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Studies on Biodiversity Assessment of Selected Man made Areas of Kota District, Rajasthan

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ABSTRACT: The present study was conducted in urban areas of Kota district in rainy and winter seasons. Data revealed that in Rainy season *Aristida depressa* (IVI 22.22) at R.T.U., *Cynodon dactylon* (IVI 25.45) at C.V.G. and *Brachiaria ramosa* (IVI 32.32) at Ch.G were the most dominant species. Whereas in winter season *Polygonum plebeium* with IVI (21.29) at R.T.U.; *Cynodon dactylon* with IVI (36.32) at C.V.G. and *Cynodon dactylon* with IVI (39.61) at Ch.G. ranked first among all the species. Perusal of data revealed that at site R.T.U. the maximum IVI was showed by *Acacia leucophloea* (96.17) followed by *Azadirachta indica* (65.87), *Acacia nilotica* (62.41) and *Dichrostachys cinerea* (38.38). At site C.V.G. highest IVI was showed by *Mangifera indica* (54.52). Data revealed that at site Ch. G *Cassia fistula* was observed as the most dominant species with IVI (86.09) followed by *Poinciana regia* (71.42), *Azadirachta indica* (66.2) and *Bauhinia variegata* (43.1).

Keywords: Rainy, Winter, Summer, Dominant, IVI.

INTRODUCTION

Urbanisation means the conversion of land into urban environments. The urban landscape mosaic is quite complex, with residential, commercial, industrial, government, institutional, cultural, educational land uses, patches of remnant vegetation, secondary green areas such as parks or cemeteries, and other land uses and all of them more or less suited as habitat for different species. Cities host regionally important educational institutions, such as universities, that often constitute the largest green patches amidst urbanization. Besides cultivated parks and gardens, such establishments also harbour derelict areas, with remnant natural vegetation such as grassland or thorny bushes and economically important plant species. These vestigial green patches may lock up to half the total urban organismic species. Such refugia, particularly the large institutional premises, must be recognised by conservationists and environment departments for protection against any landuse changes. Combating the threat of urbanisation on surrounding environments is one of the greatest challenges facing conservationalists and ecologists. It demands a thorough and often complicated process in which areas of high priority are identified, assessed and either conserved or restored.

Taking a more proactive stance towards conservation right now and in the near future, however, is the only way to assure that future generations will be able to enjoy the services of nature we so often take for granted.

STUDY AREA

The present study is an attempt to know about the plant diversity in urban areas of Kota. As the urban landscape mosaic is quite complex with residential, commercial, industrial, government, institutional, cultural, educational land uses, patches of remnant vegetation, secondary green areas such as parks or cemeteries and other land uses and all of them are more or less suited as habitat for different species. For the purpose of study different urban habitats were selected in order to ensure sufficient data for study and to arrive at conclusions. Different study sites selected includes:

Government Engineering College (R.T.U.): It is one of the prestigious technical institute in North India established in 1981 by Government of Rajasthan. This site is selected because of its earlier history of being unplanned mine area with disturbed habitat. It still has certain plots rich in vegetation.

Chattra Vilas Garden (C.V.G.): It is an ancient garden established by Maharao Bhim Singh II on an area of 200 acres of land, but now due to rapid and continuous urbanisation the area of the garden has been reduced.

Chambal Garden (Ch.G.): It is one of the prestigious garden in Rajasthan constructed in the year 1976. It is located at the right side of Kota Rawatbhata road on an area of ten acres.

