Community Structure and Species Diversity of Herbaceous and Woody Vegetation in Kumbhoshi, (Purandar tehsil) an Eco-Sensitive Zone of Western Maharashtra, India

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Abstract— **Vegetation ecology is the study of structure of vegetation and vegetation systematics. It is the investigation of species composition and the sociological interface of species in communities. The quadrat methods were used for studying the plant community. Quadrats of 1m x 1m size for herbaceous vegetation and quadrats of 30m x30m for woody vegetation were laid down in the Purandar tehsil. GPS was noted for ten quadrats laid down at particular location. Based on the data recorded by quadrat method, qualitative and quantitative structures analysed were percentage frequency, Frequency class, Relative frequency, Abundance, Density, Relative density, and IVI.**

The nine Eco sensitive villages/zones belong to Purandar include Bandalwadi, Chivhewadi, Davanewadi, Haparanda, Ketkawale, Kumbhoshi, Panvadi, Pingori and Satalwadi. The number of herbaceous species studied at one of the proposed ecosensitive village, Kumbhoshi were 51and number of individuals were 2686 following phytosociology. Spermacoce pusilla shown more abundance (150.71) followed by Oplismenus burmanii (65.00). IVI for Spermacoce pusilla (43.26) was highest while the least IVI (0.61) noted for Iphigenia indica, Celosia argentia, Cleome viscosa, Lepidogathis cristata, Rotheca serrata and Abelmoschus manihot. The herbaceous vegetation was varied.

Forty-seven tree species were studied at Kumbhoshi with respect to Phyto-sociology. The number of individuals were 544. Acacia nilotica (30), Dendrocalamus strictus, (23) Jatropa curcus (18) and Acacia catechu (16) shown abundance in descending order. Seme carpus anacardium, Tectona grandis and Acacia nilotica shown maximum IVI (55.12, 36.69 and 33.60). Zizyphus xylocarpus, Argyriea nervosa, Acacia torta, Cryptostegia grandiflora, Celastrus paniculata, Boswellia serrata, Dragea volubilis and Asparagus racemosus (0.96) shown lowest IVI. The arboreal vegetation was also heterogenous.

Index Terms— **Eco-Sensitive, vegetation systematics, Quadrats, Phytosociology, Accumulation, Importance Value Index.**

I. INTRODUCTION

The quantitative structure of the study of vegetation has been called as 'Phyto-sociology' (Odum, 1971). Phytosociology is also called a Vegetation science, Vegetation ecology, Sociological geobotany, ecological geobotany etc. Plants naturally occur together in repetitive groups of associated plants and most frequent and abundant plants describe them well (Mueller- Dombois, 1974). Vegetation is an assemblage of plants growing together in a particular location and may be characterised either by its species composition or by combination of structural and functional characters that describe the appearance or physiognomy of vegetation (Goldsmith et.al. 1992). Vegetation form is a significant feature of the given area (Arey, 2010). Phytosociological and floristic studies are widely recognised in acquiring baseline data for the planning and management of any area (Mahajan, Shinde, 2021). Species composition patterns and outcrop communities are influenced by multiple environmental factors like soil type, elevation, aspect of rock outcrop and micro-environments. Complete diversity on the plateaus in the northern western ghats is not yet revealed satisfactorily (Rahangdale, 2014).

The zones had been demarcated after Kasturirangan committee recommended a ban on development activities in 60,000 sq km ecologically-sensitive area spread over six states of Gujarat, Karnataka, Maharashtra, Goa, Kerala and Tamil Nadu. In Maharashtra, the notification will be applicable in the

districts of Ahmednagar, Dhule, Kolhapur, Nandurbar, Nashik, Pune, Raigad, Ratnagiri, Sangli, Sindhudurg, Satara and Thane.

As per the report, the biologically rich areas with some measure of contiguity are about 37 per cent of the Western Ghats. They are considered to have high biological richness, low forest fragmentation, low population density and comprise protected areas, world heritage sites and tiger and elephant corridors.

As per the Environment Ministry's notification, there can be no mining, quarrying and setting up of thermal plants and big building complexes in ecologically-sensitive areas as identified by the Kasturirangan committee. In Pune district, 37 villages in Ambegaon taluka, 56 in Bhor, 4 in Haveli, 32 in Junnar, 51 in Maval, 22 in Khed, 66 in Mulshi, 9 in Purandar and 60 in Velhe had been demarcated. The committee had recommended a no-tolerance policy with respect to highly interventionist and environmentally damaging activities like mining or polluting industries. This would restrict activities like mining for stones and sand, atomic energy projects, construction up to 20,000 sq. m. or development of townships up to 50 hectares.

