

# Phytodiversity of A Grassland Community of Rairangpur In The District of Mayurbhanj, Odisha

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## ABSTRACT

The phytodiversity of a grassland community of Rairangpur (86° 11' 45" E ; 22° 16' 45"N) in the district of Mayurbhanj, Odisha was studied. The community comprised of 29 species. Of which 10 species were grasses and 19 species were non-grasses. They belong to 11 families i.e. Acanthaceae, Asteraceae, Cammelinaceae, Convolvulaceae, Cyperaceae, Euphorbiaceae, Fabaceae, Plantaginaceae, Poaceae, Rubiaceae and Violaceae. The members of the family Poaceae showed high percentage contribution (34.48%) compared to other families. This variation in flora in the grassland community might be due to the topography, geographical distribution, soil characteristics, climatic conditions and biotic interference of the locality.

**Keywords:** Phytodiversity, Grassland community

## I. INTRODUCTION

The characteristic features pertaining to structural aspects of community is essential for any in-depth studies relating to ecology of a place. It provides the knowledge to build up a picture of the type of vegetation of an area i.e the phytodiversity, life-form patterns and also the dynamics of a vegetation unit. Although such study seems to be classical yet it forms the core of the ecological study pertaining to vegetation analysis.

Much work has been carried out on grassland ecology by Raunkiaer (1), Cain (2), Hanson & Churchill (3), Pandeya (4), Singh (5), Rao (6), Singh & Yadava (7), Singh & Ambasht (8), Misra & Misra (9), Malana & Misra (10), Rath & Misra (11), Naik (12), Misra (13), Patnaik (14), Behera & Misra (15), Pradhan (16), Barik & Misra (17), Barik (18), Kar *et al.* (19), Pandey *et al* (20), Nair (21), Ray & Sainkhediya (22) and many

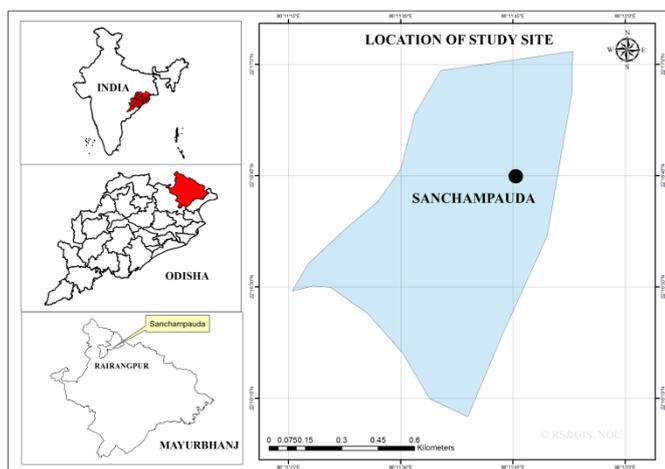
others. In this study an attempt has been made to analyse the phytodiversity of a grassland community of this region.

### 1.1 Aim of the Study

The aim of this investigation is to assess the phytodiversity of a grassland community of Rairangpur in the district of Mayurbhanj, Odisha.

### 1.2 Study Site and Environment

The experimental grassland was selected at Sanchampauda (86° 11' 45" E ; 22° 16' 45"N,) Rairangpur, situated at a distance of 95 kms from the North Orissa University and 90 kms from Baripada, the district headquarter of Maurbahnj in the state of Odisha and is located at an average elevation of 248m. (Fig – 1 & 2).



**Figure 1.** Map showing the location of Experimental site



**Figure 2.** Photograph showing the Experimental site

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 was 1903mm, of which a maximum of 652mm was recorded during the month of July. No rainfall was observed in the month of October, November and December. (Table-1).

**Table – 1** Monthly rainfall and number of rain days of the experimental site during the study period.

Month (s)	Rainfall (mm)	No. of rainy days
Jan. 2007	11	01
Feb. 2007	10	01
Mar. 2007	08	01
Apr. 2007	55	02
May. 2007	170	04
June. 2007	118	09

July. 2007	652	18
Aug. 2007	468	12
Sept. 2007	363	13
Oct. 2007	-	-
Nov. 2007	-	-
Dec. 2007	-	-
Jan. 2008	48	02
Total	1903	33

The soil of the experimental site was found to be moderately acidic. The available phosphorous, potassium and organic carbon contents of the experimental site were found to be low (Table -2).