MATERIAL AND METHODS

A. Floristic Survey and Herbarium Preparation

The present work is based on the result of two years study of plant diversity in urban areas of Kota. To study the plant diversity in various selected sites visits were made during post monsoon season like July and August, early winter that is late October, November and early December and summer season that is April and May in order to study the seasonal variation. After collection the plant specimens were carefully pressed on the pressing sheet, newspaper sheets were used for the pressing process. Precautions were taken to avoid the folding of the plant parts. The large specimens were bent into a V or W shape in order to fit them on herbarium sheets. After drying, the specimens were mounted and labelled on herbarium sheet of 40×27 cm or (16.5"×10.5") size. The prepared herbarium were identified provisionally with the help of certain manuals like Flora of Rajasthan (Shetty and Singh vol. 1-3, 1987-1993) and Flora of Rajasthan (South and South East region) by Sharma and Tiagi, (1979); Bhandari, (1990).

B. Phytosociological Studies

Phytosociological studies were made along the selected study sites as per the methods suggested in ecological workbook by Misra (1968) to find out the distribution pattern of plant species and the quantitative parameters were calculated by using their standard formulas. The corresponding GBH (1.37m above the ground) and Height of the sampled tree species was also measured.

(i) Density : $$\text{Density} = \frac{\text{Total no. of individuals of the species}}{\text{Total number of quadrats studied}}$$

(ii) Abundance : $$\text{Abundance} = \frac{\text{Total no. of individuals of the species}}{\text{Total no. of quadrats in which species has occured}}$$

(iii) Frequency : $$\text{Frequency \%} = \frac{\text{Total no. of quadrats in which species has occurred}}{\text{Total no. of quadrats studied}} \times 100$$

(iv) Cover : $$\text{Cover} = \frac{\text{Density of species}}{\text{Total density of all species}} \times 100$$

(v) Importance value index (IVI): Any one of the three quantitative parameters: density, area and frequency may be interpreted as an "importance value" (Whittaker, 1970) IVI is defined as the sum of relative density, relative frequency and relative dominance.

Relative density, relative frequency and relative dominance are calculated by following formulas:

A. Relative Frequency :

$$\text{R.F.} = \frac{\text{Frequency of species}}{\text{Sum of frequency for all the species}} \times 100$$

B. Relative Density :

$$\text{R.De} = \frac{\text{Total no. of individual species}}{\text{Total no. of individual of all species}} \times 100$$

C. Relative Dominance :

$$\text{R.Do} = \frac{\text{Dominance of a species}}{\text{Dominance of all species}}$$

Thus IVI = R.F. + R.De. + R.Do.

OBSERVATION AND RESULTS

Urbanisation is the process leading to increasing amounts of urban areas. In broad sense it means the conversion of land into urban environments. The spread of cities has been accompanied by habitat loss and fragmentation which directly or indirectly results in loss of species.

Persual of data revealed that at site R.T.U. in Rainy season *Aristida depressa* with IVI (22.22) was the most dominant species followed by *Eragrostis tenella* (18.37), *Brachiaria ramosa* (16.07), *Dicanthium annulatum* (12.58) and *Polygonum plebeium* (12.26) whereas in winter season *Polygonum plebeium* with IVI (21.29) was observed to be the most dominant species followed by *Dicanthium annulatum* (20.96), *Sphaeranthus indicus* (17.47), *Euphorbia hirta* (14.69) and *Achyranthes aspera* (14.59) **(Table 1).**

Table 1: Importance Value Index (Study site : R.T.U., Size of quadrat : 1×1 mts).

