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Floristic Diversity of A Grassland Community of Baripada, Odisha, India

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ABSTRACT

The floristic diversity of a grassland community of Maharaja Purna Chandra Autonomous College, Takhatpur, Baripada (21°93′ N; 86°76′ E), Mayurbhanj in the state of Odisha, India was thoroughly studied from July-2022 to July-2023. All the information related to floristic composition was collected throughout the research period and was analyzed. The plant community consists of 36 species, out of which, 18 species were grasses and 18 species were non-grasses. All the species come under 12 families. The family Poaceae share a maximum of 50% followed by Asteraceae and Cyperaceae (8.33% each). The family Malvaceae, Fabaceae and Rubiaceae share 5.55% each and the rest 6 families Amaranthaceae, Euphorbiaceae, Convolvulaceae, Violaceae, Mimosaceae and Phyllanthaceae share only 2.77% throughout the period of data collection and analysis. The experimental grassland community was found to be enriched with different grasses and non grasses might be due to topography, soil composition and climate of the locality.

Key words: *Floristic diversity, Grassland community, Soil composition, Topography.*

Introduction

Grassland habitats are the beautiful gift by the nature, where the biotic and abiotic components are constantly acting and reacting with each other to form a balanced unit. Approximately 20-40% of area covered by grassland throughout the world. The floral diversity of grasslands varies from location to location. Grasslands are the primary habitats for grazing animals or herbivores where the primary producers are grasses. Perennial grasses anchor and protect the soil from erosion. The seeds of the variety grasses are used for foods. The stem and leaves of grasses are also used in industry for making decorative materials, paper etc. Grasses fix atmospheric carbon and nitrogen and increase the soil fertility. Grassland communities absorb rain water heavily and increase ground water level. But the percentage of grassland ecosystem declining day by day due to habitat destruction, overgrazing and by human interference. So the researchers and scientists, many government and private organizations all over the globe doing research for the conservation of grassland habitats for the betterment of living beings.

Review of Literature

Literature review gives a lot of information and ideas on grassland communities of different climatic regions throughout the world, Dansereau (1960), Golley (1965), Misra and Misra (1981), Behera

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(1994), Barik and Misra (1996) and many others. Overbeck *et al*. (2006); Kar *et al.* (2010); Rout and Barik (2013); Chawpattanayak and Barik (2014); Kar and Barik (2017); Barik (2017); Sahu and Barik (2017); Barik and Barik (2018); Mohanty and Barik (2018); Devalaxmi *et al*. (2020) and many others. So far, the grassland community is concerned, a lot of work has been done at various locations by a number of workers, but no work has been done on the grassland community of Maharaja Purna Chandra Autonomous College Takhatpur, Baripada, in the district Mayurbhanj, Odisha, India. Keeping all these facts into consideration, present research is design to study the floristic diversity of this particular location.

Materials and Methods

Study area

The experimental grassland community (Fig. 1) is selected at Maharaja Purna Chandra Autonomous College, Takhatpur, Baripada, Mayurbhanj in the state of Odisha (21°93' N; 86°76' E), India. The experimental site is situated near about 200 meters apart from the Maharaja Sriram Chandra Bhanja Deo University, Takatpur, Baripada. To avoid grazing practices, the experimental site was fenced with the help of bamboos. The floras of the community were allowed to grow without any biotic interference under natural climatic condition and floristic survey of the experimental grassland community has been made.

Fig. 1. Experimental grassland community located at Baripada, Odisha, India

Floristic diversity study

The plant specimens along with their inflorescence and reproductive parts were collected from the experimental site throughout the study period and a complete catalogue of different species, their families and author citation was prepared. The collected plant specimens were identified with the help of Regional and National flora books, i.e. The Botany of Bihar and Orissa Haines (1921-25); Supplement to the Botany of Bihar and Orissa, Mooney (1950); Flora of Orissa, Saxena and Brahmam (1994-96); Flora of Similipal, Saxena and Brahmam (1989); Flora of Madhya Pradesh, Verma *et al*. (1993); Mudgal *et al*. (1997) and Singh *et al*.(2001). A complete herbarium was prepared by taking all collected plant specimens along with their floral parts throughout the study period and submitted in the Department of Botany, Maharaja Sriram Chandra Bhanja Deo University for partial fulfillment of research work and future use.

Meteorology of the experimental site

The meteorological data like atmospheric temperature, annual rain fall and the number of rainy days of the experimental site was collected from District Agriculture Office, Mayurbhanj, Baripada and included in this investigation.

