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Study of Vegetation Structure and Soil analysis of Government College, Ajmer

Bhanwar Lal Jat*[1], Ranjeeta kumari[2], Rajesh Lomror[3], Bhanwar Lal[4], Raaz K Maheshwari[4], Manisha Mavai[5]

[1]*Department of Botany, SBRM Govt. PG College, Nagaur, Rajasthan*
[2]*Department of Microbiology, Mewar University, Gangrar, Chittorgarh, Rajasthan*
[3]*Department of Botany, Mewar University, Gangrar, Chittorgarh, Rajasthan*
[4]*Department of Chemistry, SBRM Govt. PG College, Nagaur, Rajasthan*
[5]*Department of Physiology, M G Medical College, Jaipur, Rajastan, India*

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Abstract

The phytosociololgical study of Government College, Ajmer are dominated by Holoptelea integrifolia (Ulmaceae). Azadirachta indica (Meliceae) and Eucalyptus camaldulensis (Myrtaceae). All these three species are represented by highest frequency values in class-A. Species such as Acacia leucophloea, Acacia senegal, Acacia tortilis and Maytenus emarginata are present in all the localities and are different in respect of phytosociololgical parameters, height, girth and canopy width. In the present study shrubs and trees of sand dunes were differentiated on the basis of profile diagrams and scattering patterns of height and canopy width. Surveys are designed to define the extent of spatial units. Soil surveyors map the distribution of soil taxonomic units and provide descriptive summaries of the main properties of the soils. Parameters which are used for analysis of soil are soil ph, soil conductivity, soil texture, soil organic carbon and soil moisture content.

Keywords: Frequency, height, girth, canopy width, profile diagram, scattering, pattern

Contents

***Corresponding author**
Bhanwar Lal Jat
Department of Botany,
SBRM Govt. PG College, Nagaur, Rajasthan
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1. Introduction

General outlook or vegetation or topography.

Vegetation of GCA Campus was studied during the month of December to February (2005 – 2006). Western Indian desert has been divided into five major phytogeographical divisions (PHD'S) i.e. sand dunes, sandy plains, stony and hilly tracts, gravel and compact tracts and saline area. Basically these PHD'S differ from each other in their

floristic composition due to topographical and geological formations. Being the position of Ajmer in central Aravallis and just on the line of demarcation between western arid and middle semiarid zone (Fig-1) the climatic conditions are slightly favorable and the area shares the floristic elements of both hilly and sandy tracts. Since the sand dunes and sandy plains surveyed for the present phytosociological study are situated in the northwest Aravalli gaps has not been studied phytosociologically except a list of trees and shrubs. Vegetation study of December month shows that vegetation does not show much change throughout. Vegetation indicated the environmental conditionsas most of the perennial plants are of xerophytic type. The plants are characterized by sclerophyllous shrubs, cacti, Euphorbia and other xerophytic plants such as Acacia nilotica A.decidue.

Soil surveyors map the distribution of soil taxonomic units and provide descriptive summaries of the main properties of the soils. In soil survey the association between soil classes and landscape units is established in the field by judicious selection of sampling points (termed the free survey approach). This type of judgment sampling can be an extremely efficient way of completing the inventory. Contaminant surveys are most typically undertaken by private-sector environmental consultants, and the specific objective may range from an initial evaluation of the extent of contamination to the final stage of remediation of the problem. Pattern studies are undertaken to assess and explain the spatial or temporal pattern of properties. Two main types of pattern studies exist: (a) the quantification of the spatial and temporal variability in properties and (b) hypothesis generation and testing using point patterns. In pattern studies the initial goal may be a visual assessment of the pattern of observations in time or space, and statistical estimation of the populations may be a secondary goal. The area of the study is located at a distance of 10 Km N-W to Ajmer, a centrally situated city of Rajasthan, lies between 260 25’ and 260 29’ N latitude and 740 37’ and 740 42’ E longitude.

