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Study of angiospermic wall floristic composition of city Buxar, (Bihar) India

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ABSTRACT

A study was conducted to analyze the seasonal angiospermic wall floristic composition of city Buxar of state Bihar (India) covering the total land area of 24.7 km². A total of 78 angiospermic wall flora was recorded. The angiospermic wall flora was represented by 64 genera belonging to 29 different families. Asteraceae, Poaceae and Amaranthaceae were dominant families of the angiospermic wall flora of city Buxar. Majority of the non woody wall flora appear in the rainy and winter seasons of the year. Among the woody perennials *Azadirachta indica*, *Ficus benghalensis* and *Ficus religiosa* were the most common wall flora of city Buxar ^[1].

Keywords: Wall flora, Seasonal appearance, Woody perennials, Herbaceous habit, Undershrub.

1. Introduction

Buxar district is an administrative district of Bihar. This district has its headquarters at city Buxar. The study area is city Buxar spreading over 24.7 km² land has well maintained roads with enough greenery all along. All the basic constructions necessary for a district headquarters like schools, colleges, hospitals, parks, court, jail, playgrounds, jail, government staff quarters with a very old fort named Buxar Fort etc. are present here ^[1].

Walls are manmade artificial habitats. Generally the walls having cracks and crevices support the growth and development of plant species. The wall plants are the result of spontaneous colonization unassisted by human action ^[2]. Several studies have been conducted to analyze the floristic composition of the wall habitats in India and abroad. Walls may be generally classified into five types which are (01) brick cement wall, (02) stone cement wall, (03) brick mud wall, (04) stone mud wall and (05) mud wall. In the brick cement wall and stone cement wall the cementing material used is cement while in brick mud wall and stone mud wall the cementing material used is mud. The mud wall is purely made up of mud ^[2, 3, 4]. All the five types of walls are available at city Buxar. This city has several old constructions with walls developing cracks and crevices with passage of time. The cracks and crevices in the wall provide anchorage to the plant roots thus supporting the growth of the plants ^[5, 6, 7]. The objectives of the study were to analyze the seasonal appearance of angiospermic flora on the walls of all the present constructions of the city Buxar.

2. Materials and Methods

The study area is the city Buxar which is the district headquarters of the district Buxar. The river Ganga and Karamnasa divide it from UP. Total area occupied by the city Buxar is 24.7 km². It located at 25°34' North and 85°34' East. It has an average elevation of 56 meters (186 feet) above the sea level. The rivers flowing through the city are Ganga and Karamnasa. River Ganga forms the border in North and in the West the Karamnasa. The land form is low lying alluvial plane of river Ganga and her tributaries Thora and Karamnasa ^[1].

An extensive field survey was conducted from July 2012 to July 2013 to record the angiospermic flora growing on the walls in different parts of the city. One visit was made after every two months. Thus a total of six visits were made for the field observations in a year. During the process of observation visits were made to all the practically possible places in search of angiospermic wall flora. The walls investigated for the flora included the main boundary walls surrounding the schools, colleges, hospitals, central and sub jail, motor garages, government staff quarters, Buxar fort etc. the identification of plant species was done using taxonomic literatures and with the help of experts ^[2, 5].

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3. Result and Discussion

The angiospermic wall flora of the city Buxar along with their habit and seasonal appearance is depicted in the Table 01. On the basis of this study it becomes clear that angiospermic wall flora was represented by 78 plants species belonging to 64 genera of 29 families out of which 26 were represented by dicotyledonous families while only 03 were represented by monocotyledonous families. Of the total angiospermic flora recorded the maximum number of species that is 13 (16.66%) belongs to family Asteraceae, 09 (11.53%) to family Poaceae whereas 06 (7.69%) species were represented by family Amaranthaceae. Thus the study reveals that Asteraceae, Poaceae and Amaranthaceae are the dominant families of angiospermic wall flora city Buxar.

It was also observed that members of families Asteraceae, Fabaceae, Lamiaceae and Acanthaceae colonize the walls in winter season whereas the members of families Poaceae, Cyperaceae, Euphorbiaceae and Malvaceae colonize the walls in rainy season. Contrary to these members of family Amaranthaceae colonize the walls in summer season. Based on habit, of the total plant species observed 64 (82.05%) were represented by herbs, 06 (7.69%) by trees, 06 (7.69%) by Undershrub and only 02 (2.56%) by shrubs (Figure 01). Thus it becomes clear that plants of herbaceous habits are the chief representatives of the angiospermic wall flora of city Buxar.

