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Diversity and distribution of plants species in Ozat river, Junagadh district, Gujarat

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Abstract
A survey was conducted between October 2020 and June 2020 to determine the diversity, and distribution of plants in 6 sites of the ozat river and to relate species diversity and soil types. The survey examined the vegetation diversity of all sites with the help of a twin belt transect, in which phytosociological parameters such as frequency, density, abundance, relative density, and diversity indices such as Shannon's index, Simpson index, and Pielou's index were calculated. Ten (10) quadrates, each of 5 × 5 m, were surveyed at the selected sites of the ozat river. 37 plant species belonging to 35 genera were identified and the dominant species *Alternenthera sessile, Parthenium husterophorus, and Acacia Senegal* were the most represented. The present study investigated higher species diversity (Shannon index) in the Shapur region (1.79), wherever lower diversity was observed in the Dhanfuiya region (0.7) and higher species richness was observed in Shapur (0.68), whenever lower species richness was observed in Dhanfuiya region (0.89).

Keywords: vegetation, phytosociology, diversity, species richness

Introduction
The term biodiversity- the short form of biological diversity was coined by Walter G. Rosen in 1985, not withstand the origin of concept goes for back in time. Vegetation diversity is the study of the relationship between the local Flora and indigenous culture. The distraction between vegetation (the general appearance of a community) and flora (the taxonomic composition of a community) was first made by (Thumanr, 1849). Vegetation is the study of not particular regions of planters. The study of all plants community or vegetation simply means the investigation of plants used by local people. The diversity of vegetation types in our landscapes is often closely tied to the range of ecosystems- the variety of habitats, biotic communities, and ecological processes- that are available for native plants to live in. Vegetation types are also usually the most obvious parts of terrestrial ecosystems; so many ecosystems are described in terms of their dominant plant (e.g. grasslands, yellow Box-Red Gum woodland).

The principal aim of Phytosociology is to describe the vegetation, explain or predict it's pattern and classify it in a meaningful manner. (Kaddahun *et al*., 2008) [6]. We know that ecosystems are undergoing change due to pollution, invasive species, overexploitation by humans, and climate change. Most people are beginning to recognize that diversity at all levels-gene pool, species and biotic community is important and needs to be considered. (Ghani 2003) [5]. In Thailand and Sri Lanka, it is used as a galactagogur. The leaves and shoots are boiled and drunk as an antihypertensive remedy (Acharya and Pokhrel, 2006) [2]. Many plants and their parts are used for the treatment of various diseases in different parts of the world, and are being screened for antimicrobial activities and the results obtained from these scientific studies have aided in the rationalization of medical use of these plants (Abo *et al*., 1999) [1]. Much work has been done on pollution parameters and biodiversity of rivers, lakes, pounds and their marginal wetlands (Kapoar, 2004) [7]. The vegetation complex fluctuates from season to season and year to year. The fluctuation suggests a response by each species population to incoming heat, moisture and light as modified by the vegetation itself (Gaston, 2000) [3]. May completely cover the young growing apex. Seedings are often grazed by gazelles, goats, and pigs (Morton, 1977) [8]. Due to their dietary importance, many scientific studies have been carried out on the nutritive values of green leaves (Gayathri *et al*., 2006) [4]. Many of these indigenous medicinal plants are used as spices and food plants. They are also sometimes added to foods meant for pregnant and nursing mothers for medicinal purposes (Okwu, 1999) [9].

A total of 215,644 species of plants out of 298,000 predicted have been cataloged on Earth to date. Apart, 8,600 plant species have been recommended from the ocean out of an estimated 16,600. In India, the floral diversity is concentrated in four phytogeographical unique regions. The Indian flora accounts for 11.4% of the world and about 28% of the plant species are endemic (species confined to a particular geographical region) to India. According to current estimates, the Indian flora represents nearly 12% of the global floral diversity (excluding viruses). The significance of the Indian flora is further evidenced by the number of different regions of the country.

Materials and Method

Study area

The study was conducted in the selected sites of Ozat River in Junagadh district, Gujarat, India. Selected villages of Ozat River are Vanthali sinchay, Vanthali Pull, Shapur, Ganthila and Dhanfuliya. The average temperatures of the Ozat river area are 32°C and 40°C respectively. The average annual rainfall is 55 inches. The natural vegetation of the study area is characterized as Acacia-wooded grasslands. Ozat river covers the natural vegetation. The study conducted biodiversity and soil analysis of selected villages near Ozat river (Junagadh). I was surveyed selected villages of the Ozat River. In selected sites are 5×5 m quadrate 10 times is used.