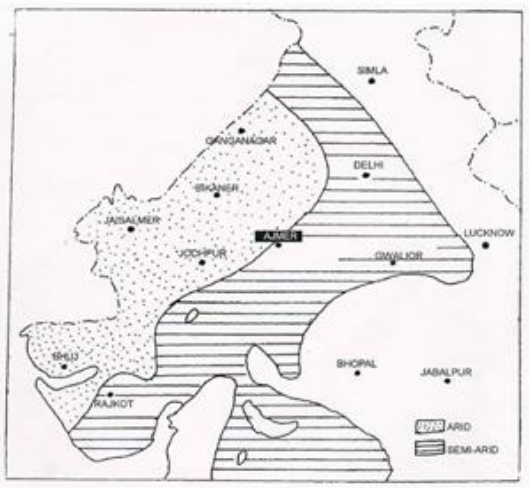


Figure 1: North West part of india showing arid (Dottted are) and semi arid (horizontal lined area) of Rajasthan. Ajmer is situated in the transistional zone between aris and semi-arid

2. Methods of Analysis

Soil pH

The soil pH indicates the amount of acidity present in the soil solution and is one of the most commonly measured soil properties. It is considered as a standard and routine soil analysis. Soil pH affects the solubility and availability of many elements as well as microbial activity. pH is technically defined as the negative base 10 logarithm of the effective hydrogen ion concentration (Eq. 1) in gram equivalents per litter (Puvaneswaran, 1987).

$pH = -\log10[H+]$ (1)

The glass electrode ph meter standeadized with tandard ph 4 to 9 solution. After standardization the electrode is washed with distilled water and then immersed into soil suspension of 1:5 (soil:water) and keep for 4 hours. Suspension is determined.

Soil moisture content

The percentage of soil moisture present in a unit weight of soil. Sample collected at the deth of 0.5 and 50-60 cm. fresh and oven dried at 108^0 C for 24 hrs , weight of each sample.

Formula: Moisture% = (fresh weight–dry weight/ dry weight) 100

Electrical conductivity: The total solute concentration in the various extracts is normally estimated by measuring EC. Although the relationship between conductivity and salt concentration varies somewhat depending on solution ionic composition, E Cprovides a rapid and reasonably accurate estimate of solute concentration.

Procedure

1. Weigh appropriate amount of air-dry soil into a flask, add sufficient deionized water to achieve desired extraction ratio, and shake for 1 h.
2. Filter the suspension using highly retentive filter paper and store filtrate at 48C before analysis.
3. Comments However, the 1:5 ratio is commonly used in Australian salinity work.
4. Measure with conductivity meter.

Soil Organic Carbon (SOC)

SOC is dynamic: newly photosynthesized C is added regularly in the form of plant litter, and existing SOC is gradually decomposed back to CO2 by soil biota. Management or environmental conditions that change the relative rates of inputs and decomposition will effect a change in the amount of SOC stored. Transfer 1-5 gm of soil which is dried and powdered , screen through 0.5 mm sieve plate into a 500 ml flask. Add 10 ml of N Potassium dichromate, 20 ml of distilled water, 10 ml of 85% phosphoric acid and 1 ml of diphenylamine indicator and run in N ferrous sulphatr with burrete until colour become greenish. Add 0.5 ml of N potassium dichromate and add ferrous sulphate to make solution colourless.

3. Results and Discussion

Soil pH

Sample from Govt. College = ph 6

Soilorganic carbon percentage

Organic carbon = $V_1 – V_2$ *0.003 *100 /100

Percentage organic carbon = 0.15ml/lt

Soil Texture

Sr. no.	Size of the particles in mm	Types of particles
1	2.00 – 5.00	Fine gravel
2	0.2 – 2.00	Coarse sand
3	0.02 – 0.2	Fine sand
4	0.002 – 0.02	Silt
5	Less then 0.002	Clay