**Table - 2** The pH, conductivity, organic carbon (%), available phosphorus and potassium content of the soil of the study site (n=5 each)

Surface depth in cm	pH	Conductivity	Organic carbon (%)	Available phosphorus (ppm)	Available potassium (ppm)
0 to 10	5.18	0.5	0.532	0.4	15.2
10 to 20	5.22	0.5	0.474	0.34	11.4
20 to 30	5.3	0.5	0.392	0.16	12.5

## II. MATERIALS & METHODS

The plant specimens preferably along with the reproductive parts were collected and brought to the laboratory for identification (Mueller-Dombois and Ellenberg, 23). The identification of each taxon was made in consultation with various regional and national flora books i.e. The Botany of Bihar and Orissa (Haines, 24), Supplement to the Botany of Bihar and Orissa (Mooney, 25), The Flora of Simlipal (Saxena and Brahmam, 26), Flora of Orissa (Saxena and Brahmam, 27), Flora of the Madras Presidency (Gamble, 28), Flora of Bilaspur district, M.P. (Panigrahi and Murti, 29; Murti and Panigrahi, 30) and Flora of Madhya Pradesh (Verma et al., 31; Mudgal et al., 32 and Singh et al., 33). The herbarium specimens were prepared following standard methodology as proposed by Jain & Rao (34). The voucher specimens were preserved and housed in

Herbarium, P.G. Department of Botany, North Orissa University, for future use and reference.

### III. RESULTS & DISCUSSION

A complete floristic list of grasses and non-grasses along with their families of the experimental site is presented in Table-3. The community comprised of 29 species (10 species of grasses and 19 species of non-grasses). They belong to 11 families (Acanthaceae, Asteraceae, Commelinaceae, Convolvulaceae, Cyperaceae, Euphorbiaceae, Fabaceae, Plantaginaceae, Poaceae, Rubiaceae and Violaceae).

**Table-3:** Floristic list of various species and their families occurring in the experimental site.

Sl. No.	Name of species	Family
<b>Grasses</b>		
1	<i>Brachiaria reptans</i> (L.) C.A. Gardner & C.E. Hubb	Poaceae
2	<i>Chrysopogon aciculatus</i> (Retz.) Trin.	Poaceae
3	<i>Chrysopogon verticillatus</i> (Roxb.) Trin. ex Steud	Poaceae
4	<i>Cynodon dactylon</i> (L.) Pers.	Poaceae
5	<i>Dactyloctenium aegyptium</i> (L.) Willd.	Poaceae
6	<i>Digitaria longiflora</i> (Retz.) Pers.	Poaceae
7	<i>Eleusine indica</i> (L.) Gaertn.	Poaceae
8	<i>Heteropogon contortus</i> (L.)P. Beauv. ex Roem. & Schult.	Poaceae
9	<i>Setaria pumila</i> (Poir.) Roem. & Schult.	Poaceae
10	<i>Sporobolus indicus</i> (L.) R.Br.	Poaceae
<b>Non-Grasses</b>		
1	<i>Commelina benghalensis</i> L.	Commelinaceae
2	<i>Cyperus compressus</i> L.	Cyperaceae
3	<i>Cyperus triceps</i> Endl.	Cyperaceae
4	<i>Desmodium triflorum</i> (L.) DC.	Fabaceae
5	<i>Elephantopus scaber</i> L.	Asteraceae
6	<i>Evolvulus alsinoides</i> (L.) L.	Convolvulaceae
7	<i>Evolvulus nummularius</i> (L.)L.	Convolvulaceae
8	<i>Fimbristylis acuminata</i> Vahl	Cyperaceae