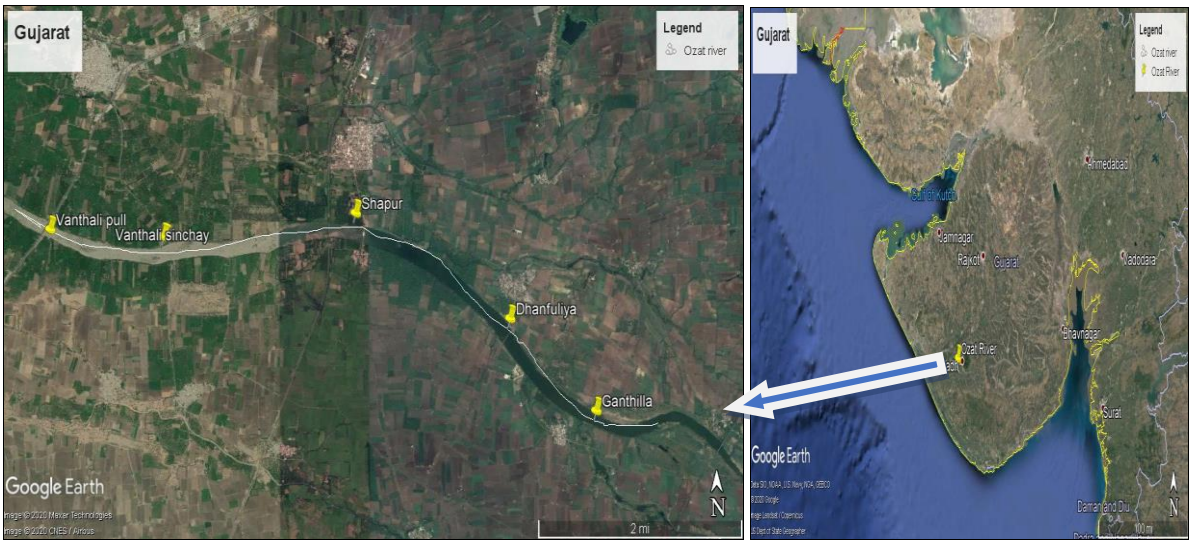

Fig 1: Map Shows study area (Source: Google earth)

Data analysis

Density, Frequency, Abundance, Relative Frequency and Relative Density was calculated by using the following formulas. Diversity indices such as a Shannon diversity index and Simpson index were calculated in following formulas (Shannon, 1948; Simpson 1949).

Results and Discussion

Ozat River is a river in western India in Gujarat whose origin is near Visavadar. I have surveyed five location near or around the Ozat river namely, Vanthali sinchay, Vanthali pull, Shapur, Ganthila and Dhanfuliya. Study revealed the vegetation diversity in selected sites of Ozat River. Phytosociological parameters such as a frequency, density, relative density and relative frequency were studied and other diversity indices like Shannon index and Simpson index were studied.

From this 37 plant species highest frequency is observed in *Parthenium husterophorus* (100%), *Panicum repens* (!00%), and *Eustachys paspaoides* (100%) plants. Wherever, lowest frequency was observed in *Tecona grandis* (10%), *Ficus benghalensis* (10%), *Musa paradisiacal* (10%), and *Syzygium cumini* (10%). The highest density is observed in *Parthenium husterophorus* (61.74). When lowest density is observed in *Tecona grandis* (0.1), *Ficus benghalensis* (0.1), *Musa paradisiacal* (0.1), and *Syzygium cumini* (0.1) plants. The highest abundance was observed in *Chionachn egigantea* (78.2). When lowest abundance was observed in *Tecona grandis* (1), *Ficus benghalensis* (1), *Musa paradisiacal* (1), and *Syzygium cumini* (1) plants. The highest relative frequency was observed in *Eustachys paspaoides* (74.99%). When the lowest relative frequency was observed in *Syzygium cumini* (4.76%) plants. The highest relative density was observed in plants. When lowest relative density were observed in plants.

Table 1: Average of phytosociological attributes of plant species in Ozat River region.