Plant Species	**Rainy season**				**Winter season**			
	R.F.	**R.D.**	**R. Dom.**	***IVI***	**R.F.**	**R.D.**	**R. Dom.**	**IVI**
Acacia nilotica	1.37	0.43	0.93	2.74	2.38	1.03	2.68	6.09
Achyranthes aspera	3.08	2.83	3.52	9.43	5.36	3.93	5.3	14.59
Ageratum conyzoides	2.74	1.39	1.55	5.68	4.76	2.88	3.23	10.88
Alysicarpus vaginalis	3.08	3.9	1.94	8.92	2.98	2.83	1.84	7.65
Apluda mutica	2.74	2.43	2.42	7.58	-	-	-	-
Aristida depressa	4.11	9.62	8.43	22.22	-	-	-	-
Boerhavia diffusa	2.4	1.62	1.62	5.64	3.57	2.01	1.66	7.23
Brachiaria ramosa	3.42	5.63	7.01	16.07	-	-	-	-
Calotropis procera	0.68	0.22	0.91	1.82	1.19	0.51	2.89	4.6
Cardiospermum halicacabum	1.03	0.76	0.59	2.37	-	-	-	-
Cassia tora	3.08	2.34	4.65	10.07	3.57	2.82	4.49	10.89
Corchorus aestuans	1.71	0.87	1.58	4.16	-	-	-	-
Cleome visocsa	2.4	1.19	1.64	5.23	-	-	-	-
Coccinia grandis	1.37	0.76	0.59	2.72	-	-	-	-
Convolvulus prostratus	1.71	0.97	0.57	3.26	4.17	2.88	2.12	9.17
Croton bonplandianum	2.4	1.44	1.79	5.63	2.98	1.8	2.43	7.2
Cynodon dactylon	2.05	3.25	1.12	6.42	2.38	3.6	1.11	7.09
Cyperus rotundus	2.4	2.73	1.84	6.97	3.57	4.63	3.41	11.61
Dactyloctenium aegyptiacum	2.4	3.03	4.61	10.04	2.38	2.57	3.17	8.12
Dicanthium annulatum	3.08	4.48	5.01	12.58	4.76	8.02	8.17	20.96
Echinochloa colonum	2.05	2.27	2.83	7.16	-	-	-	-
Eclipta alba	1.71	1.73	0.86	4.31	2.38	2.31	1.33	6.02
Eragrostis tenella	3.42	6.28	8.66	18.37	-	-	-	-
Euphorbia hirta	3.08	4.58	2.27	9.94	4.17	7.02	3.5	14.69
Euphorbia thymifolia	2.05	1.75	0.39	4.2	2.38	1.85	0.38	4.61
Evolvulus alsinoides	2.74	2.71	1.35	6.8	2.98	2.31	1.51	6.8
Hyptis suaveolens	1.71	0.97	3.02	5.71	3.57	2.31	6.81	12.7
Indigofera linifolia	2.74	2.86	4.35	9.95	2.98	1.8	2.64	7.42

Plant Species	**Rainy season**				**Winter season**			
	R.F.	**R.D.**	**R. Dom.**	***IVI***	**R.F.**	**R.D.**	**R. Dom.**	**IVI**
Lantana camara	1.71	0.54	1.36	3.62	1.79	1.29	2.76	5.83
Merremia emarginata	1.37	1.52	0.13	3.02	-	-	-	-
Oxalis corniculata	1.37	1.54	0.16	3.37	2.98	8.23	1.03	12.23
Passiflora foetida	1.37	0.87	0.76	3	1.79	1.03	0.85	3.66
Phyllanthus amarus	2.4	2.73	1.36	6.48	2.98	3.08	1.77	7.83
Physalis minima	1.03	0.42	1.14	2.59	-	-	-	-
Polygala erioptera	2.05	1.74	0.72	4.51	2.38	1.8	0.66	4.84
Polygonum plebeium	3.08	4.87	4.3	12.26	4.76	9.52	7.01	21.29
Pupalia lappacea	1.37	0.78	1.08	3.23	1.19	0.77	0.95	2.91
Sesamum indicum	1.03	0.32	0.94	2.29	-	-	-	-
Sida rhombifolia	1.37	0.97	0.76	3.1	-	-	-	-
Solanum nigrum	1.03	0.32	0.59	1.95	1.19	0.51	0.89	2.59
Solanum virginianum	1.37	0.43	0.54	2.34	2.38	1.03	1.91	5.32
Sonchus aspera	0.68	0.22	0.76	1.67	1.79	1.03	4.18	6.99
Spermacoce pusilla	2.4	2.93	2.27	7.59	-	-	-	-
Sphaeranthus indicus	-	-	-	-	2.38	6.43	8.66	17.47
Tephrosia purpurea	2.74	1.21	2.61	6.57	4.17	1.98	3.41	9.55
Trichosanthes cucumerina	1.71	0.76	0.67	3.14	-	-	-	-
Tridax procumbens	2.74	3.03	1.77	7.54	2.98	3.6	2.35	8.92
Vernonia cinerea	1.37	0.87	0.6	3.1	1.79	1.31	1.34	4.43
Zizyphus nummularia	1.71	0.54	1.36	3.62	2.98	1.29	3.57	7.83