9	<i>Fimbristylis dichotoma</i> (L.) Vahl	Cyperaceae
10	<i>Oldenlandia corymbosa</i> L.	Rubiaceae
11	<i>Hedyotis neesiana</i> Arn.	Rubiaceae
12	<i>Hybanthus enneaspermus</i> (L.) F. Muell	Violaceae
13	<i>Phyllanthus fraternus</i> Webster	Euphorbiaceae
14	<i>Rungia repens</i> (L.) Nees	Acanthaceae
15	<i>Scleria levis</i> Retz.	Cyperaceae
16	<i>Scoparia dulcis</i> L.	Plantaginaceae
17	<i>Spermacoce pusilla</i> Wall.	Rubiaceae
18	<i>Tridax procumbens</i> L.	Asterraceae
19	<i>Zornia gibbosa</i> Span.	Fabaceae

The members of the grass family, Poaceae alone exhibited 34.48% in the community. The non-grass family i.e. Acanthaceae, Commelinaceae, Euphorbiaceae, Plantaginaceae and Violaceae shared 3.45% each; Asteraceae, Convolvulaceae and Fabaceae shared 6.89% each, whereas the family Rubiaceae and Cyperaceae shared 10.34% and 17.24% respectively during the study period. Table -4 shows details about the percentage contribution of various families with respect to their members of species occurring in the experimental grassland community.

**Table - 4** Percentage contributions of various families in respect to their numbers of species occurring in the experimental site.

Sl No	Name of the family	No of species	% Contribution
1	Acanthaceae	01	3.45 %
2	Asteraceae	02	6.89 %
3	Commelinaceae	01	3.45 %
4	Convolvulaceae	02	6.89 %
5	Cyperaceae	05	17.24 %
6	Euphorbiaceae	01	3.45 %
7	Fabaceae	02	6.89 %
8	Poaceae	10	34.48 %
9	Rubiaceae	03	10.34 %
10	Plantaginaceae	01	3.45 %
11	Violaceae	01	3.45 %
Total		29	99.98

#### IV. CONCLUSION

The experimental grassland community of Rairangpur in Mayurbhanj District of Odisha was rich in grasses, sedges and other associated herbs and shrubs. The topography, temperature variability, physico-chemical characteristics of soil, precipitation, solar insolation, biotic interference etc. might be responsible for variation in the species composition in the experimental site.

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#### VI. REFERENCES

- [1]. C. Raunkiaer, The life forms of plants and statistical plant geography. Oxford Univ. Press, Oxford, (1934).
- [2]. S.A. Cain, Life forms and phytoclimates. Bot. Rev., 16 (1950) 1-32.
- [3]. H.C. Hanson, E.D Churchill, The plant community. Reinhold Publishing Corporation, New York (1961).
- [4]. S.C. Pandeya, Ecology of grassland of Sagar, M.P., II A. Composition of the fenced grassland association. J. Ind. Bot. Soc. 43 (1964) 577-605.
- [5]. J.S. Singh, Seasonal variation in composition, plant-biomass and net community production in the grassland at Varanasi. Ph. D. Thesis, BHU, Varanasi (1967).
- [6]. C.C Rao., Biological spectrum of Karamnasa watershed flora, Varanasi, India. In: Proc. Symp. Recent Adv. in Trop. Ecol., Part-II, ISTE, BHU, Varanasi. (1968).
- [7]. J.S. Singh, P.S. Yadava, Seasonal variation in composition, plant biomass and net primary productivity of a tropical grassland at Kurukhetra, India. Ecol. Monogr., 44 (1974) 351-376.
- [8]. U.N. Singh, R.S. Ambasht, Biotic stress and variability in structure and organic net primary production of grassland communities at Varanasi, India. Trop. Ecol., 16 (1975) 86-95.
- [9]. M.K. Misra, B.N. Misra, Biological spectrum of a tropical grassland community at Berhampur, Ind. J. For., 2 (1979) 313-315.
- [10]. M. Malana, B.N. Misra, Effect of burning on biological spectrum of a tropical grassland. Geobios, 7 (1980) 293-295.
- [11]. S.P. Rath, B.N. Misra, Effect of grazing on the floristic composition and life form of species in the grassland of Berhampur. Ind. J. For., 3 (1980) 336-339.
- [12]. B.K. Naik, Phytosociology and primary production of a natural grassland community of Western Orissa. Ph. D. Thesis, Sambalpur University, Sambalpur, Orissa (1985).
- [13]. B.N. Misra, Ecological studies on grassland community of South Orissa -Project Report, Ministry of Environment, Government of India, New Delhi (1992).
- [14]. S K. Patnaik, Ecological studies of an upland coastal grassland of South Orissa. Ph. D. Thesis, Berhampur University, Berhampur, Orissa, India (1993).
- [15]. R.K. Behera, B.N. Misra, Biological spectrum of a grassland community of Phulbani (India). Mendel, 10 : 2-4 (1993) 59-61.
- [16]. D. Pradhan, Primary production and phytosociology of a grassland community of Bhubaneswar. Ph. D. Thesis, Berhampur University, Berhampur, Orissa (1994).
- [17]. K.L. Barik, B.N. Misra, Biological spectrum of a grassland ecosystem of South Orissa. Ecoprit, 5 : 1 (1998) 73-77.