The total rainfall (mm) throughout the research period was 1958.9 mm. A maximum rainfall of 526.4 mm was recorded during the month of August-2022. The minimum rainfall of 38mm was recorded in the month of march and no rainfall was observed during the month of November, December, January and February. The total number of rainy days was found to be 124 days, of which highest 28 days was observed in the month of July- 2022.The atmospheric temperature (^{0}C) was varies from time to time throughout the study period. December-2022 exhibited the lowest mean minimum atmospheric temperature (14.5^{0}C), whereas June experiences highest mean maximum atmospheric temperature (37.8^{0}C) during the study period (Table 1).

Physico-chemical analysis of soil

The soil sample was collected from the experimental site and the characteristics of soil, i.e. pH, conductivity, (%) carbon, available phosphorous and potassium content was tested at Soil Testing Laboratory, Department of Agriculture, Government of Odisha, Takhatpur, Baripada. The pH value of the

experimental site varies from 5.12 to 5.36 which was moderately acidic. The available phosphorus (ppm) was found to be very low (0.32 to 0.44). The available potassium (ppm) content of the experimental site varies from 90.4 to 103.2. The organic carbon (%) of the soil sample was also very low and the value varies within a range of 0.19% to 0.22%. (Table 2)

Results and Discussion

Floristic diversity of the research site was extensively studied throughout the study period. The community consists of 36 species, of which 18 species each was shared by the grasses and non-grasses. All the species were included under 12 families i.e. Poaceae (*Aristida setacea, Chrysopogon acciculatus, Cynodon dactylon, Dactyloctenium aegyptium, Digitaria longiflora, Eragrostis amabilis, Eragrostis unioloides, Eleusine indica, Heteropogon contortus, Ischaemum indicum, Oplismenus burmannii, Oplismenus hirtellus, Paspalidium flavidum, Pennisetum pedicellatum, Perotis indica, Sacciolepsis indica, Sporobolus indicus, Sporobolous pyramidalis*), Amaranthaceae (*Alternanthera sessilis*), Fabaceae (*Desmodium triflorum, Zornia gibbosa*), Asteraceae (*Elephantopus scaber, Tridax procumbens, Vernonia cinerea*), Euphorbiaceae (*Euphorbia hirta,*), Convolvulaceae (*Evolvulus nummularius*), Cyperaceae (*Fimbristylis dichotoma, Kyllinga brevifolia, Scleria lithosperma*), Violaceae (*Hybanthus enneaspermus*), Mimosaceae (*Mimosa pudica*), Rubiaceae (*Mitracarpus hirtus, Spermacoce ramanii*), Phyllanthaceae (*Phyllanthus virgatus*), Malvaceae (*Sida acuta, Sida cordifolia*). (Table 3). It showed that the present grassland was highly dominated by the members of the family Poaceae (50%). The family Asteraceae and Cyperaceae contribute 8.33% each. The family Malvaceae, Fabaceae and Rubiaceae share 5.55% each, whereas the family Amaranthaceae, Euphorbiaceae, Convolvulaceae, Violaceae, Mimosaceae and Phyllanthaceae contribute only 2.77% each during the entire study period (Table 4)

Table 1. The Rainfall (mm), No. of Rainy Days and Atmospheric Temperature (°C) of the experimental site during the study period

Months	Rainfall (mm)	No. of Rainy Days	Atmospheric Temperature (°C)	
			Mean Minimum	Mean Maximum
July 2022	301.2	28	24.4	31.1
Aug. 2022	526.4	21	25.6	30.6
Sept. 2022	261.8	15	25.6	31.9
Oct. 2022	86.0	06	23.3	30.8
Nov. 2022	0.0	0	17.5	27.8
Dec. 2022	0.0	0	14.5	25.9
Jan. 2023	0.0	0	15.1	26.7
Feb. 2023	0.0	0	17.3	32.0
March 2023	38.0	07	21.3	33.6
April 2023	86.6	03	24.5	37.3
May 2023	78.0	09	25.3	37.3
June 2023	192.9	14	26.5	37.8
July 2023	388.0	21	26.2	32.1
Total	1958.9	124	-	-

Table 2. The pH, Conductivity, Organic Carbon (%), Available Phosphorus and Potassium content of the experimental site (mean ± SD, n = 5 each)

