (including Tanguar Haor) have collected from Sylhet station. The Sylhet area has been experiencing temperature ranges from 9.68 ~ 35.70C (from January to December).

According to the historical monthly maximum and minimum temperature analysis (from 1981 to 2016), the maximum temperature occurs in the month of April-July while minimum temperature occurs in December and January (Figure 3).

Conclusion

The present study has found a wide range of diversity in aquatic weeds of Tanguar haor. Most of these weeds have a positive role in the ecosystem of Tanguar haor, it has just enriched the ecosystem to great extent. It has also a significant role in the socio-economic condition of the adjacent human community. The availability of weeds has changed with the change of season due to seasonal succession. So, further research can be done to get more diversified and available species of weeds in Tanguar haor.

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