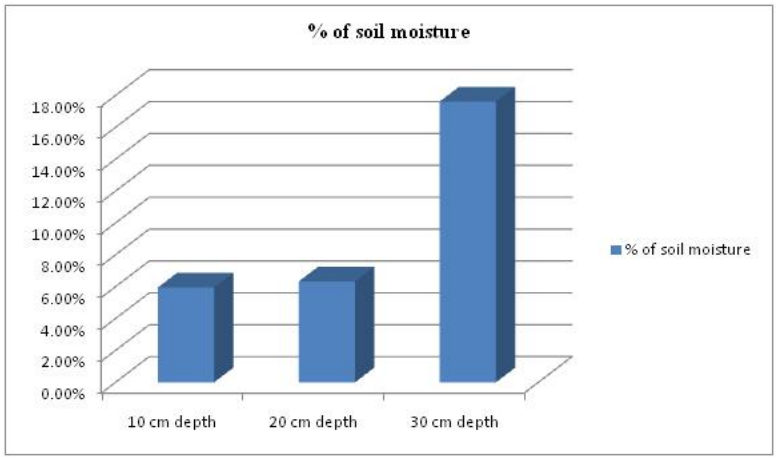
Different fractions that is on the basis of their relative proportion soil texture is determined.

Sr. No.	Relative proportion of soil proportion	Types of soil
1	85% sand + 15% clay or silt or both	Sandy soil
2	70% sand + 30% clay or silt or both	Sand loam
3	50% sand + 50% clay or silt or both	Loam
4	90% silt + 10% sand	Silt
5	9% or more clay	Clay soil

Soil moisture content

Formula = (fresh wt–dry wt / dry wt) 100

Sr. No.	Soil sample	Depth in cm	Weight of soil in gm	Soil moisture percentage	Average moisture percentage
1	Soil with moisture (fresh weight)	10	39.2	5.95%	9.97%
		20	47.0	6.33%	
		30	24.7	17.62%	
2	Soil without moisture (dry weight)	10	37.0		
		20	44.2		
		30	21.0		



Check list of trees and shrubs of GCA campus and census of individual 2005–2006

Sr. No.	Names	1	2	3	4	Total
1	Annonaceae					
	Annona squamosa	1	0	1	1	3
	Polyathia longifolia	0	6	7	3	16
	Polyathia peidula	10	8	12	0	30
2	Capparceae					
	Crateva reliagousa	1	0	1	1	3
	Marrua arenaria	8	2	1	1	12
3	Malvaceae					
	Thespesia populnea	1	0	1	1	3
	Hibiscus rosa sinesis	8	2	12	4	25
4	Bombacaceae					
	Bombax ceiba	1	0	0	1	2
5	Rutaceae					
	Aegle marmelos	0	0	1	1	2
	Ferohia limonia	0	0	1	0	1
6	Simaraublaceae					
	Ailanthus excels	0	1	2	1	4
7	Meliaceae					
	Azadirachta excels	30	60	25	35	150
8	Rhamnaceae					
	Ziziphus jujube	0	2	0	1	3
9	Anacardiaceae					
	Lannae coromandelica	0	0	1	1	2
	Mangifera indica	0	2	0	1	3
10	Moringaceae					
	Moringa oleifera	1	2	6	5	7
	Moringa concanensis	2	2	0	6	10
11	Fubaceae					
	Dalbergia sisso	0	0	5	3	8
	Butea monosperma	0	0	2	1	3
12	Caesalpiniaceae					
	Caesalpinia bondukcella	0	0	1	0	1
	Bauhinia racemosa	0	1	0	0	1