In Rainy season at site C.V.G. *Cynodon dactylon* with IVI (25.45) was the most dominant species followed by *Echinochloa colonum* (25.28), *Eragrostis tenella* (16.45), *Sida rhombifolia* (15.73) and *Euphorbia hirta* (15.42). On the other hand in winter season *Cynodon dactylon* was observed to be the leading dominant with IVI (36.32) followed by *Achyranthes aspera* (16.80), *Anagallis arvensis* (15.73), *Sida rhombifolia* (13.91), *Parthenium hysterophorus* (13.11) and *Tridax procumbens* (13.11) (Table 2).

At Ch.G. site in Rainy season highest dominance was observed by *Brachiaria ramosa* with IVI (32.32) followed by *Cynodon dactylon* (28.78), *Phyllanthus amarus* (14.98), *Echinochloa colonum* (14.91) and *Euphorbia hirta* (13.55) respectively, whereas in winter season *Cynodon dactylon* with IVI (39.61) ranked first among all the species followed by *Oxalis corniculata* (16.68), *Euphorbia hirta* (16.21), *Anagallis arvensis* (16.04) and *Phyllanthus amarus* (13.89) (Table 3).

Persual of data revealed that at site R.T.U. the maximum IVI was shared by *Acacia leucophloea* (96.17) followed by *Azadirachta indica* (65.87), *Acacia nilotica* (62.41) and *Dichrostachys cinerea* (38.38) (Table 4).

At site C.V.G. highest IVI was showed by *Mangifera indica* (54.52) followed by *Syzygium cumini* (54.32), *Mitragyna parvifolia* (41.67) and *Poinciana regia* (34.72) (Table 5). Persual of data revealed that at site Ch. G *Cassia fistula* was observed as the most dominant species with IVI (86.09) followed by *Poinciana regia* (71.42), *Azadirachta indica* (66.2) and *Bauhinia variegate* (43.1) (Table 6).

Statistical Analysis of trees showed that *Acacia nilotica* and *Cassia fistula* were significantly superior over the other tree species in terms of mean density followed by *Azadirachta indica, Dalbergia sissoo, Anogeissus pendula, Callistemon citrinus* and *Poinciana regia* respectively.

Table 2: Importance Value Index (Study site: C.V.G., Size of quadrat : 1×1 mts).