Phytosociological studies are necessary for protecting the biodiversity and natural plant communities (Rao S.D., Murthy, et. al, 2015). Phytosociological studies are very essential components for understanding the changes accomplished in the past and future (Hamzaoglu, 2006). Quadrats were laid down at multiple locations considering environmental factors like soil type, elevation, aspect of rock outcrop and micro-environments. Fig.1

The nine ecosensitive villages/zones belongs to Purandar include Bandalwadi, Chivhewadi, Davanewadi, Gherapurandar, Ketkawale, Kumbhoshi, Panvadi, Pingori and Satalwadi Fig.2

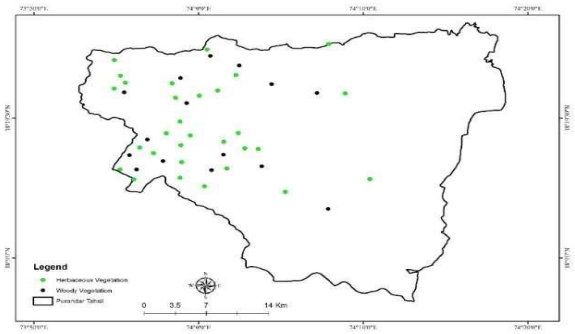

Fig.1: Locations for woody and herbaceous vegetation

Fig. 2: Ecosensitive Villages (09), Purandar Tehsil.

II. MATERIALS AND METHODS: HERBACEOUS VEGETATION

In a phyto-sociological study, field sampling is the very first step. Biologists, Naturalists, Environmentalists use different implements and skills to perform phyto-sociological studies. To learn the multiplicity of plant communities in the Purandar tehsil, following techniques of sampling were followed.

Quadrat of 1x 1m. for herbaceous vegetation, Scale-tape, GPS Instrument, Camera, String, nails, Plastic rods (04), are essential.

Plant communities or vegetation are best described by perceiving the identity and growth form of most abundant species. A community is characterised by detailing those species which most contribute to its characteristic structure and composition. The study of the structure and composition of each and every plant community is practically impossible. Therefore, rough estimate of species content of a locality has been done by observing the plant species at variety of places, in the habitat. The quadrat method was used for studying the plant communities. The size of a quadrat varies with the type of vegetation studies. For studying woody vegetation, a quadrat of 30mx 30m size was used. The methods used by Misra, (1968); Odum, (1971); Muller-Dombios (1974); Michael, (1984); and Trivedi, Goel, et.al., (1988) were followed for the quantification of the data.

Field Sampling: Herbaceous Vegetation-

A quadrat is a square sample plot or unit of applicable size for detailed analysis of vegetation. It is actually a sample plot method (Weaver, and Frederic, et al., 1938). For the herbaceous vegetation communities, 1m x1m. size quadrats were used. Fig. 3

Fig. 3: Sampling of Herbaceous vegetation-

Kumbhoshi: It is located in the proposed ecosensitive zone. Kumbhoshi is in the interiors of the tehsil. The percent and relative frequencny for Apluda mutica (100, 5.68) was more. The percent and relative frequencny of Oplismenus burmanii and Heteropogon contortus also (90, 5.11 and 80, 4.55 each) were also high. Spermacoce pusilla also shown more (70, 3.98) percent and relative frequency Table 1

