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ASSESSMENT OF FLORAL DIVERSITY OF A GRASSLAND COMMUNITY OF KAPTIPADA FOREST RANGE OF MAYURBHANJ DISTRICT IN ODISHA, INDIA

BOTANY

KEYWORDS: Grassland, Floral Diversity, Medicinal Plants, Forage.

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ABSTRACT

The present study was carried out critically during 2015-2016 to assess the floral diversity of a grassland community located at Kaptipada forest range (210 51' N; 860 53'E) in the district of Mayurbhanj, Odisha, India. The community comprises of 39 species (17 were grasses and 22 were non - grasses) belonging to 12 families i.e., Poaceae, Cyperaceae, Euphorbiaceae, Amaranthaceae, Asteraceae, Nyctaginaceae, Caesalpiniaceae, Capparaceae, Convolvulaceae, Rubiaceae, Fabaceae and Molluginaceae. The community was dominated by the members of family Poaceae (43.6 %). The result showed good number of economically important plants such as forage and medicinal plants. Most of the plant species help in erosion control and need conservation.

INTRODUCTION:

Floral diversity refers to all the plant species present in any geographic locality. It is an indication of vegetation and plant resources of an area. Floristic richness of an area depends upon the type, quality and stratification of its vegetation (Whittaker, 1972). It gives the nature and functioning of the natural communities and also provides complete understanding of the pattern and process of their structure.

The blessings of plants on mankind are innumerable. Plants have immense economic importance. From the pre-historic times man has been dependent on the grasses for food, fodder, shelter and medicines. Not only human population but even the very survival of the animal kingdom is dependent on the grasses. Besides supplying food to livestock, grassland communities provide oxygen to the surrounding, maintain biodiversity, provide recreation, enhance soil fertility, prevent soil erosion, provide employment and contribute aesthetic beauty.

LITERATURE REVIEW:

Most works on grassland communities have been reported by odum (1960), Ovington **et al.** (1963), Golley and Gentry (1966), Bliss (1970), Dahlman and Kucera (1965), Varshney (1972), Redmann (1975), Billore and Mall (1977), Misra and Misra (1979 & 1981), Bharadwaj (1981), Ambasht and Pandey (1981), Behera **et al.** (1981), Rath and Misra (1980 & 1981), Malana and Misra (1980, 1981 & 1982), Misra (1983), Naik (1985), Ambasht and Sharma (1989), Ram and Arya (1991), Ram and Ramakrishnan (1992), Misra (1992), Patnaik (1993), Behera and Misra (1993), Pradhan (1994), Barik and Misra (1995, 1996, 1997, 1998, & 2000), Barik (2006), Kar **et al.** (2010), Baldau and Jaiswal (2014), Pullaiah (2015), Dash and Barik (2015), Rout and Barik (2016) and many others in India and abroad. However, very little work has been made so far on the grassland communities of Mayurbhanj district in Odisha. The present study was designed to assess the floral diversity of a grassland community located at Kaptipada forest range of Mayurbhanj district in Odisha, India.

Study site and Environment:

The experimental site was selected at Kaptipada forest range (21° 51' N and 86° 53'E), situated at a distance of 56 kms away from North Orissa University and 52 kms from Baripada, the District headquarter of Mayurbhanj in the state of Odisha. The altitude of the site is above 135.7m. The experimental site was protected from grazing and human interferences for a period of one year prior to start of this investigation.

The climate of the locality is monsoonal with three distinct seasons viz. rainy (July to October), winter (November to February) and summer (March to June). The total rainfall during the study period was 1389.4 mm of which a maximum of 289.6 mm was recorded during July. The mean minimum and mean maximum atmospheric temperature was found to be normal. January showed the lowest temperature (13.37°C) whereas April experienced the highest temperature (41.21°C). Table – 1 shows the monthly rainfall, mean minimum and mean maximum atmospheric temperature and number of rainy days of the experimental site during the study period.

Table-1:Monthly rainfall, mean minimum and mean maximum atmospheric temperature of the experimental site during the study period.