- [18]. K. L. Barik, Ecological analysis of an upland grassland community of eastern Orissa, India. *Ekologia*, 5 : 1-2 (2006) 137 – 150.
- [19]. P.K. Kar, A.K. Biswal, K.L. Barik, Floristic composition and biological spectrum of a grassland community of Rangamatia in the district of Mayurbhanj, Odisha. *J. Curr. Sci.*, 15 :2 (2010) 465-469.
- [20]. D.D. Pandey, K. Pandey, S.S. Kumar, Phytosociological studies of grassland in the vicinity of Pataratu thermal power, Hazaribagh, Jharkhand. *J. Phytology*, 3 : 12 (2011) 63-66.
- [21]. R. Nair, Floristic study of Dadra and Nagar Haveli. *Life Sci. leaflets*, 20 (2011) 872-875.
- [22]. S. Ray, J. Sainkhediya, Diversity of grasses in Nimar region, Madhya Pradesh. *Ind. J. Plant Sci.* 1 : 2-3 (2012) 144-152.
- [23]. D. Muller- Dombois, H. Ellenberg, Aims and methods of vegetation Ecology. John Wiley and Sons, New York, (1974).
- [24]. H.H Haines,. The Botany of Bihar and Orissa, 6 parts, Adlard & sons, London (1921-25).
- [25]. H.F. Mooney, Supplement to the Botany of Bihar and Orissa. Catholic Press, Ranchi (1950).
- [26]. H.O. Saxena, M. Brahmam, The Flora of Similipal, Orissa, Regional Research Laboratory (CSIR), Bhubaneswar (1989).
- [27]. H.O. Saxena, M. Brahmam, The flora of Orissa. Vol. I-IV, Regional Research Laboratory (CSIR), Bhubaneswar, Orissa and Forest Development Corporation Ltd, Bhubaneswar (1994-96).
- [28]. J.S. Gamble, Flora of the Presidency of Madras, London, Repr. ed. 1967, Calcutta (1915-36).
- [29]. G. Panigrahi, Murti, Flora of Bilaspur District, M.P. Vol. 1, Botanical Survey of India, Calcutta (1989).
- [30]. S.K. Murti, G. Panigrahi, Floral of Bilaspur District, M.P. Vol. 2, Botanical Survey of India, Calcutta (1999).
- [31]. D. M. Verma, N.P. Balakrishnan, R.D. Dixit (eds), Flora of Madhya Pradesh, Botanical Survey of India, Vol-I, Calcutta (1993).
- [32]. V. Mudgal, K. K. Khanna, P.K. Hajra (eds), Flora of Madhya Pradesh, Vol-II, Botanical Survey of India, Calcutta (1997)
- [33]. N.P. Singh, K.K., Khanna, V. Mudgal, R.D. Dixit, (eds), Flora of Madhya Pradesh, Botanical Survey of India, Vol-III, Calcutta (2001).
- [34]. S.K. Jain, R. Rao, A handbook of field and herbarium methods. Today & Tomorrows printers and publishers, New Delhi (1977).