Table 1: Phyto-sociological analysis of herbaceous vegetation-Kumbhoshi

Botanical name	% Freq	FreqCl.	Rel. Freq.	Abun.	Density	Rel. Den.	IVI
Spermacoce pusilla	70	D	3.98	150.7	105.50	39.28	43.26
Oplismenus burmanii	90	E	5.11	65.00	58.50	21.78	26.89
Heteropogon contortus	80	E	4.55	20.25	16.20	6.03	10.58
Apluda mutica	100	E	5.68	6.60	6.60	2.46	8.14
Senna glauca	50	C	2.84	14.00	7.00	2.61	5.45
Urochloea ramosa	50	C	2.84	11.00	5.50	2.05	4.89
Alternanthera triendra	60	C	3.41	4.67	2.80	1.04	4.45
Alysicarpus rugosus	50	C	2.84	8.20	4.10	1.53	4.37
Parthenium hysterophorus	40	B	2.27	13.75	5.50	2.05	4.32
Tridax procumbens	60	C	3.41	2.17	1.30	0.48	3.89
Commelina sinensis	50	C	2.84	5.20	2.60	0.97	3.81
Kyllinga triceps	40	B	2.27	10.25	4.10	1.53	3.80
Indigofera cordifolia	50	C	2.84	4.80	2.40	0.89	3.73
Solanum galapagense	50	C	2.84	3.60	1.80	0.67	3.51
Amaranthes viridis	50	C	2.84	3.60	1.80	0.67	3.51
Cynotis cristata	40	B	2.27	8.00	3.20	1.19	3.46
Senna obtusifolia	30	B	1.70	15.33	4.60	1.71	3.42
Polygala chinensis	40	B	2.27	7.25	2.90	1.08	3.35
Acacia nilotica	50	C	2.84	1.80	0.90	0.34	3.18
Xanthium strumarium	50	C	2.84	1.80	0.90	0.34	3.18
Cyperus triceps	40	B	2.27	6.00	2.40	0.89	3.17
Bidens sulphurius	40	B	2.27	4.00	1.60	0.60	2.87
Cleome simplicifolia	40	B	2.27	2.75	1.10	0.41	2.68
Conyza stricta	30	B	1.70	8.67	2.60	0.97	2.67
Blainvillea acmella	30	B	1.70	8.67	2.60	0.97	2.67
Cyperus alternifolia	20	A	1.14	14.50	2.90	1.08	2.22
Triumfetta rhomboidea	30	B	1.70	4.33	1.30	0.48	2.19
Trichodesma indicum	30	B	1.70	4.33	1.30	0.48	2.19
Launea procumbens	30	B	1.70	3.67	1.10	0.41	2.11
Euphorbia pcnostegia	30	B	1.70	3.33	1.00	0.37	2.08
Euphorbia heterophylla	30	B	1.70	2.67	0.80	0.30	2.00
Euphorbia microphylla	30	B	1.70	2.33	0.70	0.26	1.97
Martynia diandra	30	B	1.70	2.00	0.60	0.22	1.93
Plectranthes barbatus	30	B	1.70	1.67	0.50	0.19	1.89
Ipomea obscura	30	B	1.70	1.33	0.40	0.15	1.85
Impatiens balsamina	20	A	1.14	9.50	1.90	0.71	1.84
Justicia simplex	20	A	1.14	2.50	0.50	0.19	1.32
Vernonia cinera	10	A	0.57	19.00	1.90	0.71	1.28
Zizyphus maurtiana	20	A	1.14	1.00	0.20	0.07	1.21

Botanical name	% Freq	FreqCl.	Rel. Freq.	Abun.	Density	Rel. Den.	IVI
Acanthospermum hispidum	10	A	0.57	12.00	1.20	0.45	1.01
Synedrella nodiflora	10	A	0.57	10.00	1.00	0.37	0.94
Habenaria grandifloriformis	10	A	0.57	9.00	0.90	0.34	0.90
Amaranthes spinosus	10	A	0.57	9.00	0.90	0.34	0.90
Ledebouria revoluta	10	A	0.57	2.00	0.20	0.07	0.64
Lantana camara	10	A	0.57	2.00	0.20	0.07	0.64
Iphigenia indica	10	A	0.57	1.00	0.10	0.04	0.61
Celosia argentia	10	A	0.57	1.00	0.10	0.04	0.61
Cleome viscosa	10	A	0.57	1.00	0.10	0.04	0.61
Lepidogathis cristata	10	A	0.57	1.00	0.10	0.04	0.61
Rotheca serrata	10	A	0.57	1.00	0.10	0.04	0.61
Abelmoschus manihot	10	A	0.57	1.00	0.10	0.04	0.61
			100			100	200
Kumbhoshi: Coordinates- N 18^0 14.902' E0 73^0 56.066'					Simp. = 0.790393807		
					Shan. = 2.373785619		