Month (s)	Atmospheric temperature(˚c)		No. of rainy days	Rainfal l (mm)
	Mean minimum	Mean maximum		
Jul. 2015	25.56	32.25	20	289.6
Aug.2015	26.62	32.56	13	197.6
Sep. 2015	26.29	33.08	11	112.2
Oct. 2015	22.87	32.81	4	8.2
Nov. 2015	18.35	29.91	-	-
Dec. 2015	15.77	25.55	6	51.2
Jan. 2016	13.37	26.44	1	1.8
Feb. 2016	19.12	29.94	4	30.8
Mar. 2016	21.88	36.60	3	13.2
Apr. 2016	25.41	41.21	3	31.2
May 2016	24.28	37.82	13	107.6
Jun. 2016	25.01	34.26	15	274.0
Jul. 2016	24.44	32.91	15	272.0
Total			**108**	**1389.4**

The soil of the experimental site (Table – 2) was found to be almost neutral. The available phosphorus content was high (0.96 ppm) in upper soil and minimum (0.84 ppm) in lower soil profile. The available potassium content was high (153.6 ppm) in middle soil and minimum (105.6 ppm) in lower soil profile. The organic carbon content of soil was found to be very low (0.16%).

Table-2: The pH, conductivity, organic carbon (%), available phosphorus and potassium content of the soil of the study site (values are in mean ± SD, n=5 each).

Surface depth (cm)	PH	Conductivity	Organic carbon (%)	Available phosphorus (ppm)	Available potassium (ppm)
0 to 10	7.22±0.26	0.66±0.09	0.16±0.02	0.96±0.38	136.4±70.87
10 to 20	7.34±0.21	0.66±0.16	0.16±0.02	0.92±0.389	153.6±89.32
20 to 30	7.46±0.22	0.64±0.114	0.16±0.027	0.84±0.669	105.6±99.96

MATERIALS AND METHODS:

The experimental site was thoroughly surveyed form July 2015 to July

2016 covering all the months. The plant specimens preferably along with reproductive parts were collected from the site and brought to the laboratory for identification (Mueller Dombois and Ellenberg, 1974).

The collected specimens were made into herbarium according to the methodology described by Jain and Rao (1977) and Forman and Bridson (1989). Identification of all the species was made in consultation with various regional and national Flora i.e. The Botany of Bihar and Orissa (Haines, 1921-25); Supplement to The Botany of Bihar and Orissa (Mooney, 1950); Flora of Madras Presidency (Gamble, 1915-36) and The Flora of Similipal (Saxena and Brahmam, 1989); The Flora of Orissa ((Saxena and Brahmam, 1994-96) ; Flora of Madhya Pradash (Verma **et al.**, 1993, Mudgal **et al.,** 1997 & Singh **et al.,** 2001) and Flora of Eastern Ghats (Pullaiah and Ramamurthy, 2001 ; Pullaiah and Rao, 2002 ; Pullaiah **et al.** 2007 & 2010). The information regarding uses of the plant species was collected from the secondary literature and the local inhabitants of nearby areas.

RESULTS AND DISCUSSION:

The present study was the outcome of the one year of critical study on floral diversity of a grassland community of Kaptipada forest range of Mayrubhanj district in Odisha. The experimental grassland community comprised of 39 species, out of which 17 species were grasses and 22 species were non - grasses. *Chrysopogon aciculatus, Cynodon dactylon, Digitaria abludens, Eleusine indica* and *Eragrostis pilosa* among the grasses and *Boerhaavia diffusa, Bulbostylis barbata, Evolvulus nummularius, Phyllanthus fraternus* and *Tridax procumbens* among the non-grasses were found dominant during the study period. Based on species contribution, Poaceae, was found as dominant families. The community was inhabited by good number of economically important plants such as medicinal plants, green manuring plants and forage. Most of the plant species play significant role in the control of soil erosion (Table-3).

Table – 3: Floristic composition, family and uses of taxa of the experimental site.