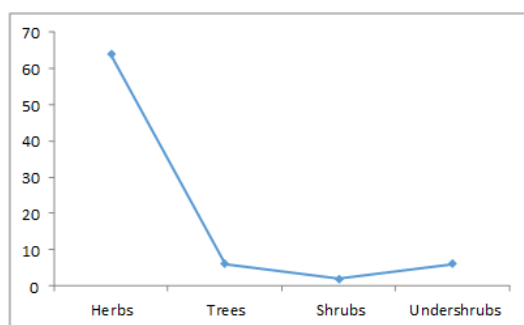


Fig 1: Graphical representation of number of plants according to their habits

In the study 31(39.74%), 21(26.92%) and 09(11.53%) plant species were recorded in rainy, winter and summer seasons respectively on the walls of city Buxar. However 10(12.82%) plant species were recorded throughout the year. Furthermore 06 (7.69%) plant species were observed during both rainy and winter seasons. Similarly 01 (1.28%) plant species were observed during both rainy and summer seasons on the walls of city Buxar (Figure 02). Thus it is evident from the study that most of the angiospermic flora colonizes the walls during rainy and winter seasons.

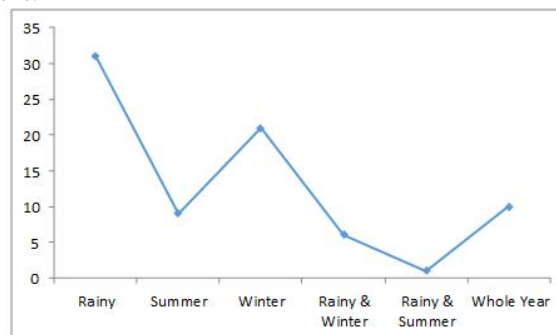


Fig 2: Graphical representation of number of plants according to their seasonal appearance

4. Conclusion

It can be concluded from the study that the angiospermic flora on the walls of city Buxar is dominated by herbaceous angiosperms. Most of the flora on walls appears during the rainy and winter seasons of the year. The Asteraceae, Poaceae and Amaranthaceae families represented exclusively by herbaceous species dominate the angiospermic wall floristic composition of city Buxar.

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Table 1: List of angiospermic wall flora of city Buxar (Bihar, India)

S.No.	Plant species	Family	Habit	Seasonal appearance
1.	<i>Justicia diffusa</i>	Acanthaceae	Herb	Winter
2.	<i>Peristrophe bicalyculata</i>	Acanthaceae	Herb	Winter
3.	<i>Rungia parviflora</i>	Acanthaceae	Herb	Winter
4.	<i>Trianthema portulacastrum</i>	Aizoaceae	Herb	Rainy
5.	<i>Achyranthes aspera</i>	Amaranthaceae	Herb	Whole year
6.	<i>Alternanthera sessilis</i>	Amaranthaceae	Herb	Rainy & Winter
7.	<i>Amaranthus polygamus</i>	Amaranthaceae	Herb	Summer
8.	<i>Amaranthus spinosus</i>	Amaranthaceae	Herb	Rainy & Summer
9.	<i>Amaranthus tenuifolius</i>	Amaranthaceae	Herb	Summer
10.	<i>Amaranthus viridis</i>	Amaranthaceae	Herb	Summer
11.	<i>Calotropis procera</i>	Asclepiadaceae	Shrub	Whole year
12.	<i>Ageratum conyzoides</i>	Asteraceae	Herb	Summer
13.	<i>Blumea aromatica</i>	Asteraceae	Herb	Rainy
14.	<i>Blumea indica</i>	Asteraceae	Herb	Summer
15.	<i>Blumea oxyodonta</i>	Asteraceae	Herb	Rainy
16.	<i>Eclipta alba</i>	Asteraceae	Herb	Rainy
17.	<i>Gnaphalium indicum</i>	Asteraceae	Herb	Winter
18.	<i>Launaea nudicaulis</i>	Asteraceae	Herb	Winter
19.	<i>Parthenium hysterophorus</i>	Asteraceae	Herb	Rainy
20.	<i>Sonchus arvensis</i>	Asteraceae	Herb	Winter
21.	<i>Spilanthes acmella</i>	Asteraceae	Herb	Winter
22.	<i>Tridax procumbens</i>	Asteraceae	Herb	Summer