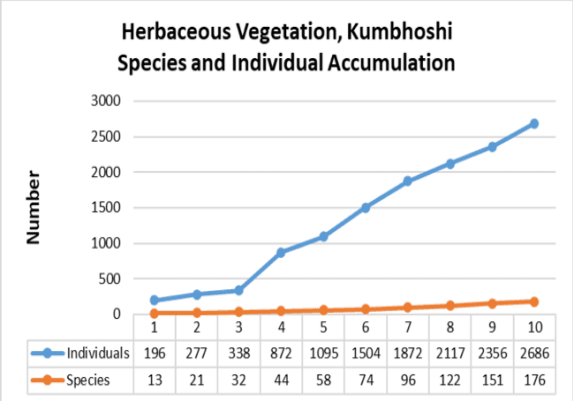

Fig. 4: Species and Individuals Accumulation Curve, Kumbhoshi

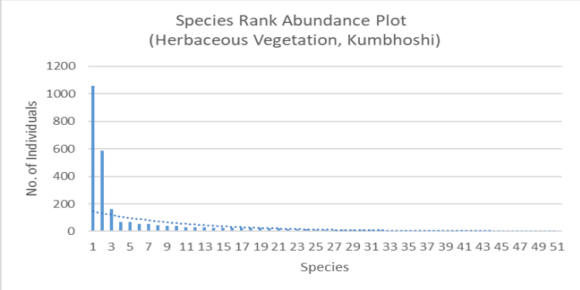

Fig.5: Species Rank Abundance Plot, Kumbhoshi

The number of herbaceous species studied at one of the proposed ecosensitive village, Kumbhoshi were 51and number of individuals were 2686. Spermacoce pusilla shown more abundance (150.71) followed by Oplismenus burmanii (65.00). Fig. 4 IVI for Spermacoce pusilla (43.26) was highest while the least IVI (0.61) noted for Iphigenia indica, Celosia argenti, Cleome viscosa, Lepidogathis cristata, Rotheca serrata and Abelmoschus manihot. The vegetation was varied. According to the results, frequency class A represented by 33.33%, indicating the high ratio of low frequency species, class B with 37.25%, class C shows 21.56%, class D 1.96% and class E represented by 5.88% of the total number of species Table 1. This region follows the Raunkier's law of frequency. The species are uniformly distributed. Based on these results the equation can be sited as A > B > C > D < E.

Sr.	Species	Sr.	Species
1	Spermacoce pusilla	27	Trichodesma indicum
2	Oplismenus burmanii	28	Acanthospermum hispidum
3	Heteropogon contortus	29	Cleome simplicifolia
4	Senna glauca	30	Launea procumbens
5	Apluda mutica	31	Euphorbia pycnostegia
6	Urochloea ramosa	32	Synedrella nodiflora
7	Parthenium hysterophorus	33	Acacia nilotica
8	Senna obtusifolia	34	Xanthium strumarium
9	Alysicarpus rugosus	35	Habenaria grandifloriformis
10	Kyllinga triceps	36	Amaranthes spinosus
11	Cynotis cristata	37	Euphorbia heterophylla

12	Polygala chinensis	38	Euphorbia microphylla
13	Cyperus alternifolia	39	Martynia diandra
14	Alternanthera triendra	40	Plectranthes barbatus
15	Commelina sinensis	41	Justicia simplex
16	Conyza stricta	42	Ipomea obscura
17	Blainvillea acmella	43	Zizyphus maurtiana
18	Indigofera cordifolia	44	Ledebouria revoluta
19	Cyperus triceps	45	Lantana camara
20	Impatiens balsamina	46	Iphigenia indica
21	Vernonia cinera	47	Celosia argentia
22	Solanum galapagense	48	Cleome viscosa
23	Amaranthes viridis	49	Lepidogathis cristata
24	Bidens sulphurius	50	Rotheca serrata
25	Tridax procumbens	51	Abelmoschus manihot
26	Triumfetta rhomboidea		

