

Floristic Composition of A Grassland Community of Gidhmal in Subarnapur District of Odisha



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Abstract

The floristic composition of a grassland community of Gidhmal (21°01'50"N ; 23°37'30"E) in Subarnapur district, Odisha was studied during 2015. The community comprised of 29 species, of which 9 species were grasses and 20 species were non-grasses. They belong to 13 families i.e. Amaranthaceae, Asteraceae, Commelinaceae, Convolvulaceae, Cyperaceae, Euphorbiaceae, Fabaceae, Malvaceae, Mimosaceae, Poaceae, Rubiaceae, Scrophulariaceae and Violaceae. Among them the members of the family Poaceae showed high percentage contribution (31.034%) followed by Amaranthaceae and Fabaceae (10.345% each) and Asteraceae, Euphorbiaceae, Cyperaceae and Malvaceae (6.897% each) where as the rest six families shared 3.448% each during the study period. This variation in floristic composition in the experimental site might be due to the topography, geographical distribution, soil characteristics, climatic conditions and biotic interference of the locality.

Keywords: Floristic composition, Grassland, Community, Subarnapur.

Introduction

Grasslands are the biological communities containing few trees or shrubs which are characterized by mixed herbaceous vegetation and are usually dominated by grasses. Grasslands occur naturally on all continents except Antarctica. Based on the ecological and economical stand point, grassland plays a vital role for the survival of all herbivores including human beings. They controls soil erosion, absorb precipitation, restore soil fertility and are regarded as the richest sources of nutrients for domesticated animals of the locality. They are rich in proteins, vitamins and minerals. Some of the plant species in grassland community are used as herbal medicines, thatching purposes and in preparation of aromatic oil.

Human activities have chiefly affected the grasslands, as a result much of the area has been converted into agriculture land and it is hard to locate virgin grassland in thickly populated regions like India. The floristic composition in a community is essential for any in-depth study relating to occurrence of species in a particular locality. It provides knowledge to interpret the floral diversity or the phytodiversity of an area. Although such study seems to be classical yet, it forms the core of ecological research pertaining to vegetation analysis.

Review of Literature

In temperate region a lot of work has been done on grassland by Odum (1960), Golley (1965), Baker (1963), Dahlman & Kucera (1965), Dix & Beidleman (1969), Slivertown (1980) and Vandvik & Birks (2002). All their works were focused on primary productivity/energy dynamics in different grassland ecosystems. The gradient analysis of grassland vegetation was carried out by Ejrnaes & Bruun (2000). The response of grassland community to grazing and other potential threats was studied by Noy-Meir et al. (1989), Smith & Rushton (1994) and Austrheim et al. (1999). Grasslands diversity, its effect and management were studied by Sarmiento & Monasterio (1983), Hector et al. (2001), Batalha & Martins (2004) and Planturex et al. (2005) and Isselstein et al. (2005) reviewed the agronomic aspects of biodiversity targeted management of temperate grasslands in Europe. Jaksic et al. (2006) made a comparative study on net ecosystem exchange of grassland in dry and wet years. The effect of extreme rainfall on the functions of grassland ecosystem was studied by Fay et al. (2008). Zavaleta et al. (2010) gave an idea that the sustenance of multiple ecosystem functions, in grassland community requires higher biodiversity.

In India also a lot of work has been done by Singh & Ambasht (1980), Singh & Yadav (1974), Kala (2009), Shankar et al. (1991), Misra & Misra (1986), Rath & Misra (1980), Malana & Misra (1980), Misra (1992), Behera & Misra (1993), Barik & Misra (1998), Barik (2006), Kar et al. (2010), Pandey et al. (2011), Nair (2011), Ray & Sainkhediya (2012), Baldau & Jaiswal (2014), Dash & Barik (2015), Barik et al. (2015), Rout & Barik (2016), Bhuyan & Barik (2017), Sahu & Barik (2017) and many others. In this study an attempt has been made to study the floral diversity of a grassland community of Subarnapur district in Odisha.