	Bauhinia variegate	1	0	0	0	1
	Cassia fistula	2	2	5	1	10
	Cassia nodosa	1	0	0	1	2
	Cassia siamea	5	8	0	0	13
	Delonix regia	4	0	2	2	8
	Parkinsonia aculeate	2	0	1	1	4
	Tomarindus indica	10	5	5	10	30
13	Mimosaceae					
	Acacia nitotica	1	0	0	1	2
	Albizia lebbeck	2	2	0	2	6
	Albizia procera	1	2	0	2	5
	Dichrostachys cinerea	1	0	1	0	2
	Leucaena latiiliqua	8	0	10	10	28
	Pithecellobium ducle	10	0	8	2	20
	Prosopis cineroaria	1	0	1	1	3
14	Myrtaceae					
	Callistemon exclsa	2	0	0	0	2
	Eucalyptus camaldulensis	10	17	5	20	53
	Psiduim guajava	2	0	1	1	4
	Syzygium cumini	0	0	1	1	2
15	Cactaceae					
	Stapelia gigentia	0	1	0	1	2
16	Sopataceae					
	Manikara hexandra	2	0	0	2	4
	Mimusops elengi	1	0	0	1	2
17	Oleaceae					
	Nyctanthus arbor tristis	0	1	1	0	2
18	Salvodoraceae					
	Salvodora perica	5	0	5	2	12
19	Apocynaceae					
	Carissa carandus	0	0	0	1	1
	Nerium	5	10	20	5	40
	Plumeria acutisjolia	0	5	5	1	11
	Taber naemontana divergata	5	8	0	2	14
	Thevetia peruvia	10	8	0	0	18
20	Aslepiadaceae					
	Tylophora asthmatica	0	0	1	0	1
21	Ehretiaceae					
	Cordial crenta	5	0	3	2	10
	Cordial oblique	0	0	1	0	1
	Cordial myxa	0	1	0	1	2
	Ehretia laevis	3	0	2	1	6
22	Biognoniaceae					
	Kigelia Africana	0	1	0	1	2
	Mileingtonia hortensis	5	0	3	2	10
23	Acanthnaceae					
	Adhatoda vassica	1	0	0	1	2
24	Verbenaceae					
	Clerodendrum phlomidis	2	2	0	1	5
	Vitex negundo	0	0	1	0	1

25	Euphorbiaceae					
	Phyllantus emblica	0	2	1	2	5
	Picinus communis	4	0	2	2	8
	Euphorbia irucalli	1	0	0	1	2
	Putranjeeva roxburghii	0	0	0	1	1
26	Ulmaceae					
	Holoptelea integrifolia	10	16	18	8	52
27	Moraceae					
	Ficus benghalensis	0	5	5	0	10
	Ficus religiosa	2	2	12	6	22
	Ficus krishnii	0	1	0	0	1
	Ficus glomerulata	0	0	0	1	1
28	Casuarinaceae					
	Casuarinas eqisetijobia	0	1	0	1	2
29	Gnetaceae					
	Ephedra joliata	0	1	0	0	1
30	Arecaceae					
	Phoenix sylvestris	1	0	0	0	1
31	Poaceae					
	Dendrocalamus strictus	1	0	1	0	2
32	Cycadaceae					
	Cycos circinnolis	2	0	1	3	6
33	Pinaceae					
	Pinus roxburghi	0	0	1	1	2
34	Papilionaceae					
	Glaricidea supayna	0	0	0	1	1
	Pteracarpous marsupial	0	0	0	1	1
35	Annonaceae					
	Sacchopetalum frutirobrum	0	0	0	1	1
36	Asclepiadaceae					
	Oxylstema grandiflora	0	0	0	1	1
	Pentatropis spirulis	0	0	0	1	1
37	Combretaceae					
	Quisqualis indica	0	0	0	2	2
38	Bignoniaceae					
	Tababua linearis	0	0	0	1	1
39	Convolvulaceae					
	Argeria indica	0	0	0	1	1

4. Conclusion

Understanding the quality of water is as important as that of its quantity, since, it is the main factor determining the suitability of water for drinking, domestic, agricultural and industrial purposes. The present investigations conclude that the quality of water samples subjected to study was hard, slightly alkaline in nature and was unfit for drinking. The COD and BOD values were found to be high. Thus the water from the pond is not good enough to be used for cooking and drinking purposes.

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