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PHYTOSOCIOLOGICAL STUDY OF ANGIOSPERMIC PLANTS OF PATAN

¹SURAJ R. PARMAR AND DR. M. A. CHAUDHARY²

¹ADARSH SCIENCE P.G. COLLEGE, PATAN &

²M.N. COLLEGE, VISNAGAR.

Corresponding author's e-mail: parmarsuraj521@gmail.com

ABSTRACT:

Patan city is one of the district that forms north Gujarat region of Gujarat state in western India. The forest type of this area is Dry deciduas and Desert thorn forest. Total forest area of the district is about 482.95 sq.km. Total 20 tree species are noted in this range. *Acacia nilotica* L. , *Acacia chundra* and *Acacia tortalis* is the most dominant in this area while *Mangifera indica*, *Limonia acidissima* L. and *Tamarindus indica* L. are the minimum number in this area. *Salvadora persica* L. and *Acacia nilotica* (L.) have the greatest IVI ranges, while *Mangifera indica* L., *Limonia acidissima* L. have the lowest range of IVI. All tree species present in the study area are identified using the "Flora of Gujarat" state by shah (1978) and flora of Bombay presidency by Cooke (1903). The forest are of Patan has more than 80% trees, thus the state of the forest will be good during the next ten(10) years.

KEYWORDS: *Phytosociology, Density, Frequency, Abundance. Relative Frequency (RF), Relative Density (RD), Abundance (A), % of composition, Importance Value Index (IVI).*

INTRODUCTION:

Phytosociology is the study of the characteristic, relationship, classification and distribution of plant community. Scientists have focused on biodiversity and its varied distribution throughout the planet for the past ten years. (Hector and Andy, 2000). Phytosociological analysis of any vegetation forms an important part of ecological study. It offers a comprehensive grasp of the community structure, which is essential for accurately characterizing the current community (Mishra

and Tiwari, 2006). Phytosociological methods are helpful in experimental studies of the communities and giving information needed for community structure and the role performed to various plants species. Keeping this in mind, the current study focuses on the diversity of trees and the density of their populations.

STUDY AREA:

The total area of Patan District is 5,722.0 sq.km. Total forest area of the district is about 482.95 sq.km . It is lies between 23° 23' latitude and between 71° 02' to 72° 29' east longitude. Its east - west distance is 146.72 km and north – south distance is 84.568km .It is bounded to west by Banaskantha district, south by the Surendranagar district and to east by Mehsana district. The soil of patan district 90% sandy and temperature was increase rapidly after February month.

MATERIALS AND METHODS:

For analyzing Phytosociology of the tree species 5m long line transect are laid randomly in different season throughout a year. Frequency, Abundance and density of all tree species in the study area are determined by the methods of Mishra (1968). Every plant found in the study region is gathered when it is in developing or fruiting, and its identity is confirmed using "Flora of Gujarat" state by Shah (1978) and flora of Bombay presidency by Cooke (1903).

RESULTS AND DISCUSSION:

In the research region, 20 different species have been identified. Below Table give the data on the community structure in Patan City in respect to the density, abundance, frequency, and IVI of the species. With a frequency of 100%, density and abundance of 10, 48.9, 48.1 and % composition 0.78, 3.8, 3.74 respectively, *Acacia chundra* (Roxb. Ex Rottl.) Willd., *Acacia nilotica* (L.) and *Acacia tortalis* are the dominating species in the study region. This is the highest result in the the study area. *Azadirachta indica* L. is found in the research region with a frequency of 70%, density of 3.6 and an abundance of 5.14 and % composition of 0.28, whereas *Ailanthus excelsa* Roxb. is documented with an frequency of 80%, density of 1.50, abundance of 1.88 and % composition of 0.12. In addition, *Cassia fistula* L. and *Prosopis juliflora* (SW.) DC. has a 70% & 80% frequency, 5.00 & 47.80 density, 7.14 & 59.75 abundance and % of composition is 0.39 & 3.72. The frequency of remaining 13 species like *Aegle marmelos* (L.) , *Dalbergia sissoo* Roxb. , *Ficus religiosa* L. , *Ficus benghlensis* L. , *Holoptelea integrifolia* (Roxb.) Planch. , *Limonia acidissima* L. , *Mangifera indica* L. , *Moringa oleifera* Lam. , *Prosopis Juliflora* (Sw.) DC. , *Salvadora persica* L. , *Tamarindus indica* L. , *Tecomella undulate* (SW) Seem. , *Zizyphus nummularia* (Burm.f.)W&A range from 20% to 50%. Were the lowest dominant species in the study area *Tamarindus indica* L. with 20% frequency.