Aim of the Study

The aim of this investigation is to study the floristic composition of a grassland community of Gidhmal in Subarnapur district of Odisha.

Study site and Environment

The experimental site was selected at Gidhmal (21°01'50"N ; 23°37'30"E) in Subarnapur district of Odisha (Fig.-1 & 2). The district is located in the western part of Odisha between 20° 30' to 20° 10' N latitude and 83° 27' to 84° 15' E longitudes with elevation range from 172m to 153m. The total geographical area of the district is 2284.4 Square Km, out of which forest occupies 415.75 Sq km area.

Fig. 1 : Location of the Study Site

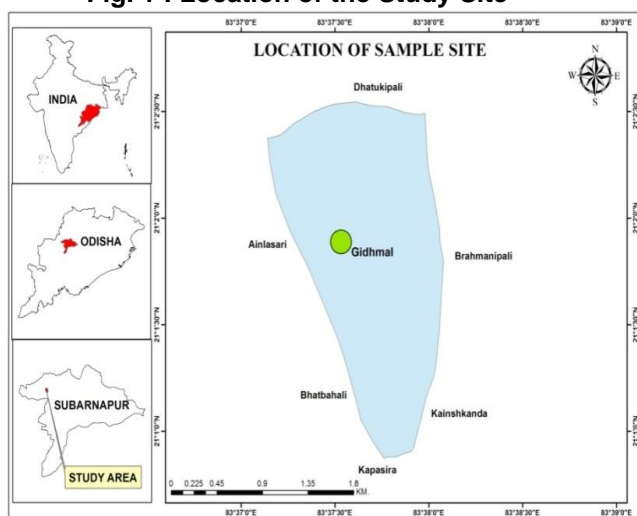


Fig.2 Photograph Showing the Experimental Site



The climate of Subarnapur is quite extreme. Summer is very hot and dry. Rainy season is characterized by fairly good rainfall and high degree of humidity. Cold is equally severe during winter. The temperature shows a wide fluctuation varying between 48°C in summer and below 7°C in winter. In summer highest day temperature ranged from 32°C to 48°C. Rains in the district are caused by the South-West monsoon which breaks in June, reaches its peak in August and retreats in the middle of October. The total annual rainfall during 2015 in Subarnapur district was found to be 1443.5 mm. The district has alluvial and fertile soil in the basins of the rivers 'Mahanadi' 'Tel' & 'Ong' suitable for cultivation. The soil type is mostly sandy, sandy clay and Sandy loam.

Materials and Methods

All the plant specimens encountered from the experimental grassland community were collected in quadruplicates either in flowering or fruiting stage and identified taxonomically with the help of floras (Hooker, 1872-1897; Haines, 1921-25; Mooney, 1950; Saxena & Brahmam, 1994-96; Panigrahi & Murti, 1989; Murti & Panigrahi, 1999; Verma et al. 1993; Mudgal et al. 1997 and Singh et al. 2001). The herbarium specimens were prepared following standard methodology as proposed by Jain & Rao (1977). The voucher specimens were housed in Herbarium, P.G. Department of Botany, North Orissa University, Baripada, Odisha.

Results and Discussion

A complete floristic list along with their families of the experimental site was presented in Table-1. The community comprised of 29 species. Out of which 9 species were grasses and 20 species were non-grasses. All grasses and non-grasses belonged to 13 families (Amaranthaceae, Asteraceae, Commelinaceae, Convolvulaceae, Cyperaceae, Euphorbiaceae, Fabaceae, Malvaceae, Mimosaceae, Poaceae, Rubiaceae, Scrophulariaceae and Violaceae).