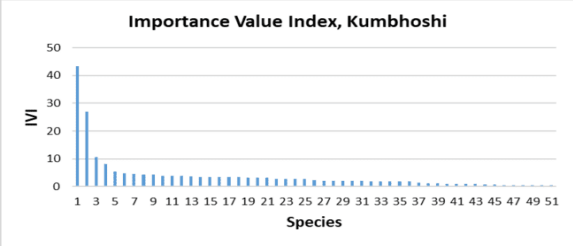

Fig. 6 Importance Value Index, Kumbhoshi

Sr.	Species	Sr.	Species
1	Spermacoce pusilla	27	Triumfetta rhomboidea
2	Oplismenus burmanii	28	Trichodesma indicum
3	Heteropogon contortus	29	Launea procumbens
4	Apluda mutica	30	Euphorbia pcnostegia
5	Senna glauca	31	Euphorbia heterophylla
6	Urochloea ramosa	32	Euphorbia microphylla
7	Alternanthera triendra	33	Martynia diandra
8	Alysicarpus rugosus	34	Plectranthes barbatus
9	Parthenium hysterophorus	35	Ipomea obscura
10	Tridax procumbens	36	Impatiens balsamina
11	Commelina sinensis	37	Justicia simplex
12	Kyllinga triceps	38	Vernonia cinera
13	Indigofera cordifolia	39	Zizyphus maurtiana
14	Solanum galapagense	40	Acanthospermum hispidum
15	Amaranthes viridis	41	Synedrella nodiflora
16	Cynotis cristata	42	Habenaria grandifloriformis
17	Senna obtusifolia	43	Amaranthes spinosus
18	Polygala chinensis	44	Ledebouria revoluta
19	Acacia nilotica	45	Lantana camara
20	Xanthium strumarium	46	Iphigenia indica
21	Cyperus triceps	47	Celosia argentia
22	Bidens sulphurius	48	Cleome viscosa
23	Cleome simplicifolia	49	Lepidogathis cristata
24	Conyza stricta	50	Rotheca serrata
25	Blainvillea acmella	51	Abelmoschus manihot
26	Cyperus alternifolia		

IV. KUMBHOSHI

It is located in the proposed ecosensitive zone. Kumbhoshi is in the interiors of the tehsil. The percent and relative frequency for Apluda mutica (100, 5.68) was more. The percent and relative frequency of Oplismenus burmanii and Heteropogon contortus also (90, 5.11 and 80, 4.55 each) were also high. Spermacoce pusilla also shown more (70, 3.98) percent and relative frequency.

The number of herbaceous species studied at one of the proposed ecosensitive village, Kumbhoshi were 51and number of individuals were 2686. Spermacoce pusilla shown more abundance (150.71) followed by Oplismenus burmanii (65.00). IVI for Spermacoce pusilla (43.26) was highest while the least IVI (0.61) noted for Iphigenia indica, Celosia argenti, Cleome viscosa, Lepidogathis cristata, Rotheca serrata and Abelmoschus manihot. The vegetation was varied.

According to the results, frequency class A represented by 33.33%, indicating the high ratio of low frequency species, class B with 37.25%, class C shows 21.56%, class D 1.96% and class E represented by 5.88% of the total number of species. This region follows the Raunkier's law of frequency. The species are uniformly distributed. Based on these results the equation can be sited as A > B > C > D < E.

V. FIELD SAMPLING: WOODY VEGETATION-

A quadrat is a square sample plot or unit of applicable size for detailed analysis of vegetation. It is actually a sample plot method (Weaver, and Frederic, et al., 1938). For the woody vegetation communities 30 x30 m. size quadrats were used. 170 quadrats were laid down for woody vegetation in the Purandar tehsil. GPS were noted for each and every locality Fig. and GBH was also noted of each and every tree species having thickness of stem more than 15 cm. Fig.

Materials And Methods: Woody Vegetation-

In a phyto-sociological study, field sampling is the first step. Naturalists use different implements and skills. The different ranges of considerations are in use as they are investigated to understand the vegetation structure. To learn the multiplicity of plant communities in the Purandar tehsil, following techniques of sampling were followed. Quadrat of 30 x 30 m. for woody vegetation, Scale-tape, GPS Instrument, Paint, Rope, String nails etc. are essential.

