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Role of Sacred Groves in Phytodiversity Conservation of Block Nud, District Samba (J&K)

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Abstract: ***The study aimed to investigate tree diversity in sacred groves and their adjoining forest areas. A total of seven (7) sacred sites and their adjoining forest areas were selected randomly and thirty five (35) quadrates, five (5) in each grove of size 20m×20 m were established in the sacred groves and thirty five (35) quadrates of same dimensions were established in the adjoining forest areas. For the qualitative analysis, a detailed questionnaire was designed. For quantitative analysis; frequency, density and abundance of tree species were analyzed and IVI (Importance value index) was calculated. The study concluded that the sacred groves were rich in tree diversity than their adjoining forest areas. Shannon-Wiener index of sacred groves was calculated as H= 3.5 and that of the adjoining forests was calculated as H= 2.8. Simpson index-D of Scared groves was (0.9) and their adjoining forest was (0.9) and the Evenness of tree species was (0.88) for sacred groves and (0.37) for their adjoining forests. Margalef's index for sacred groves was (6.9) and (7.0) for the adjoining forests.***

Keywords: Sacred grove, Phyto-diversity, Adjoining forests, Conservation, Qualitative & Quantitative analysis

1. Introduction

Sacred groves are banks of genetic diversity that are to be preserved and sustained. These often contain certain species that have disappeared from the outer regions of the grove [1]. These are also described as information sites regarding various herbs and medicinal flora. These are the storage of rare and endangered species and can be regarded as remains of primary forest, unaffected by local inhabitants due to their belief that deities reside in them [2]. Sacred groves also provide a meeting place for various cultural festivals including marriages, death rituals, etc. [3].

The vast repository of traditional knowledge of plants has been cared for and preserved by local communities and transferred orally from generation to generation [3]. As a belief, the vegetation and other life forms on a patch of land are to be kept undisturbed this is an expression of inter-relation of a man with the divine or with nature [4]. The problems of the cultural, physical and social environment can be solved by the supervision of these sacred groves [5]. These are often perceived as folk-conservationist strategies [6].

To study the diversity of vegetation in the sacred groves and their adjoining forests as well as the role played by groves in phytodiversity conservation, the present study was conducted in some prominent sacred groves of Block Nud, district Samba (J&K).

2. Literary Survey

Sacred groves areforest areas of different sizes which are protected by the local people living nearby. Federal legislation in India did not protect sacred groves. Some Non-governmental Organizations work with local villagers to protect such places. Traditionally, members of the community take steps to protect the grove. For centuries, traditional institutions managed most community forests in hill regions of North-eastern India and most of these mechanisms are still functional [7]. The traditional institutions are more or less effective in managing the community forests in the region which is evidenced by the prevalence of a high percentage of forest covers outside the government control [8]. Examples of traditional biophilia of ancient human culture are sacred groves and other ethno-forestry elements which express a tendency to love and respect nature [9].

3. Previous Work

The Phytodiversity of the sacred grove and its traditional uses in Karaikal District, U.T Puducherrywas studied by Sambandan and Dhatchanamoorthy [10].They worked on the value of sacred groves as the repositories of medicinal and economically important plants. The diversity of vegetation in the sacred groves of Rajouri, J&K was studied by Gupta and Sharma [11]. Devi and Sharma [12] studied the traditional ways of conserving plant diversity in sacred groves of the Bhalwal block of Jammu district. This study also pointed out the damage faced by the sacred groves like construction activities, grazing of live stocks and modernization. Premalatha [13] studied the phytodiversity and phytosociology in Daroji Sloth bear Sanctuary and its adjoining area near Hospet Bellary District Karnataka. The impact and ecosystem service of forests and sacred groves as the savior of water quantity and quality in Garhwal Himalaya, India was studied by Jana *et al.*,[14]. Dar *et al.*, [15] studied Tree Diversity, Biomass, and Carbon storage in Sacred Groves of Central India and observed high species richness, higher carbon stocks, and sequestration potential in both vegetation and soil of sacred groves.