Plant Species	Rainy season				Winter season			
	R.F.	R.D.	R.Dom.	IVI	R.F.	R.D.	R.Dom.	IVI
Acalypha indica	2.97	2.05	3.28	8.29	2.86	1.24	2.63	6.73
Achyranthes aspera	3.81	3.67	5.27	12.76	4.57	3.68	7.82	16.80
Ageratum conyzoides	2.12	1.4	2.02	5.54	2.29	1.42	3.01	6.71
Alternanthera sessilis	2.12	1.62	2.33	6.06	3.43	2.66	5.14	11.23
Alysicarpus vaginalis	2.97	1.21	0.77	4.95	2.86	1.42	1.8	6.07
Amaranthus viridis	2.54	1.49	1.91	5.94	2.86	1.77	3.43	8.05
Anagallis arvensis	-	-	-	-	4.57	10.05	1.1	15.73
Boerhavia diffusa	2.54	1.08	1.23	4.85	2.29	0.92	1.46	4.67
Brachiaria ramosa	2.97	2.81	5.48	11.25	-	-	-	-
Coccinia grandis	2.54	1.17	1.16	4.87	2.86	1.24	1.39	5.49
Commelina benghalensis	1.27	0.65	1.39	3.31	-	-	-	-
Cynodon dactylon	5.93	14.37	5.15	25.45	7.43	18.87	10.02	36.32
Cyperus rotundus	2.97	4.54	3.94	11.44	2.86	3.01	3.82	9.68
Dactyloctenium aegyptiacum	2.97	2.19	4.7	9.86	2.86	1.95	4.52	9.33
Dicanthium annulatum	2.54	1.62	2.59	6.75	2.29	1.27	2.47	6.03
Digera muricata	1.69	0.99	1.76	4.45	-	-	-	-
Echinochloa colonum	4.24	8.64	12.4	25.28	-	-	-	-
Eclipta alba	2.12	1.62	1.21	4.95	2.29	2.34	2.63	7.25
Eragrostis tenella	3.81	4.86	7.77	16.45	-	-	-	-
Euphorbia hirta	4.66	6.15	4.61	15.42	5.14	6.37	5.48	17
Euphorbia thymifolia	3.81	3.02	0.66	7.49	4	2.97	0.84	7.81
Evolvulus nummularius	1.69	1.3	0.21	3.2	-	-	-	-
Gomphrena celosioides	2.97	3.02	4.34	10.33	3.43	2.97	6.32	12.72
Lantana camara	1.25	0.54	1.5	3.31	1.71	0.53	2.24	4.49
Lathyrus aphaca	1.69	1.43	0.16	3.28	3.43	4.78	0.76	8.96
Leucas aspera	2.12	0.86	1.38	4.36	-	-	-	-
Merremia emarginata	2.97	2.95	0.33	6.24	2.29	1.98	0.31	4.58
Mirabilis jalapa	2.12	0.97	1.4	4.49	2.29	1.06	2.69	6.03
Oxalis corniculata	2.12	2.38	0.38	4.87	3.43	6.05	1.7	11.18
Parthenium hysterophorus	3.81	2.16	3.45	9.42	5.14	2.55	5.42	13.11
Phyllanthus amarus	3.39	4.54	2.89	10.82	4	3.84	3.79	11.64
Portulaca oleracea	1.69	0.79	1.55	4.22	1.71	0.69	2.05	4.45
Rhynchosia minima	2.12	1.19	1.18	4.49	1.71	0.69	0.88	3.28
Sida rhombifolia	3.81	6.38	5.54	15.73	4	4.09	5.82	13.91
Trianthema portulacastrum	2.12	1.3	1.86	5.27	2.29	1.06	3.15	6.5
Tridax procumbens	2.97	3.35	2.51	8.82	4	4.58	4.53	13.11
Vernonia cinerea	2.54	1.51	1.71	5.76	2.86	1.59	2.53	6.98
Vicia hirsuta	-	-	-	-	2.29	2.34	0.27	4.88

Table 3: Importance Value Index. (Study site : Ch.G., Size of quadrat : 1×1 mts).

Plant Species	Rainy season				Winter season			
	R.F.	R.D.	R.Dom.	IVI	R.F.	R.D.	R.Dom.	IVI
Acalypha indica	3.88	3.61	5.02	12.52	4.57	2.71	6.58	13.86
Achyranthes aspera	3.02	1.83	2.83	7.67	4	2.26	5.48	11.74
Ageratum conyzoides	2.59	1.08	1.68	5.35	2.86	1.29	3.13	7.28
Alysicarpus vaginalis	1.72	0.92	0.67	3.32	1.71	0.63	0.83	3.18
Amaranthus viridis	3.02	2.11	2.93	8.05	3.43	2.23	4.95	10.6
Anagallis arvensis	-	-	-	-	5.14	9.35	1.55	16.04
Apluda mutica	1.72	0.92	1.14	3.79	-	-	-	-
Aristida depressa	1.29	0.81	1.01	3.11	-	-	-	-