The density of remaining 13 species like *Aegle marmelos* (L.) , *Dalbergia sissoo* Roxb. , *Ficus religiosa* L. , *Ficus benghlensis* L. , *Holoptelea integrifolia* (Roxb.) Planch. , *Limonia acidissima* L. , *Mangifera indica* L. , *Moringa oleifera* Lam. , *Polyalthia longifera* (Sonn.)Thwaites , *Salvadora persica* L. , *Tamarindus indica* L. , *Tecomella undulate* (SW) Seem. , *Zizyphus nummularia* (Burm.f.)W&A ranges from 0.50 to 4.90. Were the lowest dominant species in the study area with density of 0.50. The abundance of remaining 13 species like *Aegle marmelos* (L.) , *Dalbergia sissoo* Roxb. , *Ficus religiosa* L. , *Ficus benghlensis* L. , *Holoptelea integrifolia* (Roxb.) Planch. , *Limonia acidissima* L. , *Mangifera indica* L. , *Moringa oleifera* Lam. , *Polyalthia longifera* (Sonn.)Thwaites , *Salvadora persica* L. , *Tamarindus indica* L. , *Tecomella undulate* (SW) Seem. , *Zizyphus nummularia* (Burm.f.)W&A range from 1.00 to 9.00. Were the lowest dominant species in the study area is *Limonia acidissima* L. with abundance of 1.00.

The % composition of remaining 13 species follows *Aegle marmelos* (L.) [0.08] , *Dalbergia sissoo* Roxb.[0.32] , *Ficus religiosa* L.[0.08] , *Ficus benghlensis* L. [0.33] , *Holoptelea integrifolia* (Roxb.) Planch. [0.09] , *Limonia acidissima* L. [0.05] , *Mangifera indica* L. [0.04] , *Moringa oleifera* Lam. [0.14] , *Polyalthia longifera* (Sonn.)Thwaites [0.28] , *Salvadora persica* L. [0.38] , *Tamarindus indica* L. [0.06] , *Tecomella undulate* (SW) Seem. [0.11] , *Zizyphus nummularia* (Burm.f.)W&A [0.16]. Rich and healthy diversity is seen as a result of fewer disturbances, ideal soil, and appropriate rainfall that encourage natural species regeneration. However, overgrazing and a small area with a high population of people may be the cause of the lack diversity. *Prosopis juliflora* (Sw.) DC had the highest IVI of 55.71, which was followed by *Acacia nilotica* L. and *Acacia tortalis* (Forsk.) Brennan, each with an IVI value of 53.33 and 52.59. The *Tamarindus indica* L. had a minimum IVI Value of 3.68. IVI represent for a species' dominance within a community. The degree of dominance increases with IVI. In study region IVI values of *Acacia nilotica* (L.) , *Prosopis Juliflora* (Sw.) DC. , *Acacia tortalis* (Forsk.) Hayne., *Acacia chundra* (Roxb. Ex Rottl.) Willd., *Cassia fistula* L. , *Salvadora persica* L. , *Azadirachta indica* A. Juss. , *Ailanthus excelsa* Roxb. are 53.33, 55.71, 52.59, 17.31, 12.33, 12.22, 10.86, 9.59 respectively. It means that the most dominant species is *Prosopis juliflora* (Sw.) DC. followed by *Acacia nilotica* L. , and *Acacia tortalis* (Forsk.) Hayne. IVI value of species shows that the species altered through time and was functional surrounding environmental condition, as nutrient accessibility in the main spoils organic matter content, structure and texture besides their specific competition (Soave, 1996).