4. Study Area

The union territory of Jammu and Kashmir lies between latitude $32^0.27`$ to $37^0.50`$N and longitude $73^0.26`$ to $76^0.57`$ E, covering an area of about 42,241 km^2. The UT is located in the far north of the Indian republic and is a mountainous zone of the northwest Himalayas that shares

boundaries with Pakistan in the west and china in the northeast. It has been divided into two divisions which are Jammu and Kashmir. These two divisions are further divided into 20 districts, 10 districts in the Kashmir division and 10 districts in the Jammu division. Samba is a district of the Jammu region in the Indian administered union territory of Jammu and Kashmir. Samba district lies between the latitude of $32^0.34`N$ &$75^0.07`E$ and the longitude of $32^0.57`N$ &$75^0.12`E$ covering an area of about 90632 hectares. It is 42 km away from the winter capital Jammu.

District Samba is bound by district Kathua in the east Udhampur district in the north, district Jammu in the west and on the southern side this district shares about 55.5 km long international border with Pakistan. It consists of 6 tehsils and nine blocks. The nud block is one of the 9 blocks of the Samba district of the Jammu and Kashmir union territory of India. Nud block comprises of 10 panchayats. The nud block is our study area which is located 5 km toward the west of the district head-quarter of samba as shown in Figure 1. The block Nud is situated 384 meters above sea level.

Figure 1: Blockwise map of district Samba

5. Methodology

The study aimed to investigate tree diversity in sacred groves and their adjoining forest areas. A total of seven (7) sacred sites and their adjoining forest areas were selected randomly and thirty five (35) quadrates, five (5) in each grove of size 20m×20m were established in the sacred groves and thirty five (35) quadrates of same dimensions were established in the adjoining forest areas.

For the qualitative analysis, a detailed questionnaire was designed. For quantitative analysis; frequency, density and abundance of tree species were analyzed and IVI (Importance value index) was calculated. A list of trees along with their families was also mentioned. Tree diversity in both the sacred groves and their adjoining areas was calculated using Shannon Wiener Index.

5.1 Primary analysis of data

The frequency, density and abundance of plant species were analyzed from collected data according to the formulae given by Curtis and McIntosh [16]. IVI (Importance value index) was obtained by calculating the relative frequency, relative density and relative abundance of each tree species in each of the seven sacred groves and its adjoining forest using random sampling by the Quadrat method.

Frequency: It may be defined as the degree of dispersion of individual species in an area and represented in terms of percentage occurrence and calculated by the following equation:

$$\textit{Frequency} = \frac{\text{Number of quadrats in which species occurred}}{\text{The total number of Quadrats studied}} \times 100$$

Density: It may be defined as several individuals of the species in any unit area and represented as the numerical strength of the species in a community. It is calculated as under:

$$\textit{Density} = \frac{\text{Total number of plants of a species in all the quadrats}}{\text{The total number of quadrats studied}}$$

Abundance: It may be defined as the number of individuals of any species per sampling unit of occurrence. It is the ratio of the total number of species in all quadrates and the total number of quadrats in which the species occurred.

$$\textit{Abundance} = \frac{\text{Total number of plants of a species in all quadrats}}{\text{Total Number of quadrats in which the species occurred}}$$

Basal area: It refers to the ground penetrated by stems and is used to calculate the dominance of tree species. It is a good indicator of the size, volume and weight of the tree. It may be defined as one of the most important parameters of calculating the standard biomass in any area used in turn as a measure of productivity and calculated by formulae given as under:

$$\textit{Basal Area} = \frac{(\text{CBH})^2}{4\pi}$$

(Where, CBH= Circumference at breast height)

Importance Value Index (IVI): It helps to estimate the relative importance of species as compared to other species in a community. For calculation of importance value index of species, the absolute values recorded were converted into relative values and thus incorporated the following three parameters:

Relative Frequency: It is defined as the proportion of frequency of a species to the stand as a whole and calculated as under:

$$\textit{Relative Frequency} = \frac{\text{Frequency of the species}}{\text{The total frequency of all the species}} \times 100$$

Relative Density: It may be defined as the proportion of density of a species to the stand as a whole and calculated as under:

$$\textit{Relative Density} = \frac{\text{Density of the species}}{\text{Total density of all the species}} \times 100$$

Relative Dominance: as the proportion of dominance of a species to the stand as a whole and calculated as under:

$$\textit{Relative Dominance} = \frac{\text{Basal area of the species}}{\text{Total Basal area of all the species}} \times 100$$

In calculating the Importance Value Index (IVI), the percentage value of relative frequency, relative density, and

relative dominance are summed together and this value is called as Importance Value Index of species [17] which determines vegetation status and importance of component species in stratum stand.

