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Salt's Chemical Makeup and Floral Composition

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ABSTRACT

The three salt affected habitats near Sant Ravidas Nagar Bhadohi were characterized by a grass-dominated sparse vegetation with extensive deposition of salt during major part of the year. Species diversity was maximum during the rainy season, which undergoes simplification through elimination subsequent to increasing soil moisture stress. Low organic Matter, low nitrogen content, high pH and high ECe is characteristic feature of the soil. During rainy season decomposition and mineralization of organic matter were rapid which result in to high nitrogen content in the soil.

Keywords- Salt affected habitat, physico-chemical properties, floristic composition, soluble salts.

I. INTRODUCTION

Salinity problems are found in all countries where arid and semi-arid climate exist. Vast expanse of Indo-Gangetic plains of Indian subcontinent is characterized by high salt content high ECe and poor soil structure, which inhibit growth of the plants. Only a few species of plants are specially adapted to survive under these conditions. The climate is tropical and year is divisible into three main seasons, viz. rainy, winter and summer. The present investigation was aimed to study the ecology of these salt effected habitats embracing floristic pattern in relation to soil moisture content, ECe, pH soil organic matter and total nitrogen content.

II. MATERIALS AND METHODS

Three distantly located study sites representing salt effected soils were selected for the present investigation within a radius of (50 Km. around Bhadohi district) and designated as sites I, II and III. Each of these sites was not under agricultural use for over five years.

Plant species occurring at the study sites were collected in different seasons round the year. Composite soil samples to 30cm. depth were collected in different seasons. Samples thus collected were brought to the laboratory in polythene bags, moisture content was determined by oven dry weight method (Moodie et al. 1963) and pH (1:5) was determined by electronic pH meter. Electrical conductivity of soil saturation exract of the soil at 25^0 C was determined by Walkley and Black's rapid titration method (Piper, 1950). The total nitrogen content was determined by micro- Kjeldahl method (Jackson, 1962).

III. RESULTS

The study sites were characterized by white or grayish- white deposition of salts trough out the major part of the year subsequent to monsoon period and scattered patches of vegetation. The number of species was maximum in rainy season when community attained the optimum stage of development and decreased gradually to minimum in summer season. Differences in floristic composition and density of their communities in different season is discernible from a glance in Table 1. The values of soil moisture content, and total soil nitrogen where maximum in rainy season and decreased to a minimum in summer season, why an inverse trend obtained in case of pH and ECe of soil extract, soil organic matter and carbon nitrogen ratio.

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IV. DISCUSSION

Rainy season stimulated leaching of excess soluble salts below the root zone which in its turn, favored many species to germinate and thus a high floristic value. Subsequent fall in the number of species with the approaching winter season is ascribed to the drying up of the above ground portions of the majority of the species due to the intensified soil moisture stress and low temperature of season. Increasing salt level, poor aeration, unfavorable moisture regime are the characteristic aspect responsible for elimination of majority of the species concomitant to advancing dry months and only a few perennials *viz Cynodon dactylon, Cyperus rotandus*, *Desmostachya bipinnata, Prosopis spicegera* and *Sporobolus diander* were capable of surviving round the year. High values of pH during season are due to the percolation of neutral water-soluble salt in the lower layer and hydrolysis of exchangeable sodium with formation of sodium hydroxide in the upper soil surface. Lower organic matter during monsoon months is attributed to the rate of organic matter decomposition due to rejuvenated microbial activity under warm and moist environmental condition. High organic matter content in the soil during summer season is due to death and mechanical breakdown of the plant parts and with microbial activity. Higher values of total nitrogen in the soil profile during rainy season reflects blue green algae fixation, rain water input and higher rate of release of mineral nitrogen through microbial decomposition (Birch 1958, Choudhri and Sharma 1975). High C/N ratio in summer and winter seasons as indicative of infectivity of these processes coupled with the loss of nitrogen from the soil profile through denitrification and direct volatilization of nitrogen in gaseous form.

Table 1: Chemical Properties and Floristic Composition of Salt

	Site I			**Site II**			**Site III**		
Name of Species	**Rainy**	**Winter**	**Summer**	**Rainy**	**Winter**	**Summer**	**Rainy**	**Winter**	**Summer**
Blumea lacera D.C	0.80	-	-	-	-	-	1.00	-	-
Bothriochloa pertusa.	1.04	1.00	-	-	-	-	1.44	1.4	-
A Camus									
Cloris barbata Sw	2.0	-	-	4.10	3.7	-	4.5	2.0	-
Convolvulus arvensis (Linn)	1.0	1.0	-	2.5	2.4	-	1.8	1.8	-
Cynodon dactylon (Linn)	28.0	26.4	-	15.2	28.6	23.2	22.0	28.0	24.0
Pers.									
Cyperus rotundus (Linn)	3.2	2.0	1.8	2.7	2.04	-	8.6	5.2	3.2
Dactyloctenium aegyptium	14.0	7.00	-	7.5	4.8	-	13.5	6.86	4.6
(Linn) Beauv.									
Desmostachya	3.2	2.5	2.0	-	-	-	2.8	2.0	1.8
***Bipinnata* (Linn)**									
Dichanthium annulatum	2.0	-	-	2.0	-	-	-	-	-
Stapf									
Eclipta alba (Hassk)	2.65	-	1.2	1.3	8.0	-	1.65	-	-
Eleusine indica	-	-	-	2.9	-	-	4.3	-	-
Eragrostis tennella Roem	3.2	-	-	2.4	-	-	5.6	-	-
Sch.									
Euphorbia prostrata Ait.	0.6	0.6	-	0.65	0.6	-	2.2	-	-
Launaea asplenifolia Hook.	-	-	-	-	-	-	2.2	-	-
Phyla nodiflora (Linn)	14.6	9.7	-	14.2	10.3	8.4	-	-	-
Gren									
Pluchea lanceolata (Cl.)	1.4	0.5	2.4	-	-	-	1.2	0.6	2.6
Prosopis spicigera (Linn)	2.4	2.0	1.94	4.2	3.6	2.1	8.5	3.6	3.2

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Sporobolus diander (Beauv)	20.3	17.2	10.2	12.2	9.1	7.3	20.8	16.6	12.2
Total	**16**	**11**	**6**	**13**	**10**	**4**	**16**	**10**	**7**

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