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ASSESSMENT OF PHYTODIVERSITY OF A GRASSLAND COMMUNITY IN JAJPUR DISTRICT OF ODISHA WITH SPECIAL REFERENCE TO HUMAN WELFARE

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ABSTRACT

The phytodiversity of a grassland community in Jajpur district (20º 59' N ; 85º 58' E) of Odisha state was studied during 2015. A total number of 30 species were enumerated. Out of which 10 species belong to grass family and the rest (20 species) to the non-grass families. The community was dominated by the members of the family Poaceae (33.33%). The community comprised 21 medicinal species and 5 fodder species. A few of them are also used as vegetables, famine food, lawn tufts, making brooms, mattresses, curtains and religious purposes. Most of the species help in controlling soil erosion and needs to be conserved for human welfare.

Keywords : Phytodiversity, Grassland, Community, Human welfare

I. INTRODUCTION

The grasslands are very much valuable to mankind. The thatching materials, clothings, food and medicines which we use in our day to day life, the milk, the meat which we drink or eat, all are directly or indirectly obtained from grassland flora. Basing upon the ecological and economical point of view, grassland plays a very important role for the survival of human being. The grassland flora control soil erosion, absorbs rainfall, restores soil fertility and is regarded as the cheapest source of nutrients for livestock, grasshoppers, rabbit, deer, and many other herbivores. It is therefore important to collect information on grassland flora for human welfare.

II. LITERATURE REVIEW

Literature review revealed a lot of work on various aspects of grassland communities by odum 1960 [1]; Ovington **et al**., 1963 [2]; Golley and Gentry, 1966 [3]; Bliss, 1962 [4] & 1970 [5]; Dahlman and Kucera, 1965 [6]; Varshney, 1972 [7]; Redmann, 1975 [8]; Billore and Mall, 1977 [9]; Misra and Misra, 1979 [10] & 1981[11]; Bharadwaj, 1981 [12]; Ambasht and Pandey, 1981 [13]; Behera **et al.**, 1981 [14]; Rath and Misra, 1980 [15] & 1981 [16]; Malana and Misra, 1980 [17], 1981 [18] & 1982 [19]; Misra, 1983 [20]; Naik, 1985 [21]; Sharma and Ambasht, 1987 [22]; Ambasht and Sharma, 1989 [23]; Ram and Arya, 1991 [24]; Pandey and Singh, 1992 [25]; Ram and Ramakrishnan, 1992 [26]; Misra, 1992 [27]; Patnaik, 1993 [28]; Behera and Misra, 1993 [29]; Pradhan, 1994 [30]; Barik and Misra, 1995 [31], 1996 [32], 1997 [33], [34], [35], [36], 1998 [37] & 2000 [38]; Barik, 2006 [39]; Kar **et al**, 2010 [40]; Baldau and Jaiswal, 2014 [41]; Dash and Barik, 2015 [42], [43]; Rout and Barik, 2016 [44] and many others in India

and abroad. However, very little work has been made so far on the ecology of grassland community, especially in this region of the state, Odisha. Keeping all these facts in view, an attempt has been made to assess the phytodiversity of a grassland community of Jajpur district in Odisha with special reference to human welfare.

2.1 Study Site and Environment :

The experimental site was selected at Duburi (20º 59' N ; 85º 58' E) in the District of Jajpur, situated at a distance of 55 kms from Jajpur town, 160 kms from the North Orissa University and 80 kms from Bhubaneswer, the capital of the state of Odisha. The climate of the locality is monsoonal with three distinct seasons i.e. rainy (July to October), winter (November to February) and summer (March to June).

The total rainfall during the study period (August 2015 to December 2015) was 695 mm of which a maximum of 303 mm was recorded during September. No rainfall was observed in the month of December. Total number of rainy days was found to be 50 days during the study period. The mean minimum and mean maximum atmospheric temperatures recorded during the study period were found to be normal. August showed the highest temperature (34.25º C) whereas December exhibited the lowest temperature (18.12ºC). Table-1 represents the atmospheric temperature, number of rainy days and rainfall during the study period.

Table -1 The atmospheric temperature, no. of rainy days and rainfall during the study period.

Month (s)	Mean minimum temp. (^{o}C)	Mean maximum temp. (^{o}C)	No. of Rainy days	Rainfall (mm)
Aug. 2015	25.54	34.25	13	158
Sep. 2015	25.06	32.13	17	303
Oct. 2015	24.93	30.80	17	227
Nov. 2015	20.33	25.93	03	07
Dec. 2015	18.12	26.00	-	-
		Total	50	695

The soil of the experimental site was found to be somehow acidic (pH range - 6.22 to 6.64). The percentage of organic carbon was found to be in the range of 0.49 to 0.76. The available phosphorus and potassium contents in the soil were found to be very low. The organic carbon (%), available phosphorus and potassium contents of the soil were found to maximum at upper surface and gradually decreased with the increase in soil depth. Table - 2 reveal the pH, percentage of organic carbon, available phosphorus and potassium content of soil of the experimental site.

Table – 2 The pH, organic carbon (%), available phosphorus and potassium content of the soil of the study site (values are mean of 5 samples each).