(IVI)= Relative density + Relative frequency + Relative dominance.

5.2 Secondary Data Analysis

Secondary analysis of data was done to document the species diversity of the sacred groves under the proposed study area.

Species Diversity: It is the measure of diversity within an ecological community and will be calculated by using the Shannon-Wiener index as:
H' = -∑ [(*ni*÷*N*) ln (*ni*÷*N*)**]**
Where *ni* = number of individuals of i^{th} species
N = total number of individuals of all species.

5.2.1. Species Richness, Diversity and Dominance Indices

The species richness of the vascular plants was calculated by using the following method.

(a) 'Margalef's Index of Richness' (DMg) [18]**:-**
DMg = (S-1) / (ln N)
Where,
S = Total number of species
N = Total number of individuals

Species diversity and dominance were calculated by using Shannon's diversity index and Simpson's index of dominance which were calculated using the important value index (IVI) of species.

(b) Shannon-Weaver index of diversity[19]**:-** The formula for calculating the Shannon diversity index is:
H = - ∑ Pi ln Pi
Where, H' = Shannon index of diversity pi = the proportion of the important value of ith species (pi = ni / N, ni is the IVI of i^{th} species
N is the IVI of all the species).

(c) Simpson Index of Dominance[20]:- The equation used to calculate Simpson's index was

$$D = - \sum (Pi)^2$$

Where, D = Simpson index of dominance pi = the proportion of the important value of ith species (p= ni/N, ni is the IVI of ith species and N is the IVI of all the species). When the value of D decreases, diversity increases and hence the Simpson's index is represented as 1/D or 1- D.

(d) Sorensen's Similarity Index[18]**:-**

$$IS = \frac{2C\ X\ 100}{A + B}$$

Where IS = Index of similarity A = Total number of species in one community B = Total number of species in another community C = Number of species which occur in both communities. The similarity index ranges from 0 to 100 to quantify the range from no similarity to complete similarity.

6. Results

The study was conducted in various sacred groves of Nud. The names of the sacred groves, local deities associated with them and other related information have been given in Table 1.

6.1 Quantitative analysis

The results of the quantitative analysis of data obtained are given in Table 2 and Table 3. In Sacred groves, the IVI value of *Ficusreligiosa was* found to be the highest among all i.e., 46.06 while in their adjoining forest areas, the *Mangiferaindica* L. (42.93) has the maximum IVI value.

6.2 Qualitative analysis

For the qualitative analysis, a detailed questionnaire was designed. The socio-economic and religious importance based on interviews revealed that these sacred groves were associated with religion. The respondents were familiar with these sacred groves and considered these sites as a place of deity and had little concern about the biological diversity present in them. But they had a belief that if they disturb the trees and other biological assets in the area, the deity will punish them.

7. Conclusion

The study concluded that the sacred groves were rich in diversity than their adjoining forest areas. As Species diversity increases with the stability of the community, the sacred groves can be considered to be more stable than their adjoining areas (Shannon- Wiener index for tree species of Sacred groves was H=3.5 and of the adjoining forests of sacred groves was H=2.8 and the Evenness of tree species was (0.88) for sacred groves and (0.37) for their adjoining forests). Margalef's index for sacred groves was 6.9 and 7.0 for the adjoining forests.

8. Future Scope

The traditional belief system is disappeared which was important to the concept of sacred groves. The study revealed that these sacred groves are degrading and getting reduced in size due to human activities. The construction activities in the sacred groves have influenced the biodiversity significantly which has reduced the area under trees. To protect these groves, there is a need to raise awareness among rural people about the importance of sacred groves and these should be managed through some initiatives taken by the government.

References

[1] Malhotra K.C., Stanley S., Hemam N.S., Das K. 2001. Biodiversity conservation and ethics: Sacred groves and pools, In Fujiki, N., &Macer, R.J., (eds.),