Fig. 7 Woody Vegetation: GBH

Table: Phyto-sociological analysis of Woody vegetation-Kumbhoshi

Botanical name	% Freq.	FreqCl.	RelFreq.	Abun.	Density	Rel. Den.	Rel. Domi.	IVI
Semecarpus anacardium	40.00	B	3.10	9.25	3.7	6.80	45.22	55.12
Ficus religiosa	10.00	A	0.78	1.00	0.1	0.18	0.01	0.97
Tectona grandis	70.00	D	5.43	7.43	5.2	9.56	21.70	36.69
Santalum album	20.00	A	1.55	2.00	0.4	0.74	0.07	2.36
Grewia tiliifolia	20.00	A	1.55	2.00	0.4	0.74	0.02	2.30
Madhuca latifolia	20.00	A	1.55	1.50	0.3	0.55	0.09	2.19
Lantana camara	70.00	D	5.43	10.43	7.3	13.42	0.00	18.85
Rotheca serrata	20.00	A	1.55	6.00	1.2	2.21	0.00	3.76
Osyris wighitiana	20.00	A	1.55	1.00	0.2	0.37	0.00	1.92
Zizyphus maurtiana	60.00	C	4.65	1.83	1.1	2.02	0.38	7.05
Carissa congesta	70.00	D	5.43	2.57	1.8	3.31	0.01	8.74
Asparagus racemosus	10.00	A	0.78	1.00	0.1	0.18	0.00	0.96
Cissus woodrowii	50.00	C	3.88	4.60	2.3	4.23	0.07	8.18
Cippadesa baccifera	40.00	B	3.10	5.25	2.1	3.86	0.00	6.96
Calotropis procera	20.00	A	1.55	3.50	0.7	1.29	0.00	2.84
Flacourtia indica	60.00	C	4.65	2.33	1.4	2.57	0.10	7.33
Erythrina suberosa	60.00	C	4.65	2.00	1.2	2.21	1.35	8.20
Jatropa curcus	10.00	A	0.78	18.00	1.8	3.31	0.00	4.08
Woodfordia fruticosa	50.00	C	3.88	4.40	2.2	4.04	0.00	7.92
Dragea volubilis	10.00	A	0.78	1.00	0.1	0.18	0.00	0.96
Azadirachta indica	40.00	B	3.10	2.25	0.9	1.65	0.69	5.45
Butea monosperma	20.00	A	1.55	1.00	0.2	0.37	0.00	1.92
Pleuocaulus ritchiei	10.00	A	0.78	4.00	0.4	0.74	0.00	1.51
Heterophragma quadrilocularae	10.00	A	0.78	2.00	0.2	0.37	0.00	1.14
Bombax ceiba	30.00	B	2.33	1.33	0.4	0.74	0.08	3.14
Acacia nilotica	10.00	A	0.78	30.00	3.0	5.51	27.31	33.60

Botanical name	% Freq.	FreqCl.	RelFreq.	Abun.	Density	Rel. Den.	Rel. Domi.	IVI
Rhus mysorense	30.00	B	2.33	4.00	1.2	2.21	0.00	4.54
Syzigium cumini	50.00	C	3.88	1.40	0.7	1.29	0.41	5.58
Bridelia retusa	60.00	C	4.65	4.33	2.6	4.78	1.72	11.15
Plumeria alba	10.00	A	0.78	1.00	0.1	0.18	0.01	0.97
Mangifera indica	30.00	B	2.33	1.67	0.5	0.92	0.58	3.83
Holoptelia integrifolia	40.00	B	3.10	1.00	0.4	0.74	0.05	3.89
Agave sissalana	10.00	A	0.78	4.00	0.4	0.74	0.00	1.51
Leucaena leucaecephala	20.00	A	1.55	5.50	1.1	2.02	0.00	3.57
Dendrocalamus srictus	10.00	A	0.78	23.00	2.3	4.23	0.00	5.00
Celastrus paniculata	10.00	A	0.78	1.00	0.1	0.18	0.00	0.96
Boswellia serrata	10.00	A	0.78	1.00	0.1	0.18	0.00	0.96
Acacia catechu	10.00	A	0.78	16.00	1.6	2.94	0.01	3.72
Dalbergia sissoo	10.00	A	0.78	1.00	0.1	0.18	0.00	0.96
Cryptolepis buchanani	30.00	B	2.33	1.33	0.4	0.74	0.00	3.06
Acacia torta	10.00	A	0.78	1.00	0.1	0.18	0.00	0.96
Cryptostegia grandiflora	10.00	A	0.78	1.00	0.1	0.18	0.00	0.96
Lannea coromandelica	30.00	B	2.33	2.33	0.7	1.29	0.09	3.70
Gnidia glauca	10.00	A	0.78	3.00	0.3	0.55	0.00	1.33
Euphorbia lingularia	30.00	B	2.33	9.00	2.7	4.96	0.00	7.29
Zizyphus xylocarpa	10.00	A	0.78	1.00	0.1	0.18	0.00	0.96
Argyriea nervosa	10.00	A	0.78	1.00	0.1	0.18	0.00	0.96
			100			100		300
Kumbhoshi: Coordinates- N 18^0 17.884' EO 73^0 56.885						Simp. = 0.95		
						Shan. = 3.27		