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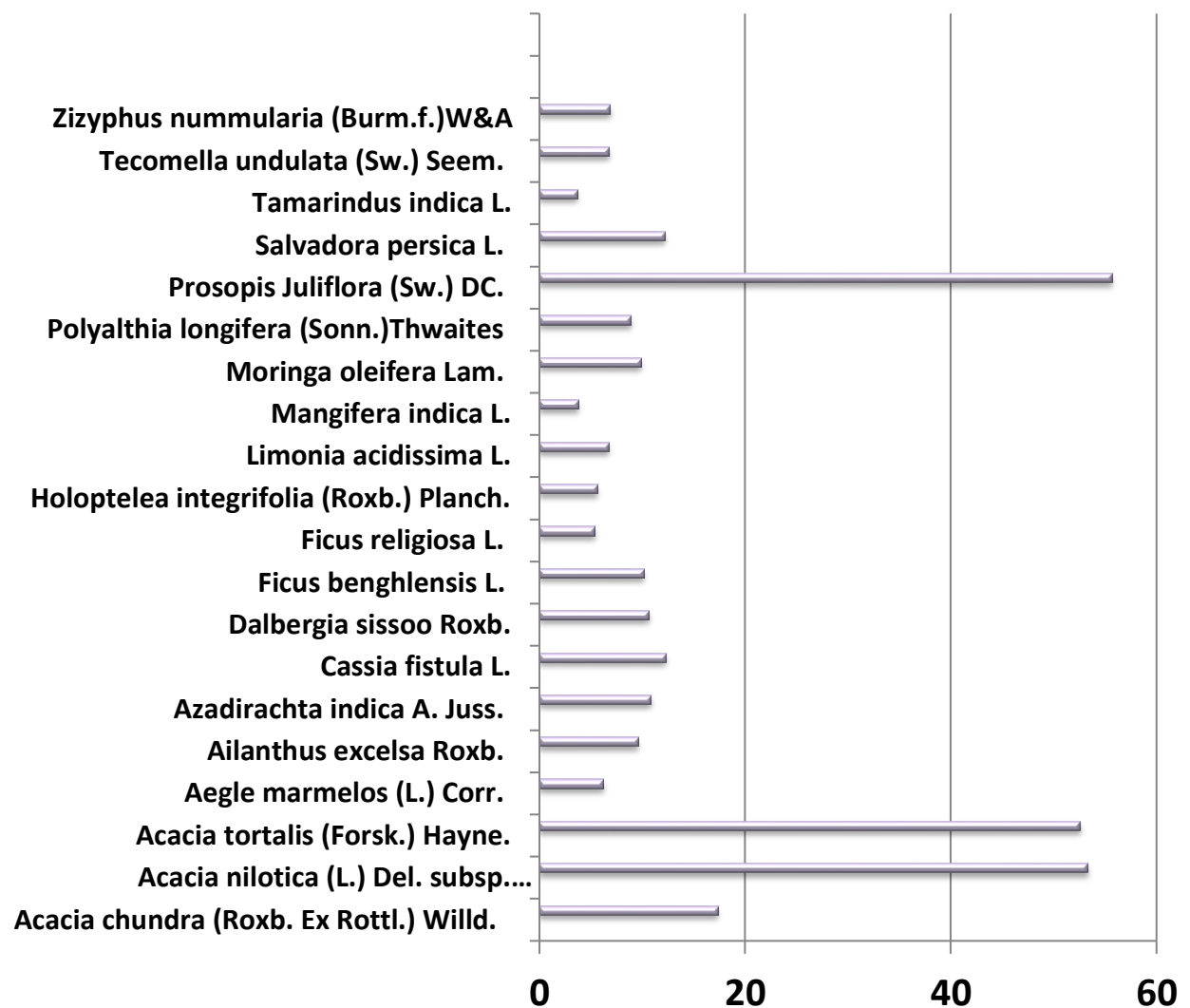
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Table 1: Phytosociological data analysis

Sr. No.	Scientific Name	Local name	No of species	No Of Plot	Density	Abundance	Frequency	Frequency Class	Relative Density	Relative Abundance	Relative Frequency	% Composition	IVI
1	<i>Acacia chundra</i> (Roxb. Ex Rottl.) Willd.	Kher	100	10	10.00	10.00	100.00	E	6.37	2.87	8.13	0.78	17.37
2	<i>Acacia nilotica</i> (L.) Del. subsp. indica(Bth.) Brenan	Baval	489	10	48.90	48.90	100.00	E	31.15	14.05	8.13	3.80	53.33
3	<i>Acacia tortalis</i> (Forsk.) Hayne.	Babool	481	10	48.10	48.10	100.00	E	30.64	13.82	8.13	3.74	52.59
4	<i>Aegle marmelos</i> (L.) Corr.	Bili	10	5	1.00	2.00	50.00	C	0.64	0.57	5.06	0.08	6.27
5	<i>Ailanthus excelsa</i> Roxb.	Arduso	15	8	1.50	1.88	80.00	D	0.96	0.54	8.10	0.12	9.59
6	<i>Azadirachta indica</i> A. Juss.	Limdo	36	7	3.60	5.14	70.00	D	2.29	1.48	7.09	0.28	10.86
7	<i>Cassia fistula</i> L.	Garmalo	50	7	5.00	7.14	70.00	D	3.18	2.05	7.09	0.39	12.32
8	<i>Dalbergia sissoo</i> Roxb.	Sisam	41	6	4.10	6.83	60.00	C	2.61	1.96	6.07	0.32	10.65
9	<i>Ficus benghlensis</i> L.	Vad	42	5	4.20	8.40	50.00	C	2.68	2.41	5.06	0.33	10.15
10	<i>Ficus religiosa</i> L.	Piplo	10	4	1.00	2.50	40.00	B	0.64	0.72	4.05	0.08	5.40
11	<i>Holoptelea integrifolia</i> (Roxb.) Planch.	Kanajho	12	4	1.20	3.00	40.00	B	0.76	0.86	4.05	0.09	5.67