Bioethics in Asia, Proceedings of the UNESCO Asian. Bioethics Conference, 338-345.
[2] Ganesan S.,Ponuchamy M., Kesavan L., Selvaraj A. 2009. Floristic composition and practices on the selected sacred grooves of Pallapatty Village, Tamil Nadu. Indian journal of traditional knowledge, 8(2), 154-162.
[3] DebD., Malhotra K.C. 1997. Interface between biodiversity and tribal cultural heritage: An explanatory study, I. Human Ecology,8, 157-163.
[4] Chandran M.D.S., Gadgil M., Hughes J.D., 1998. Sacred groves of the Western Ghats. Conserving the sacred for biodiversity management, Oxford and IBH, New Delhi, 211-232.
[5] Pal T.,2012. Supervision of Sacred Groves (A traditional science) on Environment Management: Diagrammatically explained.
[6] Arora V.,2006. The forest of symbols embodied in the Tholung sacred landscape of Northern Sikkim, India. Conservation of society, 4(1), 55-83.
[7] Bhagwat S.A., Kushalappa C.G., Williams P.H., Brown, N.D., 2005. A landscape approach to biodiversity conservation of sacred groves in the Western Ghats of India. Conservation Biology, 19(6), 1853-1862.
[8] Tiwari S., Rao P., 2012. Ecosystem Conservation through Sacred Groves. In innovative energy technology systems and environmental concerns: a sustainable approach
[9] Deb D., 2007. Sacred Groves of West Bengal: A model of community forest management. Available at SSRN 2403540
[10] Sambandan K., Dhatchanamoorthy N., 2012. Studies on the phytodiversity of a sacred grove and its traditional uses in Karaikal district, UT Puducherry. Journal of Phytology, 4(2).
[11] Gupta B., Sharma S., 2013. Role of sacred groves in Phyto-diversity conservation in Rajouri (J&K), International Journal of Science and Research, 2, 97-101.
[12] Devi R., Sharma S., 2014. Sacred Groves: Traditional Way of Conserving Plant Diversity in Block Bhalwal of Jammu District (J&K), International Journal of Science and Research, 3, 239-242.
[13] Premalatha K., 2015.Phytodiversity and phytosociological studies in Daroji Sloth Bear Sanctuary and its adjoining area near hospet Bellary District Karnataka.
[14] Jana P., Dasgupta S.,Todaria N.P., 2017. Impact and ecosystem service of forest and sacred grove as saviour of water quantity and quality in Garhwal Himalaya, India. Environmental monitoring and assessment, 189(9), 1-10.
[15] Dar J.A., Subashree K., Raha D.,Kumar A., Khare P.K., Khan M.L., 2019. Tree diversity, biomass and carbon storage in sacred groves of central India.Environmental Science and Pollution Research,26,37212-37272.
[16] Curtis J.T., McIntosh R.P., 1950. The interrelation of certain analytic and synthetic phytosociological characters. Ecology, 31, 434-455.
[17] Curtis J.T., 1959. The Vegetation of Wisconsion: An Ordination of Plant Communities.University of Wisconsion Press, Madison, Wisconsin, pp: 657.
[18] Magurran A.E., 1988. Ecological diversity and its measurement.Princeton university press.
[19] Shannon C.E., WeaverW., 1949. The mathematical theory of communication.The University of Illinois. Urbana, Chicago, London. pp. 3–24.
[20] Simpson E.H., 1949. Measurement of Diversity. Nature 163: 688.

Table 1: List of Sacred Groves selected for vegetative study in Block Nud:

S No.	Name of the Sacred Grove	Place	Built in	Built/ Maintained by	Deities Associated	No of Tree species
1.	Thakur Dwarka Mandir	Motliyan Kalan	200 yrs old	by a local named KanhaNand	Thakur Dwarka	25
2.	AvduNath	Mananu	2700 yrs old	Baba Satpal	Lord Shiva	35
3.	Baba Sidhgoria	BadlaDeonia	100 yrs old	Locals	Baba Sidhgoria	31
4.	Shiv ji	Kayanialna	2014	Ram Das	Lord Shiva, Lord Ram, Hanuman Ji,Sukrala Mata, GanpatiJi, Mata Vaishnodevi and Radha Krishanmandir.	26
5.	Shiv Mandir	Navi Kali	150 yrs old	Locals	Lord Shiva	33
6.	Shiv JiMandir	South Sarain	1950	Locals	Lord Shiva	24
7.	Lakshmi Mata temple	Dagore	2003	By SC Community	Lakshmi Mata	21

Table 2: Phyto-sociological Parameters for Trees in the selected sacred groves:

S. No.	Name of the tree species	Relative frequency (%)	Relative density (%)	Relative dominance (%)	IVI
1.	*Acacia modesta*(L.) Willd.	1.75	2.15	0.46	4.36
2.	*Acacia nilotica*Willd.	0.70	0.53	0.57	1.8
3.	*Aeglemarmelos*(L.) Corr.	3.5	0.26	0.34	4.1
4.	*Ailanthus excelsa*Roxb.	0.70	1.07	0.27	2.04
5.	*Alstoniascholaris*(L.) R.Br.	1.40	2.07	0.26	3.73
6.	*Azadirectaindica* A. Juss.	2.80	2.688	2.89	8.37
7.	*Bauhinia variegata*L.	2.456	2.35	0.87	5.67
8.	*BerberislyticumRoyle*.	3.50	3.20	1.62	8.32

9.	*Buteamonosperma*Taub.	1.40	2.07	1.62	5.09
10.	*Callistemon lanceolatus*(Sm.) Sweet	1.40	1.88	0.27	3.55
11.	*Carica papaya* L.	3.50	3.20	0.173	6.87
12.	*Cassia fistula* L.	1.40	1.07	0.208	2.67
13.	*Casearia*tomentosaRoxb.	.700	0.47	0.659	1.82
14.	*Citrus aurantium* L.	2.80	4.24	0.300	7.34
15.	*Citrus limon* L.	2.45	2.64	0.219	5.30
16.	*Citrus sinensis* L.	3.50	3.96	0.277	7.73
17.	*Dalbergiasisoo*Roxb.	1.40	1.88	3.24	6.52
18.	*Emblicaofficinalis*L.	3.85	4.24	0.81	8.9
19.	*Eriobotrya japonica* (Thunb.) Lindl.	1.40	1.07	0.219	2.68
20.	*Eucalyptus citridora*Linn.	1.05	0.75	2.43	4.23
21.	*Ficusbenghalensis*L.	3.50	3.20	14.58	21.28
22.	*Ficus palmate* Forssk.	1.754	1.88	0.55	4.18
23.	*Ficusracemosa*L.	1.40	1.07	3.24	5.71
24.	*Ficusreligiosa*L.	4.211	3.20	38.65	46.06
25.	*Gossipiumhirsutum*L.	.700	0.53	0.18	1.41
26.	*Grewiaoptiva*Drumm. exBurret.	3.50	4.52	0.42	8.44
27.	*Hibiscus rosa- sinensis*L.	1.40	1.88	0.173	3.45
28.	*Lanneacoromandelica*(Houtt.) Merr.	1.40	1.32	0.243	2.96
29.	*Leucaenaleucocephala (Lam.)* de Wit.	1.754	2.64	0.42	4.81
30.	*Mangiferaindica*L.	3.50	3.94	8.68	16.12
31.	*Meliaazaderach*L.	4.211	3.20	0.265	7.67
32.	*Moringaoleifera*, Lamk.	3.50	3.20	1.14	7.84
33.	*Morus alba* L.	2.105	1.88	0.509	4.49
34.	*Murrayakoenigii*(L.) Spreng.	3.50	4.03	0.37	7.9
35.	*Musa paradisiaca*L.	.700	0.53	0.243	1.47
36.	*Psidiumgujava*L.	2.806	2.64	0.45	5.89
37.	*Spermodictyonsuaveolens*Roxb.	0.35	0.26	0.17	0.78
38.	*Syzygiumcumini*(L.) Skeels.	2.105	1.61	7.16	10.87
39.	*Terminaliaarjuna*(Roxb.) Wight and Arn.	3.50	2.96	0.87	7.33
40.	*Terminaliabellirica*Roxb.s	1.40	1.03	0.64	3.07
41.	*Terminaliachebula*Retz.	0.70	1.03	0.49	2.22
42.	*Thevetiaperuviana*(L) Lippold.	1.75	1.61	0.428	3.78
43.	*Toonaciliata*M Roemer.	4.91	6.73	0.81	12.45
44.	*Ziziphusmauritiana*Lamk.	3.50	3.22	0.97	7.69
	Total	99.812	99.898	99.356	

Table 3: Phyto-sociological Parameters for Trees in the adjoining forest areas of sacred groves:

S. No.	Name of the tree species	Relative frequency (%)	Relative density (%)	Relative dominance (%)	IVI
1.	*Acacia catechu* (L.f) Willd.	1.123596	0.656457	1.442152	3.22
2.	*Acacia modesta*(L.) Willd.	0.749064	0.437638	1.854195	3.04
3.	*Acacia niloticaWilld.*	0.374532	0.218819	2.472261	3.06
4.	*Aeglemarmelos*(L.) Corr.	1.123596	0.656457	1.442152	3.22
5.	*Ailanthus excelsa*Roxb.	0.749064	0.656457	2.236807	3.64
6.	*Alstoniascholaris*(L.) R.Br.	0.374532	0.218819	0.941814	1.53
7.	*Azadirectaindica* A. Juss.	7.490637	9.846859	2.619419	19.95
8.	*Bauhinia variegata*L.	2.621723	1.969372	1.648174	6.23
9.	*Berberislyticum*Royle.	0.749064	0.437638	2.648851	3.83
11.	*Callistemon lanceolatus*(Sm.) Sweet	1.123596	0.875276	0.294317	2.29
12.	*Carica papaya* L.	1.123596	0.875276	0.52977	2.52
13.	*Cassia fistula* L.	1.123596	0.875276	0.618065	2.61
14.	*Casearia*tomentosaRoxb.	0.749064	0.437638	1.265562	2.45
15.	*Cedrusdeodara*(Roxb. Ex D.Don) G.Don	0.749064	1.094095	4.91509	6.75
16.	*Citrus aurantium* L.	0.374532	0.437638	0.35318	1.16
17.	*Citrus limon* L.	1.498127	1.094095	0.453248	3.04
18.	*Citrus sinensis* L.	1.498127	0.875276	0.618065	2.99
19.	*Dalbergiasisoo*Roxb.	0.374532	0.437638	2.531124	3.34
20.	*Emblicaofficinalis*L.	0.374532	0.218819	1.648174	2.24
21.	*Eucalyptus citridora*Linn.	5.617978	4.376382	5.26827	15.26
22.	*Ficusbenghalensis*L.	0.749064	0.437638	10.1245	11.31
23.	*Ficus palmate* Forssk.	0.374532	0.437638	0.959473	1.77
24.	*Ficusracemosa*L.	1.123596	0.656457	5.179975	6.96
25.	*Ficusreligiosa*L.	1.498127	1.094095	3.590664	6.18
26.	*Gossipiumhirsutum*L.	0.374532	0.218819	0.559202	1.15
27.	*Grewiaoptiva*Drumm. exBurret.	0.749064	0.437638	1.147835	2.33

28.	*Hibiscus rosa- sinensis*L.	0.749064	0.656457	0.470907	1.87
29.	*Holarrhaenaantidysenterica*Wall. Ex A. DC.	0.374532	0.218819	0.618065	1.21
30.	*Lanneacoromandelica*(Houtt.) Merr.	3.745319	2.40701	0.559202	6.71
31.	*Leucaenaleucocephala (Lam.)* de Wit.	0.749064	0.437638	0.988904	2.17
32.	*Mangiferaindica*L.	11.23596	17.06789	14.62754	42.9
33.	*Meliaazaderach*L.	5.617978	4.376382	0.732849	10.7
34.	*Moringaoleifera*, Lamk.	8.614233	9.62804	2.236807	20.4
35.	*Morus alba* L.	0.374532	0.437638	1.651117	2.46
36.	*Murrayakoenigii*(L.) Spreng.	3.370787	2.625829	0.930041	6.92
37.	*Musa paradisiaca*L.	0.749064	0.437638	0.412043	1.59
38.	*Psidiumgujava*L.	1.498127	1.312915	1.854195	4.66
39.	*Spermodictyonsuaveolens*Roxb.	0.374532	0.218819	0.412043	1.00
40.	*Syzygiumcumini*(L.) Skeels.	0.749064	0.437638	9.447567	10.63
41.	*Terminaliaarjuna*(Roxb.) Wight and Arn.	1.872659	1.312915	1.854195	5.03
42.	*Terminaliabellirica*Roxb.	0.374532	0.218819	1.442152	2.03
43.	*Terminaliachebula*Retz.	0.374532	0.437638	1.088972	1.90
44.	*Thevetiaperuviana*(L) Lippold.	1.123596	0.656457	0.588633	2.36
45.	*Toonaciliata*M Roemer.	11.98502	14.00442	0.515054	26.5
46.	*Ziziphusmauritiana*Lamk.	11.23596	13.12915	2.236807	26.6
	Total	100	100	100.	300

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