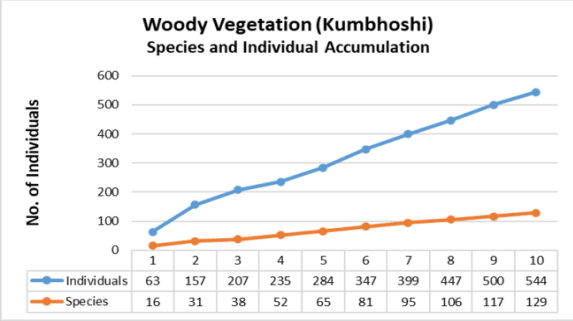

Fig. 8 Species and Individuals Accumulation Curve, Kumbhoshi

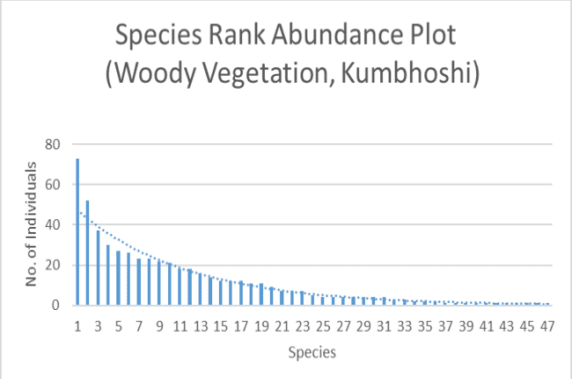

Fig. 9 Species Rank Abundance Plot, Kumbhoshi

Sr. No.	Species	Sr. No.	Species
1	*Lantana camara*	25	*Santalum album*
2	*Tectona grandis*	26	*Grewia tiliifolia*
3	*Semecarpus anacardium*	27	*Pleuocaulus ritchiei*
4	*Acacia nilotica*	28	*Bombax ceiba*
5	*Euphorbia lingularia*	29	*Holoptelia integrifolia*
6	*Bridelia retusa*	30	*Agave sissalana*
7	*Cissus woodrowii*	31	*Cryptolepis buchanani*
8	*Dendrocalamus srictus*	32	*Madhuca latifolia*
9	*Woodfordia fruticosa*	33	*Gnidia glauca*
10	*Cippadesa baccifera*	34	*Osyris wighitiana*
11	*Carissa congesta*	35	*Butea monosperma*
12	*Jatropa curcus*	36	*Heterophragma quadrilocularae*
13	*Acacia catechu*	37	*Ficus religiosa*
14	*Flacourtia indica*	38	*Asparagus racemosus*
15	*Rotheca serrata*	39	*Dragea volubilis*
16	*Erythrina suberosa*	40	*Plumeria alba*
17	*Rhus mysorense*	41	*Celastrus paniculata*
18	*Zizyphus maurtiana*	42	*Boswellia serrata*
19	*Leucaena leucaecephala*	43	*Dalbergia sissoo*
20	*Azadirachta indica*	44	*Acacia torta*
21	*Calotropis procera*	45	*Cryptostegia grandiflora*
22	*Syzigium cumini*	46	*Zizyphus xylocarpa*
23	*Lannea coromandelica*	47	*Argyriea nervosa*
24	*Mangifera indica*		

Forty-seven tree species have been studied at Kumbhoshi with respect to Phyto-sociology. The number of individuals were 544. Fig. 8 Acacia nilotica (30), Dendrocalamus strictus, (23) Jatropa curcus (18)

and Acacia catechu (16) shown abundance in deceasing order. Semecarpus anacardium, Tectona grandis and Acacia nilotica shown maximum IVI (55.12, 36.69 and 33.60). ZIzyphus xylocarpus, Argyriea nervosa, Acacia torta, Cryptostigmin grandiflora, Celastrus paniculata, Boswellia serrata, Dragea volubilis, Asparagus racemosus (0.96) and Ficus religiosa and Plumeria alba (0.97) shown lowest IVI. The vegetation was varied.