12	<i>Limonia acidissima</i> L.	Kothu	6	6	0.60	1.00	60.00	C	0.38	0.29	6.07	0.05	6.74
13	<i>Mangifera indica</i> L.	Ambo	5	3	0.50	1.67	30.00	B	0.32	0.48	3.04	0.04	3.83
14	<i>Moringa oleifera</i> Lam.	Saragavo	18	8	1.80	2.25	80.00	D	1.15	0.65	8.10	0.14	9.89
15	<i>Polyalthia longifera</i> (Sonn.)Thwaites	Asopalav	36	4	3.60	9.00	40.00	B	2.29	2.59	4.05	0.28	8.93
16	<i>Prosopis Juliflora</i> (Sw.) DC.	Gando baval	478	8	47.80	59.75	80.00	D	30.45	17.17	8.10	3.72	55.71
17	<i>Salvadora persica</i> L.	Piludi	49	7	4.90	7.00	70.00	D	3.12	2.01	7.09	0.38	12.22
18	<i>Tamarindus indica</i> L.	Amli	8	2	0.80	4.00	20.00	A	0.51	1.15	2.02	0.06	3.68
19	<i>Tecomella undulata</i> (Sw.) Seem.	Ragatrohido	14	5	1.40	2.80	50.00	C	0.89	0.80	5.06	0.11	6.76
20	<i>Zizyphus nummularia</i> (Burm.f.)W&A	Chani bor	21	4	2.10	5.25	40.00	B	1.34	1.51	4.05	0.16	6.89
	Total		1921		192	237	1230		122.36	67.99	118.52	14.94	308.87

IVI of different tree species of Patan



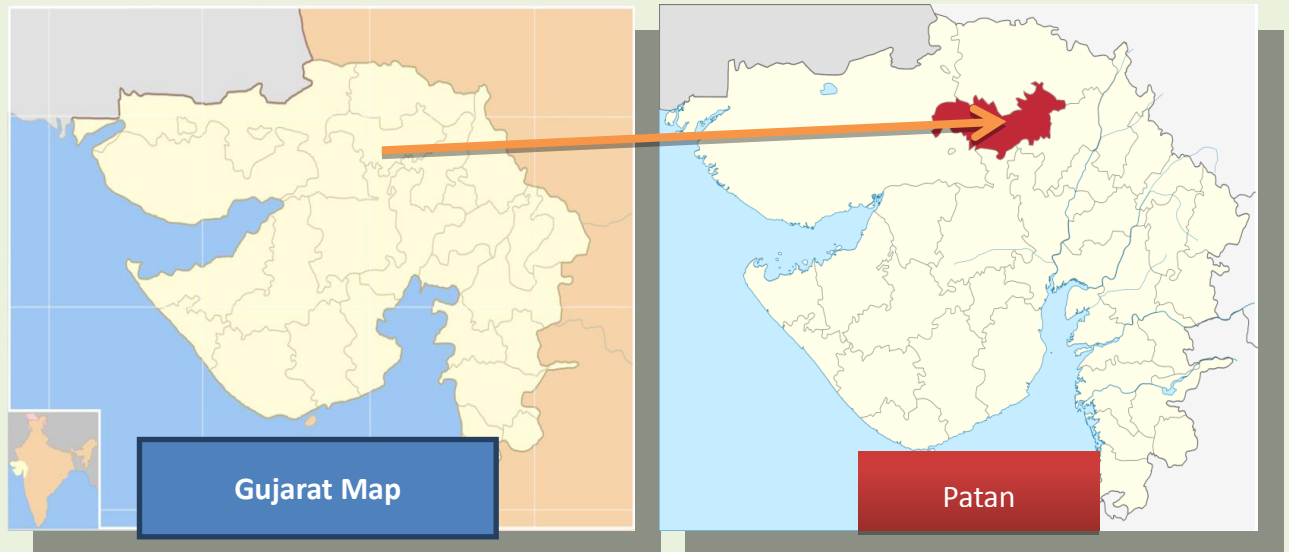


Fig.1: Showing study area