Sl. No.	Name of Species	Family	Uses
GRASSES			
1	*Brachiaria distachya* (L.) Stapf	Poaceae	Forage,
2	*Brachiaria reptans* (L.) Gard. & C.E. Hubb.	Poaceae	Forage, grains used as famine food .
3	*Chrysopogon aciculatus* (Retz.) Trin.	Poaceae	Erosion control, Forage.
4	*Cynodon dactylon* (L.) Pers.	Poaceae	Erosion control, Forage, Medicinal, fodder, social rituals
5	*Dactyloctenium aegyptium* (L.) Wild.	Poaceae	Forage, seeds edible, Medicinal.
6	*Digitaria abludens* (Roem. & Schult.) Veldkamp	Poaceae	Forage
7	*Digitaria ciliaris* (Retz.) Koeler	Poaceae	Erosion control, Forage,
8	*Digitaria longiflora* (Retz.)Pers.	Poaceae	Forage
9	*Eleusine indica* (L.) Gaertn.	Poaceae	Erosion control , seeds used as famine food, Forage, Medicinal.
10	*Eragrostis pilosa* (L) P. Beauv.	Poaceae	Forage,
11	*Eragrostris tenella* (L.) P.Beauv. ex Roem. & Schult.	Poaceae	Forage,
12	*Eragrostris unioloides* (Retz.) Nees ex Steud.	Poaceae	Forage, Green manure.
13	*Heteropogon contortus* L.P. Beauv. ex Roem. & Schult.	Poaceae	Erosion control, Forage
14	*Panicum notatum* Retz.	Poaceae	Fodder, Forage
15	*Paspalum distichum* L.	Poaceae	Erosion control, Forage
16	*Setaria pumila* (Poir.) Roem. & Schult.	Poaceae	Erosion control, Forage
17	*Sporobolus indicus* (L.) R. Br.	Poaceae	Medicinal, Fibre, Forage
NON-GRASSES			
1	*Achyranthes aspera* L.	Amaranthaceae	Medicinal, Edible.
2	*Alternanthera sessilis* (L.)R.Br. ex DC.	Amaranthaceae	Medicinal, Edible, Fodder.
3	*Boerhaavia diffusa* L.	Nyctaginaceae	Medicinal, Edible, Fodder.
4	*Bulbostylis barbata* (Rottb.) C.B.Cl.	Cyperaceae	Medicinal, Fodder.
5	*Senna tora* (L.) Roxb	Caesalpiniaceae	Medicinal, Forage Green manure.
6	*Cleome viscosa* L.	Capparaceae	Medicinal, Leaves and young shoots cooked as vegetable, Green manure, Forage.
7	*Croton bonplandianus* Baill.	Euphorbiaceae	Medicinal
8	*Rhynchospora colorata* (L.) H. Pfeiff	Cyperaceae	Forage
9	*Cyperus rotundus* L.	Cyperaceae	Medicinal, Palatable, Forage, Making of mats and baskets, Erosion control.
10	*Cyperus dubius* Rottb.	Cyperaceae	Medicinal, Forage
11	*Desmodium triflorum* (L.) DC.	Fabaceae	Medicinal, Forage Green manure.
12	*Euphorbia hirta* L.	Euphorbiaceae	Medicinal, Forage
13	*Evolvulus nummularius* (L.) L.	Convolvulaceae	Ornamental, Soil binding.
14	*Fimbristylis acuminata* Vahl.	Cyperaceae	Medicinal, Forage Green manure.
15	*Fimbristylis aestivalis* Vahl	Cyperaceae	Medicinal, Forage Green manure.
16	*Fimbristylis dichotoma*(L.) Vahl	Cyperaceae	Medicinal, Forage Green manure, Making of Mats.
17	*Oldenlandia corymbosa* L.	Rubiaceae	Medicinal, Forage
18	*Mollugo pentaphylla* L.	Molluginaceae	Medicinal, Leafy Vegetable
19	*Phyllanthus fraternus* G.L. Webster	Euphorbiaceae	Medicinal
20	*Phyllanthus niruri* L.	Euphorbiaceae	Medicinal
21	*Phyllanthus virgatus* Forst.	Euphorbiaceae	Medicinal
22	*Tridax procumbens* (L.) L.	Asteraceae	Medicinal, Fodder, Forage.

CONCLUSION:

The grassland community of Kaptipada forest range in Odisha is rich in species diversity. Most of the species exhibited medicinal properties and played a major role in controlling soil erosion. Some species are used as forage and some others used as green manure. The grasslands are now being change forcibly because of urban development, overgrazing and appearance of invasive species. It is a matter of great concern for the ecologists and environmentalists to conserve nature and indigenous knowledge of local inhabitants for human welfare.

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