No	Species name	Average Frequency	Average Density	Average Abundance	Average Relative Frequency	Average Relative Density
1	*Parthenium husterophorus*	100%	61.74	61.74	68.8%	16.08%
2	*Alternenthera sessile*	96.66%	33.25	58.83	69.18%	13.26%
3	*Malvastrum coromandelianam*	60%	5.8	9.6	33.33%	1.8%
4	*Dactyloctenium aegyptium*	65%	32.57	42.7	42.21%	7.08%
5	*Chionachn egigantea*	100%	78.2	78.2	73%	21.02%

6	*Alpuda mutica*	90%	11.64	11.64	68.8%	36.42%
7	*Tecona grandis*	10%	0.1	1	55.5%	0.032%
8	*Ficus benghalensis*	10%	0.1	1	55.5%	0.57%
9	*Bamboo valgaries*	20%	3.3	11.3	34.89%	1.38%
10	*Acacia senegal*	50%	1.5	2.93	29.6%	0.37%
11	*Vachellia nicotica*	50%	1.2	2.3	32.18%	0.28%
12	*Senna auriculta*	20%	0.7	3.5	5.55%	0.22%
13	*Dichanthium caricousm*	20%	0.60	2.16	34.89%	0.03%
14	*Chloris barbata*	100%	41.2	41.2	59.3%	11.04%
15	*Tridax procumbens*	55%	13.7	17.4	28.3%	3.86%
16	*Leucaena leucocephala*	35%	2.95	2.7	17.82%	1.81%
17	*Azadirachta indica*	30%	0.5	1.66	12.77%	0.14%
18	*Psidium guajava*	30R	5.4	3.1	17. 82%	0.82%
19	*Ageratum houstoniana*	40%	4.2	10.5	19.04%	1.27%
20	*Moringa oleifera*	40%	0.6	1.5	19.04%	0.18%
21	*Ageratum conyzoides*	20%	0.5	2.5	9.52%	0.15%
22	*Oxalis dillenili*	50%	76	152	23.80%	23.10%
23	*Corymbia citriodora*	50%	1.2	2.4	23.80%	0.36%
24	*Murray koenigii*	40%	1	2.5	19.04%	0.30%
25	*Musa paradisiaca*	10%	0.1	1	4.76%	0.03%
26	*Abutilon theophrasti*	20%	0.3	1.5	9.52%	0.091%
27	*Panicum repens*	100%	29.1	29.1	47.61%	8.84%
28	*Solenum virginianum*	15%	0.3	1.75	9.03%	0.08%
29	*Pithecellobiun duice*	40%	1.8	7.9	24.59%	1.42%
30	*Lantana camara*	15%	0.95	5	10.46%	0.19%
31	*Syzygiumcumini*	10%	0.1	1	4.76%	0.030%
32	*Butea monosperma*	26.6%	0.36	1.38	21.06%	0.088%
33	*Ziziphus maritima*	33.33%	0.8	2.28	26.68%	0.19%
34	*Calotropis procera*	46.6%	1.7	2.67	36.006%	0.27%
35	*Calotropis gigantea*	30%	0.6	2	27.27%	0.15%
36	*Brassica napus*	90%	32.5	36.11	75%	6.44%
37	*Eustachys paspaoides*	100%	12.08	12.08	74.99%	26.53%

Shannon index and Simpson index

Diversity Index (also called phylogenetic or Simpson's Diversity Index) is a quantitative measure that reflects how many different types (such as Species) there are in a dataset (a community) and that can simultaneously take into account the phylogenetic relations among the individual's distribution among those types, such as richness, divergence or evenness. Shannon index is derived diversity of each and every location. Higher diversity is measured in the Vanthali pull. However, lower diversity is measured in Vanthali sinchay. Simpson index is derived in species richness in a particular location. 0 contain higher species richness and 1 contains lower species richness. Shapur village contains higher species richness and Vanthali pull contain lower species richness.

Table 2: Diversity indices in selected sites of Ozat river

Location name	Shannon index	Simpson's index
Vanthali sinchay	1.28	0.71
Vanthali pull	0.9	0.75
Shapur	1.79	0.68
Gathila	1.41	0.73
Dhanfuliya	0.7	0.89

Conclusion

The study was undertaken on the Ozat river In five different places. The names of those five places are According to: 1. Vanthali sinchay yojna, 2. Vanthali Bridge, 3. Shapur, 4. Dhanfuliya and 5. Ganthila. In five places I had varieties of different plants were seen. Of that total 37 species present 15 species are shrubs, the other 10 species are trees, there are 7 species of remaining grass. Dominant species were found in *Alternenthera sessile, Parthenium husterophorus, and Acacia Senegal. Alternenthera sessile* is used for the treatment of dysuria and hemorrhoids. *Parthenium husterophorus* is used for health benefits, *viz* remedy for skin, inflammation, diarrhoea, malaria, and urinary tract infection, and *Acacia Senegal* is used for pharmaceutical ingredient in stomach inflammation and medication for throat.

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