Plant Species	**Rainy season**				**Winter season**			
	R.F.	**R.D.**	**R.Dom.**	**IVI**	**R.F.**	**R.D.**	**R.Dom.**	**IVI**
Boerhavia diffusa	1.72	0.6	0.66	2.99	1.71	0.48	0.8	3
Brachiaria ramosa	5.17	10	17.15	32.32	-	-	-	-
Coccinia grandis	1.72	0.92	0.89	3.54	1.71	0.82	1.09	3.63
Commelina benghalensis	0.86	0.5	0.95	2.31	-	-	-	-
Cynodon dactylon	6.47	16.56	5.75	28.78	8	20.32	11.29	39.61
Cyperus rotundus	3.88	4.52	4.36	12.76	4	3.05	4.04	11.09
Dactyloctenium aegyptiacum	3.45	3.21	6.08	12.74	3.43	2.42	5.38	11.22
Dicanthium annulatum	3.02	1.34	2.07	6.42	2.86	1.29	2.61	6.76
Echinochloa colonum	3.45	4.5	6.96	14.91	-	-	-	-
Eclipta alba	2.59	2.53	1.83	6.95	2.86	3.06	3.6	9.52
Eragrostis tenella	3.45	3.21	6.67	13.33	-	-	-	-
Euphorbia hirta	5.17	5.18	3.2	13.55	5.71	5.16	5.33	16.21
Euphorbia thymifolia	3.02	2.6	0.55	6.16	2.86	2.26	0.84	5.96
Gomphrena celosioides	2.59	1.69	2.61	6.88	2.86	1.77	3.94	8.57
Lantana camara	1.72	0.4	1.16	3.29	2.29	0.65	2.67	5.6
Lathyrus aphaca	2.16	2.01	0.22	4.38	4.57	6.84	1.13	12.54
Leucas aspera	1.29	0.69	1.19	3.17	-	-	-	-
Merremia emarginata	2.59	1.99	0.21	4.79	1.71	1.11	0.25	3.08
Mirabilis jalapa	1.72	0.6	0.93	3.26	1.71	0.63	1.95	4.3
Oxalis corniculata	2.59	3.19	0.34	6.12	4.57	9.36	2.75	16.68
Parthenium hysterophorus	3.45	2.65	3.68	9.78	4	2.6	5.26	11.85
Phyllanthus amarus	4.31	7.03	3.65	14.98	4.57	4.9	4.41	13.89
Pupalia lappacea	1.29	0.3	0.47	2.06	-	-	-	-
Rhynchosia minima	1.72	1.2	1.01	3.94	1.14	0.48	0.64	2.27
Sida rhombifolia	3.45	3.45	3.33	10.23	2.86	1.94	3.21	8
Trianthema portulacastrum	3.02	2.18	2.7	7.9	3.43	1.74	4.61	9.78
Tribulus terrestris	1.72	1	1.72	4.45	1.71	1.13	3.24	6.08
Tridax procumbens	2.16	2.81	2.36	7.33	3.43	4.16	4.89	12.48
Vernonia cinerea	3.02	1.83	2.01	6.85	3.43	2.13	3.17	8.72
Vicia hirsuta	-	-	-	-	2.86	3.23	0.37	6.45

Table 4: Importance Value Index. (Study site : R.T.U., Size of Transect : 10×5 mts)

Species Name	**R.D.**	**R.F.**	**R.Dom.**	**IVI**	**Average GBH (cm.)**	**Average Height (mt.)**
Acacia leucophloea	33.33	27.27	35.56	96.17	86.16	5.98
Acacia nilotica	22.22	18.18	22.01	62.41	83.02	5.64
Azadirachta indica	22.22	18.18	25.47	65.87	89.30	5.93
Dichrostachys cinerea	11.11	18.18	9.08	38.38	75.42	4.34
Ficus religiosa	5.56	9.09	5.1	19.75	79.94	6.12
Zizyphus mauritiana	5.56	9.09	2.78	17.42	58.96	4.76

Table 5: Importance Value Index (Study site : C.V.G., Size of Transect : 10×5 mts).