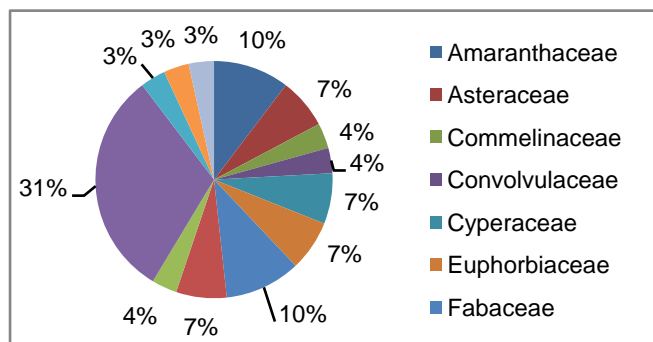
Table - 1: Floristic List along with Their Families of the Study Site

S. No	Name of the Species	Family
Grasses		
1	<i>Alloteropsis cimicina</i> (L.) Stapf	Poaceae
2	<i>Brachiaria reptans</i> (L.) Gard. & C.E. Hubb	Poaceae
3	<i>Chloris barbata</i> Sw.	Poaceae
4	<i>Chrysopogon aciculatus</i> (Retz.) Trin	Poaceae
5	<i>Chrysopogon zizanioides</i> (L.) Roberty	Poaceae
6	<i>Cynodon dactylon</i> (L.) Pers.	Poaceae
7	<i>Eleusine indica</i> (L.) Gaertn.	Poaceae
8	<i>Perotis indica</i> (L.) Kuntze	Poaceae
9	<i>Sporobolus indicus</i> (L.) R. Br.	Poaceae
Non-Grasses		
10	<i>Achyranthes aspera</i> L.	Amaranthaceae
11	<i>Aerva lanata</i> (L.) Juss. ex Schult.	Amaranthaceae

12	<i>Alternanthera paronychioides</i> St.-Hil.	Amaranthaceae
13	<i>Alysicarpus vaginalis</i> (L.) DC.	Fabaceae
14	<i>Butea superba</i> Roxb.	Fabaceae
15	<i>Chromolaena odorata</i> (L.) R. King & H. Rob.	Asteraceae
16	<i>Croton bonplandianus</i> Baill.	Euphorbiaceae
17	<i>Cyperus compessus</i> L.	Cyperaceae
18	<i>Cyperus rotundus</i> L.	Cyperaceae
19	<i>Evolvulus nummularius</i> (L.) L.	Convolvulaceae
20	<i>Hybanthus enneaspermus</i> (L.) F. Muell.	Violaceae
21	<i>Lindernia anagalis</i> (Burm. f.) J. Arnold.	Scrophulariaceae
22	<i>Mimosa pudica</i> L.	Mimosaceae
23	<i>Mitracarpus villosus</i> (Sw.) DC.	Rubiaceae
24	<i>Murdannia nudiflora</i> (L.) Brenan	Commelinaceae
25	<i>Phyllanthus amarus</i> Schum. & Thonn.	Euphorbiaceae
26	<i>Sida acuta</i> Burm. L.f.	Malvaceae
27	<i>Tephrosia purpurea</i> (L.) Pers.	Fabaceae
28	<i>Tridax procumbens</i> L.	Asteraceae
29	<i>Urena lobata</i> L.	Malvaceae

The community was mostly dominated by the members of the family Poaceae. Poaceae alone shared 31% in the community followed by 10.34% each by the family Amaranthaceae and Fabaceae and 6.9% each by Asteraceae, Cyperaceae, Euphorbiaceae and Malvaceae. The sharing was found to be less (3.45% each) by the members of family Commelinaceae, Convolvulaceae, Mimosaceae, Rubiaceae, Scrophulariaceae and Violaceae. Fig - 3 shows in details about the percentage contribution of various families with respect to their number of species occurring in the experimental site.

Fig -3 Percentage Contribution of various families in respect to their Number of species occurring in the experimental site



Conclusion

The experimental grassland community of Gidhmal in Subarnapur district of Odisha was rich in grasses, sedges and other associated herbs and shrubs. The topography, geographical distribution, soil

characteristics, climatic condition, biotic interference etc. might be responsible for variation in floristic composition of the experimental site.

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