Surface depth (cm)	pH	Organic Carbon (%)	Available Phosphorus (ppm)	Available Potassium (ppm)
0 to 10	6.64	0.76	0.23	28.32
10 to 20	6.43	0.64	0.21	27.71
20 to 30	6.22	0.49	0.14	26.53

III. MATERIALS AND METHODS

The plant specimens preferably along with following / reproductive parts were collected from the experimental grassland and brought to the laboratory for identification (Muller- Dombois and Ellenberg, 1974) [45]. Identification

of all the species were made in consultation with various regional and national Flora i.e. The Botany of Bihar and Orissa, Haines, 1921-25 [46]; Supplement to the Botany of Bihar and Orissa, Mooney, 1950 [47]; Flora of Madras Presidency, Gamble,1915-36 [48]; Flora of Similipal, Saxsena and Brahmam, 1989 [49]; Flora of Orissa, Saxena and Brahmam, 1994-96 [50]; Flora of Madhya Pradesh, Verma **et al**., 1993 [51]; Mudgal **et al**.,1997 [52] and Singh **et al.**, 2001 [53]. The voucher specimens were preserved and housed in the laboratory for future use and reference.

For the analysis of soil, soil samples were collected from three different depths i.e.0 to10, 10 to 20 and 20 to 30 cm with the help of a soil corer. Five samples were taken from each depth, labeled and were mixed thoroughly in order to make a composite soil sample. The samples were dried in the open, rolled and sent to the soil testing laboratory, Department of Agriculture, Government of Odisha, District headquarter branch, Jajpur for the determination of soil pH, organic carbon, available phosphorus and potassium content of the experimental site.

The meteorological data, i.e. rainfall, number of rainy days and atmospheric temperature were collected from District Agriculture Office, Jajpur and were incorporated in this investigation.

IV. RESULTS AND DISCUSSION

The study revealed that, the community comprised 30 species. Out of which 10 species belonged to grass family i.e. Poaceae and the rest 20 species to the non-grass family i.e. 4 species from the family Fabaceae, 3 species from Asteraceae, 2 species each from family Cyperaceae, Rubiaceae and Malvaceae and single species each from family Nyctaginaceae, Capparaceae, Euphorbiaceae, Convolvulaceae, Verbenaceae, Lamiaceae and Acanthaceae.

The percentage contribution of various families occurring in the study site (Table–3) revealed that the community was dominated by the members of family Poaceae (33.33%) followed by Fabaceae (13.33%) and Asteraceae (10%). The species belonging to family Cyperaceae, Rubiaceae and Malvaceae, contributed 6.67% each whereas the family Nyctaginaceae, Capparaceae, Euphorbiaceae, Convolvulaceae, Verbinaceae, Lamiaceae and Acanthaceae exhibited the lowest percentage contribution in the community.

Table – 3. Percentage contribution of the families occurring in the experimental grassland community

Sl No	Family	Species	% Contribution
1	Poaceae	10	33.33
2	Fabaceae	4	13.33
3	Asteraceae	3	10
4	Cyperaceae	2	6.67
5	Rubiaceae	2	6.67
6	Malvaceae	2	6.67
7	Nyctaginaceae	1	3.33
8	Capparaceae	1	3.33
9	Euphorbiaceae	1	3.33
10	Convolvulaceae	1	3.33
11	Verbinaceae	1	3.33
12	Lamiaceae	1	3.33
13	Acanthaceae	1	3.33
	Total	30	99.98

Table – 4 shows the uses of flora occurring in the experimental grassland community. The community exhibited 21 medicinal species, and 5 fodder species. A few of them are used as vegetables, famine food, lawn tufts, making brooms, mattresses and curtains, and in religious ceremony. Most of the species are soil binder and help in controlling soil erosion.

Table – 4. Uses of plant species occurring in the experimental grassland community.

Sl. No.	Name of the Species	Uses
	Grasses	
1	*Brachiaria reptans*	Medicine, Soil binder
2	*Brachiaria ramosa*	Soil binder, Traditional food and Fodder
3	*Chrysopogon aciculatus*	Soil binder, Fodder
4	*Cynodon dactylon*	Medicine, Religious, Soil binder
5	*Dactyloctenium aegyptium*	Fodder, Soil binder
6	*Eragrostis tenella*	Famine food, Lawn tuft, Soil binder
7	*Heteropogon contortus*	Medicine, Fodder, Soil binder
8	*Microchloa indica*	Mattresses, Forages, Soil binder
9	*Pennisetum pedicellatum*	Medicine, Curtains, Soil binder
10	*Vetiveria zizanioides*	Fodder, Soil binder
	Non-grasses	
1	*Alysicarpus vaginalis*	Medicinal, Soil binder
2	*Boerhavia diffusa*	Vegetable, Soil binder
3	*Cleome viscosa*	Medicine, Soil binder
4	*Crotalaria prostrata*	Medicine, Soil binder
5	*Cyperus rotundus*	Medicine, Soil binder
3	*Desmodium triflorum*	Medicine, Soil binder
7	*Emilia sonchifolia*	Medicine, Soil binder
8	*Euphorbia hirta*	Medicine, Soil binder
9	*Evolvulus nummularius*	Medicine, Soil binder
10	*Fimbristylis dichotoma*	Medicine, Soil binder
11	*Hedyotis corymbosa*	Medicine, Soil binder
12	*Indigofera linnaei*	Soil binder
13	*Lantana camara*	Medicine, Soil binder
14	*Leucas aspera*	Medicine, Soil binder
15	*Rungia pectinata*	Broom making, Soil binder
16	*Sida acuta*	Medicine, Soil binder
17	*Sida cordata* .	Medicine, Soil binder
18	*Spermacoce ramanii*	Medicine, Soil binder
19	*Tridax procumbens*	Medicine, Soil binder
20	*Vernonia cinerea*	Medicine, Soil binder

V. CONCLUSION

The experimental grassland community of Jajpur district in Odisha comprised 70% of medicinal species and 16% of fodder species. Some are used as vegetables, famine food, lawn tufts, making brooms, mattresses, curtains and in religious ceremony. Most of the species are helpful in controlling soil erosion and needs conversation for human welfare.

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