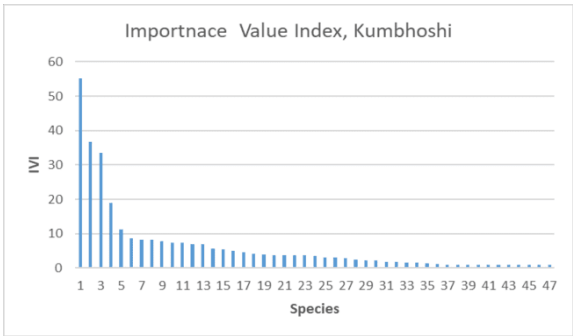

Fig. 10 Importance Value Index, Kumbhoshi

Sr.	Species	Sr.	Species
1	Semecarpus anacardium	25	Bombax ceiba
2	Tectona grandis	26	Cryptolepis buchanani
3	Acacia nilotica	27	Calotropis procera
4	Lantana camara	28	Santalum album
5	Bridelia retusa	29	Grewia tiliifolia
6	Carissa congesta	30	Madhuca latifolia
7	Erythrina suberosa	31	Butea monosperma
8	Cissus woodrowii	32	Osyris wighitiana
9	Woodfordia fruticosa	33	Pleuocaulus ritchiei
10	Flacourtia indica	34	Agave sissalana
11	Euphorbia lingularia	35	Gnidia glauca
12	Zizyphus maurtiana	36	Heterophragma quadriloculare
13	Cippadesa baccifera	37	Ficus religiosa
14	Syzigium cumini	38	Plumeria alba
15	Azadirachta indica	39	ZIzyphus xylocarpa
16	Dendrocalamus srictus	40	Boswellia serrata
17	Rhus mysorense	41	Dalbergia sissoo
18	Jatropa curcus	42	Acacia torta
19	Holoptelia integrifolia	43	Celastrus paniculata
20	Mangifera indica	44	Asparagus racemosus
21	Rotheca serrata	45	Dragea volubilis
22	Acacia catechu	46	Cryptostegia grandiflora
23	Lannea coromandelica	47	Argyriea nervosa
24	Leucaena leucaecephala		

VI. RESULTS

Based on the results the species were distributed into various frequency classes. Class A was represented by 63.15 %, class B 21.27 %, class C 14.89 % and class D has been represented by 6.38 % of all species where as class E (frequency more than 80 %) was absent. As class E was absent the vegetation can be interpreted as completely heterogeneous.

Fig. 11 Bot. name: Habenaria longicorniculata Grah. Cat.
Fam.: Orchidaceae, Common name: Akash Habe Amari
Origin: Old world, Habit: Herb, Flo. & Fruit period: July-Oct.

Fig. 12 Bot. name : Arisaema murrayi (Grah.) Hook.
Fam: Araceae, Common name: Pandhra sap-kanda
Origin: Asia, Habit: Herb, Flo. & Fruit period: June-Oct.

VII. DIVERSITY

The entire tehsil including Purandar fort consists of variety of plant species. In the entire tehsil, 1350 number of flowering plant specimens were documented. They belong to 749 genera and 106 families. Among the total no. of Angiosperms 82% were dicotyledonous plants and 18% were monocotyledonous taxa. As far as Habit of the plant forms is concern, trees were 15.56 %, shrubs 17.85%, herbs 56.80 % and climbers 9.79 %.

VIII. CONCLUSION

The number of herbaceous species studied at one of the proposed ecosensitive village, Kumbhoshi were 51 and number of individuals were 2686 following phytosociology. Spermacoce pusilla shown more abundance (150.71) followed by Oplismenus burmanii (65.00). IVI for Spermacoce pusilla (43.26) was highest while the least IVI (0.61) noted for Iphigenia indica, Celosia argenti, Cleome viscosa, Lepidogathis cristata, Rotheca serrata and Abelmoschus manihot. The herbaceous vegetation was varied.

Forty-seven tree species were studied at Kumbhoshi with respect to Phyto-sociology. The number of individuals were 544. Acacia nilotica (30), Dendrocalamus strictus, (23) Jatropa curcus (18) and Acacia catechu (16) shown abundance in descending order. Semecarpus anacardium, Tectona grandis and Acacia nilotica shown maximum IVI (55.12, 36.69 and 33.60). ZIzyphus xylocarpus, Argyriea nervosa, Acacia torta, Cryptostegia grandiflora, Celastrus paniculata, Boswellia serrata, Dragea volubilis, Asparagus racemosus (0.96) and Ficus religiosa and Plumeria alba (0.97) shown lowest IVI. The arboreal vegetation was also heterogenous.

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