Surface depth (cm)	pH	Conductivity	Organic Carbon (%)	Available Phosphorus (ppm)	Available Potassium (ppm)
0 to 10	5.12 ± 0.277	0.034 ± 0.005	0.19 ± 0.030	0.32 ± 0.179	103.2 ± 20.030
10 to 20	5.24 ± 0.230	0.03 ± 0.007	0.216 ± 0.033	0.32 ± 0.110	91.2 ± 11.189
20 to 30	5.36 ± 0.329	0.022 ± 0.004	0.228 ± 0.060	0.44 ± 0.167	90.4 ± 16.349

Table 3. List of Grasses and Non-Grasses occurring in the experimental grassland community

Sl.No.	Name of the Species	Family
	GRASSES	
1	*Aristida setacea* Retz.	Poaceae
2	*Chrysopogon acciculatus* (Retz.) Trin.	Poaceae
3	*Cynodon dactylon* (L.) Pers.	Poaceae
4	*Dactyloctenium aegyptium* (L.) Willd.	Poaceae
5	*Digitaria longiflora*(Retz.) Pers.	Poaceae
6	*Eragrostis amabilis*(L.) Wight & Arn.	Poaceae
7	*Eragrostis unioloides* (Retz.) Nees ex Steud.	Poaceae
8	*Eleusine indica* (L.) Gaertn.	Poaceae
9	*Heteropogon contortus* (L.) P. Beauv. Ex Roem. & Schult.	Poaceae
10	*Ischaemum indicum* (Houtt.) Merr.	Poaceae
11	*Oplismenus burmannii* (Retz.) P.Beauv.	Poaceae
12	*Oplismenus hirtellus* (L.) P.Beauv.	Poaceae
13	*Paspalidium flavidum* (Retz.) A. Camus.	Poaceae
14	*Pennisetum pedicellatum* Trin.	Poaceae
15	*Perotis indica (*L.*)* Kuntze.	Poaceae
16	*Sacciolepsis indica* (L.) Chase	Poaceae
17	*Sporobolus indicus* (L.) R. Br.	Poaceae
18	*Sporobolous pyramidalis* P.Beauv.	Poaceae
	NON-GRASSES	
1	*Alternanthera sessilis* (L.) R. Br. ex-DC.	Amaranthaceae
2	*Desmodium triflorum* (L.) DC.	Fabaceae
3	*Elephantopus scaber* L.	Asteraceae
4	*Euphorbia hirta* L.	Euphorbiaceae
5	*Evolvulus nummularius* (L.) L	Convolvulaceae
6	*Fimbristylis dichotoma* (L) Vahl.	Cyperaceae
7	*Hybanthus enneaspermus*(L.) F. Muell.	Violaceae
8	*Kyllinga brevifolia* Rottb.	Cyperaceae
9	*Mimosa pudica* L.	Mimosaceae
10	*Mitracarpus hirtus* (L.) DC.	Rubiaceae
11	*Phyllanthus virgatus* G. Forst.	Phyllanthaceae
12	*Scleria lithosperma* (L.) Sw.	Cyperaceae
13	*Sida acuta* Burm. f.	Malvaceae
14	*Sida cordifolia* L.	Malvaceae
15	*Spermacoce ramanii* Sivar & Nair.	Rubiaceae
16	*Tridax procumbens* L.	Asteraceae
17	*Vernonia cinerea* (L.) Less.	Asteraceae
18	*Zornia gibbosa* Spanoghe .	Fabaceae

Conclusion

The experimental grassland community of Maharaja Purna Chandra Autonomous College campus, Takhatpur, Baripada, Mayurbhanj in the state of Odisha, India was enriched with diversified flora might be due to the topology, soil composition, atmospheric temperature, relative humidity and rainfall of the locality.

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Table 4. Percentage contribution of various species and their families occurring in the experimental grassland community

Sl. No.	Name of the family	No of species	% contribution
1	Amaranthaceae	1	2.77
2	Fabaceae	2	5.55
3	Asteraceae	3	8.33
4	Euphorbiaceae	1	2.77
5	Convolvulaceae	1	2.77
6	Cyperaceae	3	8.33
7	Violaceae	1	2.77
8	Mimosaceae	1	2.77
9	Rubiaceae	2	5.55
10	Poaceae	18	50
11	Malvaceae	2	5.55
12	Phyllanthaceae	1	2.77
	Total	36	99.93

Conflict of interests

The authors declare that there is no conflict of interest.

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