Species Name	R.D.	R.F.	R.Dom.	IVI	Average GBH (cm.)	Average Height (mt.)
Bauhinia variegata	5.0	8.33	4.02	17.35	126.35	8.94
Callistemon citrinus	5.0	8.33	2.05	15.38	90.24	6.42
Cassia fistula	15.0	8.33	10.5	33.83	117.93	9.23
Ficus benghalensis	5.0	8.33	16.1	29.43	252.95	12.21
Mangifera indica	10.0	8.33	36.19	54.52	268.15	15.72
Mitragyna parvifolia	20.0	16.67	5.01	41.67	70.52	6.38
Poinciana regia	10.0	16.67	8.05	34.72	126.47	13.37
Saraca asoka	10.0	8.33	0.44	18.77	29.45	5.41
Syzygium cumini	20.0	16.67	17.66	54.32	132.44	14.45

Table 6: Importance Value Index (Study site : Ch.G., Size of Transect : 10×5 mts).

Species Name	R.D.	R.F.	R. Dom.	IVI	Average GBH (cm.)	Average Height (mt.)
Azadirachta indica	21.05	20.0	25.14	66.2	139.60	11.34
Bauhinia variegata	10.53	20.0	12.57	43.1	139.60	9.67
Callistemon citrinus	15.79	10.0	7.41	33.19	87.48	6.24
Cassia fistula	31.58	30.0	24.51	86.09	112.53	8.89
Poinciana regia	21.05	20.0	30.37	71.42	153.42	15.32

DISCUSSION

Ecosystems provide three main kinds of services to the city: provisioning of food, fibre and fuels; regulating through purification, detoxification and mitigation of droughts and floods; and enriching the spiritual, aesthetic and social life of urban dwellers. Present study is based on the objectives of how the cities develop without disturbing the biodiversity of the neighbourhood in the larger interest of the inhabitants. Data, in this study were used from a probability based survey to explore the variation in plant diversity across Kota using spatial statistical analyses that incorporate biotic, abiotic, and human variables. Our prediction for the city was that land use, along with distance from urban center, would replace the dominantly geomorphic controls on spatial variation in plant diversity in the study area. Fabaceae is regarded as one of the most successful families of the flowering plants due to its extreme flexibility in the adaptive response to different environments (Rundel, 1989). The next group of families were Mimosaceae, Caesalpiniaceae, Malvaceae and Convolvulaceae. The other families were less represented. Grasses have significant role in stabilization of the habitat (Ambasht and Mishra, 1980; Singh *et al*., 1980). Annual grasses are often seeded to provide quick, temporary cover and provide nurse crop for further vegetation. These fast growing annual "nurse crop" grass can help to establish organic nutrient cycles. These temporary annual species provides protective mulch after they die out for perennial grasses and forbs**.** *Dactylocteuium aegyptiacum* assumed the highest importance here in rainy season. This species is assumed to be one of the very useful species in soil reclamation of the disturbed habitats (Sharma and Sunderraj, 2005). *Cynodon dactylon* was the leading dominant in terms of IVI at C.V.G. site in rainy season. At site R.T.U. and Ch.G. *Aristida depressa* and *Brachiaria ramosa* were the leading dominants in terms of IVI respectively. Monsoon supports good percentage of annuals, because there is enough soil moisture and precipitation. Secondly there is less intensive light which would otherwise also have deterious effect on the vegetation. In winter season, the top leading dominants were distinctly different at R.T.U. with the dominance of *Euphorbia hirta*, whereas *Cynodon dactylon* was the leading dominant at site C.V.G. and Ch.G. respectively.

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