23.	<i>Vernonia cinerea</i>	Asteraceae	Herb	Winter
24.	<i>Xanthium strumarium</i>	Asteraceae	Herb	Rainy
25.	<i>Heliotropium indicum</i>	Boraginaceae	Herb	Winter
26.	<i>Cleome viscosa</i>	Capparidaceae	Herb	Rainy
27.	<i>Chenopodium album</i>	Chenopodiaceae	Herb	Winter
28.	<i>Commelina benghalensis</i>	Commelinaceae	Herb	Rainy
29.	<i>Convolvulus pluricaulis</i>	Convolvulaceae	Herb	Summer
30.	<i>Evolvulus nummularius</i>	Convolvulaceae	Herb	Rainy
31.	<i>Coccinia grandis</i>	Cucurbitaceae	Herb	Winter
32.	<i>Cyperus compressus</i>	Cyperaceae	Herb	Rainy
33.	<i>Cyperus difformis</i>	Cyperaceae	Herb	Rainy
34.	<i>Cyperus iria</i>	Cyperaceae	Herb	Rainy
35.	<i>Acalypha indica</i>	Euphorbiaceae	Herb	Rainy
36.	<i>Euphorbia hirta</i>	Euphorbiaceae	Herb	Rainy & Winter
37.	<i>Euphorbia heterophylla</i>	Euphorbiaceae	Herb	Rainy & Winter
38.	<i>Phyllanthus niruri</i>	Euphorbiaceae	Herb	Rainy & Winter
39.	<i>Cassia tora</i>	Fabaceae	Herb	Rainy
40.	<i>Melilotus alba</i>	Fabaceae	Herb	Winter
41.	<i>Mimosa pudica</i>	Fabaceae	Undershrub	Winter
42.	<i>Nepeta ruderalis</i>	Lamiaceae	Herb	Winter
43.	<i>Salvia plebeia</i>	Lamiaceae	Herb	Winter
44.	<i>Punica granatum</i>	Lythraceae	Tree	Whole year
45.	<i>Abutilon indicum</i>	Malvaceae	Herb	Rainy
46.	<i>Malvastrum tricuspidatum</i>	Malvaceae	Undershrub	Rainy
47.	<i>Sida acuta</i>	Malvaceae	Undershrub	Rainy
48.	<i>Sida rhombifolia</i>	Malvaceae	Undershrub	Rainy
49.	<i>Urena lobata</i>	Malvaceae	Undershrub	Rainy
50.	<i>Azadirachta indica</i>	Meliaceae	Tree	Whole year
51.	<i>Ficus benghalensis</i>	Moraceae	Tree	Whole year
52.	<i>Ficus glomerata</i>	Moraceae	Tree	Whole year
53.	<i>Ficus racemosa</i>	Moraceae	Tree	Whole year
54.	<i>Ficus religiosa</i>	Moraceae	Tree	Whole year
55.	<i>Boerhavia diffusa</i>	Nyctaginaceae	Herb	Rainy & Winter
56.	<i>Oxalis corniculata</i>	Oxalidaceae	Herb	Rainy & Winter
57.	<i>Argemone mexicana</i>	Papaveraceae	Herb	Winter
58.	<i>Rumex nigricans</i>	Polygonaceae	Herb	Rainy
59.	<i>Brachiaria ramosa</i>	Poaceae	Herb	Rainy
60.	<i>Cynodon dactylon</i>	Poaceae	Herb	Whole year
61.	<i>Dichanthium annulatum</i>	Poaceae	Herb	Rainy
62.	<i>Digitaria marginata</i>	Poaceae	Herb	Rainy
63.	<i>Eleusine indica</i>	Poaceae	Herb	Summer
64.	<i>Eragrostis tenella</i>	Poaceae	Herb	Rainy
65.	<i>Eragrostis iscosa</i>	Poaceae	Herb	Rainy
66.	<i>Oplismenus burmannii</i>	Poaceae	Herb	Rainy
67.	<i>Panicum psilopodium</i>	Poaceae	Herb	Rainy
68.	<i>Anagallis arvensis</i>	Primulaceae	Herb	Winter
69.	<i>Oldenlandia corymbosa</i>	Rubiaceae	Herb	Winter
70.	<i>Oldenlandia dichotoma</i>	Rubiaceae	Herb	Winter
71.	<i>Lindenbergia indica</i>	Scrophulariaceae	Herb	Rainy
72.	<i>Lindernia ciliata</i>	Scrophulariaceae	Herb	Rainy
73.	<i>Scoparia dulcis</i>	Scrophulariaceae	Herb	Summer
74.	<i>Datura metel</i>	Solanaceae	Undershrub	Rainy
75.	<i>Datura innoxia</i>	Solanaceae	Herb	Rainy
76.	<i>Nicotiana plumbaginifolia</i>	Solanaceae	Herb	Winter
77.	<i>Solanum nigrum</i>	Solanaceae	Herb	Winter
78.	<i>Lantana camara</i>	Verbenaceae	Shrub	Whole year

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